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# ACEP RESEARCH FORUM

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## Pennsylvania Convention Center
## Philadelphia, PA

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**MONDAY, OCTOBER 9, 2023**

**8:00 am - 9:00 am**

***RF1 Telemedicine***

Room 104AB

**16** Vital Sign Monitoring During Crowding in Emergency Department Triage Using a Non-invasive Wearable Biosensor
*G Rovenolt, Virginia Tech Carilion School of Medicine, Roanoke, VA*

**17** A Novel Indication-Based Ordering Tool to Prioritize Emergency Department Patients Waiting for Computed Tomography of the Head
*B Gordon, Regions Hospital St Paul, MN; University of Minnesota, Minneapolis, MN*

**18** Acceptability and Feasibility of Mobile Web-Based Patient-Reported Abdominal Symptoms in the Emergency Department: A Pilot Study
*M Chae, CyrenCare, New York, NY*

**19** The Use of Emergency Physician Televideo Visits to Provide Care-at-Home After Emergency Department Discharge
*A Kreshak, UC San Diego, San Diego, CA*

**20** Extending Emergency Care Beyond Discharge: Piloting a Virtual After Care Clinic
*S Mullennix, Emergency Care Specialists, Grand Rapids, MI*

**21** Telehealth Emergency Department Triage Streamlined Patient Care and Reduced Left Without Being Seen Rates
*D Le, Lehigh Valley Hospital and Health Network/USF Morsani College of Medicine*

***RF2 Wellness***

Room 110AB

**22** Emergency Medicine Residency Program Leadership Well-Being: Results From a National Survey
*J Barrett, Augusta University, Augusta, GA*

**23**[EMF] Pilot Testing the Feasibility of Wearable Devices and Ecological Momentary Assessments Among Emergency Medicine Providers
*A Agarwal, University of Pennsylvania, Philadelphia, PA*

**24**[EMF] Emergency Physician Perspectives on Workplace Wellbeing and Digital Mental Health
*A Agarwal, University of Pennsylvania*

**25** Burnout in the Emergency Department: Its Prevalence and Link to Occupational and Extra-Occupational Factors
*M Kraus, Penn State College of Medicine, Hershey, PA*

**26** Integrating Front-Line Wellness Support into a Quality Strategy into an Emergency Medicine Practice
*J Throop, Emergency Care Specialists, Grand Rapids, MI*

**27** Helping Healers Heal (H3): Recognizing the Importance and Need of Targeted Wellness Resources Within the Emergency Department Setting
*C Montgomery, New York City Health + Hospitals, New York City, NY*

***RF3 Ultrasound***

Room 106AB

**28** Are We Performing Ultrasound-Guided Nerve Blocks for Geriatric Hip Fractures in the Emergency Department? A Qualitative Survey of Perceptions
*V Lew, Washington University in St. Louis, St. Louis, MO*

**29** Pericapsular Nerve Group Block Versus Fascia Iliaca Compartment Block for Hip and Femur Fractures in the Emergency Department: A Propensity Score Matched Cohort Study
*A Kumar, AIIMS New Delhi*

**30** Ultrasound-Guided Nerve Block Compared to Traditional Pain Control Modalities in the Emergency Department: A Systematic Review
*J Ballard, Augusta University, Augusta, GA*

**31** Safety of Ultrasound-Guided Regional Anesthesia Performed by Emergency Physicians: A Systematic Review of Adverse Events
*R Safa, Washington University School of Medicine in St. Louis, St. Louis, MO*

**32** Biplane Ultrasound in Ultrasound-Guided Vascular Access: Impact on Medical Student Competency
*C Thom, University of Virginia Health System*

**33** Landmark vs. Ultrasound-Guided Identification of the Cricothyroid Membrane: A Randomized, Prospective Cohort Study
*M Hoffer, George Washington University; Washington, DC*

***Poster Session 1***

Room 108AB

**370** Accuracy of Clinical Assessment in Predicting Source of Infection for Septic Patients in the Emergency Department
*N Wanis, Henry Ford Hospital, Detroit, MI*

**371** WITHDRAWN

**372** Comparison of Resource Utilization Between Geriatric Falls on Anticoagulation Evaluated at Trauma Centers Versus Non-trauma Centers
*P Majmundar, Hackensack University Medical Center, Hackensack, NJ*

**373** Massive Transfusion in Trauma: Does Payer Status Decrease Futile Transfusion?
*M Arnold, Mount Sinai Hospital, New York, NY*

**374*** Comparison of Arterial Oxygen Levels of Mechanical Ventilators Versus Bag-Valve Ventilation During Cardiopulmonary Resuscitation: A Randomized Trial
*J Tosibphanom, Khon Kaen University, Khon Kaen, Thailand*

*Best Overall Abstract

**375** Laboratory Risk Assessment for Intracranial Bleeding in Mild Traumatic Brain Injury for Elderly and Anticoagulated Patients
*G Hertner, UCHealth, Colorado Springs, CO*

**376** WITHDRAWN

**377** WITHDRAWN

**378** Effect of Intravenous Push and Piggyback Administration of Ceftriaxone on Mortality in Sepsis
*S Lim, Seoul National University Bundang Hospital, Republic of Korea*

MONDAY, OCTOBER 9, 2023 —*cont'd*

**379** Vital Signs among Emergency Department Trauma Patients in the Setting of Alcohol or Drug Use
*D Locke, Penn State Health - Hershey Medical Center, Hershey, PA*

***RF4 Quality***

Room 105AB

**34** Our Growing Challenge: Urban Emergency Department Workplace Violence Based on Gender, Health Care Role, and Barriers to Reporting
*N Cozzi, Rush University Medical Center, Chicago, IL*

**35** Improving Adherence to Best Practices and Clinical Outcomes in Difficult Intravenous Access Patients
*T Zimmerman, Beaumont Hospital: Royal Oak, Royal Oak, MI*

**36** Effect of Contrast Dye on Renal Function of Diabetics Who Presented With Acute Ischemic Stroke After Computed Tomography Angiography Head and Neck
*L Murray, Broward Health Emergency Medicine Residency, Deerfield Beach, FL*

**37** The Patient Voice Project: A Qualitative Analysis of Patient Experiences With New York City Emergency Departments During the COVID-19 Pandemic
*C Sanky, Icahn School of Medicine at Mount Sinai, New York, NY*

**38** Are Happy Experiences Only From Happy Clinicians? An Observational Study Investigating the Relationship Between Practitioner Well-Being and Patient Experience
*B Carr, Mayo Clinic, Rochester, MN*

**39** Leveraging Big Data in American College of Emergency Physicians Emergency Medicine Data Institute Registry to Find the Rate of Co-testing for Syphilis When Already Testing for Gonorrhea and Chlamydia
*E Weathers, The Mount Sinai Hospital / Elmhurst Hospital Center*

**MONDAY, OCTOBER 9, 2023**

**10:30 am - 11:30 am**

***RF5 Resuscitation***

Room 104AB

**40** Impact of En Route Critical Care Provider Experience on Lung Protective Ventilation Compliance During Air Transport of Combat Wounded
*W Davis, En route Care Research Center, 59th Medical Wing, Science & Technology, Defense Health Agency, San Antonio, TX*

**41** Analysis of an Emergency Department Extubation Protocol Using Readiness-To-Wean and Rapid Shallow Breathing Index
*M Sherman, University of Massachusetts Chan Medical School, Worcester, MA*

**42** "Baby Box": Neonatal Resuscitation Box With Asynchronous Training Improves Emergency Medicine Provider Preparedness for Precipitous Delivery
*Y Huang, NYU Langone Health, New York City, NY*

**43** Impact of the COVID-19 Pandemic and Research Publications in Critical Care
*S Razavi, University of Maryland School of Medicine, Baltimore City, MD*

**44** Evaluation of Processed Electroencephalographic Data to Stratify Neurological Outcomes 6 Hours After Cardiac Arrest Treated with Targeted Temperature Management
*H Williams, University of New England College of Osteopathic Medicine (UNECOM)*

**45** The Learning Curve of Resuscitative Transesophageal Echocardiography Performed by Emergency Physicians for Patients With Out-of-Hospital Cardiac Arrest
*P Lee, Far Eastern Memorial Hospital, New Taipei City, Taiwan*

***RF6 Toxicology***

Room 110AB

**46** Phenobarbital Versus Benzodiazepines in Alcohol Withdrawal Syndrome: A Meta-Analysis
*A Sahu, All India Institute of Medical Sciences, New Delhi*

**47** Assessing Safety Outcomes of Patients Discharged From the Emergency Department After Receiving Phenobarbital for Alcohol Withdrawal
*N Ebeling-Koning, Lehigh Valley Health Network/USF Morsani College of Medicine, Bethlehem, PA*

**48** Capabilities of Emergency Departments to Treat Alcohol Use Disorder: Assessment From a Large Quality Improvement Initiative
*S Weiner, Brigham and Women's Hospital, Boston, MA*

**49** Comprehensive Safety Profile of the Most Commonly Ordered Medications for Breastfeeding Patients in the Emergency Department
*C Premer-Barragan, Northwestern University, Chicago, IL*

**50** Acetaminophen Overdose Treated in the Emergency Department: Analysis of Nationwide Emergency Department Sample (NEDS)
*S Berg, Cook County Health, Chicago, IL*

**51** Topical Tranexamic Acid in Outpatient Epistaxis: Unplanned Return Visits
*M McEnery, Ascension Resurrection Medical Center, Chicago, IL*

***RF7 Quality improvement***

Room 106AB

**52** Disposition and Management of Emergency Department Patients With Computed Tomography Interpretation Suggestive of Stercoral Colitis
*B Lorenzen, Southern California Permanente Medical Group, San Diego, CA*

**53** An Evaluation of the Reporting Quality of Emergency Department Systematic Reviews
*J O'Donnell, Massey University, Auckland, New Zealand*

**54** Characterization of Emergency Department Quality Assurance Cases Seen Within a Midwestern United States Health System
*K Smith, UnityPoint Health - Des Moines. Des Moines, IA*

**55** Patiromer Utility as an Adjunct Treatment in Patients Needing Urgent Hyperkalemia Management
*Z Rafique, Baylor College of Medicine, Houston, TX*

**56** Intubation in Propofol-Treated Status Epilepticus: A Cohort Study
*M Mikutra-Cencora, Université de Montréal, Montréal, Quebec, Canada*

**57** Evaluating Practice Patterns of Observation Periods Status Post Epinephrine Administration for Anaphylaxis
*B Walters, Penn State College of Medicine*

MONDAY, OCTOBER 9, 2023 —*cont'd*

***RF8 Geriatrics***

Room 105AB

**58** Total and Out-of-Pocket Costs for Emergency Department Visits Among Older Adults by Medicare Coverage Type, 2015 to 2020
*W Salah, Yale University School of Medicine, New Haven, CT*

**59** COVID-19-Related Disruptions in Emergency Department Use Among Older Veterans
*J Seidenfeld, Durham VA Medical Center, Durham, NC*

**60** Emergency Department Utilization by Nursing Home Residents: A National Cross-Sectional Study
*P Serina, Brown University, Providence, RI*

**61** Characteristics of Patients Identified at Risk for Malnutrition in a Geriatric Emergency Department
*A Davis, University of California San Diego, San Diego, CA*

**62** Forecasting Areas of Need for Geriatric Emergency Care: Quantifying National Access to and Utilization of Geriatric Emergency Departments
*H Elamin, West Health Institute, San Diego, CA*

**63** Outcomes in Older Patients Presenting With Major Trauma to an Irish University Hospital Emergency Department: A Five-Year Review
*A McCabe, Tallaght University Hospital, Dublin, Ireland*

***Poster Session 2***

Room 108AB

**380** Prediction of a Therapeutically Active Dose of the Cannabinoid Type 1 Receptor Antagonist ANEB-001 for Reversal of Acute Cannabis Intoxication Using a Pharmacokinetic/Pharmacodynamic Model
*L Klumpers, Verdient Science, LLC, Denver, Colorado; and Larner College of Medicine, University of Vermont, Burlington, VT*

**382** Moral Distress in Resuscitation Policy Implementation During the COVID-19 Pandemic: A Mixed Methods Study
*R Welch, Yale University, New Haven, CT*

**383** Accuracy of AIIMS Sepsis Protocol in Early Identification of Sepsis in Patients Presenting to Emergency Department
*R PK, All India Institute of Medical Sciences, New Delhi*

**385** Underage Alcohol Intoxication in the Emergency Department
*C Collier, Ascension Resurrection Medical Center, Chicago, IL*

**386** COVID-19 Vaccine Messaging Platforms in the Emergency Department
*R Monzon, UCSF, San Francisco, CA*

**387** Age-Related Trends in Laboratory Testing, Radiologic Imaging, Empiric Antibiotics, Intravenous Fluids, and Hospital Admission Among Adult Patients Presenting With Diarrhea to United States Emergency Departments (2016-2020)
*M Azqul, Ministry of Health, Egypt*

**388** Increasing Incidence of Methamphetamine Use in Hospitalized and Critically Ill Patients
*D Suto, UC San Diego, San Diego, CA*

**389** The Use of a Viral Pandemic Dispatch Protocol to Filter Out Minor Illness Cases of COVID
*J Winslow, Suffolk County EMS*

**MONDAY, OCTOBER 9, 2023**

**11:30 am - 12:30 pm**

***RF9 Leadership/Trauma***

Room 104AB

**64** The New York ACEP Opportunities for Women in Leadership Program: Best Practices and Key Lessons Learned
*M Butt, Maimonides Medical Center, Brooklyn, NY*

**65** One Year of Passive Weapons Detection and Deterrence at an Academic Emergency Department
*S McGuire, Mayo Clinic, Rochester, MN*

**66** Hands-Only CPR and Stop the Bleed Training for Bank of America Chicago Marathon Volunteers
*M Chenworth, Northwestern University Feinberg School of Medicine, Chicago, IL*

**67** Evaluation of Acute Pediatric Ankle and Foot Injuries Using Point-of-Care MRI in the Emergency Department
*H Piard Jr., NewYork-Presbyterian Brooklyn Methodist Hospital, Brooklyn, NY*

**68** Impact of Debriefings and the Review of the Patient's Audio/Video Recordings on Trauma Team Performance in the Emergency Department
*V Aukstakalnis, Lithuanian University of Health Sciences, Kaunas, Lithuania*

***RF10 Airway***

Room 110AB

**69** Timely Post Intubation Sedation and Analgesia: How Often Do We Get It Right?
*D Villegas, Kirk Kerkorian School of Medicine at UNLV*

**70** Procedural Sedation and Analgesia in the Emergency Department and Intensive Care Unit: A Systematic Review and Network Meta-Analysis
*S Sharif, McMaster University, Hamilton, Ontario, Canada*

**71** Physician Assistant Intubation in the Emergency Department: An Analysis From the National Emergency Airway Registry
*F Wu, University of California, San Francisco - Fresno; Fresno, CA*

**72** Airway Management Practices Among Community Emergency Departments: A Multicenter Evaluation of Over 11,000 Endotracheal Intubation Attempts
*J Kei, Kaiser Permanente San Diego Medical Center, San Diego, CA*

**73** Succinylcholine Versus Rocuronium in Emergency Airway Management: A Systematic Review and Meta-Analysis
*C Malhotra, All India Institute of Medical Sciences, New Delhi*

**74** Overweight and Obesity in the Pediatric Population Is Associated With Significantly Increased Risk of Receiving an Intervention in Emergency Department Procedural Sedations
*R Doyle, Lake Erie College of Osteopathic Medicine, Erie, PA*

***RF11 Best of Research Forum I***

Room 106AB

**1*** Results from the "hEad Pulse for Ischemic StrOke DEtection Prehospital Study during the COVID-19 pandemic" (EPISODE-PS-COVID)
*J Paxton, Wayne State University, Detroit, MI*

*Best Overall Abstract

MONDAY, OCTOBER 9, 2023 —*cont'd*

**2** Lower In-Hospital Mortality and Rebleeding Among Patients With Major Gastrointestinal Bleeding Treated With Andexanet Alfa vs 4-Factor Prothrombin Complex Concentrate
*G Fermann, University of Cincinnati, Cincinnati, OH*

**3*** Impact of Time to Antibiotic Therapy on Clinical Outcomes in Patients With Sepsis in the Emergency Department
*M Hsieh, National Yang Ming Chiao Tung University, Taipei, Taiwan*

*Best Early Career Abstract

**4** Oral Varespladib for Snakebite Envenoming: The BRAVO International Randomized Controlled Trial
*C Gerardo, Duke University Hospital, Durham, NC*

**5** Stepped-Wedge Trial to Assess Reduction of Mortality of Sentential Conditions After World Health Organization Emergency Care System Toolkit Implementation
*T Firew, Federal Ministry of Health of Ethiopia*

***RF12 COVID***

Room 105AB

**75** Differential Effect of Age on Mortality in African Americans Infected With the SARS-CoV-2 Virus in the United States
*K Kwamin, Trinity Health-Livonia, MSU COM*

**76** Feasibility and Outcomes of Monoclonal Antibody Administration in the Emergency Department for Non-Hospitalized Patients With COVID-19
*C Rustscheff, Good Samaritan University Hospital, West Islip, NY*

**77** Effects of COVID-19 on Pregnant Women and Their Newborns
*D Mendez, UTMB, Galveston, TX*

**78** Validation of ANCOC Score for Prognosis of COVID-19 in Different SARS-CoV-2 Variants
*M Fernandez, Università Cattolica del Sacro Cuore, Facoltà di Medicina, Rome, Italy*

**79** N95 Contamination With COVID-19 Following Mask Reuse and Extended Use: A Multicenter, Prospective Cohort Study
*J Ford, University of California, San Francisco, San Francisco, CA*

**80** Effect of the COVID-19 Pandemic on Adult Emergency Department Visits for Depression and Suicidal Ideation
*B Luu, Morristown Medical Center, Morristown, NJ*

***Poster Session 3***

Room 108AB

**390** A Before and After Comparison of a Novel Device for ECG
*C McClung, University of Southern California*

**391** Sensitivity of Software-Automated Interpretation of STEMI
*D Pitter, SUNY Upstate Medical University, Syracuse, NY*

**392** Descriptive Study of Utilization of Urine Drug Screen for Abdominal Pain Complaints in the Emergency Department
*S Choi, Hackensack University Medical Center, Hackensack, NJ*

**393**[EMF] WITHDRAWN

**394** Pre- and Post-Implementation Comparison of the Impact of Emergency Department-Based COVID-19 Point-of-Care Testing on Emergency Department Patient Metrics
*K Fenstermacher, Johns Hopkins University, Baltimore, MD*

**395** Brazilian Airway Registry COoperation: Comparison Between Intubations Performed by Emergency Physicians or Non-Emergency Physicians
*I Maia, HCFMUSP, São Paulo, Brazil*

**396** Brazilian Airway Registry COoperation: Comparison Between Intubations Performed With or Without Videolaryngoscope
*I Maia, HCFMUSP, São Paulo, Brazil*

**397** Analysis of Follow-Up Chest Radiography for Adult Emergency Department Patients
*A McCabe, Tallaght University Hospital, Dublin, Ireland*

**398** Patient Variables Associated With High/Moderate Acuity Abdominal/Pelvis CT Scan Results in the Adult, Non-Traumatic Emergency Department Patient
*J Moore, North Alabama Medical Center Florence AL & East Carolina University, Greenville, NC*

**399** Extracorporeal Membrane Oxygenation in Hemodynamically Unstable Stanford Type A Aortic Dissection: Case Series
*S Miyaoka, Tokyo Bay Urayasu Ichikawa Medical Center, Urayasu, Chiba, Japan*

**MONDAY, OCTOBER 9, 2023**

**12:30 pm - 1:30 pm**

***RF13 Health Policy***

Room 104AB

**81** Characterization of Potentially Avoidable Emergency Department Transfers Among Medicare Beneficiaries
*K Li, University of Washington*

**82** A Cross-Sectional Assessment of Variations in Discounted Cash Prices for Critical Care Time at American Hospitals
*T Zitek, Mount Sinai Medical Center, Miami Beach, FL*

**83** Medical Malpractice Lawsuits Involving Nurse Practitioners and Physician Assistants
*S Ghaith, Mayo Clinic Alix School of Medicine, Phoenix, AZ*

**84** An Overview of State Stroke Center Designation Processes in the United States
*M Feldmeier, University of California, San Francisco, San Francisco, CA*

**85** Publishing Trends in the Field of Emergency Department Observation Medicine: A Bibliometric Analysis
*A Majeed, Penn State College of Medicine, Hershey, PA*

**86** Unfilled in Emergency Medicine: An Analysis of Open 2022 and 2023 Match Positions by Program Accreditation, Ownership, and Geography
*W Sun, Yale University School of Medicine, New Haven, CT*

***RF14 Substance Use Disorder***

Room 110AB

**87** Medication-Assisted Treatment Program: Addressing Gaps in Linkages to Care
*L Hasleton, Summa Health System, Akron, OH*

**88** Emergency Department Visits Among Opioid Use Disorder Patients
*S Gaiazov, Indivior, North Chesterfield, VA*

**89** Use of Psychological Surveys to Predict Retention in Medication-Assisted Treatment Programs
*D Seaberg, Summa Health, Akron, OH*

MONDAY, OCTOBER 9, 2023 —*cont'd*

**90** Addressing Substance Use Disorder to Decrease Hospital Readmissions and Improve Behavioral Health Patient Outcomes
*J Bernard, Hackensack Meridian Health Network, Patient Safety & Quality*

**91** Bridging to Better Substance Use Treatment: Implementation and Effectiveness of Statewide Emergency Department Opioid Use Disorder Treatment Programs in California
*E Samuels, UCLA, Los Angeles, CA*

**92** How Much Is Treatment? Health Care Utilization Cost for Patients With Opioid Use Disorder
*L Hasleton, Summa Health, Akron, OH*

***RF15 Quality***

Room 106AB

**93** Novel Monitoring Dashboard for Patients Presenting to the Emergency Department With Chest Pain
*C Keller, Lehigh Valley Hospital and Health Network/USF Morsani School of Medicine*

**94** Save the Brain: A Door-to-Needle Time Multi-Modal Initiative at a Suburban Stroke Center
*J Keilty, University of Minnesota Medical School, Minneapolis, MN*

**95** Driving Quality Improvement into the 21st Century: Creating a Quality Improvement Database
*S Pavuluri, Yale School of Medicine, New Haven, CT*

**96** Review of Intensive Care Unit Upgrades Within 24 Hours of Admission: A Quality Assurance Initiative
*P Draper, NYU Langone Medical Center, New York, NY*

**97** Do Observation Unit Admissions for Patients With Renal Colic Help Prevent Return Visits to the Emergency Department
*P Giarrusso, Good Samaritan University Hospital, West Islip, NY*

**98** An Effective Method of Reducing Patient Left Without Being Seen Rates
*B Blackwood, Eastern Virginia Medical School, Norfolk, VA*

**99**[EMF] A Retrospective Study of a Novel Prediction Tool for Assessing Those at Risk for Firearm Violence
*S Jones, SUNY Upstate Medical University, Syracuse, NY*

***RF16 Public Health***

Room 105AB

**100** First Responder Experiences With a Novel Leave-Behind Naloxone Program: Results of a Pilot Qualitative Survey
*E Ager, Michigan Medicine, Ann Arbor, MI*

**101** Implementation of a Pneumococcal Vaccination Process in the Emergency Department: A Multi-Disciplinary, Patient-Centric Approach
*O Johnson, Indiana University School of Medicine, Indianapolis, IN*

**102** Improved Care for Survivors of Sexual Assault With an Electronic Health Record-Integrated Clinical Pathway
*D Yang, Yale University, New Haven, CT*

**103** Trends in Cannabis Use in New Jersey: Effects of COVID and Cannabis Legalization
*R Patel, Hackensack University Medical Center, Hackensack, NJ*

**104** It's a Philly Thing: Effect of Philadelphia Eagles' Super Bowl Participation on Emergency Department Utilization
*J Wade, Thomas Jefferson University, Philadelphia, PA*

***Poster Session 4***

Room 108AB

**400**[EMF] Staff Attitudes and Experiences With Implementation of an Emergency Department Community Health Worker-Peer Recovery Specialist Program for Patients With Substance Use Disorders
*A Naeem, The Warren Alpert Medical School of Brown University, Providence, RI*

**401** Great Expectations: A Randomized Controlled Trial of a Novel Patient Expectations Communication Tool
*M Wegman, Orange Park Medical Center, Orange Park, FL*

**402** Sedation After Intubation
*I Kim, Valley Health System*

**403** Comparison of Point-of-Care Testing Versus Hospital Lab Testing in the Emergency Department: A Time to Results Evaluation of the iSTAT Device
*S Pandey, Hennepin Healthcare Research Institute, Minneapolis, MN*

**404** Emergency Department Length of Stay, Patient Boarding, Door-to-Doctor Time, and Percent of Patients Left Without Completing Service to Evaluate if There Is Any Correlation Among These Metrics
*P Vajda, Henry Ford Health*

**405** Time to Antibiotics in Septic Shock: Associated Mortality and Opportunities to Improve Care
*B Shure, Summa Health, Akron, OH*

**406** National and Geographic Variation in Medicare Reimbursement Changes for Top Emergency Medicine Procedures From 2013 to 2023
*C Larson, Texas Tech University Health Sciences Center, School of Medicine*

**407** Identifying Human Trafficking in the Hospital Via an Abuse Screening Tool
*K Weiss, University of Iowa Hospitals and Clinics, Iowa City, IA*

**408** Success of an Intervention to Reduce CT Utilization in Patients Being Evaluated for Potential Pulmonary Embolism
*R Reddy, Lehigh Valley Hospital and Health Network/USF Morsani School of Medicine*

**MONDAY, OCTOBER 9, 2023**

**1:30 pm - 2:30 pm**

***RF17 Diversity***

Room 104AB

**105** Intersectional Inequities in Emergency Medicine Resident Performance Assessments by Race and Sex
*E Lett, University of Pennsylvania, Philadelphia, PA*

**106** Toward a Real-Time Artificial Intelligence Assistant for Characterizing and Mitigating Language Bias in Emergency Medicine Notes
*S Boley, Emergency Care Consultants, Minneapolis, MN*

**107** Exploring Diversity, Equity, Inclusion and Antiracism in Humanitarian Academic Organizations: A Preliminary Mixed Methods Study
*F Sergi, University of California, San Francisco, San Francisco, CA*

**108** I RANT: Training Session on Novel Intervention Tool Increases Residents' Recognition of and Confidence in Addressing Microaggressions
*E Grass, Prisma Health Upstate*

MONDAY, OCTOBER 9, 2023 —*cont'd*

**109** Understanding the Relationship Between Experiences With Health Care Discrimination and Emergency Health Care Delay Among Intersex Adults
*J Wang, University of California, San Francisco, San Francisco, CA*

**110** The Association Between Race and EMS Patient Offload Times
*D DiCesare, Orlando Health, Orlando, FL*

***RF18 Basic/Cardiology***

Room 110AB

**111** Potential Impact of Application of the Canadian Syncope Risk Score
*A Harris, University of Maryland School of Medicine, Baltimore, MD*

**112** Use of an Electronic Clinical Decision Support Tool for Emergency Department Oral Anticoagulation Prescribing for Acute Atrial Fibrillation: Step One of a Step-Wedge Cluster-Randomized Clinical Trial
*E Kinney, Oregon Health & Science University, Portland, OR*

**113** A Retrospective Analysis of Intravenous Diltiazem With or Without a Drip for Atrial Fibrillation in the Emergency Department
*S Zajd, Mount Sinai Medical Center, Miami Beach, FL*

**115** Rapid Outpatient Evaluation for Patients With HEART Score 4/5 Safely Reduces Admissions
*N Lesh, Summa Health System, Akron, OH*

**116** Diltiazem Versus Metoprolol for Atrial Fibrillation With Rapid Ventricular Response
*P Koscumb, UTMB, Galveston, TX*

***RF19 Diagnostics***

Room 106AB

**117** Patient and Emergency Department Medical Staff Factors Associated With Abdominal Computed Tomography Scan Utilization in United States Emergency Departments to Evaluate Adults With Diarrhea
*M Azqul, Harvard Medical School/Ministry of Health, Egypt*

**118** Reliability of Continuous Noninvasive Hemoglobin Monitoring in Healthy Participants During En Route Care Training
*W Davis, En route Care Research Center, 59th Medical Wing, Science & Technology, Defense Health Agency*

**119** Investigating Factors Influencing Diagnostic Safety in Emergency Department Patients Using Decision Trees
*F Bellolio, Mayo Clinic, Rochester, MN*

**120** Mining Electronic Health Records to Identify Key Factors Influencing Diagnostic Errors in the Emergency Department
*F Bellolio, Mayo Clinic, Rochester, MN*

**121** Clinical Utility of a Brain Activity-Based Biomarker for the Triage of Head-Injured Patients in the Emergency Department
*M Clay, Inova Fairfax Hospital, Falls Church, VA*

**122** The Effect of Contrast Rationing on the Development of AKI During the Global Contrast Shortage
*S Bellew, Prisma Health Upstate, USCSOM, Greenville, SC*

***RF20 Education***

Room 105AB

**123** Increasing Diversity in Emergency Medicine Through a Summer Fellowship
*D Kaki, University of California, San Francisco; San Francisco, CA*

**124** Resident Career Decisions in Emergency Medicine: A Qualitative Study
*J Jordan, David Geffen School of Medicine at UCLA, Los Angeles, CA*

**125**[EMF] The Geographic Alignment of Emergency Physician Birth State, Medical School State, Residency Training State and Current Practice State
*M Haas, University of Michigan, Ann Arbor, MI*

**126** National Survey of Staffing Patterns of Non-ACGME Fellowships at 4-Year Residency Programs
*J Koehler, University of Michigan, Ann Arbor, MI*

**127** Program Director Longevity in Emergency Medicine Residencies: A 40-Year Analysis
*R Bass, David Geffen School of Medicine at University of California Los Angeles, Los Angeles, CA*

**128** Effect of COVID-19 Pandemic on Emergency Medicine Resident Education
*L Smylie, Wayne State University School of Medicine, Detroit, MI*

**MONDAY, OCTOBER 9, 2023**

**2:30 pm - 3:30 pm**

***RF21 Geriatrics***

Room 104AB

**130** Older Adult Patient Engagement in Advanced Care Planning
*E Albert, Maine Medical Center, Portland, ME*

**131** Addressing Palliative Medicine Knowledge Gaps Amongst Emergency Medicine Providers: A Quality Improvement Project
*B Pare, Atrium Health Wake Forest Baptist Medical Center, Winston-Salem, NC*

**132** Geriatric Emergency Department Guidelines 2.0: A Systematic Review of Emergency Department-Based Geriatric Medication Programs to Reduce Potentially Inappropriate Medications and Adverse Events
*J Hayes, Massachusetts General Brigham, Harvard Medical School, Boston, MA*

**133** In-Home Urgent Care for Elderly, Poly-Chronic Patients and Emergency Department Utilization
*J Broderick Jr., Landmark Health, Huntington Beach, CA*

**134** "What Matters" in the Emergency Department: A Prospective Analysis of Older Adults' Concerns and Desired Outcomes
*T Chera, Yale University School of Medicine, New Haven, CT*

***RF22 Best of Research Forum II***

Room 110AB

**6*** Venous Excess Ultrasound Grading System (VExUS) as a Predictor of Early Adverse Outcomes in Emergency Department Patients Presenting With Sepsis
*J Forrester, North Shore University Hospital*

*Best Resident Abstract

MONDAY, OCTOBER 9, 2023 —*cont'd*

**7** Advanced vs. Basic Life Support Outcome Variation in the Treatment of Out-of-Hospital Cardiac Arrest in Detroit
*R Silvagi, Wayne State University School of Medicine, Detroit, MI*

**8** Changes in Emergency Department Quality Improvement Practices Between 2019 and 2023: Analysis of the Emergency Quality (E-QUAL) Network Quality Readiness Assessments
*W Sun, Yale University School of Medicine*

**9** A Randomized Controlled Trial of an Emergency Department Discharge Intervention as an Alternative to Hospitalization
*A Kilaru, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA*

**10** Application of Motor Learning Theory to Teach the Head Impulse Test to Emergency Medicine Resident Physicians
*J Lenning, Wayne State University School of Medicine, Detroit, MI*

***RF23 Trauma***

Room 106AB

**135** Early Femoral Arterial Access in Trauma: Does It Make a Difference?
*S Murali, University of Pennsylvania, Philadelphia, PA*

**136** Illustrating Quality Improvement in Extended Focused Assessment With Sonography in Trauma Through a Tailored Educational Intervention
*K Kobayashi, NYP Queens, Queens, NY*

**137** Evaluating Outcomes and Disparities for Police "Scoop and Run" vs EMS Transport for Firearm Injury Patients
*B Biebelberg, Sidney Kimmel Medical College at Thomas Jefferson University, Jefferson Center for Injury Research & Prevention*

**138** Association Between Emergency Medical Services Care and Hospital Admission for Trauma Patients Presenting to the University Teaching Hospital in Kigali, Rwanda
*O Longerstaey, The Warren Alpert Medical School of Brown University, Providence, RI*

**139** Helmet or No Helmet? An Analysis of Ski- and Snowboard-Related Head Trauma
*K Pena, Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ*

***RF24 Airway***

Room 105AB

**140** A Descriptive Analysis of Patients Undergoing Out-of-Hospital and Emergency Department Surgical Airways: Characteristics and Outcomes
*A Mathews, Vanderbilt University Medical Center, Nashville, TN*

**141** Comparing Aerosol Exposure and Prevention Strategies During Bystander, Out-of-Hospital, and Inpatient Cardiopulmonary Resuscitation
*S Li, Ditmanson Medical Foundation Chiayi Christian Hospital, Chiayi County, Taiwan*

**142** Novel Hyperangulated Laryngoscope Capable of Use in a Soiled Airway
*R Moschella, University of Michigan, Ann Arbor, MI*

**143** A Randomized Control Trial to Assess Effectiveness of Apnoeic Oxygenation Using Low-Flow or High-Flow Nasal Cannula to Prevent Desaturation During Endotracheal Intubation
*S Waheed, Aga Khan University, Karachi, Sindh*

**144** Overweight and Obesity Is Associated With Significantly Increased Risk of Receiving an Intervention in Emergency Department Procedural Sedations
*R Doyle, Lake Erie College of Osteopathic Medicine, Erie, PA*

**145** Prospective Validation of Difficult Airway Physiological Score to Predict Patients With Serious Outcomes Undergoing Endotracheal Intubation in the Emergency Department
*S Waheed, Aga Khan University, Karachi, Pakistan*

## MONDAY, OCTOBER 9, 2023

**3:30 pm - 4:30 pm**

***RF25 EMF Showcase***

Room 104AB

**146[EMF]** Development and Pilot Testing of a Novel Artificial Intelligence and Care Coach Intervention for Persons Living With Cognitive Impairment and Care Partners Experiencing Emergency Department Care Transitions
*T Chera, Yale University School of Medicine, New Haven, CT*

**147[EMF]** Improving Asthma Referrals Following Pediatric Emergency Department Care
*A DeLaroche, Children's Hospital of Michigan*

**148[EMF]** Moving Beyond "I Know It When I See It": A Qualitative Study to Develop a Behavioral Definition of the Master Adaptive Learner for Emergency Medicine Trainees
*L Hopson, University of Michigan*

**149[EMF]** Lung Ultrasound Does Not Predict Hypoxia in Cohorts of Ambulatory Patients With COVID-19
*D Theodoro, Washington University School of Medicine, St. Louis, MO*

**150[EMF]** Pilot Study of an Innovative Model to Provide Multi-modal Cognitive Behavioral Theory-Informed Physical Therapy for Neck and Back Pain in the Emergency Department
*S Eucker, Duke University School of Medicine, Durham, NC*

***RF26 Social Determinants***

Room 110AB

**151** Emergency Department-Based Social Determinants of Health Screening and Referral Program to Deliver Whole Patient Care
*L Jiang, NYP Weill Cornell Medical Center, New York, NY*

**152** Can Data Sciences Advance the Collection, Identification, and Usage of Social Determinants of Health in the Emergency Department to Improve Patient Outcomes? A Scoping Review
*D Apakama, Icahn School of Medicine, New York, NY*

**153** Social Domains of Needs Score on Predicting Hospital Admissions for Patients in a Community Paramedicine Program
*J Siddle, Prisma Health - Upstate, Greenville, SC*

**154** Food Insecurity and Social Determinants of Health in an Urban Academic Emergency Department
*C Daichang, Rutgers New Jersey Medical School, Newark, NJ*

**155** Socioeconomic Determinants of Health on Rates of Appendicitis and Computed Tomography for Diagnosis in United States Emergency Departments
*G Neyman, Robert Wood Johnson Barnabas Health Community Medical Center, Toms River, NJ*

**156** Assessing Perceptions of Social Determinants of Health Screening in the Emergency Department Among Patients and Providers
*S Hay, Brigham and Women's Hospital, Boston, MA*

TUESDAY, OCTOBER 10, 2023 —*cont'd*

***RF27 Infectious Disease***

Room 106AB

**157** An Assessment of the Prevalence of Clostridium Tetani in the Environment
*M Shalaby, Mount Sinai Medical Center, Miami Beach, FL*

**158** The Emergency Department as an Entry Point for Patients With Mpox: Opportunities for Improvement
*D Rudolph, Johns Hopkins University School of Medicine, Baltimore, MD*

**159** A Rapid Host-Based Test Integrating TRAIL, IP-10 and CRP Differentiates Bacterial From Viral Infection in Acute Febrile Patients: Apollo Double-Blind Clinical Validation Study
*R Rothman, Johns Hopkins University, Baltimore, MD*

**160** Comparisons of Hospital Mortality Between Sepsis Patients of Bacteremia With and Without Antimicrobial Resistance: A Propensity Score Matching Cohort Study Between 1996 and 2022
*M Hsieh, Taipei Veterans General Hospital, Taoyuan Branch, Taoyuan, Taiwan*

**161** A Host Response Test (MMBV) for Differentiating Between Bacterial and Viral Infection has Potential to Improve Antibiotic Stewardship in Patients With Suspected Sepsis
*A Angel, MeMed, Haifa, Israel*

**162** A National Emergency Department Registry for Mpox
*B Hansoti, Johns Hopkins University School of Medicine, Baltimore, MD*

***RF28 Pediatrics***

Room 105AB

**163** Corticosteroid Therapy Effect on Biphasic Reaction in Children With Anaphylaxis
*B Pradarelli, Mount Sinai, New York, NY*

**164** The Diagnostic Utility of Hip Ultrasound in the Diagnosis of Septic Arthritis of the Hip in Pediatric Patients
*N Lopreiato, Walter Reed National Military Medical Center, Bethesda, MD*

**165** Laboratory Predictors of Illness Severity in Multisystem Inflammatory Syndrome in Children
*M Minor, Atlantic Health System, Morristown, NJ*

**166** Real-World Evidence Demonstrates Safety and Performance of Intraosseous Vascular Access, Including for Longer Duration of Use in Pediatric Patients
*T Philbeck, Teleflex Medical Incorporated*

**167** Risk of Serious Bacterial Infections in Febrile Infants aged 7-90 days With COVID-19
*T Greenhow, Kaiser Permanente Northern California, San Francisco, CA*

**168** Brief Hospitalizations and Readmissions Among Children With Complex Chronic Conditions
*B Garrity, Boston Medical Center, Boston, MA*

**TUESDAY, OCTOBER 10, 2023**

**8:00 am - 9:00 am**

***RF29 Administration***

Room 104AB

**169** Who Is Coming In? Evaluation of Physician Performance Within Multi-Physician Emergency Departments
*R Sangal, Yale School of Medicine, New Haven, CT*

**170** Length of Stay Is Associated With Lower Patient Experience Ratings for Emergency Clinicians
*T Lardaro, Indiana University School of Medicine, Indianapolis, IN*

**171** Characteristics Associated With Patient Satisfaction Scores in the Emergency Department
*L Weber, Mount Sinai Medical Center, Miami Beach, FL*

**172** Who Fills out Emergency Department Patient Satisfaction Surveys?
*T Nunez, Mount Sinai Medical Center, Miami Beach, FL*

**173** Quantifying the Impact of Hospital Boarding on Patient Outcomes and Downstream Hospital Operations
*R Sangal, Yale School of Medicine, New Haven, CT*

**174** Price Transparency and Variation in Emergency Department Visits by Payer Type: A Nationwide Analysis
*J Morey, Mayo Clinic, Rochester, MN*

***RF30 Social Determinants***

Room 110AB

**176** A Preliminary Assessment of Emergency Department Utilization and Trends by Patients Experiencing Homelessness
*A Plezia, Loyola University Medical Center, Stritch School of Medicine, Maywood, IL*

**177** Utilization of Hospital Payor Mix as an Estimate for Socioeconomic Status in a National Database
*C Talbot, Robert Wood Johnson Barnabas Health Community Medical Center, Toms River, NJ*

**178** Emergency Department Food Insecurity Screening, Food Voucher Distribution, and Referral Utilization: A Prospective Cohort Study
*A Ulintz, The Ohio State University, Columbus, OH*

**179** Serving the Homeless in the Emergency Department Setting
*K Stucker, University of Louisville, Louisville, KY*

**180** Eligibility of Emergency Department Patients for Public Benefit Programs: A Survey
*A Kilaru, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA*

***RF31 Pediatrics***

Room 106AB

**181**[EMF] Evaluation of Insurance Type as a Proxy for Patient-Level Socioeconomic Status in the Pediatric Emergency Department: A Pilot Study
*M Monuteaux, Boston Children's Hospital, Boston, MA*

**182** Emergency Department Characteristics Associated With Pediatric Behavioral Health Readiness
*A Foster, University of California, San Francisco, San Francisco, CA*

**183** A.P.B. DUMBLEDORE Study. Algorithm Pecarne to Bowl over raDiation and brush Up Management of Brain injury in wardLy Emergency Department: Outcomes and cRowding improved
*G Savioli, IRCCS Policlinico San Matteo, Pavia, Italy*

**185** Pott's Puffy Puzzle: Unraveling a Cluster of Pediatric Cases
*K Schaeffer, NYCHHC-Jacobi/Albert Einstein College of Medicine, Bronx, NY*

**186** Prescribing Patterns of Epinephrine Upon Discharge for Anaphylaxis Patients: A Comparison Between Adult and Pediatric Patients
*J Joseph, Rutgers Health - Community Medical Center*

TUESDAY, OCTOBER 10, 2023 —*cont'd*

***RF32 Health Policy***

Room 105AB

**187** Awareness of California Medicaid Expansion for Undocumented Adults Over 50
*K Tlatelpa, David Geffen School of Medicine at UCLA, Los Angeles, CA*

**188** A Qualitative Investigation of Black Patient Perspectives on Racism and Emergency Care
*A Agarwal, University of Pennsylvania*

**189** Does Medicaid Cover Out-of-State Abortion? A Mystery Shopper Survey of State Medicaid Agencies
*H Khidir, Yale University School of Medicine, New Haven, CT*

**190** Health Disparities in Emergency Department Administration of Buprenorphine for Treatment of Opioid Use Disorder
*A Khattab, Henry Ford Hospital, Detroit, MI*

**191** Accessibility of Emergency Physicians to the Medicare Population
*G Mahdi, Mayo Clinic Arizona*

**192** Initiating Care for Low Back Pain in the Veterans Health Administration: Where Does It Start? And Where Does It Go?
*C Penza, Orlando VA Medical Center, Orlando, FL*

***Poster Session 5***

Room 108AB

**410**[EMF] Speaking the Same Language: Adapting Multilingual Approaches to a Clinical Social Needs Intervention
*D Cullen, Children's Hospital of Philadelphia, Philadelphia, PA*

**411** Emergency Department and Hospital Utilization After Emergency Department-Initiated Buprenorphine for Opioid Use Disorder
*M Patel, Henry Ford Hospital, Detroit, MI*

**412** Massive Hemorrhage Protocol: Emergency Medicine Resident Education Intervention
*P Haskins, Mount Sinai Morningside/West, New York, NY*

**413** Estimates of HIV Testing at Visits to United States Emergency Departments, 2014-2020
*C Clay, NYU Grossman School of Medicine, New York, NY*

**414** The Effect of Social Distancing Measures During the COVID-19 Pandemic on Opioid Overdose Presentation Rates
*P Aung, Good Samaritan University Hospital, West Islip, NY*

**415** Assessing Missed Opportunities for Sexually Transmitted Infection Testing and Linkage to Prenatal Care During Emergency Department Visits in Early Pregnancy
*N Pierce, University of Texas Health Science Center at Houston, Houston, TX*

**416**[EMF] Emergency Department Utilization and Hospitalizations Associated With Flooding in the Continental United States: 2008-2017
*Z Wettsein, University of Washington School of Medicine, Seattle, WA*

**417** Early Data From an Out-of-Hospital Whole Blood Transfusion Program for Trauma Patients
*T Zitek, Mount Sinai Medical Center, Miami Beach, FL*

**418** Pediatric Winter-Related Sports Injuries in the United States: An Analysis of 2012 to 2021
*A Pourmand, George Washington University School of Medicine and Health Sciences, Washington, DC*

**419** Impact of Transfer Status on Testicular Torsion: A Retrospective Database Review
*R McConnell, University of Central Florida College of Medicine, Orlando, FL*

**TUESDAY, OCTOBER 10, 2023**

**10:00 am - 11:00 am**

***RF33 Education***

Room 104AB

**193** Improving Physicians' Ability to Perform the Sexual Assault Forensic Exam in the Emergency Department
*G Ragazzo, Emory University School of Medicine, Atlanta, GA*

**194** Development of a Mastery Learning Checklist for Pregnancy Disclosure and Options Counseling in the Emergency Department
*C Preiksaitis, Stanford University, Palo Alto, CA*

**195** The Red Eye: A Diagnostic Tool to Assist the Emergency Physician
*A Torres, Loma Linda University Health, Loma Linda, CA*

**196** A Novel Simulation Model for EZ IO Emergency Craniostomy for Dural Drainage
*G Gartman, Eastern Virginia Medical School, Norfolk, VA*

**197** Residents Teaching Residents Resuscitation in a Pediatric Emergency Department: An In Situ Model
*V Oboli, Lincoln Medical Center - Weill Cornell Medical College, New York, NY*

**198**[EMF] The Impact of Stress and Distraction on Bag Valve Mask Performance
*G McDaniel, University of Toledo College of Medicine and Life Sciences, Toledo, OH*

***RF34 Disaster - Prehospital, EMS, Transfers***

Room 110AB

**199** Do Hospitals Get EMS Patient Care Reports?
*J Shanley, Corewell Health East - William Beaumont University Hospital. Royal Oak, MI*

**200** Access Granted: Investigating the Outcomes of EMS-Placed Peripheral Intravenous Catheters in Out-of-Hospital Care
*J Shanley, Corewell Health East - William Beaumont University Hospital, Royal Oak, MI*

**201** Difference of Dispatcher-Assisted Cardiopulmonary Resuscitation in Private Homes Versus Public Locations Among Patients Following Out-of-Hospital Cardiac Arrest
*S Huang, National Taiwan University Hospital, Hsin-Chu branch, Hsin-Chu City, Taiwan*

**202** Feasibility of Transesophageal Echocardiography in Out-of-Hospital Cardiac Arrest: A Single Center Pilot Study
*K Bianconi, Rutgers/RWJBH, Newark, NJ*

**203** Longer Emergency Department Length of Stay Prior to Transfer Is Associated With Lower Mortality in Rural Sepsis Patients
*B Wilkinson, University of Iowa, Iowa City, IA*

**204** Assessing the Management of Cardiac Arrest Patients in the Interfacility Transfer Setting
*M Burla, MaineHealth, Biddeford, ME*

TUESDAY, OCTOBER 10, 2023 —*cont'd*

***RF35 Cardiology***

Room 106AB

**205** Heart Rates of Patients Presenting to Hospital Triage in Rural Uganda: A Cross-Sectional Analysis
*J Fairchild, Medical University of South Carolina, Charleston, SC*

**206** High Sensitivity Troponin Is Frequently Elevated After Carbon Monoxide Exposure
*A Aloumi, Kuwait Poison Control Center, Kuwait City, Kuwait*

**207** Evaluation of Electronic Health Record-Integrated Clinical Pathway Implementation of High Sensitivity Troponin Upon Emergency Department Disposition Rates
*M Iscoe, Yale School of Medicine, New Haven, CT*

**208** Diagnostic Performance of Cardiac Stress Testing Following Exclusion of Acute Myocardial Infarction With a 0/1-Hour, High-Sensitivity Cardiac Troponin Protocol
*H Nassereddine, Henry Ford Hospital, Detroit, MI*

**209**[EMF] Uninsured Patients Diagnosed With ST-Elevation Myocardial Infarction Present to Lower Volume and Lower Quality Percutaneous Coronary Intervention Facilities
*S Lin, Michigan, Ann Arbor, MI*

**210** Electronic Health Record-Integrated Clinical Pathway and Transition to High Sensitivity Troponin to Promote Standardization of Attending Physician Chest Pain Care
*M Iscoe, Yale School of Medicine, New Haven, CT*

***Poster Session 6***

Room 108AB

**420**[EMF] Development of a Spanish Language Version of an Educational Tool for Surrogate Decision Makers of Comatose Survivors of Cardiac Arrest
*S Perman, CU, Aurora, CO*

**421** Regional Impacts on Digital Health Information Exchange During a Ransomware Attack
*C Dameff, University of California San Diego, San Diego, CA*

**422** Understanding Reason for Refusal in MIGHTy Heart Study to Reduce Return Rates to the Emergency Department
*R Mantel, Mount Sinai Hospital, New York, NY*

**423** Implementation of Standardized Curriculum for Ultrasound-Guided Intravenous Access for Pediatric Residents
*H Zelaya, NYU Langone Long Island Hospital, Mineola, NY*

**424** The Implementation and Evaluation of an E-learning Program for Residents in an Irish Emergency Department
*A McCabe, Tallaght University Hospital, Dublin, Ireland*

**425** WITHDRAWN

**426** Categorization of Usage Patterns of an Emergency Department Telehealth Follow-up Program During the COVID-19 Pandemic
*B Mallory, NewYork-Presbyterian Hospitals-Columbia & Cornell, New York, NY*

**427** All About Rhythm: The Implementation of an Unstable Cardiac Dysrhythmia Simulation Curriculum at a Rwandan Emergency Residency
*A Kothare, Kent Hospital, Warwick, RI*

**428**[EMF] The Impact of STIGMAs: Stigma Training In Graduate MedEd Addressing Substance Use
*S Follman, University of Chicago; Chicago, IL*

***RF36 Infectious Disease***

Room 105AB

**212** Emergency Department Opt-Out HIV Screening Programs Influence Overall System-wide HIV Screening Increases Within a Southern Community Health System
*P Moschella, USC School of Medicine Greenville, Prisma Health-Upstate*

**213** Trichomonas Vaginalis Infection in Male Emergency Department Patients
*I Kim, Valley Health System, Las Vegas, NV*

**214** Effect of an Emergency Department Waiting Room Outreach Intervention on Rates of COVID Vaccination
*N Jasperse, Harbor UCLA, Torrance, CA*

**215** Reasons for Delay in Primary COVID-19 Vaccine Series in Underserved Emergency Department Patients
*R Rodriguez, UCSF, San Francisco, CA*

**216** Alteration of Informed Consent in the Emergency Department Has a Significant Impact on Ability to Effectively Evaluate Novel Diagnostics for Severe Infection
*A Mauermann, Massachusetts General Hospital, Boston, MA*

**TUESDAY, OCTOBER 10, 2023**

**11:00 am - 12:00 pm**

***RF37 International***

Room 104AB

**217**[EMF] The Impact of Health Insurance on Catastrophic and Impoverishing Health Expenses for Patients Seeking Emergency Care in Kumasi, Ghana
*O Offorjebe, Brown University, Providence, RI*

**218** Understanding and Improving the Emergency Department Referral System in the Ashanti Region of Ghana
*E Kim, University of Michigan, Ann Arbor, MI*

**219** Emergency Triage Assessment and Treatment: Post-Covid Implementation of a Pediatric Emergency Care Curriculum in Belize
*J Mackey, Baylor College of Medicine, Houston, TX*

**220** External Validation and Comparison of NIRUDAK Models and WHO Algorithm for Assessing Dehydration in Patients With Acute Diarrhea
*A Levine, Brown University, Providence, RI*

**221** Basic Emergency Care: Post-Covid Implementation Utilizing Regional Teams
*J Mackey, Baylor College of Medicine, Houston, TX*

**222** Comparison of Serious Illness Communication and Self-Reported Practice Patterns of Code Status Conversation Between Japanese and American Clinicians Using a Multicenter Scenario-Based Survey
*K Numata, Sei Marianna Ika Daigaku Byouin, Japan*

***RF38 Ultrasound***

Room 110AB

**223** Usage and Clinical Impact of Point-of-Care Ultrasound Applications Among Emergency Medicine Residents and Early-Career Residency Graduates
*K Boubouleix, Cook County Health, Chicago, IL*

TUESDAY, OCTOBER 10, 2023 —*cont'd*

**224** Point-of-Care Ultrasound Quality Assurance Data From Fellow-Performed Scans in a Pediatric Emergency Department: A Descriptive Study
*C Arand, Children's Hospital of Michigan, Detroit, MI*

**225** Learning Curve Cumulative Summation in Emergency Medicine Residents Performing Ocular Ultrasound
*M Kim, UT Southwestern Medical Center, Dallas, TX*

**226** Is Handheld Point-of-Care Ultrasound "Good Enough" in a Busy Academic Emergency Department?
*B Wubben, University of Iowa, Iowa City, IA*

**227** Point-of-Care Ultrasound Use by Advanced Practice Providers in an Urban, Academic Emergency Department
*M Heffler, Denver Health Medical Center, Denver, CO*

**228** Pediatric Point-of-Care Ultrasound Training in United States Emergency Medicine Residencies: Is Current Training Adequate?
*C Shepherd, The University of Pennsylvania, Philadelphia, PA*

***RF39 Resuscitation and Critical Care***

Room 106AB

**229** A Comparison of Intraosseous Pressure Transfusion Strategies in a High Bone Density In Vivo Swine Model of Hemorrhagic Shock
*M Stein, Navy Medicine Readiness & Training Command, San Diego, CA*

**230** Abdominal Aortic Aneurysm Rupture and Predictors of Death
*D Jehle, UTMB, Galveston, TX*

**231** The Role of End-Tidal Carbon Dioxide and Cerebral Oxygen Saturation to Predict Return of Spontaneous Circulation Among Patients With Out-Of-Hospital Cardiac Arrest
*T Kawaguchi, St. Marianna University School of Medicine, Kawasaki, Kanagawa, Japan*

**233** Sex Disparity Between Patients Receiving Lung Protective Ventilation in the Emergency Department
*S Gilman, Northwell, New Hyde Park, NY*

***RF40 Diagnostics***

Room 105AB

**234** Identification of Diagnostic Errors in the Emergency Department Using Data-Driven Strategies
*F Bellolio, Mayo Clinic, Rochester, NY*

**235** Assessment of a Cellular Host Response Test Against Field Standards for Diagnosing Sepsis-3 and Risk Stratifying Subjects in the Emergency Department
*H O'Neal, Cytovale Inc., San Francisco, CA*

**236** Financial Sustainability to Increase Level 5 Billing
*J To, Jacobi Medical Center, Bronx, NY*

**237** Effect of an ED-ICU on Emergency Department Billing and Coding
*M Sherman, UMass Chan Medical School/UMass Memorial Health Care, Worcester, MA*

**238** Use of a Rapid Bedside Semi-Quantitative Test to Detect COVID-19 Immunoglobulin Levels in Vaccinated Immunocompetent Adult Patients
*I Yoon, University of Maryland School of Medicine, Baltimore, MD*

***Poster Session 7***

Room 108AB

**430**[EMF] Bridging the Gap: Interactive Virtual Training for Ultrasound Image Acquisition Skills Is Not Inferior to In-Person Training
*P Duran-Gehring, University of Florida College of Medicine-Jacksonville, Jacksonville, FL*

**431** COVID-19 and Rates of Psychiatric and Substance-Related Pediatric Emergency Department Visits
*L Kerimova, Good Samaritan University Hospital, West Islip, NY*

**432** The Use of a Psychiatric Overflow Unit in a Large Urban Community Hospital to Improve Patient Outcomes
*B Aslani-Amoli, INOVA Fairfax Medical Center, Fairfax, VA*

**433** A Cross Sectional Observational Study of Peripheral Nerve Size Versus Optic Nerve Sheath Diameter in Patients With Normal Intracranial Pressure
*E Shank, University of California Davis, Sacramento, CA*

**434** WITHDRAWN

**435** Identification of Suppurative Flexor Tenosynovitis by Emergency Medicine Residents Utilizing Ultrasound
*L Navarro, Kirk Kerkorian School of Medicine at UNLV, Las Vegas, NV*

**436** WITHDRAWN

**437**[EMF] Emergency Department Weight Management and Exercise Prescription Program for Older Veterans With Knee Pain: A Pilot Feasibility Trial
*L Abbate, VA Eastern Colorado Geriatric Research Education and Clinical Center, Aurora, CO*

**438** Involuntary Sedation of Patients in the Emergency Department for Mental Health Crises: A Retrospective Cohort Study
*C Pasadyn, The Ohio State University College of Medicine, Columbus, OH*

**439** Point-of-Care Ultrasound in Traumatic Cardiac Arrest: Perspectives and Experiences of Emergency Physicians and Trauma Surgeons
*M Sookdeo, University of Cincinnati, Cincinnati, OH*

**TUESDAY, OCTOBER 10, 2023**

**12:00 pm - 1:00 pm**

***RF41 Best of Research Forum III***

Room 104AB

**11** Ukraine Trauma Care Response: Phase 1 Summary and Impact
*S Kivlehan, Brigham and Women's Hospital, Boston, MA*

**12** Association Between Discharge Prescriptions and Revisits for Low Acuity Back Pain in the Emergency Department
*M Wegman, Orange Park Medical Center, Orange Park, FL*

**13** Development of a Novel Deep Learning Model to Predict Physiologic Deterioration in Emergency Department Patients
*G Wardi, UC San Diego, San Diego, CA*

**14** A Process Improvement Project to Increase Post-Emergency Department Discharge Appointment Scheduling at Local Hospital Specialty Clinics Utilizing Our Patient Navigation Program
*B Farmer, Weill Cornell Medicine/New York Presbyterian Hospital, New York, NY*

TUESDAY, OCTOBER 10, 2023 —*cont'd*

**15** Implementation of a Novel Bedside Electroencephalogram-Based Device Aids in Accurately Ruling Out Traumatic Intracranial Hemorrhage and Reduces Computed Tomography Utilization
*J Stelter, NorthShore University HealthSystem, Evanston, IL*

***RF42 Quality***

Room 110AB

**239** How Does a Novel Irrigation Device Compare to Standard Irrigation Techniques
*M Rosenberg, Orlando Health, Orlando, FL*

**240** Documentation and Compliance With Emergency Department Restraint Best Practices
*S Hoffman, Good Samaritan University Hospital, West Islip, NY*

**241** Characteristics Associated With Receiving a CT Among Individuals Meeting Criteria for a Non-Contrast Head CT in the Emergency Department
*N Hudepohl, Prisma Health, Greenville, SC*

**242** Leveraging Big Data in American College of Emergency Physicians Emergency Medicine Data Institute Registry to Find the Rate of Co-testing for HIV When Already Testing for Gonorrhea and Chlamydia
*E Weathers, The Mount Sinai Hospital/Elmhurst Hospital Center*

**243** A Pilot Study to Measure Noise Levels for Mitigation in the Emergency Department
*R Campbell, Regions Hospital, St. Paul, MN*

**244** Using Community TeleParamedicine to Perform In-Home Fall-Risk Reduction after a Sentinel Emergency Department Encounter
*L Jiang, NYP Weill Cornell Medical Center, New York, NY*

***RF43 Psychiatry***

Room 106AB

**245** Patterns of Chemical Restraint Use for Emergency Department Patients With Acute Mental Health Distress
*S Lippert, Kaiser Permanente Northern California, Oakland, CA*

**246** Utility of Emergency Department Diagnostic Testing in Medical Clearance of the Psychiatric Patient
*P Patel, Loyola University Medical Center, Stritch School of Medicine, Maywood, IL*

**247** Acute Healthcare Utilization among Schizophrenia or Related Conditions and Bipolar Disorder Before and After COVID-19
*G Vilke, University of California San Diego, San Diego, CA*

**248** Assessing Emergency Department Clinician Confidence in Identifying Alcohol Use Disorder And Prescribing Medically Assisted Treatment
*R Weick, Hackensack University Medical Center, Hackensack, NJ*

**249** WITHDRAWN

**250** Impact of Housing Status on an EMS-Led Leave-Behind Naloxone Program: A Retrospective Analysis
*D Enayati, Los Angeles County + USC Medical Center, Los Angeles, CA*

***RF44 Airway***

Room 105AB

**251** Comparing the Efficacy of Video-Stylet and Pentax AWS® in Simulated Cadavers With Ludwig's Angina: A Cross-Over Randomized Controlled Trial
*C Lee, Ditmanson Medical Foundation Chiayi Christian Hospital, Chiayi County, Taiwan*

**252** Effect of Real-Time Carbon Dioxide Sensing Stylet-Assisted Endotracheal Intubation: A Case-Crossover Manikin Simulation Study
*Y Kim, Seoul National University Hospital, Seoul, South Korea*

**253** AIRWAY-XR: Augmented Instruction to Refine Wayfinding and Yielding Skills in Emergency Medicine Residents for Intubation Using Mixed Reality Technology
*N Bhavsar, Columbia and Cornell University Hospital, New York, NY*

**254** Brazilian Airway Registry COoperation: The First 1,000 Emergency Intubations of the BARCO Study
*I Maia, HCFMUSP, São Paulo, Brazil*

**255** Clinical Outcomes Following Uniform Compared to Non-Uniform Dosing of Rapid Sequence Intubation Medications in the Emergency Department.
*W Norkett, Hennepin Healthcare, Minneapolis, MN*

**256** Emergency Physicians Initiate Proper Lung Protective Ventilation Tidal Volumes Three-quarters of the Time After Emergency Department Rapid Sequence Intubation
*D Villegas, Kirk Kerkorian School of Medicine at UNLV*

***Poster Session 8***

Room 108AB

**440** Peer Review and Second Victim Syndrome
*A Scherwani, Hackensack University Medical Center, Hackensack, NJ*

**441** The Preparedness of Schools to Manage Emergencies and Disasters Affecting Students: A National Survey
*N Gupta, Penn State College of Medicine, Hershey, PA*

**442** Early Administration of Ondansetron in the Pediatric Emergency Department
*L Howard, University of Arkansas for Medical Sciences, Little Rock, AR*

**443** First Implementation of WHO's Basic Emergency Care Training Course in Ethiopia
*S Patel, University of Florida - Jacksonville, FL*

**444**[EMF] Metagenomic Analysis of Bacterial Species Detected in Urine From Older Adult Emergency Department Patients With Suspected Urinary Tract Infection
*E Bradley, UMass Chan Medical School, Worcester, MA*

**445** Presenting Features of Brain Tumors Diagnosed in Emergency Department Patients
*A McCabe, Tallaght University Hospital, Tallaght, Dublin, Ireland*

**446** Screening for Bullying in the Pediatric Emergency Department: Possibilities for Intervention
*M Waseem, Lincoln Medical Center, Bronx, NY*

TUESDAY, OCTOBER 10, 2023 —*cont'd*

**447** The Evaluation of Pediatric Appendiceal Ultrasound Performed at a Community Hospital
*M Waseem, Lincoln Medical Center, Bronx, NY*

**448** Accuracy of Pediatric Interventricular Septal Thickness Measurement Obtained via Point-of-Care Ultrasound: A Prospective Study
*A Hasan, NewYork-Presbyterian Brooklyn Methodist Hospital, Brooklyn, NY*

**TUESDAY, OCTOBER 10, 2023**

**2:30 pm - 3:30 pm**

***RF45 Telemedicine***

Room 104AB

**257** Tele-Ophthalmology Has Low Acceptance and Use in the Emergency Department for Non-Traumatic Injuries
*P Haskins, Mount Sinai Morningside and West Hospitals New York, NY*

**258** Emergency Department in Home: A Novel Approach to Delivering Acute Care to Patients in Home
*E Berg, Medically Home Group, Boston, MA*

**259** Estimating the Rate of Telehealth-Able Emergency Department Visits: A Look at National Data
*E Hayden, Massachusetts General Hospital, Boston, MA*

**260** Creating an Open Source Resident/Student Telehealth Collection
*J Miller, University of Connecticut, Farmington, CT*

**261** Predictive Modeling: Telehealth Calls Are an Indicator of Emergency Department COVID-19 Surges
*B Slovis, Thomas Jefferson University, Philadelphia, PA*

**262** Impact of the COVID-19 Pandemic and Research Publications in Emergency Medicine
*S Razavi, University of Maryland, Baltimore, MD*

***RF46 Trauma***

Room 110AB

**263** Trauma Activations From Electric Scooter, E-bike, and Moped Use Before and During the COVID-19 Pandemic
*C Sanky, Icahn School of Medicine at Mount Sinai, New York, NY*

**264** Baseline Measures of Resident and Faculty Confidence Perceptions on Leading Level 1 Traumas Prior to Implementation of a Novel Training Program
*A Weitz, Texas Tech University Health Sciences Center School of Medicine & University Medical Center, Lubbock, TX*

**265** Trauma Education Practices in Emergency Medicine Residencies: A Survey of Program Directors
*C Lanning, Texas Tech University Health Sciences Center*

**266** Micro-Transit Injuries Admitted to an Urban Trauma Center: A Trauma Registry Review
*T Gaeta, NYP Brooklyn Methodist Hospital, Brooklyn, NY*

**267** Identifying Occult Shock in Young Trauma Patients Using Logistic Regression Analysis of the 2020 National Trauma Data Bank
*T Poturas, New York Presbyterian Brooklyn Methodist Hospital, New York, NY*

**268** Epidemiology of Urban Micro-Transit Injuries
*T Gaeta, NYP Brooklyn Methodist Hospital, Brooklyn, NY*

***RF47 Pain Management***

Room 106AB

**269** Inhaled Glucocorticoids for Acute Pharyngitis: A Randomized Clinical Trial
*A Al-Atbi, Royal Oman Police Hospital, Muscat, Muscat (Oman)*

**270** Appropriate Emergency Severity Index Assignment and Timely Pain Management for Emergency Department Patients With Vaso-occlusive Crisis
*F Froke, Mayo Clinic, Rochester, MN*

**271** Acupuncture Treatment in the Emergency Department Reduces Pain and Revisits
*E Zhao, Cook County Health, Chicago, IL*

**272** Evaluation of an Emergency Department-Based Over-the-Counter Analgesic Medication Starter Pack Initiative and Subsequent 30-Day Revisits
*S Sheikh, University of Florida College of Medicine - Jacksonville, Jacksonville, FL*

**273** Opioid Prescribing to Medicare Beneficiaries by American Board of Emergency Medicine-Certified Physicians and Other Physicians Practicing Emergency Medicine
*J Geddes, ABEM - American Board of Emergency Medicine, East Lansing, MI*

**274** Patient Utilization and Feedback After a Novel Pain Coach Educator and Integrative Pain Management Toolkit Session in an Urban Academic Emergency Department
*P Hendry, University of Florida College of Medicine, Jacksonville, FL*

***RF48 Education - Pain Management, Quality, Safety***

Room 105AB

**275** Factors Associated With Conversion to Procedural Sedation After Intra-articular Lidocaine Administration for Emergency Department Anterior Shoulder Dislocation Reduction
*D Wright, Yale University School of Medicine, New Haven, CT*

**276** Inhaled Nitrous Oxide for Shoulder Dislocation Reduction in the Emergency Department: A Retrospective Case Series
*S Hochman, St. Joseph's University Medical Center, Paterson, NJ*

**277** Reducing the Number of Physical Assaults on Emergency Medicine Residents by Agitated Patients Through Implementation of a BETA Guideline-Based Initiatives
*L Beyer, Parkland Memorial Hospital, Dallas, TX*

**278** Pain Control Guidance Reduces Opioid Disparities But Not Prescriber Flexibility
*C Lee, Highland Hospital, Oakland, CA*

**279** A Quality Improvement Project Is Associated With Increased Prescribing of Laxatives With Opioid Analgesics to Patients Discharged From the Emergency Department
*B Lorenzen, Southern California Permanente Medical Group, San Diego, CA*

**280** Medicine Meets Engineering: Development of Discrete Naloxone Nasal Spray Devices to Increase Access
*P Moschella, USC School of Medicine Greenville, Prisma Health-Upstate, SC*

**TUESDAY, OCTOBER 10, 2023**

**3:30 pm - 4:30 pm**

***RF49 Social Determinants and Diversity***

Room 104AB

**281** Human Trafficking: Screening and Linkage to Care
*C Pulvino, University of Cincinnati, Cincinnati, OH*

**282** Waiting for Rock Bottom: Health Care Engagement Before and After Initiation of Medication-Assisted Treatment for Alcohol Use Disorder
*E Johnson, University of Southern California*

**283** A Pilot Study to Examine Resilience and Returns to the Emergency Department
*B Westgard, Regions Hospital, HealthPartners, University of Minnesota, Minneapolis/St. Paul, MN*

**284** Nationwide Capabilities Assessment of Emergency Department Care of Patients With Opioid Use Disorder: 2022 to 2023
*K Hawk, Yale University, New Haven, CT*

**285** Trauma Evaluation and Outcomes of Incarcerated and Non-Incarcerated Patients
*M Suh, Baylor College of Medicine, Houston, TX*

**286** Race and Ethnic Differences in Anxiety-Related Emergency Department Visit Trends
*M Samtodomingo, University of California San Diego, San Diego, CA*

***RF50 COVID - Pediatrics***

Room 110AB

**287** Epidemiology of Well-Appearing Febrile Infants (<60 Days) Presenting to an Emergency Department During the COVID-19 Pandemic
*C McCrory, Pennsylvania State University College of Medicine, Hershey, PA*

**288** In-Situ Simulation Needs Assessment to Identify Areas of Opportunity in Pediatric Cardiac Arrest Management
*T Timm, Washington University in St. Louis, St. Louis, MO*

**289** Utilization of Sexual Assault Forensic Examiners in Emergency Department Child Maltreatment Evaluations
*K Morrissey, Albany Medical Center, Albany, NY*

**290** Predictors of Return of Spontaneous Circulation in Pediatric Out-of-Hospital Cardiac Arrest: A Single Out-of-Hospital Network Review
*M Hanna, Rutgers/RWJBH, Newark, NY*

**291** Improving Emergency Department Postintubation Sedation in Pediatric Patients: A Quality Improvement Initiative
*E Wynia, Washington University in St. Louis School of Medicine, St. Louis, MO*

**292** Expanding HIV Screening in a Pediatric Emergency Department on Chicago's South Side
*R Danzig, University of Chicago, Chicago, IL*

***RF51 Ultrasound***

Room 106AB

**293**[EMF] Interrater Agreement After Online Dissemination of Novel Lung Ultrasound Findings: Implications for Future Pandemics
*C Gerhart, Washington University, St. Louis, MO*

**294** How Thick Is Too Thick? Diagnostic Utility of the Anterior Pleural Line Thickness on Point-of-Care Ultrasound in Identifying Patients With Pneumonia
*C Smilios, North Shore University Hospital*

**295** Artificial Intelligence Model to Identify Pleural Line Abnormalities in Lung Ultrasound
*N Schnittke, Oregon Health Science & University, Portland, OR*

**296** Increased Number of B-Lines After 500cc Fluid Bolus Associated With Worse Outcomes
*A Jin, North Shore University Hospital*

**297** Right Ventricular Assessment by Emergency Department Clinicians
*V Rao, North Shore University Hospital*

**298** Proficiency-Based Simulation Training: Will This Work for Resuscitative Transesophageal Echocardiography
*W Huang, Washington University in St. Louis School of Medicine, St. Louis, MO*

***RF52 Toxicology***

Room 105AB

**299** Patient Factors That Influence Utilization of Emergency Department-Based Programs to Combat Opioid Use Disorder
*S Matts, The MetroHealth System, Case Western Reserve University School of Medicine, Cleveland, OH*

**300** Prevalence of Fentanyl Co-Ingestion Among Emergency Department Patients With Opioid and Non-Opioid Drug Overdoses
*D Sacco, Columbia University Irving Medical Center, New York, NY*

**301** Buprenorphine Induction in Emergency Department Patients Following Reversal of Nonfatal Opioid Overdose With Naloxone
*P Moore, University of Chicago, Chicago, IL*

**302** Incidence of Buprenorphine-Precipitated Withdrawal in Emergency Department Patients With Opioid Use Disorder in Philadelphia
*A Kilaru, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA*

**303** Suboxone for Opioid Use Disorder: Reduction in Mortality and Increased Remission
*D Jehle, UTMB, Galveston, TX*

**304** Randomized Controlled Trial of ANEB-001 as an Antidote for Acute Cannabinoid Intoxication in Healthy Adults
*A Monte, Rocky Mountain Poison & Drug Safety, Denver, CO*

**WEDNESDAY, OCTOBER 11, 2023**

**10:00 am - 11:00 am**

***RF53 Trauma***

Room 104AB

**305** The Association Between Frailty and Hospital Stays Among Geriatric Trauma Patients: A Retrospective Cohort Analysis
*O Adeyemi, New York University Grossman School of Medicine, New York, NY*

**306** Traumatic Injuries in Sexual Assault Patients Included in the 2020 National Trauma Data Base
*M Milad, New York Presbyterian Brooklyn Methodist Hospital*

**307** Identification of Patients With Low-Risk Traumatic Brain Injury Initially Treated at a Rural Emergency Department
*R Nene, University of California San Diego, San Diego, CA*

WEDNESDAY, OCTOBER 11, 2023 —*cont'd*

**308** Barriers to Early Adoption of Novel Program to Train and Evaluate Resident Performance as Trauma Team Leaders
*F Frankovsky, Texas Tech University Health Sciences Center, Lubbock, TX*

**309** Search and Rescue: Techniques for Ear Foreign Body Removal in the Emergency Department
*S Hudock, Michigan State University College of Human Medicine, Grand Rapids, MI*

**310** National Utilization of Focused Assessment With Sonography for Trauma Compared to Computed Tomography From 2019 – 2021
*S Stempien, NYP Brooklyn Methodist, Brooklyn, NY*

***RF54 Informatics and Telehealth***

Room 110AB

**311*** A Machine Learning Approach to Predicting Boarding and Admission Surges Using Triage Information
*M Makutonin, George Washington University, Washington, DC*

*Best Medical Student Abstract

**312** When AI Meets the Emergency Department: Realizing the Benefits of Large Language Models in Emergency Medicine
*N Ashenburg, Stanford University, Palo Alto, CA*

**313** Leveraging Decision Trees to Forecast Ambulance Traffic in Emergency Departments
*E Etu, San Jose State University, San Jose, CA*

**314** Machine Learning Model to Predict Emergency Department Length of Stay
*D Hunter, Mayo Clinic, Rochester, MN*

**315** Ethical Consequences of Disagreements Between Clinicians and Artificial Intelligence Recommendations: A Scoping Review
*A Matin, Mayo Clinic, Rochester, MN*

**316** Artificial Intelligence to Predict Billing Code Levels of Emergency Department Encounters
*J Morey, Mayo Clinic, Rochester, MN*

***RF55 Venous Thromboembolism***

Room 106AB

**129** A Novel Teaching Intervention Improves Comfort With Delivering Serious News in Emergency Medicine Trainees
*C Harvey, University of Michigan, Ann Arbor, MI*

**317** Outcomes in High-Risk Pulmonary Embolism Patients Presenting in Advanced Shock: Insights From the FLAME Study
*S Khandhar, Penn Presbyterian Medical Center, Perelman School of Medicine at the University of Pennsylvania*

**318** Implementation and Evaluation of a Single Center, Multi-Component Intervention to Avoid Hospitalization of Patients With Low-Risk Acute Pulmonary Embolism
*C O'Hare, University of Michigan, Ann Arbor, MI*

**319** Performance of the Khorana Score in the Prediction of Pulmonary Embolism in Emergency Department Patients With Cancer
*C Coyne, University of California San Diego, San Diego, CA*

**320** Effects of the COVID-19 Pandemic on Incidence of Thrombotic Events in Patients Presenting to the Emergency Department
*K Bischoff, Rutgers Health/Community Medical Center, Toms River, NJ*

**321** Sonography for Pulmonary Embolism in the Emergency Department
*C Blackwell, Prisma Health, Greenville, SC*

***RF56 Cardio***

Room 105AB

**322** Effect of Danegaptide on Gap Junction Preservation at the Blood-Brain Barrier After Sudden Cardiac Arrest
*A Dalo, The MetroHealth System, Case Western Reserve University School of Medicine, Cleveland, OH*

**323** Increased Burden of Cardiovascular Disease Risk Factors Associated With Short Term Emergency Department Bounceback Admission Related to Sepsis
*A Chen, University of California, San Diego, San Diego, CA*

**324** Comparison of Outcomes After Treatment of Asymptomatic Hypertension in the Emergency Department in Admitted Patients
*S Galla, Corewell Health, Royal Oak, MI*

**325** A Convolutional Neural Network for the EKG Detection of Wolff-Parkinson-White Syndrome
*A Smith, Kent State University, Kent, OH*

**326** Tracheal Intubation Prior to Arrival or Cardiac Arrest in the Emergency Department Is Associated With Lower Odds of Return of Spontaneous Circulation: A Video Review Registry Study
*S Rodriguez, North Shore University Hospital, Manhasset, NY*

**327** Does Guideline Implementation Affect Sex and Race/Ethnicity Differences in Objective Cardiac Testing for Patients Evaluated for Acute Coronary Syndrome in the Emergency Department?
*E Murray, Denver Health Medical Center, Denver, CO*

**WEDNESDAY, OCTOBER 11, 2023**

**11:00 am - 12:00 pm**

***RF57 Administration***

Room 104AB

**328** Modified Early Warning Score as a Triage Tool for Streamlined Admission
*K Rozova, Lehigh Valley Hospital and Health Network/USF Morsani College of Medicine, Allentown, PA*

**329** Trends and Analysis of Medicare Reimbursement of Emergency Department Coding Levels
*G Mahdi, Mayo Clinic, Scottsdale, AZ*

**330** A Quality Improvement Initiative to Improve Influenza Vaccinations in the Emergency Department During a Tripledemic
*P Singh, Mount Sinai Morningside-West, New York, NY*

**331** Implementation of Integrated Electronic Health Record Access for Out-of-Hospital Clinicians
*M Hall, University of Massachusetts Chan Medical School, Worcester, MA*

**332** Geriatric Population Triage: The Risk of Real-Life Over- and Under-Triage in a Crowded Emergency Department. 4- and 5-level Triage Systems Compared: The CREONTE (Crowding and R E Organization National TriagE) Study
*G Savioli, IRCCS Policlinico San Matteo, Pavia, Italy*

**333** Artificial Intelligence to Predict Emergency Department Workups From Nurse Triage Notes and Registration Data
*J Morey, Mayo Clinic, Rochester, MN*

WEDNESDAY, OCTOBER 11, 2023 —*cont'd*

***RF58 Ultrasound***

Room 110AB

**334** Novel Application of Artificial Intelligence in Ultrasound of Solid Organ Adjacent Morison's Pouch by Object Segmentation
*P Hsiang, Kaohsiung Veterans General Hospital, Kaohsiung City, Taiwan*

**335** Comparison of the Frequency of Transvaginal Ultrasound Utilization Between Radiology and Point-of-Care Ultrasound in First Trimester Pregnancy
*K Livingstone, University of Virginia Health System, Charlottesville, VA*

**336** Trends in Point-of-Care Ultrasound Image Acquisition and Interpretation Within a Regional Hospital System
*N DiMeo, University Hospitals Cleveland Medical Center, Cleveland, OH*

**337** Can the Presence of Gestational Sac Alone on Emergency Physician-Performed Point-of-Care Ultrasound Safely Exclude Ectopic Pregnancy?
*A Bates, Mount Sinai, New York, NY*

**338** Impact of Point-of-Care Ultrasound on Time to Operating Room for Patients With Ruptured Abdominal Aortic Aneurysms
*L Throckmorton, Prisma Health Upstate, Greenville, SC*

**339** Are Measurements of the Abdominal Aorta Affected by the Type of Ultrasound Gel Used?
*M Baranowski, University of Maryland School of Medicine, Baltimore, MD*

***RF59 Education***

Room 106AB

**340** Feel the Burn, While You Learn: The Impact of Exercise on Podcast Knowledge Acquisition and Retention
*M Gottlieb, Rush University Medical Center, Chicago, IL*

**341** Breaking Bad News: How Doctors Communicate Life-Threatening Diagnoses on Television
*A Croft, Michigan State University College of Human Medicine, Grand Rapids, MI*

**342** Incorporating Point-of-Care Ultrasonography to Enhance Anatomy Learning for the First Year Medical Student
*K Jones, University of Louisville School of Medicine, Louisville, KY*

**343** Assessing the Educational Value of YouTube and TikTok Videos on Home Suture Removal
*L Sellers, MSU College of Human Medicine, Grand Rapids, MI*

**344** Successful Implementation of Structured Flipped Classroom Through Case-Based Learning and Board Review Questions
*J West, NYC Health + Hospitals | Lincoln, Bronx, NY*

**345** Comparing Scenario-Based Simulation Education to Escape Room Simulation Education With Emergency Medicine Residents
*A Bethel, Banner University Medical Center - Tucson*

***RF60 Neurology***

Room 105AB

**346** Stroke Risk After Emergency Department Treatment of Elevated Blood Pressure in Transient Ischemic Attack
*A Biel, Oakland University William Beaumont School of Medicine, Rochester, MI*

**347** Effect of an Artificial Intelligence Tool on Stroke Metrics in Endovascular Thrombectomy Patients
*M Akhter, Penn State Hershey*

**348** Effect of Prior Antithrombotic Medication Use on Patients Receiving Emergent Comprehensive Stroke Treatment
*S Phadnis, Florida Atlantic University, Boynton Beach, FL*

**349** Effect of an Artificial Intelligence Tool on Length of Stay and Mortality in Endovascular Thrombectomy Patients
*M Akhter, Penn State Hershey*

**350** Accuracy of Published Screening Tools for Large Vessel Occlusion in Patients With Suspected Acute Ischemic Stroke: A Prospective Cohort Study
*F Desmeules, l'Université Laval, Québec, Canada*

**351** Inaccurate Use of HINTS Exam by Emergency Physicians in Patients With Dizziness
*M Akhter, Penn State Hershey*

**WEDNESDAY, OCTOBER 11, 2023**

**12:00 pm - 1:00 pm**

***RF61 Health Policy***

Room 104AB

**352** Evaluating ACEP Clinical Policy Awareness and Trustworthiness Among Emergency Medicine Residents and Attendings Using the National Guideline Clearinghouse Extent of Adherence to Trustworthy Standards Instrument
*I Ferguson, Washington University School of Medicine, St. Louis, MO*

**353** Medication Adherence Among Patients Who Initiated Naltrexone for Treatment of Alcohol Use Disorder in the Emergency Department
*E Forsgren, Olive View-UCLA Medical Center, Sylmar, CA*

**354** Administration of Potassium Binders in the Emergency Department Reduces Return Visits
*Z Rafique, Baylor College of Medicine, Houston, TX*

**355** Unique Implementation of an Emergency Department Human Immunodeficiency Virus Routinized Screening Program
*M Ullo, Hackensack Meridian Health - HUMC; Hackensack New Jersey; Hackensack School of Medicine, Nutley, NJ*

**356** Five-Level Triage vs Four-Level Triage in a Quaternary Emergency Department: National Analysis on Waiting Time, Validity, and Crowding. The CREONTE (Crowding and RE-Organization National TriagE) Study Group
*I Ceresa, IRCCS Humanitas, Rozzano, Italy*

**357** The Effects of Patterns of Polysubstance Use on Frequent Emergency Department Utilization and One-Year Mortality
*M Gormley, Prisma Health Upstate, Greenville, SC*

***RF62 Resuscitation***

Room 110AB

**358** Time and Day of Cardiac Arrest Presentation to the Emergency Department Associations With Time to Critical Interventions and Outcomes: A Video Review Study
*A McLaughlin, North Shore University Hospital, Manhasset, NY*

**359** Manual Versus Mechanical Cardiopulmonary Resuscitation Complications After Successful Resuscitation for Out-of-Hospital Cardiac Arrest
*C Chen, Oakland University William Beaumont School of Medicine, Rochester, MI*

WEDNESDAY, OCTOBER 11, 2023 —*cont'd*

**360** Positioned for Success: A Novel Exploration of Changes to Chest Compressions During Cardiopulmonary Resuscitation and Associated Patient Outcomes
*A Berruti, Northwell, Donald and Barbara Zucker School of Medicine at Hofstra*

**361** Assessing Targeted Temperature Management for Cardiac Arrest Patients in the Interfacility Transfer Setting
*M Burla, MaineHealth, Biddeford, ME*

**362** Role of Real-Time Visual Feedback Device on Cardiopulmonary Resuscitation Training Among School Children: A Randomized Controlled Trial
*A Sahu, AIIMS New Delhi, India*

**363** External Validation of the Relationship Between Lactate Level and In-Hospital Cardiac Arrest in the Emergency Department
*Y Fu, Far Eastern Memorial Hospital, New Taipei, Taiwan*

***RF63 Geriatrics***

Room 106AB

**364** Older Adults' Knowledge of Code Status and Perceived Outcomes After Cardiopulmonary Resuscitation
*E Albert, Maine Medical Center, Portland, ME*

**365** Trends in Hospice and Palliative Medicine Consults Initiated in the Emergency Department: A Seven-Year Utilization Analysis
*A Al-Hage, Henry Ford Wyandotte Hospital, Wyandotte, MI*

**366** Patient Preferences for Social Interventions to Reduce Social Isolation in Older Adults Discharged From the Emergency Department
*D Zheng, Schulich School of Medicine and Dentistry, London, Ontario, Canada*

**367** Metric Impact of Embedded Emergency Department Palliative Care Provider in Patients With Unmet Palliative Care Needs
*A Sharp, Mayo Clinic, Jacksonville, FL*

**368** Comprehensive Geriatric Assessments in the Emergency Department Impact Inpatient Length of Stay
*V Tolia, University of California San Diego, San Diego, CA*

**369** Geriatric Emergency Department Guidelines 2.0: Systematic Review on the Comparative Safety of Sedating Medications Used in the Treatment of Older Adults With Acute Agitation
*M Casey, University of North Carolina, Chapel Hill, NC*

***RF64 Medley***

Room 105AB

**114** High-Sensitivity Troponin Velocity for the Detection of Acute Coronary Syndrome
*E Suh, Columbia University Irving Medical Center, New York, NY*

**211** Gender Differences in Empiric Treatment in US Emergency Departments for Chlamydia and Gonorrhea: A Systematic Review and Meta-analysis
*R Patel, Northeast Ohio Medical University, Rootstown, OH*

**384** A Cluster Randomized Controlled Trial of Interventions to Increase Influenza Vaccine Uptake Among Underserved Emergency Department Patients
*R Rodriguez, UCSF School of Medicine, San Francisco, CA*

**409** Saving Extended Focused Assessment With Sonography in Trauma (eFAST) Exams During Pediatric Traumas
*G Baye, NYU Langone Health, New York, NY*

**429** Interprofessional In Situ Simulation to Optimize Cardiac Arrest Management in an Emergency Department Observation Unit
*M Losak, Stanford University, Palo Alto, CA*

Abbate L, 437 EMF
Adeyemi O, 305
Agarwal A, 23 EMF, 24 EMF, 188
Ager E, 100
Akhter M, 347, 349, 351
Albert E, 130, 364
Al-Hage A, 365
Allen J, 389
Aloumi A, 206
Angel A, 161
Ann M, 357
Apakama D, 152
Arand C, 224
Arnold M, 373
Ashenburg N, 312
Aukstakalnis V, 68
Aung P, 414
Azqul M, 117, 387
Ballard J, 30
Baranowski M, 339
Bass R, 127
Bates A, 337
Baye G, 409
Bellew S, 122
Bellolio F, 119, 120, 234
Berg E, 258
Berg S, 50
Bernard J, 90
Berruti A, 360
Bethel A, 345
Beyer L, 277
Bhavsar N, 253
Bianconi K, 202
Biebelberg B, 137
Biel A, 346
Bischoff K, 320
Blackwell C, 321
Blackwood B, 98
Boley S, 106
Boubouleix K, 223
Bradley E, 444 EMF
Broderick J, 133
Burla M, 204, 361
Butt M, 64
Campbell R, 243
Carr B, 38
Casey M, 369
Ceresa I, 356
Chen A, 323
Chen C, 359
Chenworth M, 66
Chera T, 134, 146 EMF
Choi S, 392
Clay C, 413
Clay M, 121
Collier C, 385
Coyne C, 319
Cozzi N, 34
Croft A, 341
Cullen D, 410 EMF
Daichang C, 154
Dalo A, 322
Dameff C, 421
Danzig R, 292
Davis A, 61
DeLaroche A, 147 EMF
Desmeules F, 350
DiCesare D, 110
DiMeo N, 336
Doyle R, 74, 144
Draper P, 96
Duran-Gehring P, 430 EMF
Ebeling-Koning N, 47
Elamin H, 62
Enayati D, 250
Etu E, 313
Eucker S, 150 EMF
Fairchild J, 205
Farmer B, 14
Feldmeier M, 84
Fenstermacher K, 394
Ferguson I, 352
Fermann G, 2
Firew T, 5
Follman S, 428 EMF
Ford J, 79
Forrester J, 6
Forsgren E, 353
Foster A, 182
Frankovsky F, 308
Froke F, 270
Fu Y, 363
Gaeta T, 266, 268
Gaiazov S, 88
Galla S, 324
Garrity B, 168
Gartman G, 196
Gerardo C, 4
Gerhart C, 293 EMF
Ghaith S, 83
Giarrusso P, 97
Gilman S, 233
Gordon B, 17
Gottlieb M, 340
Grass E, 108
Greenhow T, 167
Gupta N, 441
Haas M, 125 EMF
Hall M, 331
Hanna M, 290
Hansoti B, 162
Harris A, 111
Harvey C, 129
Hasan A, 22
Hasan M, 448
Haskins P, 257, 412
Hasleton L, 87
Hawk K, 284
Hay S, 156
Hayden E, 259
Hayes J, 132
Heffler M, 227
Hendry P, 274
Hertner G, 375
Hochman S, 276
Hoffer M, 33
Hoffman S, 240
Hopson L, 148 EMF
Howard L, 442
Hsiang P, 334
Hsieh M, 3, 160
Huang S, 201
Huang W, 298
Huang Y, 42
Hudepohl N, 241
Hudock S, 309
Hunter D, 314
Iscoe M, 207, 210
Jasperse N, 214
Jehle D, 230, 303
Jiang L, 151, 244
Jin A, 296
Johnson E, 282
Johnson O, 101
Jones K, 342
Jones S, 99 EMF
Jordan J, 124
Joseph J, 186
Jung M, 18
Kaki D, 123
Kawaguchi T, 231
Kei J, 72
Keilty J, 94
Keller C, 93
Kerimova L, 431
Khandhar S, 317
Khattab A, 190
Khidir H, 189
Kilaru A, 9, 180, 302
Kim I, 213, 402
Kim E, 218
Kim M, 225
Kim Y, 252
Kinney E, 112
Kivlehan S, 11
Klumpers L, 380
Kobayashi K, 136
Koehler J, 126
Koscumb P, 116
Kothare A, 427
Kraus C, 273
Kraus M, 25
Kreshak A, 19
Kumar A, 29, 46, 362
Kwamin K, 75
Lanning C, 265
Lardaro T, 170
Larson C, 406
Le D, 21
Lee C, 251
Lee C, 278
Lee P, 45
Lenning J, 10
Lesh N, 115
Lett E, 105
Levine A, 220
Lew V, 28
Li K, 81
Li S, 141
Lin S, 209 EMF
Lippert S, 245
Livingstone K, 335
Locke D, 379
Longerstaey O, 138
Lopreiato N, 164
Lorenzen B, 52, 279
Losak M, 429
Luu B, 80
Mackey J, 219, 221
Mahdi G, 191, 329
Maia I, 254, 395, 396
Majeed A, 85
Majmundar P, 372
Makutonin M, 311
Malhotra C, 73
Mallory B, 426
Mandan A, 269
Mantel R, 422
Marwaha A, 432
Mathews A, 140
Matin A, 315
Matts S, 299
Mauermann A, 216
McCabe A, 63, 397, 424, 445
McClung C, 390
McConnell R, 419
McCrory C, 287
McDaniel G, 198 EMF
McEnery M, 51
McGuire S, 65
McLaughlin A, 358
Mendez D, 77
Mikutra-Cencora M, 56
Milad M, 306
Miller J, 260
Minor M, 165
Miyaoka S, 399
Monte A, 304
Montgomery C, 27
Monuteaux M, 181 EMF
Monzon R, 386
Moore J, 398
Moore P, 301
Moran M, 89, 92
Morey J, 174, 316, 333
Morrissey K, 289

Moschella R, 142, 212, 280
Mullennix S, 20
Murali S, 135
Murray E, 327
Murray L, 36
Naeem A, 400 EMF
Nassereddine H, 208
Navarro L, 435
Nene R, 307
Neyman G, 155
Norkett W, 255
Numata K, 222
Nunez T, 172
Oboli V, 197
O'Donnell J, 53
Offorjebe O, 217 EMF
O'Hare C, 318
O'Neal H, 235
Pandey S, 403
Pare B, 131
Pasadyn C, 438
Patel M, 411
Patel P, 246
Patel R, 103
Patel R, 211
Patel S, 443
Pavuluri S, 95
Paxton J, 1
Pena K, 139
Penza C, 192
Perman S, 420 EMF
Phadnis S, 348
Philbeck T, 166
Piard H, 67
Pierce N, 415
Pitter D, 391
PK R, 383
Plezia A, 176
Poturas T, 267
Pourmand A, 418
Pradarelli B, 163
Preiksaitis C, 194
Premer-Barragan C, 49
Pulvino C, 281
Rafique Z, 55, 354
Ragazzo G, 193
Rao V, 297
Razavi S, 43, 262
Reddy R, 408
Rodriguez R, 215, 384
Rodriguez S, 326
Rosenberg M, 239
Rothman R, 159
Rovenolt G, 16
Rozova K, 328
Rudolph D, 158
Rustscheff C, 76
Sacco D, 300
Sacco M, 78
Safa R, 31
Salah W, 58
Samtodomingo M, 286
Samuels E, 91
Sangal R, 169, 173
Sanky C, 37, 263
Savioli G, 183, 332
Schaeffer K, 185
Scherwani A, 440
Schnittke N, 295
Seidenfeld J, 59
Sellers L, 343
Sergi S, 107
Serina P, 60
Shalaby M, 157
Shank E, 433
Shanley J, 199, 200
Sharif S, 70
Sharp A, 367
Sheikh S, 272
Shepherd C, 228
Sherman M, 41, 237
Shure B, 405
Siddle J, 153
Silvagi R, 7
Singh P, 330
Slovis B, 261
Smilios C, 294
Smith A, 325
Smith K, 54
Smylie L, 128
Sookdeo M, 439
Stein M, 229
Stelter J, 15
Stempien S, 310
Stucker K, 179
Suh E, 114
Suh M, 285
Sun W, 8, 86
Suto D, 388
Talbot C, 177
Theodoro D, 149 EMF
Thom C, 32
Throckmorton L, 338
Throop J, 26
Timm T, 288
Tlatelpa K, 187
To J, 236
Tolia V, 368
Torres A, 195
Tosibphanom J, 374
Tyler W, 40, 118
Ulintz A, 178
Ullo M, 355
Vajda P, 404
Vilke G, 247
Villegas D, 69, 256
Wade J, 104
Waheed S, 143, 145
Walters B, 57
Wang J, 109
Wanis N, 370
Wardi G, 13
Waseem M, 446, 447
Weathers E, 39, 242
Weber L, 171
Wegman M, 12, 401
Weick R, 248
Weiner S, 48
Weiss K, 407
Weitz A, 264
Welch R, 382
West J, 344
Westgard B, 283
Wilkinson B, 203
Williams H, 44
Wright D, 275
Wu F, 71
Wubben B, 226
Wynia E, 291
Yang D, 102
Yoon I, 238
Young S, 378
Zajd S, 113
Zelaya H, 423
Zhao E, 271
Zheng D, 366
Zimmerman T, 35
Zitek T, 82, 416 EMF, 417

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## 1 Results From the "hEad Pulse for Ischemic StrOke DEtection Prehospital Study During the COVID-19 Pandemic" (EPISODE-PS-COVID)

Paxton J, Klausner H, Wise S, Wilburn J, Kreitel K, Morgan L, Madhok D, Barazangi N, McLean S, Dunne R/Wayne State University, Detroit, Michigan, US

Objectives: Large vessel occlusion (LVO) ischemic stroke represents only one-third of acute ischemic stroke (AIS) in the United States but is associated with two-thirds of post-stroke dependence and >90% of post-stroke mortality**.** Prehospital LVO detection is essential to providing efficient EMS transport to a thrombectomy-capable center. Clinical stroke scales lack adequate sensitivity and specificity to reliably diagnose LVO. Our objective was to determine whether a portable cranial accelerometry (CA) headband device with ECG monitoring could reliably predict LVO stroke in the prehospital setting.

Methods: The "hEad Pulse for Ischemic StrOke DEtection Prehospital Study during the COVID-19 pandemic" (EPISODE-PS-COVID) enrolled consecutive adult (≥ 18 years old) patients suspected of AIS from 11 study hospitals in four different geographical regions (i.e., Detroit, Kalamazoo, Saginaw, San Francisco) over a 21month period. Patients received Harmony$^{TM}$ 5000 device placement by prehospital EMS personnel, with headset data only matched with clinical data following informed consent. Patients were excluded if they had evidence of head trauma, declined consent, or had < 90 seconds of usable headset data. Device performance was compared to contemporaneously derived Los Angeles Motor Scale (LAMS) scores. COVID-19 status was recorded, with testing and positivity rates compared between groups.

Results: 594 subjects received device placement, with 158 subjects providing informed consent with adequate useable headset and ECG data for statistical analysis. Reasons for exclusion from analysis included: unable to obtain / declined consent (191 subjects), transport to a nonstudy site (69), hardware failure (21), and inadequate data (155). Of 158 included subjects, 84 (53%) were females, and median age was 69 years (IQR 20). 58 (36.7%) subjects were ultimately diagnosed with AIS on radiographic assessment, including 28 (17.7%) LVO and 30 (19.0%) non-LVO strokes. Most LVO strokes were in the anterior circulation (2 intracranial internal carotid artery, 14 M1 segment, 10 M2 segment) with one basilar artery LVO. COVID-19 testing and positivity rates were not significantly different between groups. Treatment of LVO included t-PA in seven (25%) cases, and EVT in 17 (60.7%) cases. Nine (5.7%) subjects had intracerebral hemorrhage, and the remaining 91 (57.6%) were found to be stroke mimics. We found a sensitivity of 40.7% and specificity of 90.0% for the LAMS score in detecting LVO stroke, compared to a sensitivity of 85.0% and specificity of 89.0% for the study device. The Harmony$^{TM}$ 5000 device was found to have an area under the receiver-operator curve (AUC) of 0.91, compared to AUC of 0.83 for the contemporaneous LAMS examination in the detection of LVO stroke (Figure 1).

Conclusions: Our results suggest that cranial accelerometry can be used to detect LVO ischemic stroke with performance characteristics comparable, if not superior, to clinical stroke detection methods such as the LAMS score. This technology has the potential to standardize and greatly simplify prehospital LVO stroke detection, which has implications for improved triage and stroke transport to appropriate EVT-capable hospitals when LVO stroke is suspected. Further study is needed to determine whether earlier and more reliable LVO detection can lead to improved clinical patient outcomes.

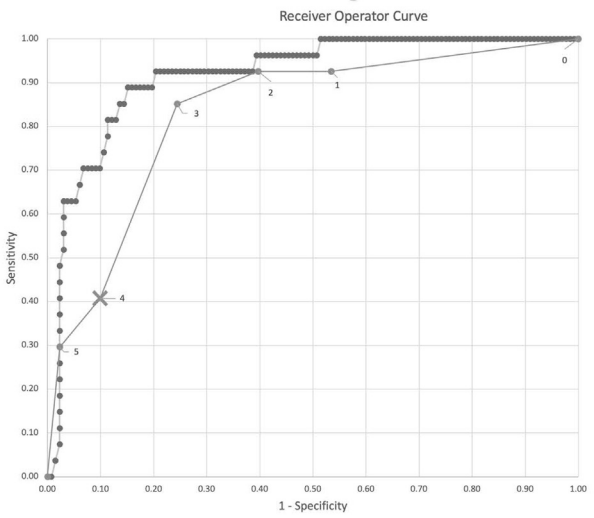


**Figure 1**. Receiver-operator curve for Harmony® 5000 device (thick line) and LAMS score (thin line). Standard threshold of 4 for LAMS cut-off (marked with X) is shown, along with other potential score thresholds.

Yes, authors have interests to disclose
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Investigator
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## 2 Lower In-Hospital Mortality and Rebleeding Among Patients With Major Gastrointestinal Bleeding Treated With Andexanet Alfa vs 4-Factor Prothrombin Complex Concentrate

Fermann G, Coleman C, Danese M, Lesén E, Christoph M, Chang R, Ulloa J, Danese S, Koch B, Dobesh P/University of Cincinnati, Cincinnati, Ohio, US

Objectives: Major bleeding related to use of oral Factor Xa inhibitors (FXai) is associated with morbidity and mortality. Several studies have assessed the impact of specific reversal agents or replacement therapies on clinical outcomes among patients with intracranial hemorrhage, but data are limited among patients with gastrointestinal (GI) bleeding. The purpose of this subgroup analysis of a larger observational cohort study was to describe baseline clinical characteristics and outcomes for patients with GI bleeding managed with either andexanet alfa or 4-factor prothrombin complex concentrate (4F-PCC).

Methods: In this multicenter observational study, patient chart data were extracted from 354 US hospitals. Eligible patients were ≥18 years old, treated with andexanet alfa or 4F-PCC when hospitalized for an anticoagulant-related major bleed (ICD-10 diagnosis code D68.32, indicating bleeding due to extrinsic anticoagulants) between July 2018 and September 2022, who received either apixaban or rivaroxaban prior to the bleed, and had a documented discharge disposition. Demographic, baseline clinical data, and key outcomes, including in-hospital mortality and experiencing a rebleeding event more than 24 hours after reversal/replacement administration during the hospitalization, were extracted from patient charts.

Results: The sample included 2,567 patients (N=1,206 andexanet alfa; N=1,361 4F-PCC) with GI bleeding (Table). Approximately 40% of patients in both treatment groups had upper GI bleeds, 33% had lower GI bleeds, and 27% had GI bleeds of other/unknown origin. Over 80% of patients in both treatment groups presented to the emergency department. In-hospital mortality occurred in 2.5% of patients treated with andexanet alfa and 4.3% in those treated with 4F-PCC ($P = 0.01$). Rebleeding within the hospitalization was 3.3% for andexanet alfa and 4.3% for 4F-PCC ($P = 0.081$).

Conclusions: In the largest real-world descriptive study to date of patients with GI bleeding related to use of rivaroxaban or apixaban, the occurrence of in-hospital mortality and of rebleeding was lower in patients treated with andexanet alfa than with 4F-PCC.

**Table**. Baseline characteristics for patients treated with andexanet alfa or 4F-PCC

| Baseline characteristics | Andexanet alfa N=1,206 | 4F-PCC N=1,361 |
|---|---|---|
| Age, mean (SD) | 65.2 (12.7) | 65.7 (13.3) |
| Male, % (n) | 56.2% (678) | 62.0% (844) |
| **Anticoagulant use, % (n)** | | |
| Apixaban | 57.5% (693) | 64.1% (873) |
| Rivaroxaban | 42.5% (513) | 35.9% (488) |
| **GI bleed location, % (n)** | | |
| Upper GI | 39.4% (475) | 40.4% (550) |
| Lower GI | 33.3% (402) | 31.9% (434) |
| Other/unknown | 27.3% (329) | 27.7% (377) |
| **Location of presentation, % (n)** | | |
| Emergency department | 82.7% (997) | 84.1% (1,145) |
| Directly admitted | 8.5% (103) | 5.9% (80) |
| Hospital transfer | 8.6% (104) | 9.8% (133) |
| Other/unknown | 0.2% (2) | 0.2% (3) |

Yes, authors have interests to disclose
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## 3 Impact of Time to Antibiotic Therapy on Clinical Outcomes in Patients With Sepsis in the Emergency Department

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Background: Guidelines for treating sepsis recommend aggressive time to antibiotic (T2A) targets for broad-spectrum antibiotics for suspected sepsis and septic shock, particularly within 1 h. This recommendation has been challenged and caused controversy because the evidence is weak.

Objectives: This study aimed to compare the hospital mortality in patients with sepsis with different T2A. This study challenged the present guidelines that T2A increased the hospital survival rate compared with its counterpart, using a hospital-based database for more than 20 years, covering the Surviving Sepsis Campaign guidelines, published in 2004, 2008, 2012, 2016, and 2021.

Methods: This study was conducted at a medical center between 1996 and 2022. The study subjects were dichotomized into (1) T2A ≤ 1 h and (2) T2A > 1 h. The demographic characteristics, underlying comorbidities, presence of septic shock, acute respiratory failure, intensive care unit (ICU) admission, Sequential Organ Failure Assessment (SOFA) score, main infection sites, serial laboratory data, and hospital mortality (within 7, 14, and 28 days) were compared between the two groups.

Univariate and multivariate Cox regression analyses were performed to determine the adjusted hazard ratio (aHR) with 95% confidence interval (CI) for total hospital mortality in both groups. The Kaplan–Meier analysis with the log-rank test was also performed to describe the hospitalization course between the two groups. Subgroup analyses by dividing the patients into four groups (i.e., ≤ 1 h, between 1 and 2 h, between 2 and 3 h, and >3 h) were further conducted.

Results: Overall, 15,317 patients with sepsis admitted to the emergency department were identified. The T2A ≤ 1 h and >1 h groups contained 1,735 (11.3 %) and 13,582 (88.7 %) patients, respectively. The mean Charlson Comorbidity

Index score was 4.45 ± 3.36 and 4.75 ± 3.28 in the T2A ≤ 1 h and > 1 h groups, respectively (P < 0.001). The mean SOFA score was 9.40 ± 3.39 and 9.75 ± 3.29 in the T2A ≤ 1 and > 1 h groups, respectively (P < 0.001). Furthermore, 791 of the 1,735 (45.59%) patients in the T2A ≤ 1 h group had septic shock; however, 7,621 of the 13,582 (56.11%) patients in the T2A > 1 h group had septic shock (P < 0.001). Six hundred and ninety-seven (40.17%) patients required ICU admission in the T2A ≤ 1-h group compared with 6,415 (47.23%) patients in the T2A > 1 h group. However, the T2A ≤ 1 h group presented with better laboratory values, particularly creatinine, C-reactive protein, procalcitonin, and lactate levels (all P < 0.05).

In the Cox regression model of univariate analysis, the T2A ≤ 1 h group demonstrated a lower crude HR (0.849, 95% CI: 0.782–0.922) for total hospital mortality. However, after adjusting for associated variables, the aHR indicated that T2A ≤ 1 h was associated with decreased hospital mortality but without statistical significance (aHR = 0.908; 95% CI: 0.774–1.065).

Advanced analyses by stratifying T2A into four groups were conducted, that is, ≤1 h, between 1 and 2 h, between 2 and 3 h, and >3 h. The Cox regression model showed that ≤1 h, between 1 and 2 h, and between 2 and 3 h were associated with decreased aHR compared with >3 h (aHR =0.85, 95% CI 0.721–1.003 for ≤1 h; aHR = 0.816, 95% CI 0.715–1.003 for between 1 and 2 h; aHR = 0.886, 95% CI 0.773–1.017 for between 2 and 3 h).

Conclusions: The early administration of antibiotics seemed to improve the hospital outcomes, at least within a 3-h time frame.

No, authors do not have interests to disclose

## 4 Oral Varespladib for Snakebite Envenoming: The BRAVO International Randomized Controlled Trial

Gerardo C, Platts-Mills T, Samuel S, Kumar S, Shirazi F, Kotehal S, Akpunonu P, Mukherjee P, Carter R, Lewin M/Ophirex, Inc., Corte Madera, California, US

Objectives: Snakebite envenoming results in death or disability for approximately 500,000 individuals annually worldwide. Of the more than 150,000 snakebite envenoming deaths each year, an estimated 75% occur before patients arrive at a hospital. Secretory phospholipase $A_2$ ($sPLA_2$) is a family of toxins found in >95% of venomous snakes and is a primary contributor to several important venom toxicities including neurotoxicity, autonomic instability, hemotoxicity, and myotoxicity. Orally administered varespladib is a potent synthetic small molecule inhibitor of snake venom $sPLA_2$. Preclinical data indicate that varespladib effectively treats important sPLA2-mediated venom toxicities. We hypothesized that oral varespladib, in addition to standard of care, will improve clinically important outcomes.

Methods: The Broad-spectrum Rapid Antidote: Varespladib Oral for snakebite (BRAVO) trial is a doubleblind, randomized, controlled trial conducted in the US (NCT#04996264) and India (CTRI/2021/11/03790). We assigned patients aged 5 years and older bitten by any species of venomous snake to oral varespladib twice daily for one week plus standard of care vs. placebo plus standard of care. The primary efficacy outcome was the change in a composite measure of illness severity from baseline to the average severity at 6 and 9 hours, using an updated version of the Snakebite Severity Score (SSS) covering pulmonary, cardiovascular, hematologic, neurologic, and renal toxicities. Three key secondary efficacy outcomes were specified: (1) a six-component SSS including the local wound score and measured as an area under the curve from baseline to Day 7; (2) total antivenom administration measured in vials; and (3) the Clinical Global Impression of Improvement. Safety assessments included adverse events, vital signs, physical examinations, EKGs, and laboratory tests.

Results: Among 96 randomized patients (India n=62; United States n=34), the mean baseline SSS was 4.8. Pediatric patients (n=9) had a mean baseline severity score of 5.6. The most common offending snakes were Russell's viper (n=29), copperhead (n=19), rattlesnake species (n=12), krait (n=9), and cobra species (n=6). Fourteen patients were bitten by an unknown species of snake. There were no deaths and no serious treatment emergent adverse events. Unblinded efficacy and safety results will be reported at the meeting.

Conclusions: This is the first clinical trial of an oral, direct toxin inhibitor for the treatment of snakebite envenoming. If demonstrative of efficacy and safety, results from this trial may support use of varespladib to improve clinical outcomes after snakebite envenoming.

Yes, authors have interests to disclose

Disclosure: Ophirex, Inc.

Employee

Ophirex, Inc.

## 5 Stepped-Wedge Trial to Assess Reduction of Mortality of Sentential Conditions After World Health Organization Emergency Care System Toolkit Implementation

Firew T, Mengistu G, Gebreyesus A, Safewo A, Sultan M, Han J, Cheng L, Patel S/Columbia University and Ministry of Health of Ethiopia, New York, New York, US

Background and Objectives: The World Health Organization (WHO) estimates that more than half of all deaths that occur in low-and-middle income countries (LMICs) could be prevented by organized prehospital and facility-based emergency care. The WHO Emergency Care System (ECS) Toolkit was developed, consisting of the Basic Emergency Care course, triage tool, trauma and medical care checklists, standardized clinical charts and critical emergency receiving area process guidance. Ethiopia, as a LMIC, experiences substantial mortality, morbidity and cost due to acute medical and traumatic conditions. There needs to be more research on which components of emergency care systems (ECS) have the greatest impact. This study aims to address some of these gaps. The primary objective of this study is to evaluate mortality and process outcomes in the selected Ethiopian primary hospitals. We hypothesize adherence to the WHO toolkit will increase early identification and stabilization of emergent conditions as well as a reduction in morality.

Methods: Stepped-wedge cluster randomized trial was utilized over 20 months. The ten selected hospitals were randomly assigned to enter the intervention from a convenience sample in the Oromia region of Ethiopia. The outcomes of interest were mortality from six sentinel conditions that WHO has identified as conditions specifically influenced by emergency care delivery, including pediatric diarrhea, asthma, pneumonia, diabetic ketoacidosis, road traffic accidents, and postpartum hemorrhage. The secondary outcome of interest were process indicators such as placement of the patient in the resuscitation bay, timely triage, airway intervention, IV fluid or blood administration, and glucose administration.

Results: The study enrolled over 72,305 patients across the ten hospitals in the Oromia region. Odds of death ratio at two months and six months post-implementation were 1.15 and 0.46, respectively. The results for key process indicators improved remarkably at the six months post-implementation period for placement of patients in the resuscitation bay, airway intervention, IV fluid or blood administration, and glucose administration.

Conclusions: The intervention reduced mortality from the six sentinel conditions and improved adherence to the key process indicators. Implementation of WHO emergency care toolkits significantly impact the delivery of emergency care in primary hospitals and can be used as a model for other LMICs.


No, authors do not have interests to disclose

## 6 Venous Excess Ultrasound Grading System (VExUS) as a Predictor of Early Adverse Outcomes in Emergency Department Patients Presenting With Sepsis

Forrester J, Cohen A, Li T, Young E, Gorlin M, Puri A, Bielawa NB, Pettet D, Nelson M, Rolston D/North Shore University Hospital, Astoria, New York, US

Objectives: The 2021 Surviving Sepsis Guidelines recommend dynamic monitoring to guide intravenous fluid (IV) resuscitation in patients with sepsis. The

Venous Excess Ultrasound Grading System (VExUS) was created as an assessment tool for venous congestion using point-of-care ultrasound (POCUS), and has been identified as a predictor of acute kidney injury in critically ill and cardiac surgery populations. This study aims to assess whether increasing degrees of venous congestion, as measured by VExUS, can predict 24-hour adverse outcomes in patients with sepsis at the time of emergency department (ED) presentation. Secondarily we sought to analyze the impact of IV fluid administration on these adverse outcomes when controlling for VExUS.

Methods: This was a prospective, cohort study of a convenience sample of patients with suspected sepsis (SIRS and clinical suspicion for infection) at a single quaternary ED. Patients were excluded if they had been intubated, had Do Not Resuscitate/Intubate advanced directives, or received greater than 250 mL of IV fluid prior to enrollment. VExUS scores were calculated using ultrasound assessments of the inferior vena cava (IVC), and Doppler flow patterns in the portal, hepatic, and renal veins. The primary composite outcome included death, intensive care unit (ICU) admission, or rapid response team (RRT) activation within 24 hours of ED arrival. Secondary outcomes included in-hospital mortality. A multivariable logistic regression model was developed to assess the association of VExUS scores with the primary composite outcome, as well as the effects of the IV fluid volume received on the primary composite outcome when controlling for VExUS.

Results: A total of 453 patients were enrolled in the study. 282 (62.3%) had a VExUS score of 0, 51 (11.3%) had a VExUS score of 1, 70 (15.5%) had VExUS score of 2, and 50 (11.0%) had a VExUS score of 3. The median fluid volume received was 17 mL/kg (IQR 7.5-13.9) (IQR). This volume varied by VExUS score: VExUS 0 received a median of 24.4 mL/kg, VExUS 1 received 13.8 mL/kg, VExUS 2 received 7.4 mL/kg, and VExUS 3 received 6.1 mL/kg. Within 24 hours of ED arrival 2.2% of patients died, 31.3% were admitted to the ICU, and 15.4% had a RRT activation. In-hospital mortality occurred in 74 (16.3%) patients. An increasing VExUS score was associated with an increased odds of the primary composite outcome (Table 1). Each additional 10 mL/kg of fluids given was associated with an increased odds of the primary composite outcome after controlling for VExUS scores and other relevant covariates (Table 1).

Conclusion: Increasing VExUS scores at the time of ED presentation in patients with sepsis were associated with an increased odds of 24-hour mortality, ICU admission, or RRT activation. Increasing volumes of IV fluid administered to septic patients in the ED were associated with an increased odds of these 24-hour adverse outcomes regardless of the VExUS score. A personalized approach to fluid resuscitation in ED patients with sepsis may be warranted, but further research is needed.

**Table 1: Logistic Regression Models of the Odds of Mortality / ICU Admission / Rapid Response within 24 Hours Associated with VExUS Score +/- Fluids Given**

| Variable | n | Composite Outcome (n = 453) | | Composite Outcome with Fluids (n = 447)* | | Multivariate Composite Outcome (n = 451)** | | Multivariate Composite Outcome with Fluids (n = 445)*** | |
|---|---|---|---|---|---|---|---|---|---|
| VExUS Score | | Odds Ratio | 95% CI | Odds Ratio | 95% CI | Odds Ratio | 95% CI | Odds Ratio | 95% CI |
| 0 | 282 | 1.00 | (Reference) | 1.00 | (Reference) | 1.00 | (Reference) | 1.00 | (Reference) |
| 1 | 51 | 2.29 | (1.25, 4.20) | 3.09 | (1.62, 5.88) | 3.16 | (1.62, 6.17) | 3.65 | (1.82, 7.32) |
| 2 | 70 | 3.51 | (2.04, 6.04) | 5.67 | (3.08, 10.46) | 3.70 | (1.98, 6.89) | 4.95 | (2.55, 9.63) |
| 3 | 50 | 7.82 | (3.82, 15.98) | 12.85 | (5.89, 28.03) | 8.78 | (3.84, 20.07) | 11.15 | (4.72, 26.31) |
| Fluids Given (per 10 mL/kg) | 447 | | | 1.35 | (1.16, 1.56) | | | 1.31 | (1.09, 1.57) |

*Adjusted for fluids given
**Adjusted for age, history of heart failure, history of renal disease, source of infection, and initial systolic blood pressure, respiratory rate, and lactate.
***Adjusted for fluids given, age, history of heart failure, history of renal disease, source of infection, and initial systolic blood pressure, respiratory rate, and lactate.

No, authors do not have interests to disclose

## 7 Advanced vs. Basic Life Support Outcome Variation in the Treatment of Out-of-Hospital-Cardiac-Arrest in Detroit

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Background: Out-of-Hospital-Cardiac-Arrest (OHCA) may be treated with Advanced Life Support (ALS) or Basic Life Support (BLS). Previous literature has indicated that ALS may provide no meaningful benefit to OHCA patients and may worsen outcomes. This study evaluated OHCA outcomes of return of spontaneous circulation (ROSC), mortality, and neurological prognosis related to prehospital ALS or BLS care and initial cardiac rhythm.

Objectives: To test for associations between prehospital ALS or BLS care and initial cardiac rhythm and ROSC, discharged alive from the hospital, and a favorable neurological outcome at hospital discharge in a large sample of OHCA patients.

Methods: A retrospective cohort of 6746 patients with non-traumatic OHCA who received CPR from a transporting Emergency Medical Service (EMS) agency was collected using the Cardiac Arrest Registry to Enhance Survival (CARES) database. Patients were sorted into 4 cohorts based on ALS vs BLS care and initial shockable vs non-shockable cardiac rhythms. ALS care was defined as manual rhythm interpretation, manual defibrillation, intravenous or intraosseous therapy, drugs, fluids, or endotracheal intubation. Cohorts were compared utilizing chi-squared and multivariable logistic regression analysis against the outcome variables of sustained ROSC, discharged alive from the hospital, and a favorable neurological outcome at hospital discharge.

Results: Patients' mean age was 62.6 years (SD=16.7), 56.3% were male, and the breakdown by race was 84.6% African-American and 12.2% Caucasian. Patient distribution by cohort was: shockable ALS (S-ALS; n=330, 4.9%); shockable BLS (S-BLS; n=466, 6.9%); non-shockable ALS (NS-ALS; n=2793, 41.4%); non-shockable BLS (NS-BLS; n=3157, 46.8%). ROSC rates were S-ALS (37.9%); S-BLS (19.5%); NSALS (18.6%); NS-BLS (9.3%). After controlling for covariates, the odds of sustained ROSC were statistically significantly higher for S-ALS vs. NS-BLS (OR=4.4, p<.001), S-BLS vs. NS-BLS (OR=1.8, p<.001), and NS-ALS vs. NS-BLS (OR=2.2, p<.001). The association between cohort and discharged alive from the hospital was also statistically significant (p<.001), and discharged alive rates were S-ALS (17.9%); S-BLS (11.8%); NS-ALS (3.7%); NS-BLS (4.0%). The odds of being discharged alive were higher for S-ALS vs. NS-BLS (OR=3.6, p<.001), and for S-BLS vs. NS-BLS (OR=2.3, p<.001), but were not different for NS-ALS vs. NS-BLS (OR=0.9, p=.41). Finally, the association between cohort and favorable neurological outcome was also statistically significant (p<.001), and outcome rates were SALS (74.6%); S-BLS (58.2%); NS-ALS (36.5%); NS-BLS (41.6%). The odds of favorable neurological outcome were higher for S-ALS vs. NS-BLS (OR=2.6, p<.001), but were not different for S-BLS vs. NSBLS (OR=1.9, p=.07), or for NS-ALS vs. NS-BLS (OR=0.9, p=.59).

Conclusions: In contrast with previous literature ALS care in the present study was superior to BLS care. ALS care was associated with higher rates of ROSC in OHCA patients regardless of rhythm. Further, ALS care was associated with higher rates of being discharged alive from the hospital and favorable neurological outcomes among patients with a shockable rhythm. In patients with a non-shockable rhythm, ALS and BLS did not differ in mortality or favorable neurological outcome.

No, authors do not have interests to disclose

## 8 Changes in Emergency Department Quality Improvement Practices Between 2019 and 2023: Analysis of the Emergency Quality (E-QUAL) Network Quality Readiness Assessments

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Background: Quality improvement (QI) models have become increasingly formalized. Essential tools for QI have been characterized for practice improvement. In the case of Emergency Medicine (EM), the American College of Emergency Physicians (ACEP) Emergency Quality (E-QUAL) Network created the Quality Readiness Assessment (QRA) with the support of Centers for Medicare & Medicaid Services (CMS) in 2016 to measure and support emergency department (ED) QI practices across ten domains.

Objectives: Our primary objective is to characterize the change in the number of EDs that were able to fully achieve QRA domains between 2019 and 2023. Our secondary objective is to identify domains from the 2023 QRA where the least number of EDs reported achievement.

Methods: We surveyed E-QUAL network participants regarding quality improvement structures and processes using a web-based survey. The survey included ED demographics, an assessment of quality improvement staffing and practices, and an ACEP-designed QRA. We report descriptive statistics on E-QUAL network ED demographics. We also report changes in readiness of QRA domains between 2019 and 2023.

Results: 196 EDs, spanning across 27 states, participated in both the 2019 and 2023 E-QUAL initiatives and completed QRAs. 45% (n=88) were rural, 17% were critical access (n=33), and 1% (n=1) were safety net hospitals. We observed

substantial increases in the number of EDs reporting "achieved" (% increase) in the following domains: reduce avoidable hospitalization (32%), reduce unnecessary testing (26%), develop a care transformation plan (24%), use of evidence-based protocols (23%), standardize quality improvement practices (22%), and develop a QI strategy (19%). There were no substantial changes in the number of EDs reporting "achieved" in the following domains: streamline work processes (0%), produce provider performance and quality goals reports (5%), improve health information transmission (6%), and participate in a shared learning collaborative (9%). From the 2023 QRA, the domains that the least number of EDs reported as "achieved" include: streamline work processes (2%), reduce avoidable hospitalization (69%), and improve health information transmission (78%). The other seven domains all had >90% EDs reporting "achieved."

Conclusions: ED QI has experienced the most growth in achievement in the following domains: reducing avoidable hospitalization, reducing unnecessary testing, developing a care transformation plan, using evidence-based protocols, standardizing quality improvement practices, and developing a QI strategy. This reflects on the success of national ED QI efforts such as the E-QUAL network. The QRA also identified gaps suitable for future QI support and resources in streamlining work processes, reducing avoidable hospitalization, and improving health information transmission domains.

Yes, authors have interests to disclose
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## 9 A Randomized Controlled Trial of an Emergency Department Discharge Intervention as an Alternative to Hospitalization

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Objectives: Hospital admissions from the emergency department (ED) comprise 20% of all US health expenses. Efforts to improve the value of emergency care will seek to reduce ED hospitalizations without worsening patient outcomes. The PATH (Practical Alternative to Hospitalization) program discharges ED patients who might otherwise be hospitalized, through short-term enhanced services including home nursing, telehealth monitoring, outpatient care coordination, and assistance with social needs. In this study, we compare the effectiveness of the PATH intervention with usual care.

Methods: We conducted a randomized controlled trial in an academic medical center (ClinicalTrials.gov NCT04639102). Enrollment occurred on Mondays and Tuesdays from 7am to 7pm between February and May 2021. A nurse practitioner screened patients and coordinated the intervention. Participants were community-dwelling adult ED patients with health insurance, primary care access, and 1 of 24 disease conditions with pre-defined eligibility criteria. We excluded patients with substance use disorder, psychiatric illness, housing insecurity, or active Covid-19 infection. Prior to randomization, the treating ED attending physician determined that participants were 1) likely to be hospitalized, and 2) stable for discharge if randomized to the intervention. After randomization, patients assigned to treatment could either consent or decline the intervention. The primary outcome was the number of days alive and out of the hospital for 30 days (DAOH), which factors in subsequent ED visits, hospitalizations, and death. Secondary outcomes included return ED visits within 30 days. The primary analysis was intention-to-treat.

Results: We screened 622 patients with pending hospitalization. 72 patients (11.6%) were randomized, with 36 in each arm. 1 treatment patient declined the intervention. Arms were balanced with regard to demographic and clinical characteristics. The mean DAOH for the treatment arm was 29.2 days (SD 2.5), compared to 25.8 days (SD 4.3) for the control ($P = .001$). 5 (13.9%) patients in the treatment arm returned to the ED within 30 days, compared to 15 (41.7%) in the control ($P = .01$).

Conclusions: An intervention to transition and monitor patients following ED discharge provided an effective alternative to hospitalization for select patients, increasing days alive and out of the hospital by 3.4 days per patient.

No, authors do not have interests to disclose

## 10 Application of Motor Learning Theory to Teach the Head Impulse Test to Emergency Medicine Resident Physicians

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Objectives: The HINTS (head impulse test, nystagmus, test of skew) examination has greater sensitivity and specificity for early stroke in acute vestibular syndrome than magnetic resonance imaging (MRI) but utility is controversial. For many, the head impulse test (HIT) is the most challenging component because it requires the patient's head to be turned precisely 10-20 degrees at >100 degrees per second while interpreting eye movement. Video-oculography (VOG) devices comprise small cameras fitted on glasses paired with accelerometers. The devices provide visual and auditory feedback indicating whether the degree and velocity of the head turn are adequate. Applying the concepts of augmented and terminal feedback from motor learning theory, this study aimed to determine if a VOG device could teach emergency medicine resident (EMR) participants to adequately perform the head turn required for the HIT.

Methods: This repeated measure study included 14 EMR participants in various stages of training. The number of successful head turns in 20 attempts (10 each direction) by each participant on fellow participants were measured using the VOG device without feedback before, immediately after, and two-weeks after a practice session. Participants practiced with feedback from the VOG device on a basketball, then a mannequin head, and then worn by fellow participants. Participants rated their confidence in performing the HIT on a 1 to 5 Likert scale before and after the study period. Data are presented as median and interquartile range (IQR) then compared with the Kruskal Wallis and Mann-Whitney U tests.

Results: Only 3 of the 14 participants found success during baseline testing with one participant recording 7 successes and two participants recording 2 successes each. Immediately after the practice session, 13 of the 14 participants were successful and 9 of the 11 participants were successful at the two-week follow-up. The median (IQR) number of successful head turns during baseline testing was 0 (0, mean 0.79), immediately after practice was 7.5 (5.75), and two weeks later was 10 (8), ($p<0.01$, Kruskal Wallis). The median number of successes immediately after practice and two weeks later where not significantly different ($p=0.85$, MannWhitney U). The median (IQR) confidence rating increased from 1.5 (1) before baseline testing to 3 (1.5) after follow-up testing ($p=0.02$, Mann-Whitney U). After conclusion of the study, 8 of the 11 participants reported the VOG device was helpful in teaching the HIT.

Conclusions: Most participants were unable to perform the head turn required for the HIT before training with the VOG device. However, most participants acquired the ability and many demonstrated retention after two weeks. This study provides proof of concept that the HIT is likely performed incorrectly by those without focused training. The VOG device may facilitate development of the skills required to accurately perform the HIT.

No, authors do not have interests to disclose

## 11 Ukraine Trauma Care Response: Phase 1 Summary and Impact

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Background: The Russia-Ukraine war and military occupation has severely impacted access to medical care in Ukraine. Healthcare systems continue to come under targeted assault with nearly one in ten health facilities hit directly by Russian weaponry and hundreds of medical transports, personnel, patients, and supply warehouses impacted by attacks. As of May 2023, there have been 23,375 documented conflict-related civilian casualties. 1,528 of these victims are children. In March 2022, an immediate need for trauma, mass casualty, and chemical, biological, radioactive, nuclear, and explosive training and preparedness for healthcare workers and civilians was identified by the health cluster.

Objectives: The primary objective was to meet this education need with a multi-modal approach that would improve participant knowledge and confidence in these topics. Secondary objectives were to train Ukrainian instructors and provide equipment to sustainably transition the program to Ukrainian leadership in alignment with local education and healthcare systems and to develop an educational package that can be easily adapted to other humanitarian contexts.

Methods: A non-governmental-organization and academic partnership was formed to design and deliver in-person educational programs. Six courses (Advanced Trauma Life Support, Trauma Nursing Fundamentals, Prehospital Trauma Fundamentals, Stop the Bleed (StB), Mass Casualty Management, and Chemical, Biological, Radiation, Nuclear, and Explosives Preparedness (CBRNE)) were developed or contextually adapted, translated into Ukrainian, and taught in Kyiv, Dnipro, Zaporizhzhia, and Odesa from August through October 2022. Participants completed pre- and post-assessments in knowledge and self-confidence. Change in knowledge and self-confidence were analyzed, respectively, with nonparametric Wilcoxon matched-pairs signed-rank test and McNemar's test for paired-data. Six to eight-week follow-up surveying was conducted to assess skill utilization and stewardship. Instructor training days were provided to select learners to aid in the facilitation of future courses. Simultaneously, 26 short online educational videos on these topics for healthcare workers and civilians were created and published in Ukrainian.

Results: 1,948 students participated in 78 course tracks (1,315 teaching-hours). Mean knowledge-assessment scores improved significantly ($p<0.0001$) from pre-assessment in all courses (percentage point increase ranging from 11.3 to 23.6). Self-confidence significantly improved in 96% of measurements (percentage point increase ranging from 10.6 to 75.3; $p<0.05$). At follow-up surveying, 99% (n=298) of participants expressed "training has had (or will have) a life-saving effect…" and 80% (n=190) had already utilized a newly learned skill during patient care. 97% of StB respondents (a 35-percentage point increase from preassessments) stated, "If I saw a stranger with life-threatening bleeding tomorrow, I would feel prepared to help."

Conclusions: Rapid and needs-based healthcare worker and citizen training in trauma, mass casualty, and CBRNE is feasible and effective in war zones and during humanitarian crisis. Civilian-directed training can empower the population to perform potentially life-saving interventions. Future research should evaluate the impact on patient outcomes and the ability to scale and adapt this approach to similar contexts.

No, authors do not have interests to disclose

## 12 Association Between Discharge Prescriptions and Revisits for Low Acuity Back Pain in the Emergency Department

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Objectives: Over 2.5 million patients visit emergency departments (ED) in the United States each year for back pain, the majority of whom receive non-emergent diagnoses and are discharged home. Yet, there is limited evidence to guide whether certain classes of medications prescribed at discharge might improve short-term outcomes for these patients. This study's objective was to examine the association between various discharge prescriptions and ED revisit rates for patients deemed to have lower-risk back pain.

Methods: We performed an analysis of ED encounters occurring during 2019-2020, abstracted from a healthcare records database of more than 180 hospitals in 21 states and encompassing > 8 million ED visits annually. Inclusion: age 18 - 65 years, discharged alive, ICD-10 primary or secondary diagnosis code M54.X, triage emergency severity index level 4 or 5, triage temperature < 38 Celsius and triage pulse < 100 beats per minute. Exclusion: pregnancy, leaving against medical advice, and use of magnetic resonance imaging during the visit. Medications prescribed at discharge were classified as corticosteroids, opioids, skeletal muscle relaxants. Low rates of benzodiazepine, topical agent and non-steroidal anti-inflammatory prescriptions were observed and thus were not separately analyzed. Logistic regression was conducted with 72-hour ED revisit as the primary outcome, and with adjustment for sociodemographic factors, body mass index, Elixhauser Comorbidities, home medication use, and ordering of spinal radiographic imaging.

Results: 95,879 index ED visits were included, 4,094 (4.3%) with an ED revisit within 72 hours. Prescription of skeletal muscle relaxants, corticosteroids and opioids occurred with 8.6%, 2.9% and 2.1% of index visits, respectively. Prescription of muscle relaxant was associated with a 25% decreased odds of 3 day ED revisit (95% confidence interval: 13% - 36%), while no significant independent association was identified for prescribed corticosteroids or opioids. Post-hoc power analysis revealed our ability to detect an odds of 33% or greater association with revisit for both corticosteroids or opioid prescription, suggesting that clinically relevant associations might be detectable for corticosteroids or opioids with larger samples.

Conclusions: Prescription of skeletal muscle relaxants for patients being discharged with low-risk back pain is associated with 25% decreased odds in short-term revisit to the ED.

No, authors do not have interests to disclose

## 13 Development of a Novel Deep Learning Model to Predict Physiologic Deterioration in Emergency Department Patients

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Objectives: Physiological deterioration of patients shortly after admission from the emergency department (ED) is associated with poor outcomes. Identifying at-risk patients is challenging and prior models to do so have had fair performance at predicting which patients decompensate and require intensive care, such as initiation of vasoactive medications or need for mechanical ventilation. Development and validation of a model to identify patients at extreme risk of physiological deterioration may help emergency physicians appropriately disposition these patients to the appropriate level of care or alert providers to prescribe therapeutic interventions to prevent deterioration.

Methods: We developed and validated a novel deep learning algorithm (DETERIO) to predict physiological deterioration in patients admitted from the ED to the hospital in a retrospective cohort study. We defined physiological deterioration as initiation of vasoactive medications or the need for mechanical ventilation. We used a prediction window of 24 hours. Data was abstracted from a large academic health system consisting of 2 hospitals. We used 50 commonly used clinical variables (vital signs and laboratory values), 6 patient demographics (age, gender etc.), and 73 comorbidities and medications, from ED patient encounters admitted from 01/2020 to 09/2021. A 3-layer neural network was used to predict decompensation up to 24 hours in advance. The overall cohort was split into training (80%) and testing (20%) datasets. We included all patients admitted to the hospital from our ED. We excluded those who required vasoactive medications or mechanical ventilation within 2 hours of admission to the ED. Performance of the model was evaluated using area under receiver operating characteristic curve (AUC). Additionally, specificity and positive predictive value (PPV) was reported at the encounter level. Continuous variables are reported as median [Inter-Quartile Range]. All statistical analysis was done using python and tensorflow.

Results: We identified 61,850 patients over the study time. Of these, 1,094 (1.77%) had unexpected physiological deterioration. The median [IQR] of age amongst patients with vs without physiological deterioration was 61.9 [51.3 – 72.4] years vs 56.6 [40.6 – 68.6] years, respectively. The proportion of males with vs without physiological deterioration was 59.5% vs 51.1%, respectively. On the testing dataset, the proposed model achieved an AUC of 0.811 with a specificity of 92.7%, and a PPV of 12.1% at a sensitivity of 53.5%.

Conclusions: DETERIO demonstrated excellent ability to predict physiological deterioration of ED patients admitted to the hospital with an AUC of 0.811 up to 24 hours in advance. This algorithm may help inform admission level of care and potential therapeutic interventions in at risk patients. Future studies are needed to validate these findings in a prospective manner.

Yes, authors have interests to disclose
Disclosure: Healciscio
Employee
Healciscio
Disclosure: Healciscio
Employee
Healciscio

## 14 A Process Improvement Project to Increase Post-Emergency Department Discharge Appointment Scheduling at Local Hospital Specialty Clinics Utilizing Our Patient Navigation Program

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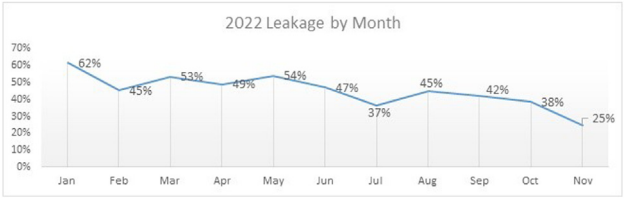
Objectives: A process improvement project was implemented utilizing our local patient navigator program (PNP) to increase post-emergency department specialty follow-up and continuity of care in our local hospital system and decrease specialty appointments scheduled at outside community clinics.

Methods: A dashboard was created to obtain baseline data and monitor the process improvement with specialty clinics follow-up appointments for our local PNP. Inclusion criteria was adult ED patients receiving PNP referrals in 2022, type of specialty appointment, and follow up location. Exclusion criteria were patients age less than 18, patients opting out of PNP services after referral, or patients referred for

primary care appointments. The specialties with the highest rates of externally scheduled appointments were identified. ED operations shared the data with each local specialty service line (e.g. cardiology, orthopedics, etc.). Meet and greets were held between PNP team and the service line team, including directors, practice managers, and scheduling staff. Scheduling challenges were shared and points of contact were established. An escalation process was developed if appointments were still difficult to establish. After these meetings, the service line teams shadowed navigators in the ED to identify additional barriers such as PNP access to certain scheduling programs for direct appointment scheduling. Processes to address these barriers were then implemented. Ongoing monthly review of the dashboard with the PNP and specialty service lines continue to identify further opportunities for improvement.

Results: Ten percent of all ED discharged patients are referred to the PNP. Prior to the implementation of our process improvement plan for specialty follow-up appointments, more than 50% of the PNP patients were scheduled in community specialty clinics instead of the local hospital specialty clinics. After the listed interventions, the percentage of externally booked appointments gradually decreased to 25% in fourth quarter of 2022. See Figure 1. Local cardiology appointments improved from 37.5% to 84.7%. Local orthopedics appointments improved from 60.0% to 82.8%. Local gastroenterology appointments went improved 19.6% to 74.6%.

Conclusions: The percentage of specialty appointments booked in our local hospital significantly increased with this process improvement initiative using our PNP program. This new process allows for improved local continuity of care for our ED patients.




No, authors do not have interests to disclose

## 15 Implementation of a Novel Bedside Electroencephalogram-Based Device Aids in Accurately Ruling Out Traumatic Intracranial Hemorrhage and Reduces Computed Tomography Utilization

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Objectives: Patients with traumatic head injuries are frequently seen in the emergency department (ED). In fact, over 2,000,000 head injury visits present to EDs in the United States annually. Most of these head injuries are minor and multiple decision rules have been developed to safely determine which patients need evaluation with a head computed tomography (CT) scan. Even so, head CT rates are high. The objective of this study is to determine if the use of a bedside device, which uses an AI-derived electroencephalogram (EEG)-based algorithm, can safely reduce the need for CT scans. Specifically, this study used the BrainScope device, which is FDA cleared for intracranial hemorrhage (ICH) evaluation and concussion evaluation in patients aged 18-85 with GCS of 15 seen within 72 hours of head injury and FDA cleared for concussion evaluation in patients 13 and over.

Methods: A retrospective pilot chart review project was performed of patients who had a BrainScope head injury assessment performed in the emergency department over a 10-month period. It was determined if patients had a CT scan at the time of their initial visit and all charts were reviewed for return to an ED within one month after the initial injury for ICH. Specifically, patients who were BrainScope negative for ICH and did not have an initial CT were followed by chart review. These charts were assessed for bounceback visits for potential missed ICH by querying surrounding healthcare systems, most of which are on the same electronic medical record.

Results: A total of 79 patient (36% male) charts were reviewed. All patients were 18-85 (mean age 41.0) and had a BrainScope ICH evaluation test performed. Thirty-one (31) of those had a Negative BrainScope result, 13 had an Equivocal result and 35 had an Evaluate result. Out of the 44 patients with Negative and Equivocal BrainScope results, 29 did not have a CT scan performed. Presuming these patients would have otherwise had a CT scan, this led to an absolute CT reduction of 36.7% (29 out of 79). It was also noted that 13 of the Negative or Equivocal BrainScope cases received a CT scan, all of which were found to be negative for ICH, demonstrating a negative predictive value (NPV) of 100%. All these cases were evaluated for bounceback ICH visit within one month and there were no identified cases of missed ICH.

Conclusions: The use of a novel bedside EEG-based device was shown to accurately rule out ICH without the need for a CT scan in patients with a negative reading. There were no bounceback cases for ICH identified within one month of the initial visit. In addition, CT scan utilization was demonstrated to be significantly reduced by using this device.

Yes, authors have interests to disclose
Disclosure: BrainScope Company Inc.
Consultant/Advisor
BrainScope Company Inc.

## 16 Vital Sign Monitoring During Crowding in Emergency Department Triage Using a Non-invasive Wearable Biosensor

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Objectives: Prolonged ED waiting room times contribute to poor outcomes. Portable, wearable biosensors have the potential to reduce staff workload and improve detection of patient decompensation via automated vital sign collection during times of ED crowding. We evaluate the use of a biosensor to automate vital sign acquisition in ED waiting room patients during high volume periods.

Methods: This prospective study consisted of patients presenting to an Urban, 90,000 volume Level 1 Trauma Center during a five-day (Mon-Fri) period in January, 2023 for 10 hrs per day during peak ED volume, with a National Emergency Department Overcrowding Scale (NEDOCS) >180. A biosensor capturing HR, BP, RR, O2 saturation, and Temperature were placed on patients presenting to ED Triage with an ESI Score of $\geq 3$, chief complaints of dyspnea, syncope, suspected infection, or at triage nurse/physician discretion, and had an expected ED waiting period $> 2$ hours. A patient monitoring station was established in the ED Triage area and a dedicated technician monitored patients until they were roomed or discharged. Vital sign completeness, time to deployment, and patient and care teams surveys for qualitative feedback were obtained.

Results: Over the five-day study period, 80 patients were monitored in the ED waiting area with NEDOCS ranges 230 - 397. The average monitoring period was 241 minutes (Max 1,159 minutes). The total monitoring period for all patients was 18,332 minutes, during which 17,947 minutes of time-stamped vital sign data was acquired (97.9% total minutes were monitored). 12,139 of the 17,947 monitored minutes (67.6%) contained a complete set of vital signs every minute (HR, RR, BP, SpO2, Temperature). SpO2 was the most common missing vital sign in 5,511 cases (30.7%). Up to 12 patients were enrolled and monitored at one time. Enrolling patients and placing the device took no longer than 6 minutes to complete after triage. Patient feedback themes included satisfaction they were being watched despite the wait, and device comfort. The ED care team felt there was no increase in work. Additional comments included "more patients could benefit from expansion of use," monitoring was "faster than doing an ECG," and specific instances where the device positively impacted patient care escalation.

Conclusion: A wearable biosensor provided a feasible alternative for vital sign collection in ED waiting room patients during crowding. Monitoring was implemented quickly and vital sign data was relatively complete and near-continuous. Compared to current practices, wearable biosensors may provide an alternative to provider-acquired vital signs in the ED waiting room and have the potential to greatly improve monitoring of patients in all ED care areas. These advantages may be especially evident during times of ED crowding and staff shortages.

No, authors do not have interests to disclose

## 17 A Novel Indication-Based Ordering Tool to Prioritize Emergency Department Patients Waiting for Computed Tomography of the Head

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Objectives: Emergency Department (ED) visits and Computed Tomography (CT) utilization have been increasing over time. As a result, larger EDs often have many

patients waiting their turn for CT imaging regardless of acuity. We therefore conducted a quality improvement effort to expedite time to CT for patients with high-risk indications. To do so without creating additional work for ordering clinicians and CT technologists, we embedded prioritization within a CT ordering tool based on the indication selected for the study. Our primary objective was to determine if an indication-based ordering tool decreased the time to head CT for patients with pre-defined high-risk indications.

Methods: The study was performed at an urban Level 1 Adult and Pediatric Trauma Center and Comprehensive Stroke Center. Separate processes were previously in place to give Trauma Team Activations (TTAs) and stroke patients the highest priority for CTs. All other ED CTs were designated "stat" by default and performed sequentially by order time. In this intervention, we developed a "CT Head/Neck Selector" ordering tool to help clinicians select and complete CT head and neck orders by navigating a list of nested indications. The indications were then used to sort the stat CTs further into a high-priority group and a lower-priority group based on the order indication. Patients on anticoagulants with head trauma and patients with a Glasgow Coma Scale of 13 or less with suspected head trauma were placed in the high-priority group, and all other indications were placed in the lower priority group. For our data analysis, we queried data on completed head CT studies and computed the interval from signed order to exam start time for each order. We excluded from the analysis all TTA patients, stroke patients, and patients with a negative order-to-start interval. We compared the average order to start time for the high-priority indication group compared to the lower-priority indication group using the Wilcoxon rank-sum test.

Results: During calendar year 2022, 6939 orders for head CT were placed from the panel. 21 studies were excluded due to negative order-to-start intervals. Of the 6918 included in the analysis, 1153 the high-priority studies began an average 49.4 minutes (median: 35 minutes) after the order was placed, and 5765 lower-priority studies began an average 62.3 minutes (median: 46 minutes) after the order was placed, a 12.9 minute average difference. The rank-sum comparison indicates the groups are statistically different ($p<0.05$).

Conclusions: Embedding a priority tool based on the indication for head ED head CTs resulted in a reduction in the average order-to-start interval for patients with high-risk indications.

No, authors do not have interests to disclose

## 18 Acceptability and Feasibility of Mobile Web-based Patient Reported Abdominal Symptoms in the Emergency Department: A Pilot Study

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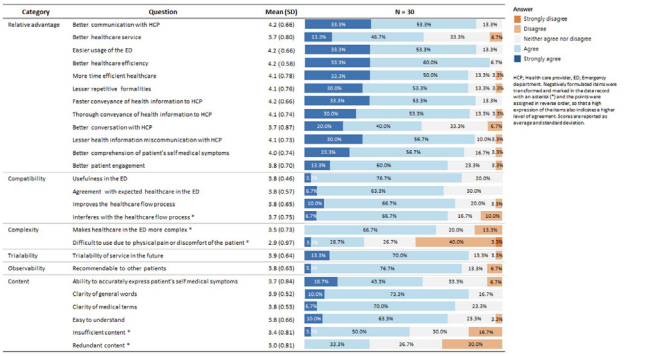
Objectives: We developed a mobile web application to help in identifying non-traumatic abdominal patient reported symptoms (PRS) by patients who visited the emergency department (ED). Patients can use this during waiting times to facilitate patient history-taking by the physician. The study aims to evaluate the feasibility and acceptability of PRS usage in the ED by patients.

Methods: Adult patients aged 65 years or below who came to the ED for abdomen-related symptoms were enrolled. Successful completion of PRS, time and help required while using PRS were investigated. A mixed methods approach was used to evaluate the acceptability of using PRS in ED care through questionnaire surveys of patients and semi-structured interviews with both patients and physicians who used the PRS.

Results: A total of 30 patient surveys were analyzed. All were able to complete the PRS questionnaire and took 7.6 (5.0) minutes to do so. A total of 16 (53.3%) requirements of help were due to content and 15 (50.0%) were technical. The acceptability of PRS regarding to the diffusion of innovation theory was acceptable with an average of 3.9 (± 0.76) out of a total score of 5.

Conclusions: In our pilot study, the PRS was feasible and acceptable for patient use in the ED.

**Figure | Survey outcomes regarding diffusion of innovation and content of PRS**




Yes, authors have interests to disclose
Disclosure: CyrenCare
Stockholder
CyrenCare

## 19 The Use of Emergency Physician Televideo Visits to Provide Care-at-Home After Emergency Department Discharge

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Objectives: The availability of care-at-home programs represent an opportunity for patients to receive care at home as an alternative to hospital admission for acute medical conditions. Our health system provides a care-at-home program as a disposition option for select emergency department (ED) patients. This study aimed to determine how participation in this ED to care-at-home program affects ED utilization.

Methods: This was a prospective cohort study at two EDs, an academic quaternary hospital and an urban teaching hospital with a combined census of approximately 86,000 patients/year, where a care-at-home program was established in late July 2022. The ED partnered with a home health agency to provide patients care at home with ED physician oversight for patients who were considered for inpatient admission but instead were enrolled in the program upon ED discharge. ED patients eligible for this program were those >/= 18 years with select insurance coverage. Patients stable for ED discharge received a next-day, ED physician televideo visit (TVV) in their home with home health (HHN) nursing, for those who required nursing care. Care was overseen by the ED physician conducting the daily TVV and included the administration of any needed parenteral medications, including antibiotics. The TVV and HHN visits continued until the patient's acute medical needs had been adequately addressed. Data for this study were collected between August 2022 - February 2023. Patients were included if they were enrolled in the care-at-home program and had >/= 1 ED visit in the 30 days before or after their index ED visit from which they were enrolled in the care-at-home program. Excluded patients were those who did not have ED visits in the 30 days before or after their index ED visit. The number of ED visits for this patient population were measured for the 30 days pre- and post- enrollment to determine rates of ED utilization. The index ED visit was not included in the pre- and post-enrollment counts.

Results: A total of 459 patient enrollments were included with the enrollment/month breakdown and percent change in number of ED visits for the 30 days before and after enrollment were as follows: August n=9 and 66.6% decrease; September n=58 and 75.8% decrease; October n=85 and 69.4% decrease; November n=58 and 72.4% decrease; December n=56 and 80.4% decrease; January n=97 and 75.3% decrease; February n=96 and 80.2% decrease. Over a 30-day pre- and post-enrollment measure of ED visits, there was an average 76.6% decrease in ED visits. ($p<0.05$).

Conclusions: The use of a care-at-home program which facilitates the transition of care to home from the ED with the use of ED physician oversight using TVV can help to decrease ED utilization in a select population. This study's limitations include the brief follow-up study period (30 days), single site location impacting generalizability, and potential selection bias in patient enrollment.

No, authors do not have interests to disclose

## 20 Extending Emergency Care Beyond Discharge: Piloting a Virtual After Care Clinic

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Objectives: Patients recently discharged from the emergency department (ED) are at high risk for ED revisits and hospitalization. One explanation for this may be inability to schedule short-term follow up with primary care providers (PCPs). To address this gap, we piloted a virtual after care clinic (VACC) to provide on-demand virtual appointments with an emergency medicine provider within 72 hours of ED discharge. We sought to determine the feasibility of this model, characterize patients who schedule appointments, describe VACC interventions, and estimate the risk of subsequent ED revisits and hospitalization.

Methods: This was a secondary analysis of a prospective patient cohort of patients who scheduled appointments at the VACC after discharge from any of 10 urban and rural EDs in a single health system in West Michigan. All adult patients discharged from participating EDs received standardized written information about the VACC in their discharge paperwork and were eligible to schedule a VACC appointment. We used descriptive statistics to characterize patients who scheduled appointments, "no-show" rates, and interventions performed by virtual providers. We also compared the risk of subsequent ED visit and hospitalization by patient characteristics (age, sex, race), insurance status, historical ED use, and attendance at their VACC appointment (vs. no-show). Multivariable regression models tested the association between keeping the VACC appointment and return visits to the ED and subsequent hospitalization, adjusted for demographics, insurance status, and historical ED use.

Results: Between March 2022 and December 2022, 309 patients scheduled 310 visits at the VACC and 211 (68%) kept their appointment. Patients who scheduled appointments were mostly young (median age 37, IQR 2952), female (75%), non-Hispanic white (80%), were treated in a rural ED (58%), had a PCP (90%), and commercial insurance (72%). The most common reasons for an appointment categorized by organ-system were gastrointestinal (15%), musculoskeletal (14%), and cardiovascular (13%) complaints. At the VACC, 64% of patients received reinforcement of the ED plan and 26% had a medication change. Two patients were referred back to the ED for further evaluation. Overall, 22 (7%) patients returned to the ED within 72 hours and 14 (5%) were admitted to the hospital within 30 days. Likelihood of VACC attendance did not differ by demographic variables, PCP status, prior ED utilization, or insurance type. There were also no associations between patient demographics, PCP, or insurance status with return ED visits. Compared to those who missed their appointment, patients who attended the VACC were less likely to return to the ED within 72 hours (4% vs 13%, p=0.005) and to be hospitalized within 30 days (3% vs 8%, p=0.038). In adjusted analysis, a VACC appointment was associated with lower odds of 72-hour return ED visit (aOR 0.2; 95% CI 0.1-0.6; p=0.002) and 30-day hospitalization (0.3; 95% CI 0.1-1.0; p=0.040).

Conclusions: A voluntary virtual follow up clinic for discharged ED patients was feasible and was utilized mostly by younger, female, rural patients with a PCP and commercial insurance. Most appointments involved reinforcing existing ED plans or adjusting medications. Patients who attended their VACC appointment were less likely to return to the ED within 72 hours and to be hospitalized within 30 days than those who did not.

No, authors do not have interests to disclose

## 21 Telehealth Emergency Department Triage Streamlined Patient Care and Reduced Left Without Being Seen Rates

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Background: Long wait times in emergency departments (EDs) are a common problem that result in patients who leave without being seen. We set out to determine if a virtual provider triage program designed to get patients through the ED process more efficiently, impacted left without being seen rates.

Methods: This pilot quality improvement initiative was undertaken in January 2023 at a level 1 trauma center with an annual ED visit census of approximately 90,000 adult visits in NE Pennsylvania. Patients who arrived by ambulance were excluded from the dataset (roomed on arrival). A centralized provider triaged arriving patients virtually during peak weekday times (11am-8pm) using a telecommunications system (interactive audio and video) in conjunction with access to the electronic health record (EHR) which included triage vitals. The telecommunication technology was separate from the EHR but documentation still took place within the EHR as if the patient was being triaged in person. In this process, laboratory and radiology tests, and other provider orders were entered and potentially completed prior to the patient being roomed in the ED. It was possible to add others to the virtual triage encounter for example, spoken language and sign language interpreters Workflow was developed to mirror as closely as possible the existing triage process.

Comparisons between "time to seen by provider" and "left without being seen" were made between similar time periods with and without the virtual provider.

Results: During the month and times of the study, 1416 patients presented to the ED. Of those, 837 (59.1%) were triaged virtually and 579 (40.9%) were triaged with traditional workflow. The average time from arrival to being seen by provider was 66 minutes when the provider was virtually present versus 110 minutes during standard work processes. Fifteen (1.79%) patients left without being seen before triage when the virtual provider was in place, versus 31 (5.35%) during usual methods.

Conclusions: In this single site pilot study, the addition of a virtual triage provider substantially decreased the time to being seen by a provider and more than halved the "left without being seen rate." This work process has promise for future study. These technologies also have the potential to eliminate geographic distances, reduce disparities in terms of access to services, and provide valuable services to patients, especially in underserved rural and urban areas.

No, authors do not have interests to disclose

## 22 Emergency Medicine Residency Program Leadership Well-Being: Results from a National Survey

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Objectives: Emergency medicine (EM) residency leaders play a vital role in promoting and sustaining the well-being of residents in training to ensure they can most effectively learn EM and begin their careers. Training EM residents requires a sufficient amount of support, as recognized by the Accreditation Council for Graduate Medical Education. While it is known that time and resources are needed to best train residents, less is known the stressors impacting emergency medicine (EM) residency program directors (PDs), their wellbeing, and the perspectives they have for the residents. The objective of this study was to investigate EM residency PD experiences with burnout and well-being to identify and inform strategies for PDs and their residents.

Methods: An anonymous online survey was conducted between February 2023 and March 2023. Participants were recruited using the Council of Residency Directors in Emergency Medicine listserv, an email group of EM residency directors from across the United States. The survey covered topics related to PD well-being and burnout, perceived trainee burnout, as well as program characteristics. Responses of 174 individuals who submitted at least partial responses to the survey were analyzed.

Results: Information on personal and program characteristics of respondents are included in the accompanying table. Over half of individuals were experiencing burnout (52.9%), and only 22.9% reported feeling professionally fulfilled as measured through the Stanford Professional Fulfillment Index. Clinical work strain was the most common factor perceived to be contributing to burnout for both program leaders and trainees (92.8% and 94.8%, respectively), followed by feeling underappreciated (62.1% and 60.8%) and EHR documentation (49.0% and 58.2%). Over half of respondents (53.6%) felt that mistreatment from consultants also negatively impacted their trainee's well-being. Half of respondents reported having considered leaving their position within the past 12 months.

Conclusion: EM residency leaders are experiencing career burnout which impacts their level of professional fulfillment and likely how they interact with and educate their trainees. While most programs are aligned with the requirements for program coordinator dedicated time, these feelings persist in part due to feelings of clinical work strain and underappreciation. Health systems must find new ways to support residency program educational leaders to ensure that they are fulfilled in their work and can most effectively train and support the next generation of physicians.

No, authors do not have interests to disclose

## 23 Pilot Testing the Feasibility of Wearable Devices and Ecological Momentary Assessments Among Emergency Medicine Providers

Agarwal A, Gonzales R, Merchant R/University of Pennsylvania, Philadelphia, Pennsylvania, US

Objectives: Emergency medicine (EM) clinicians are at exceptionally high risk for depression, anxiety, and PTSD due to repeated exposure to high-intensity patient care and chaotic work environments. These strains to one's emotional well-being often co-occur with burnout in health care and have been named "occupational hazards" associated with lower quality of care, high cost, and worse outcomes. EM physicians often fail to identify early signs of burnout and mental health strain such as poor sleep or reduced physical activity and are reluctant to seek treatment in part due to long-standing stigma and privacy concerns. Digital data such as ecological momentary assessments (EMAs) and wearable devices offer a novel way to assess individual's real-time needs and provide personalized assessments of their mental health. This project aimed to develop a process of wearable device and EMA delivery and linkage to care using an iterative pilot of 20 EM providers and assess for feasibility and exploratory effects.

Methods: We conducted a 3-month pilot trial of 20 EM providers (10 residents and 10 nurses). Providers were given a wearable device to collect biometric data as well as a subscription to an app-based platform that provides individualized data insights and actionable daily practices and coaching to help manage stress, energy, and recovery. Participants completed a pre-survey and 6-weeks of a guided experience in the app followed by 6-weeks of self-exploration of the platform. Participants then completed a final survey to measure feasibility, acceptability, and exploratory effects.

Results: In total, 20 EM providers enrolled in the study. Fifteen completed the pre-survey in the first app, and 10 successfully completed set-up to begin biometric data collection. Participants expressed a desire to be more self-aware to help them manage work-related stress. Among those who completed band setup, participants used the band for an average of 72.6 days (range 8 – 147). Participants found the interaction with data moderately useful (mean rating of 6) but found the platform somewhat difficult to use (mean rating of 4). Participants shared that they wished the device had a watch and noted that they struggled with the mechanics of the particular device. Analysis of exploratory effects is ongoing but preliminary data showed the highest user experienced moderate decreases in heart rate variability and strain scores over time.

Conclusions: EM providers were interested in increased awareness of their body's physiologic response to work-related stress and found interaction with digital data useful. Challenges with completing set-up of the wearable device deterred participants from completing study instructions and signals a need for a streamlined data collection process. These results can inform future interventions using wearable devices and EMAs and highlight the importance of sustained participant engagement for the success of such interventions.

No, authors do not have interests to disclose

## EMF 24 Emergency Physician Perspectives on Workplace Well-Being and Digital Mental Health

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Objectives: The prevalence of depression, anxiety, and post-traumatic stress disorder (PTSD) are high among physicians, particularly in emergency medicine (EM). These mental health symptoms have been exacerbated in the past years, disproportionately affecting women and underrepresented minority physicians (URM). Anxiety and depression decrease the quality-of-care physicians provide, reduce patient safety, and are associated with alcoholism, reduced sense of accomplishment, and erosion of personal and professional relationships. This qualitative study aimed to explore how EM physicians experience, process, and respond physiologically and mentally within clinical environments and to understand privacy issues related to digital health to inform future health system strategies to support physicians.

Methods: Forty semi-structed qualitative interviews will be conducted with a convenience sample of attending and resident physicians in the emergency department of a large, urban, academic health system. Interviews lasted 20-30 minutes, were recorded and transcribed. Thematic analysis of de-identified transcripts will take place in NVivo 20 software (QSR International) using a general inductive approach.

Results: Interviews and analysis are ongoing and is expected to conclude in Summer 2023. To date, participants have shared meaningful reflections on their experiences with well-being in EM. Five key themes have been preliminarily identified through 16 interviews: (1) experience in the clinical setting, (2) systemic improvement, (3) protective factors, 4) mental health data privacy and stigma, and (5) thoughts on digital data collection and sharing.

Conclusion: EM physicians experience high levels of stress and anxiety in the clinical environment. Many have developed mechanisms to cope with these negative mental health symptoms, but stigma is a major factor in how these physicians experience and discuss their mental health. However, EM physicians shared a desire to break this stigma and a willingness to share mental health data to advance science. These findings can help inform novel interventions to help physicians manage their well-being while health systems work toward broader system in parallel.

No, authors do not have interests to disclose

## EMF 25 Burnout in the Emergency Department: Its Prevalence and Link to Occupational and Extra-occupational Factors

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Objectives: This study sought to identify the prevalence of burnout, compare burnout among emergency department (ED) physicians and advanced practice providers (APPs) and compare its prevalence across demographic factors and previous studies. As awareness of healthcare-associated burnout continues to rise, it is essential to evaluate whether current data support increasing levels of burnout among ED healthcare providers. We secondarily sought to compare burnout prevalence to a range of occupational and personal lifestyle factors to identify variables that correlate with increased burnout to guide future interventions for burnout reduction.

Methods: We utilized a cross-sectional study design and obtained data through a two-part survey. The survey was offered for voluntary completion to all ED physicians, residents, and APPs at a large academic medical center. The first part was the Maslach Burnout Inventory Human Services Survey for Medical Professionals [MBI-HSS (MP)]. The second part was a set of questions pertaining to demographics as well as occupational and personal lifestyle factors. The presence of burnout was assigned with a high-range score in either the emotional exhaustion or depersonalization domains of the MBI-HSS (MP). Descriptive statistics were obtained for burnout prevalence. Chi-square analysis was performed to compare burnout prevalence across provider type and to assign significant relationships between burnout prevalence and lifestyle factor variables. A logistic regression was performed to quantify the effect of significant variables on burnout prevalence.

Results: The overall prevalence of burnout syndrome among 55 ED providers was 52.73%. The prevalence was 55%, 50%, and 55.56% for attending physicians, residents, and APPs, respectively. These differences were not statistically significant ($P$=0.93). Four variables yielded statistically significant correlations with burnout prevalence by chi-square analysis. These were 0-6 days off per month ($P$=0.02), having less than 2 hobbies ($P$=0.03), having thoughts of quitting at least some of the time ($P$=0.03), and spending less than 4 hours outdoors per week ($P$=0.04). Logistic regression showed that 0-6 days off per month had the highest correlation with burnout prevalence. The odds ratio was 4.70 with 95% CI 1.24-17.82 when comparing 0-6 days off to 7+ days off per month. Looking at these 4 variables as a set of risk factors for the prevalence of burnout, chi-square analysis showed that the presence of 3-4 versus 0-2 of these factors greatly increased the risk of burnout ($P$=0.001, OR=6.87 95% CI 2.01-23.52).

Conclusion: These results demonstrate that the prevalence of burnout in the ED has remained relatively constant when compared to previous studies and remains high relative to the prevalence reported in other medical specialties. Our results highlight risk factors whose modification could reduce future burnout. These factors are time off per month, number of hobbies, thoughts of quitting, and time spent outdoors. While some of these may be hard to influence due to the nature of the medical profession and personal preference, others provide a starting point for institutional efforts geared toward burnout prevention and reduction. Further research is needed to evaluate the measurable effect of such interventions.

No, authors do not have interests to disclose

## 26 Integrating Front-Line Wellness Support Into a Quality Strategy Into an Emergency Medicine Practice

Throop J, Port C, Stowie D/Emergency Care Specialists, Grand Rapids, Michigan, US

Objectives: There is recognition that burnout impacts healthcare quality. Emergency Medicine clinicians are at high risk for burnout. As such, there is an urgent

need to develop programs that restructure how front-line clinicians receive wellness services.

Methods: This quality improvement study describes a wellness program designed to support front-line clinicians in an independent Emergency Medicine (EM) physician practice. This Midwest practice employs over 250 Physicians and Advanced Practice Providers (APP). The group primarily practices in urban, rural, and critical access locations across four different health systems and provides care to approximately 500,000 emergency department (ED) encounters annually.

Practice leadership recognized that when clinicians experience burnout there is a negative impact on quality, retention rates, and corporate culture. Through collaboration with the local health system, providers employed by the independent practice were able to access the health system's wellness resources, but the use of this benefit for individual counseling was low, with only 14 individual sessions provided to clinicians employed by the EM group in 2022.

To improve the use of wellness services a licensed counselor with ED experience and knowledge of trauma care was contracted by the practice. The counselor developed a program geared to supply concierge-style wellness interventions for all team members employed by the physician group. This wellness program was also leveraged to meet the Merit-based Incentive Payment System (MIPS) Improvement Activity (IA) focused on provider well-being.

Counseling services could be directly scheduled by team members with the licensed counselor. Virtual and in-person sessions were offered, and the scheduling process was developed to protect the privacy of those seeking care. The counselor collaborated with physician and quality leadership to develop an internal marketing campaign to encourage use of the service. Basic metrics were tracked to evaluate how often team members opted to schedule counseling sessions.

Results: The service launched in May 2022. Roles using the service within the company included non-clinical team members 8%, APPs 33%, and Physicians 59% of the time. Initial uptake averaged 2.33 visits per month from May 2022-July 2022. Use steadily increased through December of 2022, with a quarter-four average of 10.33 visits per month. Data from 2023 showed a continued increase in scheduling with an average of 15 visits per month during quarter-one of 2023. Since program launch, 93 counseling sessions have been provided to 35 unique clients. The in-house concierge program averaged 8.45 sessions per month between May of 2022 and March of 2023 in comparison to an average of 1.16 counseling hospital-supplied counseling sessions per month in 2022.

Conclusion: Integrated wellness services offer value. The in-house counselor consistently has clinic sessions booked with an upward trend in appointments. Providers benefit from having convenient and confidential access to a licensed counselor who understands the complexity of EM. Initial obstacles included increasing awareness of the services, gaining trust from the clinicians, and encouraging a cultural shift that values the proactive use of wellness services. There is an opportunity to further explore if embedding counseling resources within an EM physician practice improves the cultural acceptance of receiving counseling services.

No, authors do not have interests to disclose

## 27 Helping Healers Heal (H3): Recognizing the Importance and Need of Targeted Wellness Resources Within the Emergency Department Setting

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Objectives: A 2020 meta-analysis by Zheng et al. found that 40% of emergency medicine (EM) physicians experience high emotional exhaustion and depersonalization, with a higher risk of burnout (> 60%, Maslach Burnout Inventory) compared to physicians in other specialties and other medical professionals working within the EM domain. The global impact of COVID-19 was extraordinary. In addition to the clear toll on patient morbidity and mortality, the evident toll on the health-care workers themselves — both physically and psychologically — cannot be underestimated. At New York City Health + Hospitals (NYC H+H), the Helping Healers Heal (H3) program (Figure 1) was established to provide comprehensive wellness support across all service lines. Designed to address staff's emotional and psychological needs, H3 became crucial for employees during the COVID-19 epidemic. Recognizing the complex challenges faced by frontline EM physicians, we sought to evaluate the utilization and impact of the H3 program within NYC H+H's EM settings from 2018 to 2021.

Methods: With wellness programming, it is important to attain ongoing qualitative and quantitative feedback from those engaging with wellness resources, as well as manage and monitor outcome, process, and balance measures for overall operational awareness and strategic planning. A concurrent multi-level assessment survey was completed every year to evaluate the overarching enterprise, individual facility, as well as unit/individual basis for a global picture of system and process health. With this information, a retrospective analysis was completed to evaluate the activation of H3 in the EM setting compared with the NYC H+H system as a whole.

Results: To encourage employee comfort and utilization of H3, the program-maintained options for anonymous participation, encompassing both internal and external resources. Out of the 6,609 instances of H3 support activation, 931 were completed with identifiable attribution. Although H3 anonymity may influence the data presented, consistent trends emerged over the past four years, emphasizing the utilization of employee wellness resources. In terms of total H3 activations, usage rose from 135 (2018) to 580 (2019) and 3,406 (2020), followed by a decrease to 2,427 (2021). Among activations with identifiable attribution, 10.9% (7) took place in the EM setting in 2018, 13.5% (50) in 2019, 20.2% (69) in 2020, and 21.1% (32) in 2021 (Figure 1). In the emergency medicine context, H3 activations were found to be comparable solely to those in Behavioral Health and Psychiatry, while consistently more than adult Med/Surg care (Figure 1).

Conclusion: In the past four years, NYC H+H has seen a notable rise in H3 activation in Emergency Medicine, paralleled only by Behavioral Health and Psychiatry. Medscape's 2022 National Physician Burnout & Depression Report reveals 60% of US emergency physicians experience burnout, increasing from 47% to 60% between 2019 and 2021. Post-pandemic long-term health effects for frontline workers are a major concern. EM providers' wellness is multifaceted and personal, influenced by various physical and mental health factors affecting overall work-life quality and potential realization. While studies are still emerging, research on frontline EM providers is limited, and such information is crucial for healthcare institutions to effectively build capacity, support their workforce, and address the pandemic's impact.

**Abstract: Helping Healers Heal (H3): Recognizing the Importance and Need of Targeted Wellness Resources within the Emergency Department Setting**

**Table 1**: H3 activations with identifiable attribution, a comparison between emergency medicine, internal medicine, and behavioral health.

| Specialty | | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| Emergency Medicine | # of Activations | 7 | 50 | 69 | 32 |
| | % of Total Activations | 10.9% | 13.5% | 20.2% | 21.1% |
| Behavioral Health/Psychiatry | # of Activations | 10 | 77 | 62 | 40 |
| | % of Total Activations | 15.6% | 20.8% | 18.1% | 26.1% |
| Adult Med/Surg | # of Activations | 6 | 44 | 68 | 21 |
| | % of Total Activations | 9.4% | 11.9% | 19.9% | 13.7% |

No, authors do not have interests to disclose

## 28 Are We Performing Ultrasound-Guided Nerve Blocks for Geriatric Hip Fractures in the Emergency Department? A Qualitative Survey of Perceptions

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Objective: Ultrasound-guided nerve blocks (UGNBs) offer an alternative to opioids for pain control among older adults with hip fractures. An American College of Emergency Physicians' position statement states that "UGNBs are within the scope of practice of emergency medicine physicians (EMPs) and represent a core component of a multimodal pathway to control pain for patients in the emergency department (ED)." The objective of this study was to investigate how frequently EMPs perform UGNBs in the ED as well as their barriers and facilitators to implementation.

Methods: This was a multicenter survey study sent through the Society for Academic Emergency Medicine-Academy of Emergency Ultrasound (SAEM-AEUS) community listserv. We solicited anonymous responses from ultrasound (US) division chiefs and/or US fellowship directors. We felt this group of EMPs would be most knowledgeable about the performance of UGNBs for geriatric hip fractures in their department. We requested their perceptions of UGNB utilization and grasp of common barriers and facilitators of UGNBs at their institution.

Results: We collected 51 participant surveys over a one-month period. Most participants (78%) were from programs with Level 1 trauma designation, >50,000 annual visits per year, and >30 ED beds. Respondents reported geriatric hip fracture

volumes of 50-200 per year in their ED, but less than 10% of those hip fractures received UGNBs while in the ED. Twelve percent of participants performed UGNBs on greater than 40% of the geriatric hip fractures in the ED. The majority of participants (69%) performed Infra-inguinal Fascia Iliaca Compartment Blocks (FICB). Approximately half of respondents reported the presence of a multi-specialty agreement with orthopedic surgery, regional anesthesia, and trauma surgery that defined UGNB criteria and 3% reported the presence of nerve block teams in their ED. Most respondents found that lack of comfort (76%) and lack of time (71%) were major barriers to performing UGNBs. Additional barriers included lack of provider enthusiasm, lack of education about the procedure, consultant disagreement, and "not part of the ED culture". An exemplary quote stated "Residents feel it takes too long to complete and rather than improving the patient's pain, they would rather give intravenous meds and see two other people in the process. Much of the faculty allow this culture to continue without trying to improve it as they do not know how to do blocks themselves, even the US trained ones." Participants identified easy documentation (54%), provider incentives (31%), and nerve block kits and carts (46%) as facilitators to UGNBs.

Conclusions: Despite strong support by professional medical organizations, EMPs in multiple EDs across the country report underutilization of UGNBs to control pain in geriatric hip fractures. Lack of comfort, time, education, and enthusiasm as well as cultural factors were major barriers. Future studies should evaluate implementation strategies to mitigate identified barriers of UGNBs for hip fractures in the ED.

No, authors do not have interests to disclose

## 29 Pericapsular Nerve Group Block (PENG) Versus Fascia Iliaca Compartment Block (FICB) for Hip and Femur Fractures in the Emergency Department: A Propensity Score Matched Cohort Study

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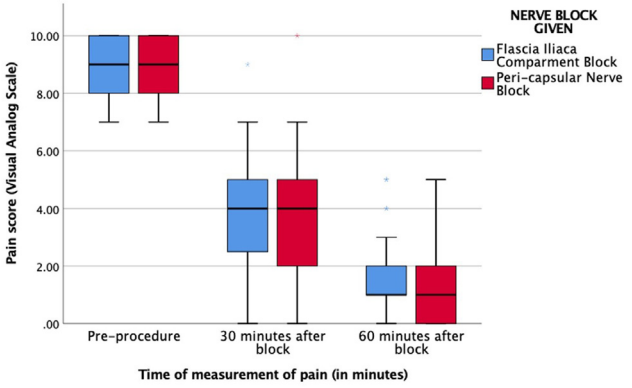
Objectives: The primary objective of this study was to investigate the efficacy of pericapsular nerve group block (PENG) versus fascia iliaca compartment block (FICB) in traumatic hip and femur fractures in terms of pain control in the ED. The secondary objectives were to compare opioid use and side effects in both treatment arms.

Methods: This prospective cohort study was conducted in a single-center ED. Consecutive adult (age > 18 years) patients receiving UGNB (FICB or PENG) for traumatic hip (acetabulum and pelvic ramus fractures) and femur fractures (femoral head, neck, intertrochanteric, subtrochanteric, and proximal shaft fractures) were included in this study. UGNBs were performed by trained emergency medicine residents under the guidance of a faculty. The choice of UGNB was according to the clinician's preference. Pain scores were assessed using Visual Analog Scale (VAS, ranging from 0 to 10, where 0 meant no pain and 10 meant maximum pain). Pain assessment was done before the block, 30 minutes, and 60 minutes after. Patients were followed up for 12 hours to record the rescue opioid use and the emergence of any side effects (block site infection, vascular injury, systemic toxicity of anesthesia, and opioid side effects). The propensity scores were estimated by logistic regression and matched using the nearest neighbor method to reduce selection bias in the baseline data in both arms. The median and interquartile range (IQR) of pain scores at baseline, 30 minutes, and 60 minutes were compared in both arms (unmatched and matched data). The total rescue opioid used in terms of oral morphine milligram equivalents and incidence of adverse events were also compared.

Results: One hundred and forty-eight patients were screened, and 104 were included (PENG: 52, FICB: 52). It was found that there was a significant difference in the baseline data between the two arms regarding UGNB indications and age. After propensity score matching, forty-eight patients (PENG: 24, FICB: 24) were analyzed for the study outcomes. The median age of the matched cohort was 38 years (IQR: 29.5-65), and 30 out of 48 (62.5%) were males. The commonest indications for UGNBs were intertrochanteric fracture (31.3%) and neck of femur fracture (31.3%). Most clinicians (90%) preferred an in-plane needle approach and used the lignocaine–bupivacaine combination for the blocks. Both treatment arms had a median preprocedural pain score of 9 (8-10). After 30 minutes of the block, patients receiving PENG (median 4, IQR: 26) had a similar pain score (p - 0.55) to that in the FICB arm (median 4, IQR: 1-5). The 60-minute pain scores were similar (p - 0.14) in both arms (PENG: 1, 0-2; versus FICB: 1, 1-2). The attached figure shows the median and IQR pain scores. Total oral morphine milligram equivalents used 12 hours post-block in the PENG arm was 41 mg (IQR: 29-63), which was similar to that in the FICB arm (median: 49mg, IQR: 3258.5) (p - 0.34). None of the patients had reported any adverse events related to UGNB or opioid use.

Conclusion: In this propensity score-matched cohort study, PENG block was found to be equally efficacious to FICB regarding pain control, rescue opioid requirement, and adverse events. A larger multi-center randomized controlled study is required to determine the superiority of one block over another.




No, authors do not have interests to disclose

## 30 Ultrasound-Guided Nerve Block Compared to Traditional Pain Control Modalities in the Emergency Room: A Systematic Review

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Objective: There are few definitive clinical guidelines or universal practices for the use of ultrasound-guided nerve blocks (UGNBs) compared to traditional pain control methods. Prior research has focused on peripheral nerve blocks of a specific anatomic site or in comparing various pain control modalities. Based on continuing research in this growing field, a systematic review is needed with a broad focus on general use of regional anesthesia in emergency departments and an exploration of risks and benefits compared to alternative therapies. We conducted a systematic review of the current literature in order to compare the analgesic efficacy of UGNBs to standard of care pain control measures in the emergency department (ED).

Methods: We performed a literature search in May 2019 and again in May 2021 using Ovid MEDLINE (1946-present), Web of Science Core Collection (1977-present), Cochrane Library (Issue 4, April 2021), and Google Scholar. In our initial search we found 1,002 articles and an additional 166 in our second search for a total of 1,168 articles. We included English-language articles that examined various types of ultrasound guided nerve blocks as compared to standard of care pain control e.g., IV analgesia, non-ultrasound guided nerve blocks, sedation, etc., in patients 18 years of age and older. The primary outcome was analgesic efficacy. Where able, we also reviewed the effect of ultrasound guided nerve blocks on length of stay, opiate consumption, post treatment complications and overall pain control. Included studies were evaluated using the Cochrane Collaboration's Risk of Bias tool, which includes an evaluation of random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other sources of bias. This investigation was performed and reported under guidance by the Preferred Reporting Items for Systematic Reviews and Meta-analysis guidelines.

Results: We identified 19 studies that met eligibility criteria for a total of 1,165 participants. A qualitative analysis showed that all but two studies reported greater reductions in pain with ultrasound guided nerve blocks. The total amount and need for rescue analgesia, as well as length of stay, were all found to be reduced for ultrasound guided nerve blocks when compared to standard of care. Only one of the studies reported a complication with ultrasound guided nerve block which was attributed to local anesthetic systemic toxicity (LAST).

Conclusions: UGNBs are an effective treatment option for pain control when compared to what is considered current standard of care. UGNBs lead to decreased patient length of stay in the ED, decreased opiate utilization, decreased complications, and provided better pain control when compared to standard therapy.

No, authors do not have interests to disclose

## 31 Safety of Ultrasound-Guided Regional Anesthesia Performed by Emergency Physicians: A Systematic Review of Adverse Events

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Objectives: Ultrasound-guided regional anesthesia (USGRA) for pain management has become increasingly prevalent in Emergency Medicine, with studies noting excellent pain control while sparing opioid use. However, USGRA use may be hampered by concern about risks for patient harm. This systematic review quantifies the documented incidence of adverse events associated with USGRA by Emergency Physicians (EPs).

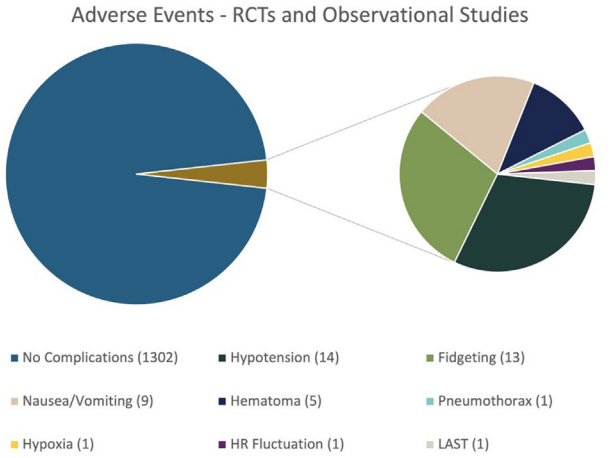
Methods: Using strategies created by a medical librarian, the published literature was searched for USGRA for emergency department patients. Databases were searched without filters and included Ovid Medline, Embase, Scopus, Cochrane Central, Pubmed, and Clinicaltrials.gov. We focused our review on randomized controlled trials (RCTs) and observational studies, but also considered case series and case studies for inclusion with the purpose of highlighting additional adverse events not reported in more robust trials. Studies pending publication, abstracts, conference presentations, and unpublished studies were also considered for inclusion. Review articles and those detailing USGRA performed exclusively by non-EP's were excluded. A risk of bias/quality assessment is in process. The review adhered to a previously established framework for systematic reviews of adverse events.

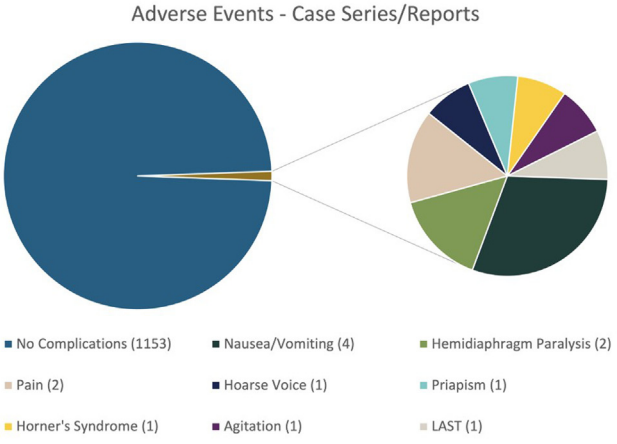
Results: Our literature search ran from inception until March 2022 and resulted in 901 unique citations, of which we reviewed 117 publications that met inclusion criteria. We also identified 2 additional studies worthy of inclusion via "file drawer" search. We reviewed 31 RCT's and 88 case series and case reports. There were 1347 USGRA procedures documented in RCT's and observational studies with 44 documented AE's (including 1 incident of LAST and 1 pneumothorax). Amongst these 1347 documented procedures, 17 (1.3%) were felt to result in a potentially severe AE (14 hypotension, 1 hypoxia, 1 LAST, 1 pneumothorax) and 7 (0.6%) were felt to result in an AE likely related to the injection itself (5 hematomas, 1 hypoxia, 1 LAST, 1 pneumothorax). There were 1166 USGRA procedures documented in case series and case reports with 14 documented AEs, including 1 incident of local anesthetic systemic toxicity (LAST) from accidental double dose of anesthetic. Regarding types of USGRA procedures evaluated, 44 publications evaluated upper extremity procedures, 43 evaluated lower extremity procedures, 36 described other non-extremity procedures, and 1 abstract did not specify. Procedures were performed by EPs of various levels, including residents, fellows, non-fellowship-trained attending physicians, and fellowship-trained attending physicians.

Conclusions: USGRA has been performed by EPs across various levels of training with rare instances of adverse events directly related to the blockade. Adherence to safety protocols is paramount to any procedure, including USGRA, but concerns for risks should not serve as a major barrier to clinical implementation of USGRA by EPs.

Other

No funding was provided for this study. This review was registered with PROSPERO (CRD42021241168).




Yes, authors have interests to disclose

Disclosure: serves on ACEP Clinical Policy Committee (CPC), lead SAEM Guidelines for Reasonable & Appropriate Care in the ED, lead the upcoming updates to the Geriatric Emergency Department Guidelines, and is the ACEP CPC liaison to the AOS Management of Hip Fractures in Older Adults Appropriate Use Criteria (AUC)

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Disclosure: Dr. Jacques Lee is the inaugural Schwartz/Reisman Emergency Medicine Institute research chair in Geriatric Emergency Medicine

## 32 Biplane Ultrasound in Ultrasound-Guided Vascular Access: Impact on Medical Student Competency

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Objectives: Ultrasound guidance improves the safety and success of vascular access procedures. It can be performed in either the short or long axis orientation, each of which offers benefits and limitations. New technology has allowed for the deployment of a novel 'biplane' approach, wherein both long and short axes are viewable simultaneously during procedures. Our objective was to determine if the novel 'biplane' technique for ultrasound-guided vascular access improves competency in ultrasound-guided peripheral intravenous line (USGIV) placement amongst a group of medical student learners.

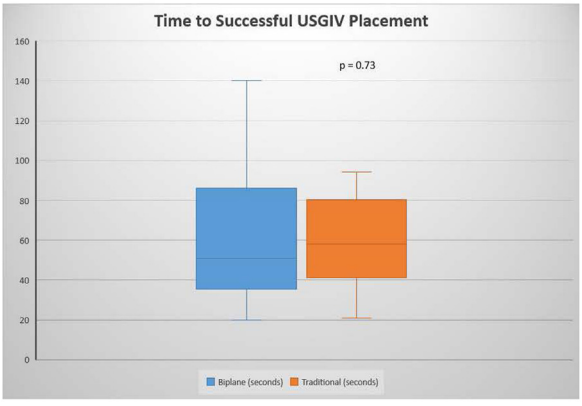
Methods: Medical students on their fourth year Emergency Medicine rotation were block randomized to 'biplane' or 'traditional' ultrasound for a 75-minute vascular

access workshop. Enrollment occurred between November 1, 2022, and April 30, 2023. Blue Phantom vascular access trainers and Butterfly iQ ultrasound devices were used for all subjects. The 'biplane' group had this feature enabled allowing simultaneous long and short axis viewing. The 'traditional' group used short axis for initial needle placement followed by rotation of the ultrasound probe to long axis for adjustment of depth and angle prior to catheter thread. Both groups were introduced to USGIV via an instructional video and a standardized 15-minute didactic demonstrating USGIV placement with the 'traditional' approach and the novel 'biplane' technique. This was followed by a 20-minute training period where students had proctored faculty instruction in their randomized ultrasound modality using the educational methodology of deliberate practice. Each learner was then evaluated for competency in USGIV placement through the measurement of time to successful catheter placement, number of needlestick attempts (NA), and number of vessel backwall punctures (BWP). To ensure educational exposure to each modality, subjects received instruction in the alternate modality after testing had been completed. Mann-Whitney test was performed to assess significance for outcome variables between the two groups, with p-values $< 0.05$ being considered significant. Median and interquartile range (IQR) were calculated for the time and Likert scale, while mean and standard deviation (SD) were used for NA and BWP.

Results: 53 subjects were enrolled, with 29 randomized to the biplane group and 24 to the traditional group. Median time to USGIV placement was 51 seconds in the biplane group (IQR 36-86) and 58 seconds in the traditional group (IQR 42-80), p=0.73 (Figure 1). Mean NA was 1.14 in biplane (SD 0.35) and 1.13 in traditional (SD 0.61), p=0.58. Mean BWP was 0.17 in biplane (SD 0.29) and 0.38 in traditional (SD 0.71), p=0.19. Likert scale rating for ease of procedure (1 being easy and 10 being difficult) was 3 in biplane (IQR 2-4) and 3 in traditional (IQR 3-5), p=0.27. 89% of students rated the biplane modality as being their preferred modality, while 11% rated traditional.

Conclusions: In our cohort of medical student learners, we did not find a statistically significant difference in our primary outcome measures for USGIV competency between the group using novel biplane ultrasound and those using traditional ultrasound for guidance. We did find a majority of our students rated biplane as their preferred modality for USGIV placement. Further study in the clinical environment would be helpful in understanding the potential impact of biplane ultrasound on vascular access procedures.

Figure 1: Box and whisker chart showing time to successful ultrasound guided intravenous line (USGIV) placement.




No, authors do not have interests to disclose

## 33 Landmark vs. Ultrasound-Guided Identification of the Cricothyroid Membrane: A Randomized, Prospective Cohort Study

Hoffer M, Dow J, Nasri F, Shahamatdar S, Moran S, Popova M, Jacomino K, Dearing E, Taheri R, Boniface K/George Washington University, Washington, DC, US

Objectives: Emergency cricothyrotomy can be a life-saving procedure in emergency department patients. Palpation and identification of the cricothyroid membrane (CTM) is an essential first step to cricothyrotomy. The objective of this study was to compare the accuracy of identification of the cricothyroid membrane (CTM) using traditional landmark palpation versus direct visualization using point-of-care ultrasound, using computed tomography (CT) scan of the neck as the reference standard.

Methods: This is a prospective randomized study performed at a single university-based tertiary care center with an emergency medicine residency and a clinical ultrasound fellowship accredited by the Emergency Ultrasound Fellowship Accreditation Council (EUFAC). Using the tracking board of our department's electronic health record (EHR), research assistants identified adult Emergency Department (ED) patients for whom a computed tomography (CT) of the neck was ordered but not yet performed (including CT of the soft tissue of the neck, CT of the cervical spine, and CT angiography of the neck). Patients in police custody and those unable to consent were excluded. Three ultrasound fellows, one emergency medicine resident, and four emergency ultrasound attendings performed either the landmark or ultrasound-based CTM identification after patient randomization. Once identified, a 1.5 mm radiopaque metallic pellet sticker was placed over the site. A neuroradiology fellow and neuroradiology attending blinded to technique of placement of the marker measured the location of the metallic marker on CT compared to the midpoint of the CTM. Correct placement was defined as the marker being within a 5 mm distance radially of the CTM midpoint.

Results: 67 patients were enrolled and had the criterion standard CT. 31 were randomized to ultrasound-guided and 36 to landmark techniques. The mean age of patients was 54.7 +/- 18.2 years. 38 (56.7%) were female. The overall median body mass index (BMI) was 26.6 (IQR 16.3-36.9); the median BMI for the ultrasound group was 28.5 and for the landmark group was 26.6. 37 out of 67 patients (55%) had the pellet within 5 mm of the center point of the CTM, with 16/31 (51.6%) accurately placed by ultrasound and 21/36 (58%) accurately placed by landmark (p=0.63).

Conclusion: There was no significant difference found between the accuracy of location of the CTM via landmark palpation or ultrasound location when compared to the reference standard of CT in this cohort.

Future studies should focus on a patient population selected for higher BMI, for whom palpation may be more challenging.

No, authors do not have interests to disclose

## 34 Our Growing Challenge: Urban Emergency Department Workplace Violence Based on Gender, Healthcare Role, and Barriers to Reporting

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Background: A 2022 American College of Emergency Physicians (ACEP) study reported 85% of emergency medicine physicians believe emergency department (ED) violence is increasing.

Objectives: To assess the rate of physical and verbal violence experienced in two EDs, determine how rates differ by gender and healthcare role, and uncover barriers to reporting violence.

Methods: An ACEP validated, anonymous survey on ED violence was emailed to all ED staff (Physicians, APPs, nurses, technicians, clerks, registrars, pharmacists) from two hospitals within an urban health system. Responses were accepted 12/15/22 to 12/23/22. Questions assessed participant's gender, healthcare role, frequency, and suspected etiology of verbal or physical assaults experienced. Descriptive statistical comparisons were made based on categorical data.

Results: Our study collected 119 completed surveys, approximately 32.5% of total ED staff, with 85% from an academic center and 15% from a community hospital. Respondents identified as female (71%), male (26%), nonbinary (2%), preferred not to answer (1%). Roles included nurses (34%), attending physicians (21%), emergency medicine resident physicians (18%), and other staff (27%). Verbal and physical assaults were experienced at 82% and 32%, respectively. Nurses experienced most physical assaults at 56%, then attendings (26%), residents (11%), and technicians (7%). Of the 23% who reported any assault to leadership, 89% were female and 11% male. Women were three times more likely to be assaulted or witness assault, 71% vs. 23% of men. Technicians reported assaults to leadership the most at 45% and residents did not report once. Physicians cited psychiatric illness and intoxication as primary factors to violence, while technicians and nurses cited increased boarding. Regarding barriers to reporting, 42% reported "Other," 33% lacked knowledge of how to report, 8% feared losing their job, 8% feared being blamed, and 8% reported lack of support from colleagues. In terms of "Other," several write-in responses indicated decreased confidence assaults will be followed up.

Conclusions: Data suggests violence experienced and reported varies by role and gender. Nurses, a cohort that is predominantly female in our study, noted the highest rates of violence. Technicians formally reported events most frequently, and residents did not report. Multiple barriers exist to reporting, including educational issues as well as the perception it will not impact change.

Impact: This study emphasizes ED-based violence is a challenge impacting all roles within the department. Further research is indicated to evaluate trends in violence while a primary focus of intervention should be to address barriers to reporting.

No, authors do not have interests to disclose

## 35 Improving Adherence to Best Practices and Clinical Outcomes in Difficult Intravenous Access Patients

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Objectives: Difficult intravenous access (DIVA) patients are known to have disproportionately poorer vascular access outcomes. Many DIVA patients are poor candidates for standard techniques and require ultrasound-guided IV (USIV) placement. This procedure has become more common, yet training is often minimal, not standardized, and without clear endpoints for competency. Following established best practices for USIV placement has been shown to improve clinical outcomes. Literature suggests most clinicians do not adhere to these guidelines and may even be unaware of them. The impact of education and training of emergency department (ED) staff on vascular access in this vulnerable population remains unclear. We aim to demonstrate the success of a teaching program (Operation STICK) on improving adherence to vascular access best practices in the ED and improved vascular access outcomes in DIVA patients.

Methods: This was an observational cohort analysis conducted at a tertiary care ED with 120,000 annual visits and 1,100 hospital beds. Adult patients requiring USIV insertion in the ED between April 1st, 2022, and March 30th, 2023, were eligible participants. ED clinicians of all levels were voluntarily trained in IV access by a teaching program, Operation STICK (OSTICK), during this time. Descriptive statistics of the study demographics, hospital course, USIV characteristics, and outcomes were performed. The primary outcome was the proportion of catheter dwell time to the hospitalization length of stay. Secondary outcomes included: time to USIV placement, site selection, PIVC failure, complications, and hospital length of stay.

Results: 3,867 USIVs placed in the ED were included in this study. 2,282 (59.0%) were placed by OSTICK-trained staff and 1,585 (41.0%) by non-OSTICK-trained staff. The average age was 59.49 years and 67.4% was female. The time from ED arrival to USIV insertion was significantly faster among OSTICK-trained staff (mean = 3.52 hours vs 6.97 hours; $p<0.001$). Further, AC fossa placement was 13.8% lower in OSTICK trained staff ($p<0.001$). Among admitted patients, the median proportion of USIV dwell time to the entire hospital length of stay was 89.0% among OSTICK USIVs, compared to 70.0% among non-OSTICK USIVs ($p=0.006$). Hospital length of stay reduced from 184.37 hours to 178.11 hours with OSTICK-trained USIV placement ($p=0.466$). The complication rate was in 37.3% of OSTICK USIVs compared to 41.1% of non-OSTICK USIVs ($p=0.232$).

Conclusions: In conclusion, the results of this study demonstrate that instituting a comprehensive vascular access program can successfully improve adherence to best practices and clinical outcomes for patients requiring USIV placement in the ED. The training program resulted in faster USIV insertion times, improved insertion practices, and a higher proportion of catheter dwell time to hospital length of stay.

Yes, authors have interests to disclose
Disclosure: B. Braun Medical
Consultant/Advisor
B. Braun Medical
Disclosure: Teleflex
Consultant/Advisor
Teleflex
Disclosure: Lineus Medical
Consultant/Advisor
Lineus Medical
Disclosure: Interad Medical
Consultant/Advisor
Interad Medical
Disclosure: Becton-Dickinson
Grant Support
Becton-Dickinson

## 36 Effect of Contrast Dye on Renal Function of Diabetics Who Presented With Acute Ischemic Stroke After Computed-Tomography Angiography Head and Neck

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Objectives: Medical providers may be hesitant to perform imaging studies using intravascular (IV) contrast without knowing a patient's baseline renal function for fear of contrast-induced nephropathy (CIN), especially in comorbid conditions like diabetes. The objective of this study was to determine if the use of IV contrast in diabetic patients undergoing computed tomography angiography (CTA) with or without computed tomography perfusion (CTP) increases the risk of acute kidney injury (AKI) in patients presenting to the emergency department (ED) with symptoms of ischemic stroke.

Methods: This was a retrospective study of patients who presented to the ED with ischemic stroke and a history of diabetes over a 24-month period, from January 1, 2019, through December 31, 2021 (n=241).. Data from patients who underwent stroke protocol including non-contrast computed tomography of the brain (CTB), CTA, CTP, or a combination of the three were collected. CIN was measured using initial baseline creatinine level (time 1) followed by levels after at approximately 48 (time 2) and 72 (time 3) hours after IV contrast was given. The primary outcome was presence of CIN based on a dichotomous creatinine level of $\leq$1.1 versus >1.1 in diabetic patients who received IV contrast versus those who did not.

Multivariable logistic regression models were performed to determine if change in creatinine was greater for those who received IV contrast while controlling for confounding variables such as age, BMI, and receiving nephrotoxic antibiotics (Vancomycin and Zosyn) and Metformin.

Results: The mean age of the patients was 70.5 (standard deviation 11.7). Mean creatinine of diabetics receiving IV contrast at time 1 (n=170) was 1.71 (1.5) compared to no contrast of 1.82 (1.8). The mean creatinine level of those receiving contrast at time 2 (n=161) was 1.67 (1.0) compared to no contrast (n=64) 1.63 (1.8) and the mean level of those receiving contrast at time 3 (n=127) was 1.69 (1.68) versus no contrast (n=48) was 1.79 (1.8). Adjusting for baseline creatinine levels, those receiving IV contrast were equally likely (odds ratio 1.48; P=0.2960) to have high creatinine levels at time 2 and time 3 (1.13; P=0.7790). Those who received contrast were also similarly likely to have higher creatinine levels after time 1 compared to those without contrast at times 2 (1.07; P=0.9497) and 3 (0.50; P=0.4578). Those who received contrast compared to those who did not were just as likely to have improved creatinine levels at times 2 and 3 (0.61; P=0.1615) and (0.576; P=0.1952), respectively. No statistical difference was found for IV contrast use between times 1 and 2 and times 1 and 3 after adjusting for age (P=0.1578 and P=0.4964), BMI (P=0.5428 and P=0.1034), and nephrotoxic antibiotics (P=0.1454 and P=0.3392). Metformin was not significantly different at time 2 (P=0.1867) but was statistically significantly protective at time 3 (0.200; P=0.0032) compared to baseline.

Conclusions: AKI was not found in diabetic patients where IV contrast was used to obtain CTA or CTP of the brain during ischemic stroke. Patients who take Metformin may be afforded some protection from CIN. These findings may instill confidence in those who are hesitant to obtain CT imaging with contrast to diagnose a stroke in patients with diabetes.

No, authors do not have interests to disclose

## 37 The Patient Voice Project: A Qualitative Analysis of Patient Experiences With New York City Emergency Departments During the COVID-19 Pandemic

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Background: In the aftermath of the COVID-19 pandemic's first wave, many patients avoided accessing emergency care due to fear of infection. News reports highlighting the marked disparities in COVID-19 infection rates, morbidity, and mortality in historically underserved communities diminished trust in emergency care delivery, leaving these communities, for whom the emergency department (ED) has served as a safety net and entry point for accessing medical care, at risk of worse health outcomes in the long-run.

Objectives: We sought to explore patients' experiences during the COVID-19 pandemic to uncover patient-driven ideas to improve equity, restore safety and public trust in emergency care delivery, and prepare for future threats.

Methods: From October 2020 to June 2021, 24 semi-structured qualitative interviews were conducted over video conferencing. Participants included adults across the greater New York City area who had experiences with emergency care starting during the first wave of COVID-19. The project team reached out to community-based organizations across the greater New York City area to identify a diverse sample of participants. Open coding and thematic analysis elucidated participant's experiences and proposed solutions.

Results: Respondents had variable experiences with emergency care since March 2020. Several themes emerged, including health equity and bias, access to care, limited knowledge and fear, challenges faced by the healthcare workforce, patient safety, logistics and systems of care, and the role of telemedicine. Participants identified solutions with respect to each of these themes and the future of emergency care. These included ED design considerations, curating the "patient journey" through communication and technology solutions, integrating telemedicine and prehospital care systems, and prioritizing humanism and patient experience.

Conclusions: Qualitative interviews illuminated patients' perceptions of inequities, fragmentation, and unique challenges in experiencing emergency care services during the COVID-19 pandemic. Such findings suggest areas for future research and systems-wide redesigning of emergency care delivery to ensure equitable, safer, resilient systems of emergency care rooted in patient's experiences and patient-driven solutions.

Yes, authors have interests to disclose

Disclosure: Agency for Healthcare Research and Quality

Employee

Agency for Healthcare Research and Quality

## 38 Are Happy Experiences Only From Happy Clinicians? An Observational Study Investigating the Relationship Between Practitioner Well-Being and Patient Experience

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Objectives: Burnout has been historically high in the field of emergency medicine over the past few years. At the same time, many emergency departments (ED) have seen significant fluctuations in their patient experience survey results. This study investigates whether there is a correlation between the self-reported well-being of emergency physicians, and non-physician emergency practitioners with the results of patient experience surveys seen by their patients during the same time period.

Methods: Staff at 18 emergency departments from an integrated health system were invited to complete quarterly well-being surveys from July 2020 through December 2021 that contained 17 items divided into four categories: work exhaustion, interpersonal disengagement, professional fulfillment, and burnout. Responses were averaged within each category and aggregate scores ranged from 1 to 5. For physicians and non-physician practitioners who completed at least one of these surveys, these results were matched with those individuals' quarterly scores for the likelihood of recommending, staff cared about me as a person, and overall rating of care questions on the institution's standard ED patient experience survey, all items scored from 1 to 5.

Results: For 210 emergency physicians and 133 emergency physician assistants and nurse practitioners, no statistically significant correlation was found between individuals self-reported well-being and patient experience scores (all $p > 0.5$). Further, all nonsignificant correlations were $< \pm 0.1$.

Conclusion: The results reported here do not support a correlation between emergency practitioner wellbeing, and patient experience survey results, and ED leaders should not use patient experience results as a surrogate for staff, well-being, or burnout. This could be related to the culture of medicine in the emergency department, but further work is needed to better understand how to improve both ED staff well-being and patient experience.

**Table 1:** Spearman correlations between patient experience and ED well-being survey results

| | Overall Rating of Care | | Likelihood to Recommend | | Staff Cared About Me | |
|---|---|---|---|---|---|---|
| | r | P-Value | r | P-Value | r | P-Value |
| Professional Fulfillment | 0.04 | 0.37 | -0.02 | 0.67 | 0.01 | 0.88 |
| Work Exhaustion | 0.05 | 0.25 | 0.04 | 0.37 | 0.03 | 0.54 |
| Interpersonal Disagreement | 0.03 | 0.43 | 0.01 | 0.82 | 0.02 | 0.59 |
| Burnout | 0.03 | 0.45 | 0.03 | 0.53 | 0.01 | 0.73 |

No, authors do not have interests to disclose

## 39 Leveraging Big Data in American College of Emergency Physicians Emergency Medicine Data Institute Registry to Find the Rate of Co-testing for Syphilis When Already Testing for Gonorrhea and Chlamydia

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Objectives: Emergency department physicians do not routinely test for syphilis based on Centers for Disease Control and Prevention recommendations or co-test for syphilis when patients present for the more commonly tested sexually transmitted infections (STIs), gonorrhea and chlamydia. Although the rates of new diagnoses of HIV are slowly decreasing, the rates of curable STIs are rising, especially syphilis. Given shared risk factors for multiple STI and high coinfection rates, emergency departments should consider STI co-testing to help reduce transmission of untreated infections, especially syphilis. Increased testing for syphilis in the emergency department (ED) can help identify cases of the disease that would otherwise go undetected, facilitate early treatment, and prevent further transmission. A current syphilis co-testing rate of 2.9% when already testing for gonorrhea and chlamydia, identified in Nationwide Emergency Department Sample (NEDS), demonstrates a significant gap in co-testing. Our aim was to assess co-testing for syphilis in an already at-risk ED patient population (i.e., those being tested for gonorrhea and chlamydia) through a large national sample of EDs, the American College of Emergency Physicians' (ACEP) Emergency Medicine Data Institute (EMDI) registry, by utilizing a novel process measure: the rate of syphilis co-testing with gonorrhea and chlamydia testing.

Methods: We examined encounter-level laboratory results data within the ACEP Registry for calendar year 2021 to create estimates of ED care by querying tests for gonorrhea, chlamydia, and syphilis testing. We generated two value sets for gonorrhea and chlamydia tests & syphilis tests using the discrete Logical Observation Identifiers, Names and Codes (LONIC) standard. Unique encounter counts were then obtained by filtering laboratory results data using the two value sets separately and sequentially. We limited the study population to 2021 encounters from EDs which have laboratory results data within the registry.

Results: We identified 40,960 encounters in which gonorrhea and chlamydia testing was performed and 3,697 encounters in which syphilis testing was performed. Co-testing of gonorrhea and chlamydia & syphilis tests was performed in 1,721 cases at a rate of 2.4% (Table 1).

Conclusions: Using ACEP's EMDI registry, we found a syphilis co-testing rate of 2.4% that is similar to the 2.9% rate found in NEDS. Despite rising syphilis incidence, screening in high-risk ED patients like those undergoing gonorrhea and chlamydia STI evaluation, only a small proportion of patients are being co-tested for syphilis. We propose a process measure, co-testing syphilis when testing for gonorrhea and chlamydia, to help benchmark and increase ED syphilis testing in high-risk individuals.

No, authors do not have interests to disclose

## 40 Impact of En Route Critical Care Provider Experience on Lung Protective Ventilation Compliance During Air Transport of Combat Wounded

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Objectives: The primary objective of this study was to evaluate the association between U.S. Air Force Critical Care Air Transport (CCAT) provider mission experience with compliance for lung protective ventilation (LPV) volumes recommended by Acute Respiratory Distress Syndrome Clinical Network (ARDSNet) guidelines.

Methods: We performed a retrospective cohort study of CCAT providers transporting combat wounded requiring mechanical ventilation from the Middle East to Germany from 2007-2012. We reviewed CCAT medical records from 2007 to 2012 for the total number of missions flown by CCAT physicians and respiratory therapists (RTs). Center for Sustainment of Trauma and Readiness Skills (CSTARS) Cincinnati process improvement questionnaire data described provider demographics and clinical backgrounds. We linked these data to patient demographics and in-flight ventilation management from a prior CCAT cohort study. Patient inclusion criteria included transport by CCAT for traumatic injury requiring mechanical ventilation between 2007-2012 from the Middle East to Germany. We excluded patients with no documented heights or tidal volumes. LPV compliance was defined as tidal volumes $\leq$8 cc/kg of predicted body weight during en route critical care transport. Chi-square or Fisher's exact tests were performed.

Results: We analyzed 71 CCAT respiratory therapists and 84 CCAT physicians, with anesthesiology (21, 25%) and emergency medicine (20, 24%) as the most common included medical specialties. Among 491 analyzed transports, median experience was 26 missions (IQR 13-40) for RTs and 23 missions (IQR 12-38) for physicians. Patients had a median age of 25 years (IQR 22-30), 98% were male, median injury severity score (ISS) was 24 (IQR 17- 34), and median preflight $PaO_2/FiO_2$ was 285 (IQR 220-365). All in-flight tidal volumes were LPV compliant in 58.3% of 491 patient transports. Differences between LPV compliant versus noncompliant patient groups included year of transport (p=0.004), physician specialty (p=0.011), and RT stateside critical care experience (p=0.045).

Conclusions: Linkage of multiple data sources enabled evaluation of provider operational and clinical experience with LPV guidelines in the operational air transport environment. Preliminary data suggest that prior clinical experience is associated with LPV compliance. Future studies should evaluate the impact of ongoing CCAT training and quality improvement interventions on LPV compliance.

Yes, authors have interests to disclose

Disclaimer: The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of the Air Force, Department of the Army, Department of Defense, or US Government.

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## 41 Analysis of an Emergency Department Extubation Protocol Using Readiness-To-Wean and Rapid Shallow Breathing Index

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Objectives: Identifying emergency department (ED) patients for extubation can benefit patient care, health care delivery, and avoid unnecessary Intensive Care Unit (ICU) stays. However, emergency physicians receive little training in evaluating patients for extubation. ED extubation (EDx) has been traditionally reserved for those intubated for intoxication or agitation. Furthermore, little data is available on the outcomes of patients who have undergone EDx. To address this, an EDx clinical practice guideline (CPG) was developed to guide in safe EDx of any patient and assess readiness-to-wean via a spontaneous awakening trial, spontaneous breathing trial, and a Rapid Shallow Breathing Index (RSBI); and included a Comfort Measures Only (CMO) pathway. Our objective was to analyze the outcomes of patients who have undergone EDx before and after the implementation of the EDx CPG.

Methods: We conducted a quasi-experimental study in an academic medical center in the United States. We examined outcomes 24 months pre-CPG vs. 19 months post-CPG from 1/19-8/22. CMO patients were excluded. The CPG EDx criteria for patients were: Intubated for safety/facilitation of workup, Resolution of acute respiratory failure criteria, Resolved Intoxication/OD, and Resolved Status Epilepticus. The EDx criteria, average number of monthly EDx, percentage of ED to ICU dispositions, and percentage of inpatient-to-home discharge before and after CPG were compared. Student's t-test and chi-squared test were used as appropriate.

Results: A total of 66 patients underwent EDx pre-CPG vs. 95 post-CPG. 42 Pre / 58 Post were excluded due to CMO status. The study included a total of 24 vs. 37 (pre vs. post-CGP) non-CMO patients. The average age was 38.2 $\pm$ 13.6 vs. 42.9 $\pm$ 17.6 (pre vs. post). 8.3% vs. 37.8% (pre vs. post) were female. The average number of comorbidities among all patients was similar (2.3/patient). Compared to pre-CPG, there was an increase of 0.9 EDx/month (95% CI: 0.05-1.84) and a net decrease of 28.0% (95% CI: 10.0-46.2) in ED to ICU dispositions after CPG implementation. There was no statistical difference in the percentage of inpatient-to-home discharges (7.5%, 95% CI: -15.3-30.0) after CPG implementation. No re-intubations in the ED or inhospital mortality occurred pre/post. Pre EDx criteria: 4 (16.7%) Resolved Status Epilepticus, 6 (25%) Intubated for safety/facilitation of workup, and 14 (58.3%) Resolved Intoxication/OD. Post-EDx criteria: 2 (5.4%) Resolved Status Epilepticus, 6 (16.2%) Intubated for safety/facilitation of workup, 8 (21.6%) Resolution of acute respiratory failure, and 21 (56.8%) Resolved Intoxication/OD. EDx for Resolution of acute respiratory failure occurred only in the post group.

Conclusions: We show that EDx with broader criteria incorporating ICU evidence-based practice results in safe EDx of an older, more gender-heterogeneous population with an increased number of EDx per month and decreased ICU admissions. This suggests that the CPG can allow us to move beyond the traditional paradigm where EDx are reserved for young patients intubated for status epilepticus, agitation, and intoxication. The Post CPG data suggests there is a group of patients with acute respiratory failure that could benefit from EDx. This study is the first use of the RSBI to assess readiness for extubation in the ED we are aware of. EDx can potentially benefit patient care and health care delivery and improve resource utilization.

No, authors do not have interests to disclose

## 42 "Baby Box": Neonatal Resuscitation Box With Asynchronous Training Improves Emergency Medicine Provider Preparedness for Precipitous Delivery

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Background: It is estimated that over 9000 infants are born outside of the hospital annually. Approximately 10% of newborns require some level of resuscitation postnatally. However, there is little published on the standards of equipment and provider readiness in the emergency department (ED). The goal of our project is to establish a portable neonatal resuscitation equipment box and improve physician readiness in the ED for precipitous deliveries.

Methods: A neonatal resuscitation box, also known as the "Baby Box," was created to consolidate resuscitation equipment necessary in an event of a precipitous delivery. We created a video to feature the contents of the Baby Box along with basic information on the Neonatal Resuscitation Program (NRP). A survey was distributed to emergency medicine (EM) residents and attendings, pediatric residents, and pediatric EM fellows and attendings at an inner-city, public hospital. A pre and post video survey was administered to assess provider confidence in neonatal resuscitation, equipment location, and NRP knowledge using a five-point Likert scale. Data was analyzed using paired sample t-test.

Results: Of the 80 respondents who opened the survey, 52 completed the entire survey and attested to watching the video. 65% of these were either EM or pediatric residents, 7% were EM fellows, and 28% were Pediatric EM or EM attendings. 44% of respondents had participated in a neonatal resuscitation at least once in the last year in the ED. Over 90% agreed the NRP was relevant to their job and 71% were confident in using the NRP. While 73% were confident in using provided supplies for resuscitation, only 38% were confident in their abilities to locate supplies in the ED. When the same questions were asked after watching the informational video introducing the Baby Box, 90% were confident in using provided supplies and 92% were confident in their abilities to locate supplies in the ED.

Paired t-tests were statistically significant at $p<0.01$ when comparing confidence before and after the video intervention for using NRP, using equipment, locating equipment, and locating equipment within the ED. Only EM providers had a statistically significant increase in confidence with NRP when broken down by department. (Table 1)

Conclusions: An ED-tailored portable neonatal resuscitation box, when paired with an asynchronous video training, increased preparedness for neonatal resuscitations and provider confidence for precipitous and ED deliveries.

**Table 1**: Survey Results Before and After Video - By Level of Training and Department *(Likert Scale of 1=Strongly Disagree to 5=Strongly Agree)*

| "In the case of a precipitous delivery in the ED, I feel confident that I can quickly locate what I need for a potential resuscitation" | | | | |
|---|---|---|---|---|
| | Respondents | BEFORE Mean (SD) | AFTER Mean (SD) | p-value |
| **Overall** | 52 | 2.98 (1.2) | 4.23 (0.76) | <0.01* |
| **Level of Training** | | | | |
| Resident | 33 | 2.88 (1.27) | 4.24 (0.61) | <0.01* |
| Fellow / Attending | 19 | 3.16 (1.12) | 4.21 (0.98) | <0.01* |
| **Department** | | | | |
| Pediatrics | 15 | 2.80 (1.32) | 4.20 (0.56) | <0.01* |
| Pediatric Emergency Medicine | 12 | 3.50 (1.17) | 4.33 (0.89) | 0.034* |
| Emergency Medicine | 25 | 2.84 (1.14) | 4.20 (0.82) | <0.01* |
| "I feel confident during neonatal resuscitations and using the current Neonatal Resuscitation Program (NRP) guidelines" | | | | |
| | Respondents | BEFORE Mean (SD) | AFTER Mean (SD) | p-value |
| **Overall** | 52 | 3.54 (0.98) | 3.98 (0.67) | <0.01* |
| **Level of Training** | | | | |
| Resident | 33 | 3.61 (0.86) | 3.97 (0.53) | <0.01* |
| Fellow / Attending | 19 | 3.42 (1.17) | 4.00 (0.88) | <0.01* |
| **Department** | | | | |
| Pediatrics | 15 | 3.73 (0.70) | 4.07 (0.46) | 0.055 |
| Pediatric Emergency Medicine | 12 | 4.08 (0.79) | 4.33 (0.65) | 0.191 |
| Emergency Medicine | 25 | 3.16 (1.07) | 3.76 (0.72) | <0.01* |

*Statistically significant

No, authors do not have interests to disclose

## 43 Impact of the COVID-19 Pandemic and Research Publications in Critical Care

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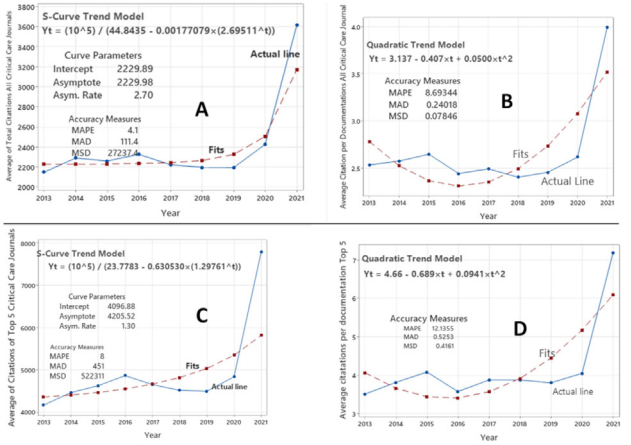
Objectives: The COVID-19 pandemic instigated a significant transformation in the domain of scientific journals, the role they play in sharing time-sensitive information, and the attention they receive from the public. As a result, there was a significant increase in publications and citations per publication during the COVID-19 pandemic. Our aim was to determine how Critical Care (CC) journals and their influence may have evolved during this time. We hypothesized that publications from the field of CC would increase their impact.

Methods: We utilized the SCImago Journal and Country Rank resource to investigate the trend of CC publications' impact from 2013 to 2021, the most recent year on file. Our outcomes were the trend of total citations and citations per publications. The annual number of total citations by a journal was measured as the total number of citations of that journal for documents published in the prior 3 years. The citations per publication were measured as an average of citations per document in the two years prior. Time series analysis was used to estimate the trend by utilizing the best fit curve, judging from each curve's measure of accuracy.

Results: We analyzed the top 18 CC journals as ranked with SCImago's journal rank indicator. The average total citations across the top 18 CC journals indicated an upward, non-linear trend over the pandemic, especially in 2021. The best fit model was an S-curve with its inflection point in 2019(Figure 1A). Similarly, the average total citations per publication of the top 18 CC journals continued to increase over time, achieving its highest level in 2021(Figure 1B). We observed that the top five critical care journals also reflected these trends, both in terms of total citations(1C) and citations per publication(1D), with the average total citations of the top 5 journals best fit to an S-curve with the inflection point at 2019.

Conclusion: Citation activity across top CC journals underwent a dramatic increase during the COVID-19 pandemic. While total citations had previously remained relatively steady, and citations per publication had even dropped in 2018 and 2019, the time series models indicated an explosive growth of citations in both categories in the year 2021. These trends suggest that the impact and relevance of CC has grown significantly since the onset of COVID-19. It will be interesting to see if the trend continues and is something we hope to investigate in the future.




No, authors do not have interests to disclose

## 44 Evaluation of Processed Electroencephalographic Data to Stratify Neurological Outcomes 6 Hours After Cardiac Arrest Treated With Targeted Temperature Management

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Objectives: More than 350,000 out-of-hospital cardiac arrests (CA) occur annually within the United States. For initial survivors who cannot follow commands, Targeted Temperature Management (TTM) between 33–36°C can limit secondary brain injury and improve neurological outcomes. At present, all TTM patients receive a similar protocol without adjustment for severity of neurological injury. Validated tools to identify the severity of hypoxic-ischemic encephalopathy early after recovery of spontaneous circulation (ROSC) are needed to develop a precision medicine approach to TTM. The purpose of this study was to evaluate the role of processed electroencephalography with the bispectral index (BIS) and suppression ratio (SR) in combination with a machine learning algorithm of data available at the time of admission to stratify patient risk in the first 6 hours after CA.

Methods: Adults surviving CA that do not follow commands were treated at Maine Medical Center (MMC) with 24 hours of TTM 33-36°C using the Arctic Sun surface cooling device and monitored with the Medtronic VISTA processed EEG. This data is downloaded for each patient, allowing calculation of the initial and 6-hour post-ROSC BIS and SR. Utstein-compliant data was entered into the International Cardiac Arrest Registry (INTCAR) with a single TTM number as the sole identifier. The BIS and SR data were calculated for each patient and linked to the INTCAR TTM number. Data are presented as median (IQR), and variables were tested using Receiver Operator Characteristic curves to predict good outcome defined as a Cerebral Performance Category score of 1 or 2 at hospital discharge.

Results: 421 patients treated with TTM between June 2017 and November 2021 were evaluated, with a median age of 60 (50-69) years, 299 (71%) were male, 310 (74%) were out-of-hospital CA, 303 (72%) were witnessed, initial rhythm was shockable in 157 (37%), PEA in 138 (33%), and time to ROSC was 19 (11-29) minutes. A good outcome was obtained in 26% of patients and was predicted better by the 6-hour SR (AUC=0.80) and BIS (AUC=0.78) than age (0.55), time to ROSC (0.58), or initial cardiac rhythm (0.69).

Conclusions: Processed EEG data best predicted neurological outcome in the first 6 hours after cardiac arrest. Machine learning algorithms are being evaluated for the additional predictive ability combined with the BIS and SR.

No, authors do not have interests to disclose

## 45 The Learning Curve of Resuscitative Transesophageal Echocardiography Performed by Emergency Physicians for Patients With Out-of-Hospital Cardiac Arrest

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Objectives: Transesophageal echocardiography (TEE) is increasingly employed in resuscitation of patients with cardiac arrest to identify reversible causes and guide the prompt site of chest compression. As a result, many residency training programs are incorporating TEE, while in 2017 the American College of Emergency Physicians (ACEP) recommended at least ten hands-on experiences with TEE to achieve competency. However, this recommendation was based on expert consensus rather than clinical evidence. This study aimed to investigate the relationship between clinical hands-on experiences and TEE competency in emergency physicians handling adult patients following non-traumatic out-of-hospital cardiac arrest (NT-OHCA).

Methods: We conducted a secondary analysis of a prospective cohort involving NT-OHCA adult patients who underwent TEE exams during resuscitation from October 1, 2020, to January 31, 2023. Patients with missing data on TEE findings were excluded. The operator information like hands-on experience of TEE, seniority, and certificate, patient characteristics like BMI or chronic disease status, video recordings of TEE, and critical time points were documented. The primary outcome was total procedure time, defined as the time from first insertion attempt to first obtaining the mid-esophageal four-chamber (Me4C) view. Secondary outcomes encompassed probe insertion time (from first attempt to successful insertion), image acquisition time (from successful insertion to initial Me4C view), and image quality score (IQS) based on the consensus of two veterans of TEE. Generalized Estimating Equations (GEE) models were employed to analyze the correlations between various factors and outcomes, as well as to delineate the learning curve.

Results: A total of 87 TEE exams were performed by 18 emergency physicians, with 50 cases (57.5%) by attending physicians and the remaining by residents. The average total procedure time, probe insertion time, and image acquisition time were 182.3±69.4, 121.4±129.7, and 60.9±87.2 seconds, respectively. The median IQS was 3±2, and 33 cases (37.9%) achieved good quality (IQS $\geq$4). In the GEE models, experience showed a significant negative correlation with total procedure time (Coefficient -2.28, $p$= .001), probe insertion time (Coefficient -1.44, $p$= .017), and image acquisition time (Coefficient -0.84, $p$= .008), but not with IQS ($p$= .740). The learning curve, developed utilizing the GEE model, revealed that a minimum of 43, 28, and 11 hands-on experiences were necessary to attain a 90% success rate in total procedure time within 150, 180, and 200 seconds, respectively.

Conclusions: This study showed that the ACEP's recommendation for hands-on practices of TEE 10 times may fall short of ensuring optimal TEE proficiency among emergency physicians.

No, authors do not have interests to disclose

## 46 Phenobarbital Versus Benzodiazepines in Alcohol Withdrawal Syndrome: A Meta-Analysis

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Background and Objectives: In drug-resistant alcohol withdrawal syndrome (AWS), numerous alternative agents to benzodiazepines have been investigated, and phenobarbital is one of them. This meta-analysis was conducted to compare the efficacy of phenobarbital (monotherapy or as an adjunct to benzodiazepines) compared to benzodiazepines alone in AWS. The outcomes studied were the length of hospital stay (LOHS), length of ICU stay (LOIS), rate of intubation, ICU admission, and the requirement for benzodiazepines.

Methods: Databases including PubMed, EMBASE, and Web of Science were searched on September–30, 2022. Studies comparing the role of phenobarbital (with or without benzodiazepines) with benzodiazepines monotherapy in adult AWS were included. Case reports/series, reviews, and conference abstracts were excluded. As it was an SRMA, sample size calculation was not applicable. Standardized mean difference (SMD) was used as effect size for evaluating quantitative outcomes (LOHS, LOIS, and benzodiazepines requirement), and odds ratio (OR) was used for comparing categorical outcomes (rate of intubation and ICU admission). These effect sizes were summarized using random effects meta-analysis. All analyses were performed in STATA-v14.2.

Results: Out of 526 articles identified, only 12 studies were included (randomized controlled trial-2, retrospective cohort-10). Six studies used phenobarbital monotherapy and the other six used phenobarbital as an adjunct. A total of 2399 patients were included (phenobarbital: 792, benzodiazepines: 1607). Mean LOHS was significantly lesser (SMD: -0.15, 95%CI: -0.26 to -0.04) in the phenobarbital arm (4.7 days) compared to that in the benzodiazepines arm (5.5 days). Similarly, mean LOIS was significantly lesser in the phenobarbital arm than in the benzodiazepines arm. Subgroup analysis revealed that when used as an adjunct to benzodiazepine, phenobarbital reduced the LOHS and LOIS, but not as monotherapy. Phenobarbital significantly reduced the benzodiazepines requirements (SMD: -0.50, 95%CI: -0.67 to -0.32) as an adjunct. There was no statistical difference in the rate of ICU admission and intubation.

Conclusions: It was found that phenobarbital was a safe and effective adjunct to benzodiazepines in AWS management. Phenobarbital as an adjunct significantly reduced the length of hospital, ICU stay, and benzodiazepines requirement, compared to benzodiazepines monotherapy.

No, authors do not have interests to disclose

## 47 Assessing Safety Outcomes of Patients Discharged From the Emergency Department After Receiving Phenobarbital for Alcohol Withdrawal

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Background/Objectives: Phenobarbital (PB) is a long-acting GABA-agonist with favorable pharmacokinetics allowing effective alcohol withdrawal (AW) treatment even after administration of a single dose. Although used in the inpatient setting for AW, PB use in AW patients discharged from the emergency department (ED) has had limited study. A subset of low-risk AW patients theoretically could be administered PB, linked with outpatient resources, and discharged from the ED ("load and go"). The study objective was to evaluate the safety outcomes of such patients who were treated and discharged from the ED after receiving phenobarbital for alcohol withdrawal.

Methods: This case series, approved by the institution's IRB, included patients who presented to 1 of 4 EDs in northeastern PA between 7/2021-1/2023 that were treated with 5-10 mg/kg (ideal body weight) of PB and discharged from the ED. Patients were selected for inclusion in consultation with a medical toxicologist. The convenience sample cohort included patients with mild AW, or who declined admission, or were judged by a toxicologist to not be at high risk for adverse effects of PB.

Results: Thirty-five patients were included in the series with an age range of 27-77 years old. The majority were Caucasian (97.1%, n=34), male (71.4%, N= 25), with a median Prediction of Alcohol Withdrawal Severity Scale (PAWSS) score of 5. Thirty-three patients were treated with the 5-10mg/kg (ideal body weight) of PB, and 2 patient received 2 additional doses of 32.4 mg during their ED stay. All patients were assessed by a medical toxicologist and offered resources for linkage to treatment. Medication assisted treatment (MAT) for alcohol use disorder was provided to 28.6% (n=10). Of the 10 that received MAT, 8 received oral naltrexone and 2 received acamprosate. The median time from seen by provider to discharge was 5 hours. No patients had adverse medication effects observed in the ED. Two patients returned to the ED within 72 hours–one simply for recurrence of ETOH use. The other, more complex, returned within 24 hours to the ED intoxicated after sustaining a minor MVA, despite receiving instructions about the dangers of consuming alcohol or driving for 10 days after receiving PB. He was subsequently discharged from the ED.

Conclusions: In this case series utilizing a novel approach of phenobarbital "load and go," there were no adverse medication effects observed in the ED, and no patients

required admission due to PB administration. ED phenobarbital administration may be a safe, effective alcohol withdrawal treatment and potentially lessen the need for hospital admission.

No, authors do not have interests to disclose

## 48 Capabilities of Emergency Departments to Treat Alcohol Use Disorder: Assessment From a Large Quality Improvement Initiative

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Objectives: Alcohol use disorder (AUD) is now responsible for 95,000 deaths annually and about 2% of all ED visits are alcohol related. Despite evidence of improved patient-level and cost-effectiveness outcomes among those treated with medications for AUD (MAUD), in 2021, fewer than 1% of individuals in the US with AUD received MAUD within the past year, including naltrexone, acamprosate and disulfiram. The ACEP E-QUAL Opioid and Alcohol Use Disorder initiative is a quality improvement program offered to emergency departments nationally to support local quality improvement (QI) projects to improve care for patients with opioid and alcohol use disorders. For the first time in 2023, we assessed the capabilities of participating EDs to treat alcohol use disorder (AUD).

Methods: Local quality improvement champions at participating EDs self-reported on their characteristics and capabilities to treat AUD on a dedicated data-collection platform. Data are reported in descriptive fashion.

Results: There were 357 EDs enrolled in the 2023 quality improvement program. 326 (91.3%) reported on their AUD care capabilities. These EDs were: 39.3% (n=128) rural, 16.3% (n=53) critical access, 1.2% (n=4) safety net and were in 38 states. 5.8% (n=19) of EDs had protocols to initiate naltrexone treatment for AUD, while 79.1% (n=258) had none and 15.3% (n=50) were in development. When asked if their ED used clinical support tools for AUD, 41.7% (n=136) said yes, 31.6% (n=103) said no, and 27.0% (n=88) were in development. 1.2% (n=4) of EDs had protocols for ambulatory or outpatient treatment of uncomplicated alcohol withdrawal and cravings. When asked "which of the following medications are used for the treatment of alcohol withdrawal and/or alcohol use disorder in your emergency department?", the most common responses were: none (78.5%, n=256), benzodiazepines (19.6%, n=64), phenobarbital (14.4%, n=47), "other" (5.2%, n=17).

Conclusions: In this sample of EDs in many states and about one-third rural, very few had protocols to initiate naltrexone for AUD, less than half had relevant clinical decision tools, and nearly none had protocols for uncomplicated alcohol withdrawal or cravings. These findings represent a significant opportunity to improve care for patients with AUD.

No, authors do not have interests to disclose

## 49 Comprehensive Safety Profile of the Most Commonly Ordered Medications for Breastfeeding Patients in the Emergency Department

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Objectives: Emergency physicians routinely treat breastfeeding patients. Quick safety information is often difficult to find resulting in recommending pumping and dumping milk for perceived safety risks while inadvertently causing detrimental effects. Here, we propose a treatment algorithm for treating breastfeeding patients in the ED based off the most commonly ordered medications.

Methods: We investigated the most commonly administered medications to female patients between the ages of 12 and 50 for all ED chief complains at Northwestern Memorial Hospital Emergency Department. Specifically, we searched our electronic health record (EHR) for the top 100 medications ordered using a de-identified clinical decision tool. A total of 167886 doses were delivered. We excluded fluid boluses from our analysis. We subsequently searched LactMed, InfantRisk Application, and Pubmed for all safety information on these medications and divided them by categories. Ultimately, we proposed a treatment algorithm for breastfeeding patients in the ED.

Results: Analgesics are the most ordered medications in the ED, and importantly analgesics ranging from ibuprofen to morphine are safe in limited doses in the ED setting. Antibiotics and antifungals pose limited restrictions. All systems-based medications have a variety of safe options available. The most commonly utilized antithrombotic agents are safe except for high-dose aspirin.

Conclusions: The majority of medications utilized in the acute setting are compatible with breastfeeding. Ultimately, there should be limited circumstances to ever advise pumping and dumping in the ED.

No, authors do not have interests to disclose

## 50 Acetaminophen Overdose Treated in the Emergency Department: Analysis of Nationwide Emergency Department Sample (NEDS)

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Objective: Even with its good safety profile, acetaminophen can lead to life-threatening hepatic failure in overdose. Recognized risk factors for acetaminophen poisoning include alcohol, opioids, and mood disorders, and acetaminophen is the second most common reason for liver transplant in the US. The aim of this study is to assess additional risk factors among patients treated in the ED for acetaminophen overdose.

Methods: A retrospective study was performed by extracting data from the 2018 Nationwide Emergency Department Sample (NEDS) from AHRQ's Healthcare Cost and Utilization Project (HCUP). The data were stratified and weighted to represent national population. All adult ED visits with principal diagnosis of acetaminophen overdose were included in the primary study population and those without it were taken as the control. Epidemiological characteristics and variables associated with acetaminophen overdose were studied. STATA, 16.1 was used to perform statistical analysis. Univariate analysis was used to identify confounders and a multivariable logistic regression analysis adjusted for them.

Results: Among the 114,823,417 adult ED visits in 2018, 27,792 of these had a principal diagnosis of acetaminophen overdose. Relative to the non-acetaminophen group, the acetaminophen group was younger (median age 32 vs 47 years; $p<0.0001$), more likely to be females (66.1% vs 57.0%; $p<0.0001$), had higher total ED charges ($3,506 vs $2,714; $p<0.0001$). These patients had a higher proportion of alcohol abuse (15.8% vs 3.5%; $p<0.0001$), anxiety disorders (30.2% vs 8.3%; $p<0.0001$), cannabis use (8.7% vs 1.4%; $p<0.0001$), malignancies (13.3 % vs 10.9%; $p<0.0001$), mood disorders (52.4 % vs 7.9%; $p<0.0001$), opioid abuse (4.1 % vs 1.0%; $p<0.0001$), and suicide attempt/ideation (12.2% vs 1.1 %; $p<0.0001$). Mortality was below permitted HCUP reporting threshold. Multivariable analysis showed following variables had higher adjusted odds ratio (AOR) of acetaminophen overdose: alcohol abuse (AOR 2.67), anxiety disorders (AOR 1.24), cannabis (AOR 1.63), females (AOR 1.45), income Q3 (AOR 1.09), malignancies (AOR 1.40), mood disorders (AOR 10.07), opioid abuse (AOR1.20), and suicide attempt/ideation (AOR 1.68).

Conclusions: In addition to previously recognized risks, cannabis use or a diagnosis of malignancy were more common in patients treated for acetaminophen poisoning in the ED. These new findings are concerning because of rapid legalization of cannabis since 2018 and the increasing incidence of cancer diagnoses in the US. Further investigation into the association of these risks with acetaminophen overdose may inform clinicians, policymakers, and researchers.

No, authors do not have interests to disclose

## 51 Topical Tranexamic Acid in Outpatient Epistaxis: Unplanned Return Visits

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Background: Epistaxis is a very common ED presentation as it accounts for 1 in 200 ED visits in the US with a bimodal age distribution of <25 and >50 years of age. The main risk factor for epistaxis is anticoagulant use which may account for the increased incidence in the elderly population. Previous studies show that the use of oral anticoagulants is not associated with more severe or complicated bleeding but rather with recurrent bleeding. Topical tranexamic acid (TXA) is being studied as an additional topical treatment to reduce recurrence and invasive management of epistaxis. One meta-analysis concluded that patients treated with TXA were 3.5 times more likely to achieve hemostasis and 63% less likely to return in 24-72 hours for recurrence while a second study, an RCT of 500 subjects, compared TXA vs saline gauze and demonstrated no significant difference in the need for nasal packing.

Objectives: Primary objective is to compare those patients who had topical TXA with those who did not. The primary outcome measure will be unplanned 72 hours return for recurrent bleeding. Secondary objective is to determine which patients were on outpatient anticoagulants and how that affected their 72 hours return rate.

Methods: This is a retrospective electronic medical chart review over 42 months from four community emergency departments (ED). Included are all adult ED patients presenting with a chief complaint of nasal bleeding, treated and discharged from the ED. Excluded are patients from the ED with trauma, cardiac arrest, pregnancy, or post-operative complications. Data include demographics, home medications, TXA use, diagnoses, and 72 hours return for recurrent bleeding. Group comparisons were performed using Chi-square or Student-t test as appropriate. Significance is set at 0.05 and a sample size of 1,110 have 80% power to detect at least 5% differences in the 72 hours unplanned epistaxis return rate.

Results: Between 01/01/2019 and 07/01/2022, there were 1,236 ED patients meeting inclusion/exclusion criteria. Within 72 hours of ED discharge, 83 cases (6.7%) returned to the ED for recurrent nasal bleeding. No significant difference in return rate for TXA use (6.8% vs. 6.7%; p=0.968). No significant difference in return rate for patients on home anti-coagulant medications (6.2% vs. 7.1%; p=0.552).

Overall, 41.7% of the patients were on anti-coagulants, including anti-platelet drugs. 53.8% of patients given TXA were on anti-coagulants while only 18.6% of the non TXA patients were on anti-coagulants (p<0.001). When stratified by different anti-coagulant type, there was no significant difference in return rate (p=0.383)

Conclusions: In this multi-center study, patients given TXA were more likely on anti-coagulants. There were no differences in 72 hours returns between patients treated with TXA versus those not treated with TXA. Impact: A large prospective study will be needed to determine the true value of TXA in epistaxis.

| Table 1 | All patients* n=1236 | TXA use n=355 | No TXA n=881 | p-value |
|---|---|---|---|---|
| Age (SD) | 63.2 (19.3) | 64.7 (15.5) | 62.9 (19.8) | 0.125 |
| Gender (% F) | 51.6% (638/1236) | 43.7% (155/355) | 54.8% (483/881) | <0.001 |
| On anti-coagulants | 41.7% (515/1236) | 53.8% (191/355) | 18.6% (164/881) | <0.001 |
| 72 hours return | 6.7% (83/1236) | 6.8% (24/355) | 6.7% (59/881) | 0.968 |

| Table 2: p-value =0.383 | n | % | return | % returns |
|---|---|---|---|---|
| no anti-coag use | 721 | 58.3% | 51 | 7.1% |
| anti-plt only | 282 | 22.8% | 14 | 5.0% |
| gen 1 anti-coag only | 42 | 3.4% | 5 | 11.9% |
| anti-Xa anti-coag only | 89 | 7.2% | 8 | 9.0% |
| gen 1 + anti-plt | 36 | 2.9% | 2 | 5.6% |
| anti-X + anti-plt | 64 | 5.2% | 3 | 4.7% |

No, authors do not have interests to disclose

## 52 Disposition and Management of Emergency Department Patients With Computed Tomography Interpretation Suggestive of Stercoral Colitis

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Objectives: Stercoral colitis is a rare, but potentially serious, condition characterized by impacted fecal material leading to colonic distention, fecaloma formation, and potentially, focal pressure necrosis and perforation. Current guidelines recommend fecal disimpaction, an aggressive bowel regimen, and admission for close monitoring. We sought to characterize emergency department (ED) management decisions in patients with radiographic evidence of stercoral colitis. Furthermore, we sought to identify potential associations between potential prognostic factors and poor outcomes.

Methods: All computed tomography reports during the time period from January 1, 2020, to January 31, 2022, from the Southern California region of an integrated health system were retrospectively analyzed. Report text was searched for "stercoral colitis" and associated terms. Charts were then reviewed manually by three independent reviewers. Demographic, clinical and laboratory data, specific treatments and interventions, disposition, and outcome data were abstracted from associated patient encounters using a standardized tool created for this project. Cases were excluded if the imaging interpretation was determined not to be suggestive of stercoral colitis, the imaging was not ordered in the ED, the patient was transferred from another ED, or the patient was not a health plan member at the time of the visit. Chi-square test was used to assess associations between binary, categorical variables.

Results: The initial query identified 433 individual cases with CT interpretation that referenced stercoral colitis. After the pre-specified exclusion criteria were applied, 308 distinct cases were included for analysis. 177 (57.5%) were admitted to the hospital and 131 (42.5%) were discharged. 30-day mortality was 11.3% in the admitted group and 2.3% in the discharged group, suggesting that clinicians selected higher risk patients for admission and were able to accurately select patients appropriate for outpatient management. Fever was rare (4.2% of cases) and was not associated with increased 30-day mortality. Leukocytosis (WBC > 12.0k) was more common (37.1% of cases) but was also not associated with 30-day mortality. Only 4.5% of admitted patients underwent procedural intervention (colonoscopy or sigmoidoscopy) and one patient (0.6%) required surgical intervention (laparotomy). These findings suggest that overall, this cohort may have had more mild disease and been at lower risk for poor outcome than previous data has suggested. Outpatient management may be a reasonable option in selected patients with radiographic evidence of stercoral colitis, contrary to current guidelines.

Conclusions: In this cohort, a significant number of patients with radiographic evidence of stercoral colitis were discharged home after initial evaluation in the emergency department. Overall mortality in this group was very low, suggesting this may be reasonable strategy.

No, authors do not have interests to disclose

## 53 An Evaluation of the Reporting Quality of Emergency Department Systematic Reviews

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Objectives: Numerous studies have demonstrated the efficacy of nasal high-flow (NHF) therapy in many settings, including the emergency department (ED). Systematic reviews (SR) and meta-analyses (MA) of these studies have now emerged, particularly since the arrival of COVID-19. Accurately reported SRs and MAs can influence ED patient-centered outcomes. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist was developed in 2009 to guide SR reporting quality. This evaluation used the PRISMA checklist to assess the reporting quality of selected ED SRs.

Methods: A search for SRs comparing NHF to other forms of respiratory support in adults was completed. A low sensitivity search strategy was employed to capture the subset of these SRs reporting on ED patient-centered outcomes across the wide-ranging ED context. PubMed, the Cochrane Database of Systematic Reviews, and SCOPUS were searched from NHF inception to April 2023. The evaluation of reporting quality was completed by two authors using the PRISMA 2020 27-point checklist. The reporting quality (adherence to the checklist) of each SRs was scored out of 27. The continuous score data were presented as means with standard deviations.

Results: The search revealed 114 SRs. Based on the individual SR inclusion criteria, 18 of the 114 were assessed as ED-relevant; notably, three of these 18 had an exclusive ER focus. The reporting quality of these 18 SRs was evaluated. The 18 included SRs were published between 2016 and 2023. The majority of these (n=5, 27 %) were published in 2017. Seventeen were SRs with MA. Ten SRs (n=10, 55 %) exclusively included RCTs. It was unclear whether a statistician had been involved in most SRs. The SRs were authored in eight countries. The primary outcomes considered included: care escalation, intubation and reintubation rates,

and mortality. The patient profiles included: all forms of respiratory failure, peri-intubation, immunological compromise, and COVID-19. All SRs proposed further research is required. Adherence to the PRISMA checklist was implied in 12 (66%) SRs, with one fulfilling all checklist elements. The overall mean number of elements achieved was 23 ± 3.22. However, the mean elements achieved for SRs adhering to the PRISMA checklist was 24 ± 1.77 versus 21 ± 4.19 not adhering; $p = 0.045$, 95% CI, -5.92 to -0.07. Whilst better reporting was demonstrated with checklist adherence, the data describing individual checklist items warranted attention.

Reporting quality was lowest for: SR protocol (n= 9, 50%); search strategy (n=7, 38%); support (n=7, 38%); data items (n=5, 27%); data availability (n=3, 16%). In contrast, reporting quality was highest for abstracts, information sources, study characteristics and their conclusions, interpretation of results, and summary of evidence (n=18, 100%).

Conclusions: This evaluation considered reporting quality alone. Nonetheless, adherence to the PRISMA checklist indirectly improved study quality. The quality of reporting of ED SRs and MAs was previously evaluated before the 2020 update of the PRISMA checklist. These findings again suggest that the quality of reporting of ED SRs and MAs must be improved**.** Evaluations of reporting inform the interpretation of the quality of all types of evidence. These findings may help inform the research prioritization in the ED.

Yes, authors have interests to disclose

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Fisher & Paykel Healthcare

## 54 Characterization of Emergency Department Quality Assurance Cases Seen Within a Midwestern United States Health System

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Objectives: To characterize emergency department (ED) cases sent for quality assurance (QA) review to better understand the sources of these referrals, the clinical nature of the concern, and the outcome of review.

Methods: A retrospective observational study was conducted of ED cases sent for QA review in the ED peer-review committee from November 2018 through July 2022. Cases were taken from one Level 1 and two Level IV trauma centers located in a single Midwestern city in the United States comprising one urban/suburban metropolitan area health system. The QA records for these cases included the original incident report, case summary, and the committee determinations and were summarized into discrete qualitative variables for analysis and characterization.

Results: During the 45-month period, 147 cases were reviewed by the QA Review in the ED QA Committee. The most frequent referral source came from physicians, followed by administration staff.

Physician referrals in general (combining ED and specialty physicians) represented 46% of cases referred – 28% coming from ED physicians and 18% from specialty physicians - whereas administration (which includes dedicated quality monitoring staff) accounted for 29% of case referrals. Common diagnostic categories included infectious (21%), cardiac (16%), gastrointestinal (11%) and neurologic (10%) concerns. Of the cases, 51% were considered nonpreventable, 33% were potentially preventable, 9% were preventable, and 4% were near misses. Inpatient boarding in the ED was explicitly implicated as a contributing factor in 6% of case reports. The wide variability in categories across variable groups created sparsity in case subgroups, making association analytics poorly powered/inconclusive and not reported in this document.

Conclusions: This study represents a comprehensive qualitative summary of all clinical cases sent for peer-review at the QA committee over a three-year period at a major Midwestern ED system. Highest risk clinical areas included infectious, cardiac, and neurological diagnostic categories which should represent areas of attention in the quality review process to seek patient care improvements. Physicians are the most frequent referral source for concerns that warrant peer-review, despite multiple mechanisms for quality reporting present outside peer-referral. Further investigation could focus on the yield of non-physician identified cases, to evaluate the efficacy of these referral avenues. The most frequent determination of these QA Committee reviews was that the adverse concern prompting referral was nonpreventable. A significant minority were considered preventable. A notable number of QA case concerns were attributable to inpatient boarding in the ED.

**Qualitative variables in quality assurance (QA) case peer reviewed by an emergency department QA Committee in Midwestern City for a 45-month period, n=147**

| Referral Source | Count (%)* | Diagnostic Category | Count (%)[$] | Determination | Count (%)[&] |
|---|---|---|---|---|---|
| Administration | 42 (29%) | Infectious Diseases | 36 (21%) | Non-preventable | 75 (51%) |
| ED Physician | 41 (28%) | Cardiology | 28 (16%) | Potentially Preventable | 49 (33%) |
| Specialty Physician | 26 (18%) | Gastroenterology | 20 (11%) | Preventable | 13 (9%) |
| Guest Relations | 16 (11%) | Neurology | 17 (10%) | Near Miss | 6 (4%) |
| Nursing | 12 (8%) | Pulmonology | 15 (9%) | | |
| Other Staff | 9 (6%) | Trauma | 11 (6%) | | |
| | | Vascular | 11 (6%) | | |
| | | Psychiatry | 9(5%) | | |
| | | Other[†] | 27 (16%) | | |

*One referral source not documented in the records.

[$]Counts may sum to greater than sample size value given more than one source was list for some cases.

[†]Other included a total of 13 additional referral categories.

[&]Counts do not sum to sample size value given fours cases did not have a clear determination category.

No, authors do not have interests to disclose

## 55 Patiromer Utility as an Adjunct Treatment in Patients Needing Urgent Hyperkalemia Management (PLATINUM)

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Background: Patiromer is a selective cation-exchange polymer that binds potassium ($K^+$) in exchange for calcium and is approved by the Food and Drug Administration (FDA) for the treatment of hyperkalemia (HK). Although HK is common and potentially life-threatening, emergency department (ED) treatment is mostly based on small studies and anecdotal experience, and the role of patiromer in acute HK is not well defined.

Objectives: Our purpose was to determine the efficacy of patiromer as an adjunct to insulin, dextrose and albuterol for the treatment of hyperkalemia in the emergency setting.

Methods: This is a multicenter, randomized, double-blind, placebo-controlled, parallel group study (NCT04443608). ED patients ≥18 years old with $K^+ \geq 5.8$ mEq/L were consented and enrolled. Exclusions were clinically significant arrhythmia, hemodynamic instability, overdose on K, known bowel obstruction, $K^+$ binder use within 7 days, expected dialysis within 6 hours of enrollment, hypersensitivity to patiromer, participation in another study <30 days prior, inability to take study drug, life expectancy of <6 months, or pregnant/breastfeeding. No more than 50% were current hemodialysis recipients.

Patients were randomized to treatment (PAT) or control (CON) in a 1:1 ratio, and all received standard-of-care (SoC) therapy of regular insulin 5U IV, plus dextrose 25g IV, plus 10mg aerosolized albuterol. PAT patients received patiromer 25.2g by mouth while CON patients received placebo. Upon ED discharge patients received a second dose of study drug and were followed for 14 days.

Efficacy was evaluated by comparing Net Clinical Benefit (NCB) at 6 hours, defined by the mean change in number of interventions less mean change in $K^+$. Therefore, net clinical benefit is used to simultaneously assess both the number of additional potassium-lowering medications required and the change in serum $K^+$. Safety analysis included frequency and severity of adverse events, electrocardiogram changes, and rates of hypokalemia and hypomagnesemia.

Results: A total of 16 sites randomized 144 patients. The last patient's last follow up was achieved in March 2023. The study will be unblinded in early May and the results will be ready to be presented at ACEP23 in October 2023.

Conclusions: PLATINUM is the largest randomized controlled trial to evaluate the efficacy and safety of patiromer as an adjunct to standard combination therapy for treatment of HK in the ED. It also establishes a new evaluation parameter (net clinical benefit) for acute hyperkalemia treatment investigations.

Yes, authors have interests to disclose

Disclosure: Astra Zeneca, CSL-Vifor

Consultant/Advisor

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## 56 Intubation in Propofol-treated Status Epilepticus: A Cohort Study

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Objectives: Status epilepticus (SE) is a neurological emergency associated with high mortality and morbidity. First-line management in emergency settings often includes endotracheal intubation with mechanical ventilation to prevent respiratory depression, especially in patients treated with anesthetic agents such as propofol, but this invasive measure carries well-known risks. At our center we use sub-anesthetic propofol as a first line anti-epileptic for SE, without intubation, after IV benzodiazepines have failed to control seizures and choices for second-line agents are being assessed. We aimed to determine whether intubation in SE patients treated with high dose propofol improves outcomes compared to patients treated with sub-anesthetic doses without intubation.

Methods: All adult patients with SE treated with propofol at a tertiary care center from 2015-2022 were identified through medical records. Survival without new neurological deficits at discharge was the primary outcome; secondary outcomes were development of common complications (pneumonia, sepsis, and delirium). Uni- and multi-variable logistic regressions were performed to compare outcomes between patients who were intubated while on propofol and those who were not intubated during their hospital stay, as well as to compare outcomes according to number of days kept intubated after cessation of propofol.

Results: We identified 162 SE patients treated with propofol, of which 44 (17%) were not intubated and 118 (83%) were. Potential confounders included in multi-variable analyses were sex, age, Charlson Comorbidity Index, pre-existing encephalopathy, previous history of epilepsy (controlled or not), local admission or transfer, type of SE, cause of SE, number of anti-epileptic drugs administered, and administration of ketamine. Intubation was not associated with improved survival without new neurological deficits (OR=1,34, 95% CI 0.372-4.831, p=0.655) or reduction in complications. Additionally, in patients intubated for management of SE, the number of days kept intubated following cessation of propofol was associated with a decrease in survival without new neurological deficits (OR=0.014, 95% CI 0.000-0.803, p=0.039), controlling for previously mentioned covariates as well as common indications for prolonged intubation (pneumonia, sepsis, delirium).

Conclusions: Intubation in propofol-treated SE patients fails to significantly improve outcomes compared to patients treated with sub-anesthetic propofol allowing intubation to be avoided. Furthermore, for intubated patients, prolonging intubation past cessation of propofol worsens outcomes. These data raise doubts as to the benefits of endotracheal intubation in SE in emergency settings and stress the need to limit the duration of this invasive measure frequently included in the first-line management of SE patients. They also underline the safety and efficacy of subanesthetic propofol without intubation as a potential first-line agent in SE.

No, authors do not have interests to disclose

## 57 Evaluating Practice Patterns of Observation Periods Status Post Epinephrine Administration for Anaphylaxis

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Background: Anaphylaxis is a life-threatening hypersensitivity reaction that results in rapid onset of systemic complications. Epinephrine is the first line medication used in patients presenting with anaphylaxis, and per the National Institute of Allergy and Infectious Disease guidelines (NIAID), observation in the ED for 4-6 hours following epinephrine administration is recommended to evaluate a biphasic reaction.

Objectives: The primary objective of this study was to investigate the practice patterns in observation time in patients seen in the emergency room for anaphylaxis after receiving epinephrine. Secondary objectives evaluated included the management of anaphylactic reactions, responsible allergens, and the frequency of biphasic reactions in adult patients in the emergency department.

Methods: This was a retrospective chart review from January 2017 to September 2022. Patients $\geq$18 years of age qualified for study if they had ICD-10 codes in their chart for or related to anaphylaxis or were observed following epinephrine administration. A total of 1,751 biological male and female patients were identified, but only 489 met criteria for this study. 1,262 patients were excluded because they did not receive epinephrine.

Results: The median number of minutes observed in the emergency department following epinephrine administration for all patients was 235 minutes (95% CI 251.50 - 285.16, SD = 187.28). Of the 489 patients included in this study, 21 patients (4.29%) experienced a biphasic reaction. Patients who experienced a biphasic reaction, which was defined as a second presentation to the emergency department 48 hours from discharge for a second anaphylactic reaction, were observed in the emergency department on their initial emergency department visit for an average of 451.38 minutes (95% CI 320.29 - 582.47, SD = 297.99), while patients who did not experience a biphasic reaction were observed for an average of 262.13 minutes (95% CI 245.43 278.83, SD = 181.47, p = 0.0071). There was no statistically significant relationship found between the timing in minutes of epinephrine administration after anaphylactic symptom onset and frequency of biphasic reaction (p = 0.5736).

Conclusions: The observation practice patterns for patients' status post epinephrine for an anaphylactic reaction can be multifactorial. Provider discretion, symptom resolution, and history of anaphylaxis are some of the variables used in decision making on patient observation time. This study found that observation in the emergency department status post epinephrine administration was comparable to the NIAID, and patients who developed biphasic reactions were observed longer than those who recovered without issue on their visit emergency department visit. Adjunctive treatment for anaphylaxis was highly variable among patients in this study, but over 50% received some combination of antihistamines, H1 & H2 antagonists, or glucocorticoids, which is the most common secondary line.

No, authors do not have interests to disclose

## 58 Total and Out-of-Pocket Costs for Emergency Department Visits Among Older Adults by Medicare Coverage Type, 2015 to 2020

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Objectives: Older adult enrollment in Medicare Advantage (MA), the private plan alternative to traditional Medicare Fee-For-Service (FFS), has grown steadily within recent years and been shown to be associated with substantial changes in healthcare spending. Little data exists regarding healthcare costs incurred by older adults for emergency care despite the recognized increased use of healthcare services before, during, and after emergency department (ED) care. We sought to describe the magnitude and trends of total and out-of-pocket (OOP) costs among older adults enrolled in FFS and MA associated with treat-and-release ED visits.

Methods: We conducted a repeated cross-sectional analysis of treat-and-release ED visits by Medicare beneficiaries identified within the 2015-2020 Medicare Current Beneficiary Survey files. We compared beneficiaries enrolled in Medicare fee-for-service (FFS) to those enrolled in Medicare Advantage (MA) at the time of the treat-and-release ED visit. The primary outcomes were the median total and OOP costs of an ED visit, stratified by FFS and MA status. Secondary outcomes were the median total costs of healthcare during the 30 days before and 30 days after the ED visit, inclusive of inpatient, outpatient, medical provider, prescription medication, and facility/institutional care. We standardized costs to 2020 dollars using the Consumer Price Index for Medical Care. We report descriptive statistics of the sample by study year.

Results: Our sample respectively consisted of 5,172 and 2,650 treat-and-release ED visits by older adults enrolled in Medicare FFS and MA during the study years. In 2015, the 1,054 ED visits by older adults enrolled in Medicare FFS exhibited a median total cost of $409.90, with OOP costs accountable for 11.4% ($46.73), and the 355

ED visits by those enrolled in MA exhibited a median total cost of $246.18, with OOP costs accountable for 20.0% ($49.24). By 2020, the 528 ED visits by older adults enrolled in Medicare FFS exhibited a median total cost of $400.50, with OOP costs accountable for 14.1% ($56.47), and the 347 ED visits by those enrolled in MA exhibited a median total cost of $141.85, with OOP costs accountable for 20.3% ($28.80). In the 30 days before treat-and-release ED visits, older adults enrolled in Medicare FFS and MA respectively exhibited median total costs of $866.10 and $470.20. In the 30 days after treat-and-release ED visits, older adults enrolled in Medicare FFS and MA respectively exhibited median total costs of $810.10 and $434.70.

Conclusions: Medicare Advantage served as the payer for older adults in approximately 40% of treat-and-release ED visits. Total and OOP costs associated with emergency care have remained stable between 2015 and 2020, with MA requiring older adults to incur a greater proportion of OOP costs. Given increasing enrollments in MA, policymakers must consider the higher OOP cost exposure for older adults in designing future policies.

No, authors do not have interests to disclose

## 59 COVID-19 Related Disruptions in Emergency Department Use Among Older Veterans

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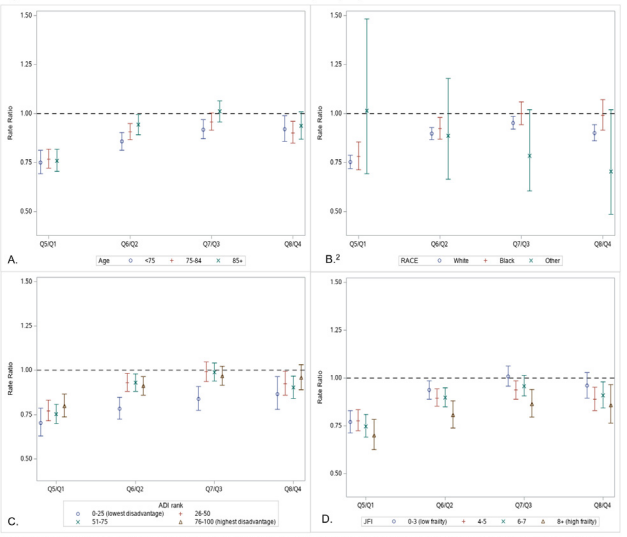
Objectives: Health systems need to identify older emergency department (ED) patients who were most vulnerable to disruptions in health care during the COVID-19 pandemic, but it is not clear which patient characteristics are relevant. Using a cohort of older Veterans, we examine differential rates in ED visits among 4 subgroups, using routine demographics (age, race), as well as neighborhood characteristics (area deprivation index (ADI)) and clinical measures (frailty) that are less routinely available.

Methods: This retrospective observational study is a secondary analysis. Individuals were aged ≥65 and with ≥2 visits in a primary or geriatric clinic between 02/02/2018-05/07/2019. Primary outcome is mean count of days with an ED visit per patient per quarter., comparing 4 COVID-19 quarters to 4 seasonally equivalent quarters before COVID. We constructed a negative binomial regression model for each of 4 subgroups: 1) Age: 65-74, 75-84, 85+; 2) Race: Black, White, Other (Asian, American Indian or Alaskan Native, Native Hawaiian or Pacific Islander, multiple); 3) ADI percentile: 0-25 (least deprivation), 26-50, 51-75, 76-100 (most deprivation); and 4) JEN Frailty Index (JFI): Low frailty 0-3, moderate frailty 4-5, high frailty 6-7, very high frailty ≥8. Outcomes are reported as mean estimate visit counts and rate ratios with 95% confidence intervals. Differential change after COVID was identified via testing the interaction between subgroups and a COVID quarter with the corresponding pre-COVID quarter. Pairwise comparison tests identified specific subgroups with differential change.

Results: Participants with complete case data was 38,871. Mean estimated ED visits counts were consistently higher in all pre- and post-COVID quarters for older patients, for Black patients, as ADI was higher (indicating higher levels of neighborhood disadvantage), and as frailty increased. All subgroups in all models demonstrated statistically significant decreases in ED visits during the first two quarters of the pandemic period (Q5, Q6) compared to their pre-pandemic baselines (Q1, Q2), with rate ratios $<1.0$ and $p<0.05$ (Figure 1). Select subgroups continued to have statistically significant decreases in ED visits through the second half of the pandemic period (Q7, Q8) as well: Age <75, White patients, 0-25 ADI (those with the lowest neighborhood disadvantage), and those with very high (JFI 8+) or moderate frailty (JFI 4-5). There were no significant differential changes by age subgroup in any quarter. White patients had a greater decrease in ED visits compared to Black patients in the 4th COVID quarter only ($\chi2= 4.13$, $p = 0.042$). For ADI, the 0-25 (lowest disadvantage) subgroup had a significantly greater decrease in ED visits compared to each of the 3 other ADI groups in both the 2nd and 3rd COVID quarters. The very high frailty JFI subgroup demonstrated a significantly greater decrease in ED visits compared to all other groups in the 2nd quarter, and to the low and high frailty subgroups in Q3.

Conclusions: Results demonstrate that select JFI and ADI subgroups had differential changes in ED visits in multiple quarters of the COVID pandemic. The very high frailty subgroup had a greater decrease in ED visits, which suggests that this may be a patient population worth special attention for future interventions. As frailty and ADI are less readily accessible to health care systems, greater effort will be needed to identify older ED patients most vulnerable to disruptions in care.

Figure 3. Mean Estimate Rate Ratios and 95% Confidence Intervals by Subgroups and Quarter[1]




[1] Rate ratio = Mean estimate of number of ED visits in subgroup in Post Covid-19 quarter relative to the mean estimate of number of ED visits in the corresponding Pre Covid-19 quarter one year prior.
[2] Other race includes Asian, American Indian or Alaskan Native, Native Hawaiian or Pacific Islander, or had more than one race identified
Pre Covid-19: Q1=March-May 2019, Q2=June-August 2019, Q3=September-November 2019, Q4=December 2019-February 2020
Post Covid-19: Q5=March-May 2020, Q6=June-August 2020, Q7=September-November 2020, Q8=December 2020-February 2021

No, authors do not have interests to disclose

## 60 Emergency Department Utilization by Nursing Home Residents: A National Cross-Sectional Study

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Objectives: There are higher rates of emergency department (ED) visits as well as increased resource utilization in the ED for both nursing home (NH) residents and older adults. These vulnerable groups have higher number of comorbidities, increased frailty, and often present with atypical symptoms. The goal of this study is to describe healthcare utilization patterns, interventions, and disposition decisions for older nursing home residents presenting to the ED in the United States.

Methods: Individuals 65 years and older visiting EDs in the United States were identified within the National Hospital Ambulatory Medical Care Survey (NAHMCS) 2017-2019 dataset and stratified according to nursing home residency. Given the changes to nursing home patient characteristics and referral patterns in 2020-2021 due to COVID, these pre-COVID data arguably provide a more generalizable and accurate picture of the expected pattern of nursing home resident ED utilization in the years ahead. Demographic, clinical, and resource use characteristics and outcomes were assessed. The use of imaging, medication administration, interventions done in the ED, and ED outcomes were compared between NH and non-NH patients using odds ratios (ORs) from logistic regressions. Because of the differences between these populations, adjusted (aORs) using age category, sex, race, number comorbidities, and estimated severity index (ESI) were also estimated.

Results: From 2017 to 2019, 24,441,285 ED visits per year (17.5%) were by patients over the age of 65; and 1,579,916 per year (6.5%) of these ED visits were by patients residing in nursing homes. Among older adults, NH residents were older, mean age difference of 6.1 [95% confidence interval (CI) 5.4, 6.7], higher proportion female (64.7% vs 57.5%), had more comorbidities (3.5 vs 2.7), slightly lower ESI (2.8 vs 3.0) and higher rates of dementia (29.4% vs 5.3%). NH residents had significantly higher odds of receiving imaging tests [aOR 1.7 (95%CI 1.3, 2.3)], similar odds of receiving medications in the ED [aOR 1.0 (95%CI 0.7, 1.3)] though significantly

lower odds of receiving potentially inappropriate medications (PIMs) [aOR 0.6 (95% CI 0.4, 1.0)]. NH patients did have higher adjusted odds of admission [aOR 1.7 (95% CI 1.3, 2.2)].

Conclusions: In the United States, there are more 1.6 million ED visits each year by older adults residing in NHs. Compared to older adults from the community, nursing home residents have higher acuity, more medical complexity, increased resource utilization, and high rates of hospital admission. However, NH residents were prescribed fewer PIMs. These findings highlight the importance of efforts to improve emergency care for this high-risk population.

No, authors do not have interests to disclose

## 61 Characteristics of Patients Identified at Risk for Malnutrition in a Geriatric Emergency Department

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Objectives: Malnutrition in emergency department (ED) settings is not consistently identified. Symptoms of malnutrition in older adults are often overlooked or may be associated with other conditions. The purpose of this study is to access clinical and demographic characteristics of older adults at risk for malnutrition who present to a Geriatric Emergency Department (GED) as well as potential factors that can contribute to malnutrition in this population.

Methods: This is a cross-sectional study to assess malnutrition risk among older adults who presented to a Level 1 GED and received comprehensive specialized screening. The GED is within a suburban quaternary medical center with an overall ED census of about 40,000. About 30% of visits are among patients 65 years and older, slightly over 50% of which qualify for a consultation with a specialized RB, and about 25% of them receive the consult. One of the screens used is the mini nutritional assessment (MNA), which identified patients at nutritional risk. Chi-square test was used to compare demographics — sex and ethnicity (Hispanic/non-Hispanic) — and clinical characteristics — prior inpatient discharge within 90 days, if the patient was recommended to have a palliative care referral, and Charlson Comorbidity Index score (CCI)— by risk status determined using the MNA. Scores $\geq$ 11 were considered at risk for malnutrition. A p-value less than 0.05 was used to indicate statistical significance. Logistic regression was used to determine the factors of malnutrition risks in this population.

Results: During this study, 4,333 older adults received a completed MNA, of which 1273 (29.4%) were considered at nutritional risk. Adults aged 85 and older had the highest proportion of nutritional risk (33.5%) within their age group. Chi-square test show there were statistically significant in clinical characteristics differences in risk status when an older adult had a prior discharge within the last 90 days ($\chi^2 = 74.80$; df = 1; p=<.001), if they were recommended to have a palliative care referral ($\chi^2 = 9.59$; df = 1; p=.002), and showed differences for older adults with a CCI score ($\chi^2 = 42.352$; df = 3; p=<.001). Demographically, there were statistically significant differences in sexes ($\chi^2 = 6.76$; df = 1; p=.009) and in ethnicity ($\chi^2 = 5.90$; df = 1; p=.015). Those with the highest odds of being at nutritional risk were patients with a CCI score of 3 or higher (OR=2.17; 95% CI: 1.66,2.84) and those with a prior inpatient discharge within 90 days (OR=2.11; 95% CI: 1.43,3.11).

Conclusions: Our findings suggest that nutritional risk is present in nearly a third of all patients in the GED and the eldest patients have the highest burden of risk. Clinical indicators such as previous ED visits or CCI may help to indicate nutritional risk and can be used to better identify those with the highest needs. This research adds to the limited data of nutritional risk in GED patients in the United States.

No, authors do not have interests to disclose

## 62 Forecasting Areas of Need for Geriatric Emergency Care: Quantifying National Access to and Utilization of Geriatric Emergency Departments

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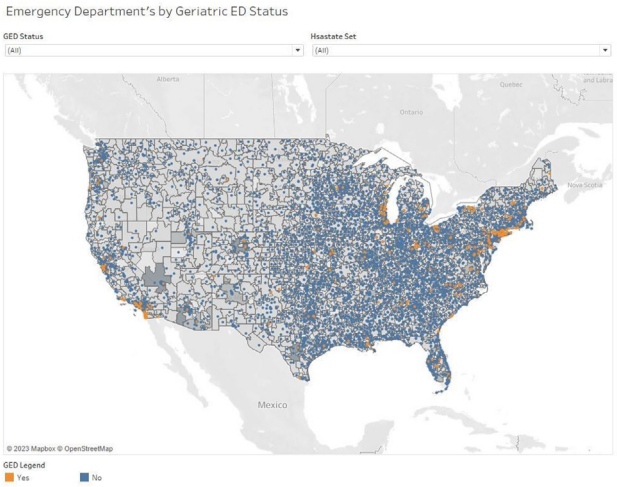
Objectives: Since its introduction in 2018, the American College of Emergency Physicians (ACEP)'s Geriatric Emergency Department Accreditation (GEDA) program has recognized over 400 sites as Geriatric Emergency Departments (GEDs). GEDs aim to provide a higher standard of care for older adults through evidence-based protocols and policies designed to improve clinical and utilization outcomes of geriatric patients. GED protocols typically target patients with complex clinical and social needs, as well as those at higher risk of medically unnecessary admissions. The growth and evolution of the GED model coincides with the growing older adult population. To assess the need for GED adoption, we sought to quantify current access to and utilization of GEDs, with the secondary objective of defining and identifying regions with the most need for specialized geriatric emergency care. An interactive map of eligible acute care facilities, accredited GEDs, and population-level data was created to assess the spread of GEDs and identify high impact emergency departments (EDs) for accreditation.

Methods: Several datasets were merged to develop a database containing information on ED names and locations nationwide, GED names and locations, Veterans Affairs EDs, zip codes, hospital service areas (HSAs), and population data for older adults. These were visualized using Tableau. Population-level access estimates were derived by summing older adult population estimates within HSAs that contain a GED. The number and percent of annual 65+ patient encounters in an accredited GED, coined GED utilization, were estimated using self-reported 65+ ED census data from GED accreditation applications over national 65+ ED utilization data from the HCUP NEDS from 2020.

Results: Nationally, 30.8% of older adults (approximately 17.45 million) live in an HSA with and have access to an accredited GED. Annually, an estimated 18.5%, 5.1 million, of ED visits by older adults take place in an accredited GED. Regions with significant need were identified as HSAs serving the largest 65+ population. HSAs in Austin TX, Orlando FL, and Minneapolis MN respectively were identified as regions with a significant need for GED services.

Conclusions: Investment in geriatric-specific emergency care is crucial as the US experiences unprecedented growth of the older adult population. As this population grows, the ability of EDs facing capacity and workforce challenges to care for patients with complex medical and social needs will become increasingly difficult. Implementation of the GED model ensures the ED staff are better equipped to serve one of their most vulnerable populations through education and evidence-based geriatric processes and protocols. Proactive and targeted action must be taken to drive awareness, spread adoption, and ensure continued access to geriatric emergency care for older adults. In the future, the dataset and visualization can be used as a tool to identify this need through multiple lenses, for example, HSAs with already high 65+ populations, regions projected to experience significant 65+ population growth, rural hospitals serving large older adult populations, and hospitals serving predominately vulnerable populations.




No, authors do not have interests to disclose

## 63 Outcomes in Older Patients Presenting With Major Trauma to an Irish University Hospital Emergency Department: A Five-Year Review

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Objectives: This study determines whether there are differences in the clinical presentation, background, management, and outcomes between a younger and an older cohort of patients with major trauma in an Irish hospital.

Methods: This was a retrospective, descriptive study. Data from all Tallaght University Hospital, an Irish academic tertiary emergency department, adult major trauma cases that were recorded in the Trauma Audit and Research Network (TARN) database from January 2016 to December 2021 were examined. TARN is the largest trauma registry in Europe. In Ireland, the Major Trauma Audit (MTA) was established by the National Office of Clinical Audit (NOCA) in 2013 and submits anonymized eligible trauma cases to TARN for cataloguing, analysis and feedback. The TARN database captures patients who were traumatically injured and were admitted for 72 hours or more, who are admitted to a critical care area, who die after arrival to hospital, or who are transferred to another hospital for specialist care and whose injuries meet specific criteria relating to bodily location. All patients were over the age of sixteen and fulfilled the national office of clinical audit's Major Trauma Audit inclusion criteria. Patients fulfilling the selection criteria were subdivided into two cohorts: patients $< 65$ years of age and patients $\geq 65$ years of age. Comparisons among the two cohorts were conducted. The Statistical Package for the Social Sciences (SPSS) version 26 was utilized for statistical analysis.

Results: There were 320,882 presentations to Tallaght University Hospital adult emergency department during the study period January 2016 to December 2021. Data pertaining to 1922 patients were entered into the TARN database for the same time period. The mean age of the included patients was 56.5 years (standard deviation 22 years); 40.7% were female. Patients aged 65 and older comprised 36.7% of presentations. The majority of patients presented by ambulance (54.3%) followed by personal vehicle (12.7%). A small but non insignificant number of patients (4.7%) arrived by helicopter. The most frequent mechanism of injury was falls from below 2 meters ($n$=988, 51.4%), followed by vehicle incidents/collisions ($n$=*459*, 23.9%). Of the 706 patients who were aged 65 years or older, 77.33% suffered from a fall of less than 2m compared to 36.3% of patients under the age of 65. Limb injury was the most prevalent category ($n$=*789*, 41.05%), followed by chest (n=295, 15.3%), and spinal injuries ($n$=*287*, 14.9%). Limb injuries were the most common injury type in both those aged below 65 (45.6%) and 65 and above (33.3%). The length of stay was significantly higher for patients aged 65 and over (18.8 days v 9.5 days, $p<0.05$). The mortality rate was statistically higher in people aged 65 and over compared to the younger cohort (5% v 1.6%, $p<0.05$).

Conclusions: Elderly patients with major trauma had longer lengths of stay and high mortality in comparison to the younger cohort in a single hospital population. Low falls at home are the commonest mechanism of injury.

No, authors do not have interests to disclose

## 64 The New York ACEP Opportunities for Women in Leadership Program: Best Practices and Key Lessons Learned

Chung A, Butt M, Lema P, Berwald N, Curato L, Melville L/Maimonides Medical Center, Brooklyn, New York, US

Objectives: The Opportunities for Women in Leadership (OWL) Program is a one-year program offered by the New York Chapter of the American College of Emergency Physicians (NYACEP) to promote the advancement of women leaders at all career stages. The OWL Program aims to provide leadership education and training; establish local and regional mentorship networks; and create sponsorship opportunities. The goal of this study was to assess attitudes about leadership and career goals before and after participation.

Methods: The OWL program was developed using the Kern model as a framework. Educational methods included a series of six virtual bi-monthly lectures, a mastermind group, and an assigned mentor based on career trajectory. Mentors initiated contact at least quarterly and sponsored the mentee in at least one aspect of career development. Qualitative program evaluation data was gathered through semi-structured interviews conducted by a single author. Questions asked before and after participation in the OWL program mirrored each other and related to leadership abilities, methods of gaining leadership skills, future career aspirations and personal goals for participation in the program. Audio recordings of the interviews were transcribed and then analyzed using independent line-by-line inductive coding by two authors, one with expertise in qualitative analysis. Discrepancies were resolved through consensus.

Results: Following an application process and use of a scoring rubric, 6 members of NYACEP were selected to participate in the first year of the program from July 2019 to June 2020. Three mentees were residents, 2 mentees were junior faculty members, and 1 mentee was a senior faculty member more than five years out of training. Six mentors were recruited through the membership of NYACEP. All 6 mentees completed the preparticipation interviews in July 2019. Due to the onset of the COVID-19 pandemic in New York in the spring of 2020, the final session and most post-participation data collection was suspended at that time out of respect for the external demands placed on mentees and mentors. All six mentor-mentee pairs published a final written summary of their accomplishments, objectives met, and lessons learned in the quarterly NYACEP journal, Empire State EPIC in August 2020. In September 2022, 5 mentees completed the post-participation interviews to assess the ongoing impact of the program two years after completion. Saturation of codes was achieved within the available interviews for analysis. Emergent themes included self-efficacy, life-long learning, and the role of women in leadership (Table).

Conclusions: Despite the limitations posed by the onset of the COVID-19 pandemic, we demonstrated a feasible model for engaging women leaders of all career stages that easily translates to other ACEP state chapters. The themes identified by the qualitative analysis point to areas of high value to participants.

| Emergent Themes | Representative Quotes |
|---|---|
| Life-Long Learning | "That's tough, it was so long ago. I don't want to be too generic with my response, but I really do feel that hearing other people's experiences, both the way that they were treated and the way that they would treat others was probably one of the more beneficial things in terms of helping me trying to take a pause and help me understand everyone's perspectives in a situation, seek to understand first before reacting or responding to whatever the issue is at hand. I think a lot of that probably came from learning everybody's perspective, the mentees, those that were residents and those that were not and then also the mentors, who had a large variety of leadership experience."<br><br>"I found hearing from people at different levels of success in emergency medicine or different experience in their career, coming up that question with different answers, I found that really engaging and interesting, whether it was my question or someone else's question." |
| Self-Efficacy | "[Participating in the program] it kind of made me, to force myself to develop a voice, if that makes any sense, and kind of hone in onto exactly what I wanted to do."<br><br>"I think having OWL and [my mentor] kind of just gave me courage, courage isn't really the right word, maybe more, just the knowledge that I can speak about those things and kind of support, Even if I'm not working on these projects, with OWL or [my mentor] on these projects, I do think there was something about OWL that really gave me context to give me the drive to do these projects now." |
| Women as Leaders | "So it would be nice to have strong female physicians to kind of look up to who can like guide you in your career and have all these stepping stones. We used to have a smaller, stronger female presence but now they've all kind of dispersed and started their own residencies in other programs or are leading other residencies, so we have like younger female physicians who are trying to make a big change but we just need more."<br><br>"I do remember always feeling after we kind of had the lecture sessions, kind of feeling a little bit of bump or bounce, because I was in an environment that was very strong female, positive, you know to not sound hokey, but inspirational."<br><br>"I gained strong female figure to guide me and have a little bit of a cheerleader, which was something I desperately needed." |

No, authors do not have interests to disclose

## 65 One Year of Passive Weapons Detection and Deterrence at an Academic Emergency Department

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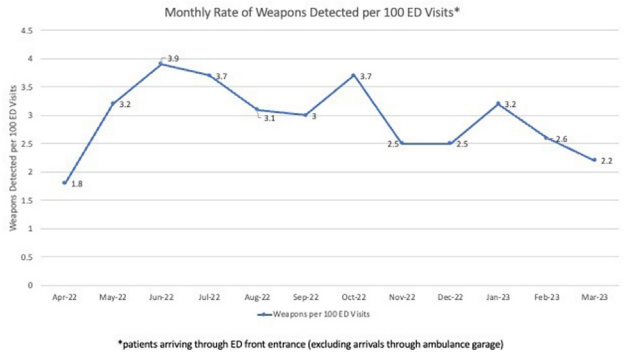
Objectives: Acts of violence occurring in the healthcare setting that involve weapons result in significant morbidity and mortality to staff and bystanders. New passive weapons screening technology (PWST) offers a potential protective measure against these low-frequency, high-impact events. Our study objective was to quantify the volume and rate of weapons detected and prevented from entering our emergency department (ED) over a 12-month period following implementation of PWST at the main entrance.

Methods: This descriptive study took place within the ED of a large, academic, Level 1 trauma center in a small urban city in the Midwest with an average annual patient volume of 80,000 patients and 24/7 security presence. PWST at the main ED entrance was instituted on 1/17/22; prior to this date, no point-of-entry weapons screening was performed. Monthly and annual weapons detection data were collected and compared to number of patient encounters where patients arrived through the main entrance. Due to technical limitations, PWST was not implemented at the

ambulance garage's point-of-entry and therefore all encounters where patients arrived through the garage (via law enforcement or ambulance) or from the rooftop helipad (air medical transports) were excluded from analysis. Weapons detected on law enforcement officers entering the ED were also excluded. The study was reviewed by the Mayo Clinic Institutional Review Board and deemed exempt.

Results: Between 4/1/22 and 3/31/23, 247,926 individuals (patients and visitors) passed through the ED PWST scanner, from which 1,728 weapons were discovered and prevented from ED entry. An additional 13 weapons were detected through non-PWST means (99.3% of weapons detected through PWST). Weapons included knives (n = 1,217; 69.9%), firearms (n = 117; 6.7%), and other/improvised weapons (n = 407; 23.4%). Prior to implementation of PWST, average monthly weapons detection was <1. A total of 80,968 ED patient encounters occurred during the study period, 59,006 (72.9%) in which patients arrived through the main ED entrance. There was a median monthly weapons detection rate of 3.0 (range 1.8-3.9; Figure 1) per 100 ED patient encounters.

Conclusions: Our findings demonstrate a concerning rate of attempts to bring weapons into our ED. This rate does not include weapons which may be entering the ED (and hospital) undetected via patients transported by emergency medical services (EMS). Future efforts should attempt to quantify this missing rate to provide a comprehensive incidence of weapons brought into the ED which would contribute towards safety measures for EMS as well. All individuals entering the main ED entrance are subject to screening, therefore we are unable to determine how many weapons were carried by patients versus visitors. However, given that violence against staff is perpetrated by both patients and their visitors, we believe the overall rate of weapons detected and deterred from both is significant.




No, authors do not have interests to disclose

## 66 Hands-Only CPR and Stop the Bleed Training for Bank of America Chicago Marathon Volunteers

Chenworth M, Payne A, Millon J, Brenneman A, Chiampas G/Northwestern University Feinberg School of Medicine, Chicago, Illinois, US

Objectives: Sudden cardiac death and life-threatening bleeding are two major medical emergencies that benefit from bystander intervention. Out of hospital cardiac arrest (OHCA) affects more than 300,000 people a year, with improved survival with bystander CPR (BCPR); however, many studies have shown that only about 26% of OHCA receive BCPR. Similarly, traumatic injuries are becoming more common with the rise of mass casualty events, and it has become increasingly important that bystanders know how to treat life-threatening bleeds. Programs such as Hands-only CPR (HoCPR) and the Stop the Bleed (STB) program have been shown to be effective in improving confidence and skill proficiency in both lay-responders and medical responders in performing CPR and life-threatening bleed treatment. Both programs are typically taught individually in 90 minute sessions. The goal of this project was to study the effectiveness of a 60-minute training on both HoCPR and STB in teaching key concepts for these protocols and increasing comfort in performing these procedures, validating the teaching of both procedures in a shortened period.

Methods: Participants consisted of security personnel and non-medical volunteers for the 2022 Bank of America Chicago Marathon as part of the city's "Safe Chicago" program in partnership with the Office of Emergency Management and Communications (OEMC). A pre-participation survey was obtained prior to the training session to ascertain prior knowledge of both topics as well as comfort in performing CPR and tourniquet placement. This was followed by a 60-minute training session going over HoCPR and STB concepts, with opportunities for participants to practice on mannequins. Finally, a post-participation survey was obtained after the training period to ascertain participant knowledge and comfort in performing hands only CPR and tourniquet placement. Paired sample T test was used to analyze differences between the pre and post tests.

Results: Twenty-six participants took the pre- and post-participation surveys and completed the 60-minute course. The majority (92%) agreed or strongly agreed with the statement "I learned something new from this course", while a similar proportion (84% and 92%, respectively) agreed or strongly agreed with the statements "I now feel more comfortable in administering hands-only CPR" and "I now feel more comfortable in treating life threatening extremity bleeds". Participants showed significant improvement in questions directed towards key concepts of HoCPR and STB following training. Of three questions directed towards CPR knowledge, 2/3 had a significant difference in correct answers between the pre-participation and post-participation tests ($p<0.05$). The participants showed improvement in questions regarding the appropriate rate of compressions and whether special training or certifications are needed to perform CPR. Similarly, participants showed a significant improvement in questions pertaining to Stop the Bleed concepts, including signs of a life-threatening bleed and what training you need to use a tourniquet ($p<0.05$).

Conclusions: Overall, participants of a combined and shortened course teaching both HoCPR and STB felt more comfortable performing CPR and tourniquet placement following training and were significantly more knowledgeable in key concepts of HoCPR and STB.

No, authors do not have interests to disclose

## 67 Evaluation of Acute Pediatric Ankle and Foot Injuries Using Point-of-Care MRI in the Emergency Department

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Objectives: The primary objective of this feasibility study was to evaluate the quality of diagnostic images and thus clinical utility of POC MRI for the diagnosis of acute pediatric acute foot and ankle injuries in the emergency department (ED) setting.

Methods: This is a prospective, nonrandomized, observational, feasibility study. Patients aged 7 to 25 years old who presented to the pediatric ED with an acute ankle and/or foot injury occurring within 72 hours of presentation were eligible for the study. A portable, 0.064-T, MRI device with prototype ankle coil (Hyperfine, Guilford, CT) was used to image enrolled patients at the bedside. POC MRI image acquisition occurred after the patient's initial evaluation but prior to radiograph dictation and pediatric emergency department treatment. An attending radiologist with specialization in musculoskeletal injuries and MRI reviewed all MRI images/sequences. Within 2 weeks of the initial evaluation, enrolled patients either followed up with an orthopedic surgeon or were contacted via phone by clinician researchers. The orthopedic surgeons and clinician researchers, both blinded to POC MRI results, determined the final diagnosis which served as the reference standard.

Results: We enrolled a convenience sample of 12 patients from May 2021 to June 2022. The average age of the patients in the study was 13 years (SD 2.73, range 9-17). The mean examination time was 24 minutes and 26 seconds. There were no adverse events or complications while using the POC MRI.A radiologist with specialization in MRI and musculoskeletal radiology reviewed the 12 image series and assessed their utility in clinical practice. None of the POC MRI images were deemed to be high quality or adequate quality for clinical interpretation. In 75% (9/12) of the subjects, the general MRI quality was graded to be inadequate quality for interpretation but with recognizable anatomy. In 16% (2/12) subjects, the POC MRI images were judged to be uninterpretable. In 8% (1/12) subjects, the POC MRI images were judged to have major limitations with some minor clinical utility. None of the 12 patients were lost to follow up.17% of the patients were diagnosed with distal fibula Salter-Harris Type 1 Fractures. Of the 2 cases of confirmed SH Type 1 Distal Fibular fracture, POC MRI failed to identify pathology. In the case of the 1 patient with partial weight bearing status, POC MRI identified nonspecific

edema in the forefoot but the radiologist was unable to make an additional diagnosis due to the image quality.

Conclusions: In this pilot study, we established that at this time, POC MRI is not clinically useful for the diagnosis of acute pediatric ankle and foot injuries in the ED setting. Given the prototype phase of development of the ankle coil, this technology offers good prospects, however, technical challenges limit its current clinical capabilities in the diagnosis of musculoskeletal pathology.

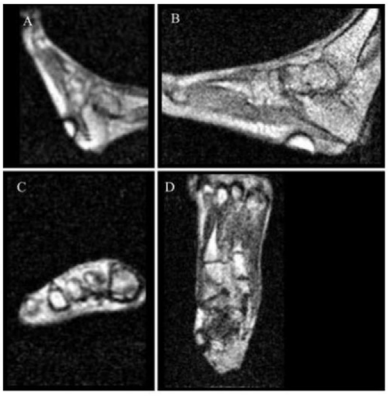


**Figure.** POC MRI of a patient diagnosed with an ankle sprain. An 14-year-old male presented with acute ankle pain after a sports-related injury with unknown twisting mechanism. Physical exam was significant for lateral malleolus tenderness and midfoot tenderness. Plain radiographs performed showed no fracture or abnormalities.The patient was treated in the PED with ace wrap and made weight bearing as tolerated with crutches. The patient was back to his baseline without pain or swelling within 2 weeks of the injury. POC MRI showed nonspecific edema at the forefoot and midfoot (A-D). The MRI was judged as inadequate quality for interpretation but with recognizable anatomy (Grade 4).

No, authors do not have interests to disclose

## 68 Impact of Debriefings and the Review of the Patients Audio/Video Recordings on Trauma Team Performance in the Emergency Department

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Background: Working in the emergency department (ED) can be stressful, resulting in errors during trauma patient resuscitation. However, an optimal level of stress can improve concentration. Studies have shown that better technical and non-technical skills of trauma teams (TT) lead to more efficient and safer work. Adherence to Advanced Trauma Life Support (ATLS) principles can improve efficiency and reduce staff stress. Various methods exist to improve TT efficiency, but most require expensive resources. Effective principles of training and process improvement are needed. A good organizational structure leads to good processes and outcomes. This study is the first in Europe to analyze the impact of structured debriefings (SD) on TT performance during real patient resuscitation events.

Objectives: The aim of this study was to determine the impact of SD with audio/video review of live TT patient resuscitation events on TT technical and non-technical skills.

Methods: This was a single center cohort study conducted from 01/01/2017 to 08/31/2017 and from 09/01/2021 to 02/28/2022. The study included all ED patients aged 18 years or older who received resuscitation from the trauma team (TT) and had a high-quality video recording of up to 1 hour or until the patient left the shockroom. Patients who were younger than 18 years old, had low-quality or partial recording were excluded from the study. We measured TT ATLS adherence using 11 measures and calculated compliance rate as a percentage out of 100%. We also measured time needed for certain steps to be completed during the patient's resuscitation. We used the T-NOTECHS scale for non-technical skills evaluation and comparison between the study group. For the intervention the researcher reviewed TT video recordings every week, evaluating their technical and non-technical skills. Every two weeks, a virtual meeting was held with the TT and SD to review one TT resuscitation video. The SD involved reviewing the video recording, presenting the clinical case and learning objectives, discussing the case, and asking TT members to verbalize a takeaway message.

Results: We included 284 TT activations: 143 activations in the control group and 140 activations in the study group. There were no statistically significant differences in patient age, gender, injury severity, or EMS prehospital time between the study cohorts. There was significant improvement in the ATLS compliance rate based on 11 measures and its derived percentage: 8 (6–9) and 73% (55–82%) in the control group vs 10 (9– 11) and 91% (82–100%) in the study group ($p < 0.001$). There was statistically significant improvement in the T-NOTECHS score after the implementation of the SD: 12 (10–14) out of possible 25 points or 48% (40– 56%) in the control group and 16 (14–19) points or 64% (56–75%) in the study group ($p < 0.001$). There were no statistically significant differences in the outcome measures. The higher the T-NOTECHS scale evaluation, the better the adherence to the ATLS protocol ($r = 0.531$; $p < 0.001$)

Conclusions: Intervention used in our study adheres to the Pareto principle: 20% of effort yields 80% of results. A simple structural discussion system that requires neither long additional time nor large investments can help to improve not only technical but also non-technical skills with little effort.

No, authors do not have interests to disclose

## 69 Timely Post Intubation Sedation and Analgesia: How Often Do We Get It Right?

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Objectives: Endotracheal intubation is a crucial intervention in critically ill patients in the emergency department (ED). This is typically facilitated by the use of rapid sequence intubation (RSI) which involves the administration of induction and paralytic agents to ensure sufficient peri-procedure sedation and muscular relaxation. Patients undergoing RSI are at risk of being paralyzed without adequate post-procedural sedation and analgesia, and this can lead to unnecessary pain and potential psychological trauma. This study aimed to determine the proportion of adult patients that received timely analgesia and sedation after RSI in the ED.

Methods: Setting: Academic, urban ED and Level 1 Trauma center supporting a PGY 1-3 EM Residency.

Design: Structured, retrospective chart review. Inclusion criteria: Adult (age >17) patients who underwent RSI in the ED. Exclusion criteria: patients intubated by EMS, patients not given paralytic for intubation, any patient who suffered peri-intubation cardiac arrest, pregnant patients, patients in police custody, or cases with missing data. Two trained and monitored abstractors, blinded to the study purpose, used a standardized data collection tool and dictionary to extract data. Interrater reliability was measured. "Time zero" was defined as the time of administration of the RSI induction agent. Data collection included pre- and post-intubation vital signs, RSI induction and paralytic agents and administration time, whether post-sedation/analgesia agents were administered, and associated dosage and time of administration. The primary outcome measure was the proportion of patients who received either timely (defined as <30 minutes after induction) analgesia or sedation. Our secondary outcome was the proportion who received both timely analgesia and sedation. We report descriptive statistics as appropriate and report primary and secondary outcomes using proportions and associated 95% confidence intervals.

Results: A total of 205 adult patients that underwent RSI were included in the study. 52.9 % were male, and the median (IQR) age was 61 (49, 71.0) The proportion of patients that received timely post-intubation sedation or analgesia was 157/205 = 76.6 % (95% CI = 70.3, 81.9). The secondary outcome (the proportion who received both timely analgesia and sedation) and the number, proportion, and (95%CI) who received timely sedation, or timely analgesia, are shown in the table. Median (IQR) timing of individual agents not included due to space limitation.

Limitations: Single center, inherent limitations of retrospective chart review, timing of administration based on time documented by the nurses.

Conclusions: There remains an opportunity for improvement at our institution as approximately one-quarter of the patients undergoing RSI did not have timely analgesia or sedation given. We hope our results may benefit others who are seeking to measure and improve intubated patients' experiences in their ED.

| Table: Any and Timely Sedation/Analgesia | | | |
|---|---|---|---|
| **N= 205** | **N given** | **% of all** | **95% CI** |
| **TIMELY SEDATION OR ANALGESIA** | 157 | 76.6 | (70.3, 81.9) |
| Any sedation | 170 | 82.9 | (77.2, 87.5) |
| Timely Sedation | 106 | 51.7 | (44.9, 58.5) |
| Any analgesia | 158 | 77.1 | (70.8, 82.3) |
| Timely Analgesia | 113 | 55.1 | (48.3, 61.8) |
| Both sedation and analgesia | 132 | 64.4 | (57.6, 70.6) |
| **2nd outcome:** Timely sedation AND analgesia | 62 | 30.2 | (24.4, 36.9) |

No, authors do not have interests to disclose

## 70 Procedural Sedation and Analgesia in the Emergency Department and Intensive Care Unit: A Systematic Review and Network Meta-analysis

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Objectives: The pharmacological options used for procedural sedation and analgesia (PSA) are diverse; understanding which agents offer preferred safety and efficacy profiles is essential. We performed a systematic review and network meta-analysis of randomized controlled trials (RCTs) comparing the efficacy and safety of various intravenous PSA medications for emergent procedures in the emergency department (ED) and Intensive Care Unit (ICU).

Methods: We searched Medline, EMBASE, Cochrane, and PubMed from inception to March 2023 for RCTs comparing two or more PSA medications in patients (adults and children > 30 days of age) requiring emergent procedures in the ED or ICU. We examined the effect on recovery time, patient satisfaction, and adverse events (AEs). We performed frequentist random-effects network meta-analysis for all outcomes and used the Grading of Recommendations, Assessment, Development, and Evaluations approach to evaluate certainty in estimates. We pre-registered the protocol with the Center for Open Science (https://osf.io/apx53).

Results: We included 82 RCTs (8,105 patients), 76 conducted in the ED and 6 in the ICU. Fifty-two studies included adults, 23 included children, and 7 included both. Compared to midazolam with opioids, which was the most commonly used comparator, recovery time is shortest with propofol (Mean Difference [MD] 16.34 minutes shorter, 95% Confidence Interval [CI] 8.39 to 24.29 minutes shorter; high certainty), and patient satisfaction is best using combination ketamine and propofol (MD 1.47 points, 95% CI 0.30 to 2.63; high certainty).

When assessing AEs, compared to midazolam with opioids, respiratory AEs are fewest with ketamine (Relative Risk [RR] 0.55, 95% CI 0.32 to 0.96; high certainty), while propofol may be associated with higher rates of cardiac AEs (RR 1.89, 95% CI 0.44 to 8.04; low certainty), and GI AEs (RR 1.99, 95% CI 0.30 to 13.21; low certainty). Again, compared to midazolam with opioids, neurological AEs are highest with combination ketamine and propofol (RR 3.68, 95% CI 1.08 to 12.53; high certainty). Compared to ketamine with propofol, another common comparator, recovery time may be shortest with propofol (MD 5.82 minutes shorter, 95% CI 12.01 minutes shorter to 0.37 longer; low certainty) and patient satisfaction may be lowest using combination of propofol with opioids (MD 0.49 points less, 95% CI 1.70 points less to 0.72 points more; low certainty). Again, compared to ketamine with propofol, propofol with opioids are associated with more respiratory AEs (RR 2.03, 95% CI 1.32 to 3.13; high certainty), cardiac AEs (RR 3.80, 95% CI 2.02 to 7.16; high certainty), and probably associated with fewer gastrointestinal AEs (RR 0.66, 95% CI 0.32 to 1.37; moderate certainty), with possibly no important difference in neurological AEs (RR 1.00, 95% CI 0.35 to 2.80; low certainty).

Conclusions: Compared to midazolam with opioids for PSA in the acute care setting, sedation recovery time is shortest with propofol while patient satisfaction is best using a combination of ketamine with propofol.

Ketamine has fewer respiratory AEs, whereas propofol may have more cardiac and gastrointestinal AEs. Compared to ketamine with propofol, propofol with opioids may be associated with higher rates of respiratory and cardiac AEs, and probably fewer gastrointestinal AEs.

No, authors do not have interests to disclose

## 71 Physician Assistant Intubation in the Emergency Department: An Analysis From the National Emergency Airway Registry (NEAR)

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Objectives: Physician assistants (PAs) play an increasing role in treating emergency department (ED) patients and may be called on to perform emergency airway management. The Society of Emergency Medicine Physician Assistants (SEMPA) practice guidelines recommend experience with intubation and difficult airway management. A 2021 SEMPA practice survey reported 67.5% of respondents performed invasive airway management but data evaluating PA performance with ED intubations are lacking. Our objective was to describe PA intubation practice using a multicenter ED intubation registry.

Methods: We analyzed prospectively collected data from the National Emergency Airway Registry (NEAR) from January 1, 2016, to January 1, 2019 using descriptive statistics and 95% confidence intervals. We report total encounters, indications, first-attempt success rates, methods and devices used, and complications for PA ED intubations.

Results: The registry contained 19,071 total intubations. PAs performed intubations in 297 (1.5%) encounters with 278 medical intubations and 19 trauma intubations. Overall, first-attempt success was 80% (95% CI, 59.4 to 100) and 68.4% (95% CI, 53.2 to 83.6), respectively. The most common medical indications for intubation were non-overdose mental status change (28.4%), cardiac arrest (17.6%), and overdose (14.4%). Most intubations were performed with a GlideScope videolaryngoscope (VL) (39.9%) followed by a standardgeometry C-MAC (37.8%). First-attempt success stratified by device was 79.7% (95% CI, 59.0 to 100) for GlideScope and 85.7% (95% CI, 61.8 to 100) for C-MAC. Rapid sequence intubation was used in 81.5% of encounters. Etomidate was the most used induction agent (84.2%). Succinylcholine and Rocuronium were used at similar rates (43.8% vs. 39.5%). The most common peri-intubation adverse events were hypoxia (30.7%), hypotension (6.8%), and esophageal intubation with immediate recognition (5.7%).

Conclusions: In this multicenter analysis, PAs performed nearly 2% of all ED intubations. Most intubations were performed using RSI and VL. First attempt success was similar to physician intubations and highest with a CMAC standard geometry blade. More data are required to validate these findings.

No, authors do not have interests to disclose

## 72 Airway Management Practices Among Community Emergency Departments: A Multicenter Evaluation of Over 11,000 Endotracheal Intubation Attempts

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Objectives: Important emergency medicine airway management trends and outcomes in the US are regularly published by the National Emergency Airway Registry, comprised of mostly academic based, level 1 trauma centers nationwide. However, the vast majority of emergency departments (EDs) across the country can be found in smaller community hospitals. This study analyzes the airway management practices of 14 community EDs in Southern California over a 7-year period.

Methods: A multicenter retrospective chart review was conducted on 11,475 intubations between January 1, 2015, to December 31, 2022. Data were collected from intubation procedure logs found within an electronic medical record utilized by all 14 sites and included: patients' age, sex, indication for intubation, medications used to facilitate intubation, use of cricoid pressure, method of intubation, number of attempts, admission diagnosis, and all-cause mortality rates. Descriptive statistics were performed to summarize the data.

Results: Among the 11,475 intubations, 56.7% of patients were male and the average age at time of intubation was 62 years old. Indications for intubation included: respiratory distress/failure (34.9%), airway protection or anticipated clinical course (30.1%) and a combination of the prior two groups (35%). Among all of the intubations, 11.4% were performed during active cardiopulmonary resuscitation. When rapid sequence intubation was employed, etomidate was chosen as the induction agent for 92.3% of intubations, with ketamine used in 3.2% and propofol used 2% of the time. In 2015 succinylcholine was chosen as the paralytic

medication in 66.1% of cases, but by 2022 it was only chosen 38.1% of the time. Conversely, rocuronium was used in only 33.9% of cases in 2015 and rose sharply to 61.9% of cases by 2022. Other significant trends include physicians in 2015 opting for direct laryngoscopy (DL) in 70.4% of cases and video laryngoscopy (VL) in only 29.6% of all the intubations. But by 2022, VL became the dominant modality of choice (83.4%), while DL dropped to 16.6%. Once a mainstay in airway management, recent studies have questioned the efficacy of cricoid pressure, which is reflected in its utilization in only 46% of intubations during the study period. The first pass success rate was 80.5%, with 0.25% failing endotracheal intubation by the emergency physician. Within 24 hours of intubation, the all-cause mortality rate was 19.7%. The mortality rates for intubated patients at 7 days (29.4%), one month (38.4%) and one year (45.4%) continued to follow a steep upward trajectory. The most common documented admission diagnoses among intubated patients were: respiratory failure or a related respiratory problem (23.2%), sepsis (16.6%), and altered mental status (9.7%).

Conclusions: Physicians intubating in community EDs had a reliable rate of first pass success and relatively low rates of failure. Etomidate continues to be the predominant induction agent of choice. Over the seven-year study period there was a decisive shift towards utilizing rocuronium over succinylcholine and a transition from DL to VL. Unlike trauma centers, the majority of intubations in these community hospitals trended towards older individuals inflicted with life-threatening medical conditions, which is reflected in the high all-cause mortality rates.

No, authors do not have interests to disclose

## 73 Succinylcholine Versus Rocuronium in Emergency Airway Management: A Systematic Review and Meta-analysis

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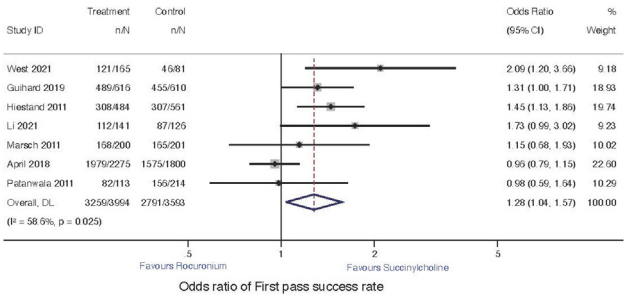
Objectives: In rapid sequence intubation (RSI), the superiority of one muscle relaxant over another (succinylcholine versus rocuronium) is unclear. This systematic review and meta-analysis (SRMA) was conducted to compare the outcomes of first pass success (FPS) rate of intubation, optimum intubating condition and peri-intubation adverse events of succinylcholine with rocuronium.

Methods: Databases including PubMed, EMBASE, and Web of Science were searched from inception to October-8, 2022 using terms 'rocuronium,' 'succinylcholine,' and 'intubation.' Observational studies and randomized control trials (RCTs) comparing the FPS of succinylcholine with rocuronium, in emergency settings were included. The methodological quality was assessed by Cochrane's ROBINS-I tool (observational studies) and ROB-2 (RCTs). Odds ratio (OR) was used as effect size for evaluating outcomes. The ORs were combined using generic inverse variance method and random effects meta-analysis. Heterogeneity was assessed using inconsistency statistics (I2). Subgroup analysis was done according to the study location (ED versus prehospital) and study type (RCTs versus observational studies).

Results: Out of 97 articles searched, only 7 studies were included (2 RCTs and 5 retrospective cohort). The study location was variable among the included studies (ED - 5, prehospital - 2). A total of 7587 patients were included (succinylcholine-3994, rocuronium-3593), with a mean age of 50 years and 63.8% were male. The FPS rate for the succinylcholine was 81.6% which was significantly higher than that for rocuronium (77.7%), with a pooled OR 1.28 (95%CI: 1.04 – 1.57, I2 – 59%). On subgroup analysis, the I2 was zero in prehospital studies and among RCTs. No publication bias was observed. There were no significant differences observed in terms of other outcomes except peri-intubation arrhythmias which was significantly higher in succinylcholine arm (OR: 1.9, 95%CI: 1.03 – 3.52, I2 – 0%).

Conclusions: Succinylcholine has a higher first pass success rate than rocuronium for emergency airway management. Although there was an increased incidence of arrhythmias in the succinylcholine arm, no significant difference in other outcomes were observed.




No, authors do not have interests to disclose

## 74 Overweight and Obesity in the Pediatric Population Is Associated With Significantly Increased Risk of Receiving an Intervention in Emergency Department Procedural Sedations

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Objectives: Procedural sedation (PS) is frequently used in the emergency department (ED) for the relief of pain and anxiety in both pediatric and adult patients undergoing diagnostic & therapeutic procedures. There is currently no large-scale study regarding the incidence, types, or severity of adverse events (AE) or interventions with the use of ED PS among overweight or obese pediatric patients.

Methods: Retrospective review of pediatric ($\leq$ 21 years old) ED patients from 2015 – 2021 at 20 hospitals (tertiary care center & 19 affiliate hospitals in 2 states) undergoing PS. AEs were complications: respiratory rate $<$ 8 breaths/min, apnea, systolic blood pressure adjusted for age, heart rate $<$ 60 or $>$ 100 beats/min and/or adjusted for age, & SpO2 $<$ 90% plus side effects (SE): emesis, nausea, emergence reaction, paradoxical reaction, itching/rash, cough, myoclonus, hiccups. WHO weight-for-length standard growth chart was utilized to classify pediatric patients up to age 2. CDC BMI-for-Age growth charts were utilized to classify pediatric patients age 2 through 19. CDC standard BMI calculator was utilized to classify pediatric patients age 20 through 21. Pediatric patients were divided into healthy or underweight & overweight or obese groups. Data was entered into a Redcap database. R was used for statistical analysis with $P < 0.05$ statistically significant.

Results: Of 883 pediatric patients, 313 were classified as overweight or obese at the time of sedation. These patients had a mean ($\pm$ SD) age of 11.6 ($\pm$ 5.9) years, 63.3% male. The 570 patients that were classified as healthy or underweight had a mean ($\pm$ SD) age of 10.3 ($\pm$ 5.8) years, 66.0% male. Age was significantly higher ($p < 0.001$) for healthy or underweight vs. overweight or obese groups, but there was no significant difference for gender (p=0.451). In the underweight or healthy group, 53 patients (9.3%) had a SE, 40 (7.0%) a complication, total 93 (16.3%) AE. 58 healthy or underweight patients (10.2%) received at least one intervention: airway repositioning (6/570 = 1.1%), airway suctioning (0), bag valve mask (7/570 = 1.2%), supplemental oxygen (10/570 = 1.8%), anti-emetic medication (38/570 = 6.7%), other IV medications (1/570 = 0.2%), IV fluid bolus (0). In the overweight or obese group, 36 patients (11.5%) had a SE, 30 (9.6%) a complication, total 66 (21.1%) AE. 52 overweight or obese patients (16.6%) received at least one intervention: airway repositioning (5/313 = 1.6%), airway suctioning (1/313 = 0.3%), bag valve mask (5/313 = 1.6%), supplemental oxygen (8/313 = 2.6%), anti-emetic medication (38/313 = 12.1%), other IV medications (0), IV fluid bolus (1/313 = 0.3%). The overweight or obese group had a significantly greater risk of receiving an intervention ($p < 0.01$), but not SEs (p =0.298), complications (p=0.171), or AEs (p=0.076).

Conclusions: Overweight or obese pediatric patients are at significantly increased risk for receiving an intervention, but not SEs, complications, or AEs during ED PS. ED providers should be aware of the increased risks when performing PS in overweight or obese pediatric patients. A lack of significant interventions (nasopharyngeal airway, oral airway, intubation) within the study demonstrates overall safety in performing PS in pediatric ED patients.

Table 1. Comparison of pediatric ED patients undergoing PS: healthy & underweight vs. overweight & obese patients.

| | Healthy & Underweight | Overweight & Obese | P-Value |
|---|---|---|---|
| Number | 570 | 313 | - |
| Age ≤ 21 | 10.3 (± 5.8) | 11.6 (± 5.9) | p < 0.001 |
| Gender (N Male) | 376 (66.0%) | 198 (63.3%) | p = 0.451 |
| Side Effects (SE) | 53 (9.3%) | 36 (11.5%) | p = 0.298 |
| Complication | 40 (7.0%) | 30 (9.6%) | p = 0.171 |
| Adverse Event (AE) | 93 (16.3%) | 66 (21.1%) | p = 0.076 |
| Interventions** | 58 (10.2%) | 52 (16.6%) | p < 0.01 |
| • Airway Repositioning | 6 (1.1%) | 5 (1.6%) | * |
| • Airway Suctioning | 0 (0%) | 1 (0.3%) | * |
| • Bag Valve Mask | 7 (1.2%) | 5 (1.6%) | * |
| • Supplemental Oxygen | 10 (1.8%) | 8 (2.6%) | * |
| • Antiemetic Medication | 38 (6.7%) | 38 (12.1%) | * |
| • Other IV Medications | 1 (0.2%) | 0 (0%) | * |
| • IV Fluid Bolus | 0 (0%) | 1 (0.3%) | * |

* - sample size too small to calculate significance

** - there were no nasopharyngeal airway, oral airway, or intubation interventions in any pediatric patient throughout the study (N = 883 patients)

No, authors do not have interests to disclose

## 75 Differential Effect of Age on Mortality in African Americans Infected With the SARS-CoV-2 Virus in the United States

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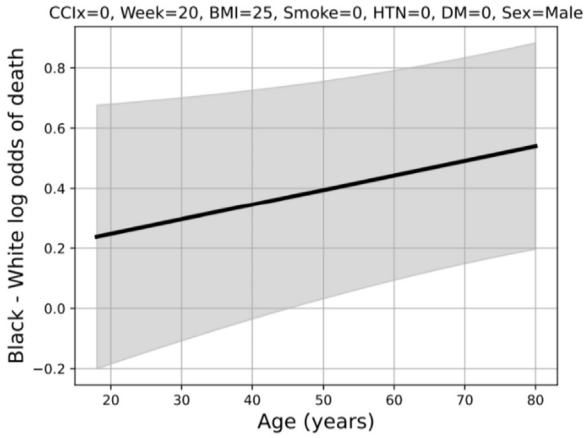
Background: It has been previously reported that African Americans (AA), had a disproportionately higher rate of infection and mortality during the COVID-19 pandemic. This study examines the effect of age on mortality disparities.

Objectives: To determine if there is a difference in mortality rates between the different age groups of African Americans and White people.

Methods: This was a retrospective cohort design. A multistate model of large hospital system electronic health records (EHRs) included patients during the pandemic (January 1, 2019, to March 31, 2022), of unique first-time test-positive patients ages 10-90 years. The primary outcome variable was mortality as a function of age. Logistic regression models were based on predictive factors of age, sex, race, week of admission, Charlson Comorbidity Index (CCI), and BMI. When the log odds are positive, there is a disadvantage for AAs.

Results: Starting with 1,520,483 records, the final dataset for covid positive subjects had 330,648 encounters for 171,125 distinct people. There were 7,155 deaths, with a crude death rate of 4.2%. Following a positive COVID-19 test result, the mortality disparity almost always either disfavored AAs or showed no statistical evidence of a disparity. The disparity tended to increase with age and decrease as the pandemic progressed. The greatest disadvantage for AAs is for older patients near the end of 2020, where the log odds ratio is around 0.6, corresponding to 1.8-fold greater odds of death for AAs. Statistically elevated mortality in AAs was evident for people over 55 from the pandemic's beginning until mid-May 2020. The graph below depicts that male African Americans have a greater mortality rate than Caucasian patients as both groups get older. The gray area indicates the confidence interval.




Conclusions: The most significant racial disparity noted during the pandemic is increased mortality for older African Americans during the early pandemic. It is essential to investigate why older African Americans exhibit greater vulnerabilities. This may provide effective preventive strategies for these risk differences.

No, authors do not have interests to disclose

## 76 Feasibility and Outcomes of Monoclonal Antibody Administration in the Emergency Department for Non-Hospitalized Patients With COVID-19

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Background: Monoclonal antibody (MAb) infusions were authorized under Food and Drug Administration (FDA) Emergency Use Authorization (EUA) for patients who test positive for COVID-19 but do not require hospitalization. In most health systems, to receive MAb infusions, patients had to schedule appointments or attend designated infusions centers. In our health system, patients were assessed and administered MAb in the emergency department (ED), greatly enhancing our local community's access to care. In this study, we describe the feasibility of ED based administration of MAb. We also describe return visit outcomes for this population.

Methods: This is a retrospective chart review of patients who received an intravenous infusion of MAb from January 1 to December 31, 2021, at 6 different EDs across a single health system on Long Island, NY. All adult patients who were administered MAb treatment were included. Demographic and visit data were obtained from the electronic medical record, as well as data on 30-day return visits after discharge. All data are presented descriptively.

Results: During the 12-month period, MAb was administered in the ED to 21,344 patients and those patients were then discharged. The specific MAb given were as follows: bamlanivimab+etesevimanb (6148, 29%), bamlanivimab (2603, 12%), casirivimab+imdevimab (3577, 17%), carisivimab+imdevimab (5656, 26%), sotrovimab (3360, 16%). Regarding return visits, there were 2393 patients (11.2%, 95% CI 10.8-11.6) that had a subsequent ED visit within 30 days of their MAb therapy, and of these 1146 patients (5.4%, 95% CI 5.1-5.7) were admitted to the hospital within the 30 days of their MAb treatment. Only 336 (1.5%, 95% CI 1.4. - 1.6) were admitted with a diagnosis related to COVID-19. Among the entire cohort of 21,344 patients only 59 (0.3%) experienced an allergic reaction necessitating treatment, including rash (37, 0.2%), localized induration (9, 0.04%), anaphylaxis/ throat swelling (6, 0.03%), and respiratory distress (3, 0.02%). Only four (0.02%) required admission to the hospital for their allergic reaction. Though the initial disposition plan was for discharge in order to be eligible for MAb, there were 136 patients (0.6%) that did require admission for clinical deterioration after MAb was received.

Conclusions: ED-based administration of monoclonal antibodies for treatment of COVID-19 is feasible and offers great potential access to treatment for this patient population. Return visits did occur but only 1.5% of revisits were related to COVID-19. Allergic reactions, particularly serious allergic reactions, were extremely uncommon.

No, authors do not have interests to disclose

## 77 Effects of COVID-19 on Pregnant Women and Their Newborns

Mendez D, Richardson J, Yaklic J, Paul K, Jehle D/University of Texas Medical Branch, Galveston, Texas, US

Objectives: The COVID-19 pandemic has presented many challenges and posed an important question concerning its effects on women infected during pregnancy and their newborns. Recent publications have been inconsistent in their findings regarding COVID-19's consequences, with some indicating that COVID-19 negatively affects pregnant females and their newborns, and other studies showing no increase in infant complications. The purpose of this study was to compare a population of COVID-19-infected pregnant women to a population of non-infected pregnant women during the same time period and to examine their outcomes as well as that of their newborns.

Methods: This retrospective study from the TriNetX database utilizes the United States Collaborative Network of 56 academic medical centers/healthcare organizations which provides access to electronic medical records. This time frame was from January 01, 2020, to March 01, 2022. This analysis compared the outcomes of two cohorts: Cohort A (39,324 patients) who were COVID-19 infected pregnant women and Cohort B (896,130 patients) who were non-COVID-19 infected pregnant women for a total study population of 935,454 patients.

Results: The risk of maternal Intensive Care Unit (ICU) admission (2.74% vs 1.83%. RR=1.50, 95% CI 1.41-1.59, p<0.001) being on a ventilator (0.26% vs 0.10%, RR=2.64, 95% CI=2.15-3.23, p<0.001), and death (0.24% vs 0.17%, RR=1.45, 95% CI 1.17-1.78, p<0.001) was significantly higher for COVID-19 infected pregnant patients. There was not an increased risk of premature birth if the mother was infected with COVID-19 (2.26% vs 2.40%, RR=0.94, 95% CI 0.88-1.01, p=0.086). Interestingly, the risk of intrauterine death (0.35% vs 0.54%, RR=0.65, 95% CI 0.55-0.77, p<0.001) and premature rupture of membranes (5.47% vs 7.36%, RR=0.74, 95% CI 0.71-0.78, p<0.001) was significantly higher among the non-COVID-19 cohort.

Conclusions: There is significantly increased risk of poor outcomes for a pregnant women infected with COVID-19 due to increased pulmonary and cardiovascular morbidity. Risk to the infant does not appear significant if the mother is COVID-19-infected. The lack of negative impacts on the infant from maternal COVID-19 infection may be related to the placenta's immune function. Our study differs from other studies that report an increased risk of preterm delivery associated with maternal COVID-19 infection. This information provides important guidance in the care and testing of pregnant women in the setting of COVID-19.

No, authors do not have interests to disclose

## 78 Validation of ANCOC Score for Prognosis of COVID-19 in Different SARS-CoV-2 Variants

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Background: The COVID -19 pandemic is one of the greatest challenges facing medical researchers worldwide. The availability of a clinical score that can predict the outcome of the disease at the time of diagnosis and that can be used even if the characteristics of the population change and the virus mutates can be a very important tool for emergency physicians to make clinical decisions and improve the quality of care for each patient. In March 2020, during the first pandemic wave, we developed a score, the ANCOC score, based on clinical parameters (age, blood urea nitrogen, C-reactive protein, oxygen saturation, comorbidities) and associated with 60-day mortality. The score correlated proportionally with mortality risk: at a score of less than -1, mortality was zero, whereas at a score of 6, the risk was 100%. The aim of our study is to investigate whether the ANCOC score correlates with patient prognosis despite vaccination status and viral variants.

Methods: We retrospectively enrolled 843 patients admitted to the emergency department (ED) of our hospital from July 2021 to September 2021, when the delta variant was statistically predominant, and in January 2022, when the omicron variant was statistically predominant, who had a diagnosis of COVID -19 confirmed by polymerase chain reaction (PCR) on an oropharyngeal swab. Demographic data, comorbidities, immunization data, and various laboratory, radiographic, and blood gas parameters were collected from all patients to evaluate differences between the two waves. Then, the ANCOC score was calculated for each patient, ranging from -6 to 6.

Results: Patients infected with the Omicron variant were significantly older, had a greater number of comorbidities, and were more likely to have hypertension and COPD. Immunization was more common in Omicron patients than in Delta patients (56% and 34%, respectively). To evaluate the accuracy of mortality prediction, we constructed a characteristic response curve (ROC). We found that the area under the ROC curve was above 0.8 for both variants, indicating that the ANCOC score is able to predict 60-day mortality regardless of viral variant.

Conclusions: In a population with increasingly high vaccination rates, several factors may be considered prognostic for the risk of ICU admission or even fatal outcome. This study suggests that the ANCOC score has very good accuracy in predicting death, regardless of vaccination status and the variant considered. By analyzing only 5 parameters, emergency physicians can quickly and accurately predict patients' prognosis and choose the right setting for their treatment.

COMPARISON OF PARAMETERS BETWEEN THE PATIENTS INFECTED BY THE DELTA VARIANT AND THE ONES INFECTED BY THE OMICRON VARIANT. DATA ARE PRESENTED AS NUMBERS/TOTAL (%) OR AS MEAN ± SD.

| | Total patients | Omicron variant | Delta variant | *p*-value |
|---|---|---|---|---|
| **General parameters** | | | | |
| Age (years) mean ± SD | 62 ± 19 | 64,5 ± 18,3 | 60,1 ± 18,6 | 0,001 |
| $O_2$ Saturation (%) mean ± SD | 93,8 ± 5,6 | 94,7 ± 5,06 | 93,07 ± 5,88 | 0,0001 |
| $PaO_2/FiO_2$ (mmHg) mean ± SD | 305,9 ± 111,6 | 323,7 ± 114,7 | 295,7 ± 108,55 | 0,001 |
| COI mean ± SD | 63,9 ± 55,9 | 71,95 ± 56,98 | 57,6 ± 54,3 | 0,005 |
| **Laboratory parameters** | | | | |
| BUN (mg/dL) mean ± SD | 26,2 ± 23,8 | 29,3 ± 25,02 | 24,25 ± 22,8 | 0,005 |
| LDH (U/L) mean ± SD | 319,8 ± 198 | 287,7 ± 214,5 | 340,05 ± 184,18 | 0,005 |
| Eosinophils (cells×$10^9$/L) mean ± SD | 0,05 ± 0,12 | 0,07 ± 0,12 | 0,04 ± 0,12 | 0,005 |
| Fibrinogen (mg/dL) mean ± SD | 477,6 ± 168,8 | 420,95 ± 148,66 | 512,7 ± 171,1 | < 0,0001 |
| **Outcome** | | | | |
| Discharged at home n (%) | 191 (23) | 95 (29) | 79 (15) | 0,02 |
| Hospitalized in medical ward n (%) | 509 (60) | 73 (22) | 336 (65) | 0,02 |
| Hospitalized in ICU n (%) | 143 (17) | 160 (49) | 100 (20) | 0,02 |
| **Radiographic data** | | | | |
| Positive Chest X-ray n (%) | 380 (45) | 110 (33) | 270 (53) | 0,001 |
| Positive Chest HRCT n (%) | 323 (38) | 82 (25) | 241 (47) | 0,001 |
| **Vaccination status** | | | | |
| Vaccinated n (%) | 357 (42) | 183 (56) | 174 (34) | 0,001 |
| Non vaccinated n (%) | 486 (58) | 145 (44) | 341 (66) | 0,001 |
| **Pharmacological therapy** | | | | |
| Remdesevir n (%) | 194 (23) | 55 (16) | 139 (27) | 0,005 |
| Corticosteroids | 508 (60) | 147 (45) | 361 (70) | 0,0001 |
| Anti-IL6R n (%) | 105 (12) | 13 (4) | 113 (22) | 0,001 |
| **Oxygen therapy** | | | | |
| HFNT n (%) | 117 (14) | 29 (9) | 88 (17) | 0,001 |
| NIV n (%) | 80 (9) | 20 (6) | 60 (11) | 0,01 |

*SD: standard deviation; PaO2: partial pressure of oxygen in arterial blood: FiO2: inspired oxygen fraction;: COI: Cut-Off Index; BUN: blood urea nitrogen; LDH: lactate dehydrogenase; ICU: intensive care unit; HRCT: high resolution computed tomography scan; IL6: interleukin-6; HFNT: high flow nasal therapy; NIV: non-invasive ventilation*

No, authors do not have interests to disclose

## 79 N95 Contamination With COVID-19 Following Mask Reuse and Extended Use: A Multicenter, Prospective Cohort Study

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Objectives: The COVID-19 pandemic led to a massive shortage of N95s, which led the United States (U.S.) Centers for Disease Control and Prevention (CDC) to publish guidelines for extended use (wearing a single mask for >1 patient encounter) and limited reuse (storage of N95s between mask donnings). Little is known about the safety of these practices and reused masks contaminated with SARS-CoV-2 pose an occupational risk to healthcare workers (HCWs). We aimed to prospectively assess the prevalence of N95 contamination with SARS-CoV-2 using real-world clinical data from HCWs in the Emergency Department (ED).

Methods: We conducted a multicenter, prospective study at six U.S. EDs from six different regions, between April 2021 to July 2022. HCWs (physicians, nurses, advanced practice providers et al.) who provided direct clinical care for patients, who practiced reuse (>50% of each shift) and who were scheduled to work ≥10 shifts within a 6-month period. Participants wore N95s that were available at their institution. N95s were used until the participant failed a fit test or until 5 shifts were completed. Six punch biopsies from different parts of the mask were then taken and tested for SARS-CoV-2 RNA via real time quantitative polymerase chain reaction. The primary outcome was the prevalence of N95 contamination with SARS-CoV-2. Data were described with descriptive statistics and the Mann Whitney U test was used to compare numeric variables.

Results: A total of 824 N95 masks were collected from 412 HCWs (2 masks per participant). Of these, 245 N95 underwent testing for SARS-CoV-2 and 28 (11.4%, 95% CI 7.7, 16.0) were positive. The mean age of participants in this subgroup was 36 ± 9 years and 62% (151/245) were women. Physicians (45%, 111/245) comprised the largest group of HCWs, followed by nurses (24%, 58/245), advanced practice providers (18%, 44/245), "other" (7%, 18/245) and patient care technicians (6%, 14/245). Most contaminated masks belonged to physicians (50%, 14/28) and nurses (29%, 8/28), although the "Other" group had the highest proportion of contamination (22%, 4/18). HCWs with contaminated masks were older than those without contaminated masks (37 vs 32 years, p=0.006).

Conclusions: SARS-CoV-2 can contaminate N95 masks, potentially posing an occupational risk to providers practicing mask reuse. Further research is needed to identify risk factors for mask contamination. Mask reuse was necessary during the COVID-19 pandemic: we hope these data will help inform future N95 reuse and extended use practice for HCWs and laypersons.

No, authors do not have interests to disclose

## 80 Effect of the COVID-19 Pandemic on Adult Emergency Department Visits for Depression and Suicidal Ideation

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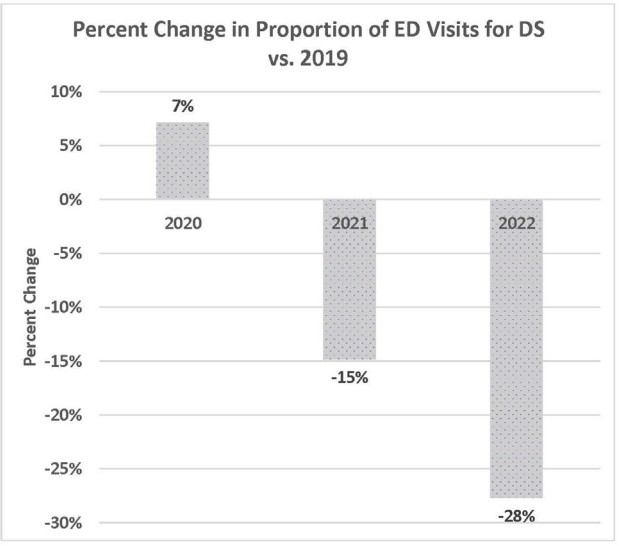
Objectives: In March 2020, the COVID-19 pandemic reached the New York tri-state area, which, at the time, was one of the regions in the US that the virus most severely affected. Social isolation increased due to mandates and fear of exposure to the virus. Quarantining at home, fear of becoming sick, and job disruptions caused the level of stress in the population to increase. We hypothesized this would cause an increase in emergency department (ED) visits for depression and suicidal ideation/self-harm (DS). Our goal was to determine whether the ED visits for DS in adult patients changed after the arrival of COVID-19.

Methods: Design: Retrospective cohort. Setting: EDs of 8 hospitals within 150 miles of New York City. Hospitals were teaching and non-teaching in rural, suburban and urban areas. Total annual ED volumes ranged from 30,000 to 120,000. Population: Consecutive ED patients & gt; 21 years old from March 1 to November 30 in 2019 through 2022. (March 2020 was the start of the pandemic and our database ended on November 30 for each year.) Data analysis: We tallied the number of patients in each year with DS, identified using International Classification of Disease codes (version 10). We calculated the proportion of these visits to total ED visits for patients ages & gt; 21 years in 2019 through 2022 to account for the marked decrease in total ED visits after the start of the pandemic. We report the changes in these proportions from 2019 to 2020, 2021 and 2022, along with 95% confidence intervals (CIs).

Results: Total adult ED visits for patients & gt; 21 years old from Mar-Nov of each year were: 374,965, 279,977, 271,126 and 284,113 in the years 2019 – 2022, respectively. The numbers of DS from Mar-Nov of each year were: 3531, 2825, 2175, and 1935 in the years 2019 – 2022, respectively. The percent changes in the proportions of visits for DS from 2019 (with 95% CIs) were: 2020: +7% (2% to 13%), 2021: -15% (-10% to -19%), and 2022: -28% (-24% to -32%).

Conclusions: Consistent with our hypothesis, the proportion of ED visits for depression and self-harm/suicidal ideation, increased in the year following the arrival of COVID-19, but unexpectedly decreased in 2021 and 2022 The reasons for these decreases are unclear.




No, authors do not have interests to disclose

## 81 Characterization of Potentially Avoidable Emergency Department Transfers Among Medicare Beneficiaries

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Objectives: Each year, over 1.8 million emergency department (ED) encounters result in transfer to another hospital rather than admission or discharge, often for specialty care not available locally. However, transfer also carries risk, including cost and psychosocial burden for patients. The rate of potentially avoidable transfers is most often described in subspecialty-specific literature, with estimates ranging from 22% to 75%. However, potentially avoidable transfers have not been characterized more broadly. We aimed to describe the potential scale of potentially avoidable transfers in a national Medicare population.

Methods: We performed a retrospective analysis of ED encounters resulting in interfacility transfer identified from national Medicare inpatient and outpatient claims from 2008-2017. Patients under the age of 65 were excluded. We examined demographic characteristics, secondary disposition, length of stay (LOS), and primary diagnosis among patients who were transferred following an index ED visit. We defined potentially avoidable transfers as those who were discharged from the ED, had an observation stay, or had a hospitalization LOS of 2 days or less. This overly broad definition serves as a starting point for identifying patients who may be able to receive care while remaining at their local hospital or as an outpatient. Work is ongoing to further exclude transfers with an associated procedure (e.g. surgery, cardiac catheterization, interventional radiology procedure, or endoscopy).

Results: We identified 2.5 million ED encounters resulting in interfacility transfer. Patients who were transferred were on average 77 years old, 51.5% were female, 89.5% were white, and 22.2% had dual enrollment in Medicare and Medicaid. Transfers from rural hospitals were most common (56.3%), and 28.3% of all transfers were from a critical access hospital. Of all transfers, 2.2% were discharged from the second ED, 6.5% had an observation stay, and 10.2% were hospitalized with a LOS of 2 days or less. In all, 19.0% met our broad definition for a potentially avoidable transfer. The rate of potentially avoidable transfers among transferred patients increased throughout the study period, from 16.5% in 2008 to 20.6% in 2017. The 10 most common diagnoses associated with transfer (myocardial infarction, stroke, sepsis, arrhythmia, coronary artery disease, hip fracture, congestive heart failure, nonspecific chest pain, device complication, and intracranial injury) made up 50% of all transfers. More than half of transfers for nonspecific chest pain and one-third of transfers for syncope were discharged after an observation or ED stay.

Conclusions: Nearly 1 in 5 transferred patients met our broad definition for potentially avoidable transfer, though this proportion varied greatly by condition. Further analysis is ongoing on what portion of transferred patients did not have a procedure, which will likely decrease our estimate of potentially avoidable transfers. A limitation of claims data is the lack of clinical data to better distinguish potentially avoidable transfers and any barriers to discharge that patients may face once transferred. These findings will inform further work to refine the definition of potentially avoidable transfers, estimate the direct and indirect costs of interfacility transfers, and explore how telehealth or other interventions might improve transfer coordination.

No, authors do not have interests to disclose

## 82 A Cross-Sectional Assessment of Variations in Discounted Cash Prices for Critical Care Time at American Hospitals

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Objectives: The United States healthcare system remains the most expensive in the world, and the costs related to critical care make up a substantial portion of the overall healthcare expenditures. Patients who present to the emergency department (ED) with a critical illness may be billed extra if the physician performs and documents critical care time (current procedural terminology [CPT] codes 99291 and 99292). No prior study has assessed the typical amounts that patients are billed for critical care time on a national level. We therefore sought to determine the median and mean critical care time fees for uninsured patients in the United States, and we sought to determine if certain hospital characteristics are associated with higher critical care time fees.

Methods: We performed a cross-sectional analysis of the discount cash price critical care time fees (CPT codes 99291 and 99292) reported by hospitals from the first 10 states in alphabetical order in the United States. We searched for all hospitals in those states using the American Hospital Association (AHA) database. We excluded psychiatric, military, long-term care, rehabilitation, and Indian Health Services Hospitals. For each hospital, we recorded the following data from the AHA database: pediatric (or not), hospital control (nonprofit, governmental, or for-profit), number of staffed beds, company ownership, and academic status (medical school or residency affiliation). We then searched for each hospital's "self-pay" or "discounted cash price" for 99291 and 99292, which is typically the amount that a hospital charges a patient who has no medical insurance. As per a rule enacted by the Centers for Medicare and Medicaid Services (CMS), all hospitals are supposed to report these charges on their hospital website. We determined the minimum, maximum, mean (SD), and median (IQR) for each state and nationally. We also calculated those values for the 5 hospital systems with the most hospitals. Finally, we performed a multivariable quantile regression analysis to determine which hospital characteristics associated with discounted cash prices for CPT code 99291.

Results: Among the first 10 alphabetical states, there were 1095 hospitals that met criteria for analysis. Of those, 849 (77.5%) and 699 (63.8%) reported discount cash prices for 99291 and 99292, respectively. For 99291, the discounted cash price ranged from $155 to $84775. The median and mean prices were $2949 (IQR: 1256-5598) and $5000 (SD 7759), respectively. For 99292, the median and mean were $811 (IQR: 351-1798) and $1415 (SD 2885). Among the analyzed states, Arizona had the highest median price for 99291 at $5971 (IQR: 2016-8451) while Alabama had the lowest at $905 (IQR: 648-1542). As shown in Table 1, for-profit hospital ownership was the only hospital characteristic independently associated with higher discounted cash prices for critical care time. In particular, hospitals owned by Tenet Healthcare charge the most.

Conclusions: The cash discounted prices for critical care time vary substantially based on state and ownership. Some for-profit hospitals charge uninsured patients much more for critical care time than others. Given that patients who require critical care are unlikely to be able to choose the hospital to which they present, standardization of critical care time fees should be considered.

**Table 1**: Unadjusted and adjusted median discounted cash prices for 30-74 minutes of critical care time (code 99291), stratified by hospital characteristic.[a]

| Hospital Characteristic | Median 99291 Cash Price | Adjusted 99291 Cash Price[b] |
|---|---|---|
| **Hospital Type** | | |
| General (n = 826) | $2949 (1262-5577) | Reference = $3078 |
| Pediatric only (n = 23) | $1738 (1055-5781) | $2325 (95% CI 1079-3905) |
| **Teaching Status** | | |
| Academic (n = 292) | $3106 (1481-6255) | $3392 (95% CI 3036-3984) |
| Not academic (n = 557) | $2672 (1153-5027) | Reference = $3078 |
| **Staffed Beds** | | |
| <100 (n = 293) | $1971 (962-4095) | $2385 (95% CI 1879-2862) |
| 100-499 (n = 492) | $3106 (1598-6242) | Reference = $3078 |
| ≥500 (n = 64) | $2473 (1042-5027) | $2635 (95% CI 1936-3073) |
| **Type of Control** | | |
| For-profit (n = 194) | $4368 (1824-10102) | $4302 (95% CI 3780-5835) |
| Government (n = 147) | $1676 (805-2913) | $1993 (95% CI 1704-2530) |
| Other nonprofit (n = 508) | $3078 (1274-5229) | Reference = $3078 |
| **System**[c] | | |
| HCA[d] (n = 65) | $7921 (5774-11901) | --- |
| CommonSpirit (n = 48) | $5887 (3749-9750) | --- |
| Kaiser (n = 35) | $3106 (2949-3106) | --- |
| Advent Health (n = 29) | $3237 (1867-3734) | --- |
| Tenet Healthcare (n = 27) | $34046 (25442-39822) | --- |

[a] Data are reported as median (interquartile range) or median (95% CI) for adjusted values.
[b] Adjusted median discounted cash price as determined by multivariable quantile regression.
[c] The five hospital systems with the most analyzed hospitals are shown. Hospital systems were not included in the regression analysis.
[d] HCA indicates Healthcare Corporation of America.

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## 83 Medical Malpractice Lawsuits Involving Nurse Practitioners and Physician Assistants

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Objectives: To provide a narrative review of nurse practitioner (NP) and physician assistant (PA) involvement in medical malpractice lawsuits.

Methods: We searched Thomson Reuters Westlaw, a legal database. Within the "Jury Verdicts and Settlements" database of Westlaw, we searched for cases occurring from 1985 to 2020 with the search term malpractice and either of the following: "physician assistant" or "nurse practitioner." This search yielded 1,048 cases. Cases were excluded if its focus was on qualifications of expert witnesses, NP or PA employment contracts, nurses rather than NPs, workers compensation claims, standard of care issues, and proper licensure issues. This left 144 cases for inclusion and data abstraction.

Results: The cases represented 32 different states, with California and Massachusetts being the highest (22 each). The median time it took to resolve a case was 5 years. The median age of the patient involved was 31.5 years. Of the 144 cases included, 49 involved an NP and 99 involved a PA. Physician involvement was unclear in 51 cases. The physician saw the patient in 5 cases and heard about the patient during the visit in 17 cases. The patient was given a prescription in 35 cases, and of these, 8 were controlled substances. The most involved specialties were primary care (50), followed by emergency medicine (24), and surgical specialties (22). There were 92 cases alleging failure to diagnose, 17 alleging procedural errors, 16 alleging failure to treat, 11 alleging medication or test error, 6 relating to communication errors, 1 relating to post-operative management, and 1 alleging failure to supervise. Of the 144 cases, 54 found no liability in favor of the healthcare provider, 40 ended in settlement, 37 resulted in findings of negligence, and 13 had unknown outcomes. For the cases ending in a finding of negligence, the mean award was $3,216,538 compared to $1,607,716 for those that were settled. Of these cases, 61 resulted in permanent disability, 55 resulted in death, and 18 resulted in a temporary injury. Other patient outcomes included prolonged hospitalizations and pain.

Conclusions: This review of malpractice cases highlights types of situations in which NP and PA involvement in patient care led to a lawsuit, with errors in diagnosis emerging as the most common category in this series. In these cases, physicians were named in most cases but actually saw or heard about the minority of the injured patients. With current and emerging laws expanding the scope of NPs and PAs, it is pivotal to understand where the highest risk of medical error lies. This study reveals the importance for law and policymakers to address training and supervision regarding NP and PA involvement in patient care in order to minimize liability risks and to provide optimal care.

No, authors do not have interests to disclose

## 84 An Overview of State Stroke Center Designation Processes in the United States

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Objectives: Stroke center certification by a national accrediting body relies on a standardized set of criteria and requirements for each of the four certification levels: Acute Stroke Ready Hospital (ASRH), Primary Stroke Center (PSC), Thrombectomy Capable Stroke Center (TSC), and Comprehensive Stroke Center (CSC). Less is known, however, regarding different state-level designation processes, as they are not federally regulated and may differ from nationally recognized standards. Previous research has identified state stroke center legislation and outlined some of the independent state designation pathways, but the overall landscape of state designation processes, as well as the most recent changes to these processes, remains widely unrecognized. Our study aims to categorize general and independent state designation processes across all 50 states and Washington DC, offer examples of specific state processes within each category, and identify processes that have undergone significant changes in recent years.

Methods: We administered a survey instrument to the 25 National Institutes of Health (NIH) StrokeNet Regional Coordinating Centers nationwide to obtain preliminary information on state stroke center designation processes and contact information for individuals at state health departments. We conducted a subsequent internet search to identify legislative language and documentation outlining state designation programs and stroke center application processes. Finally, we sought direct contact with state officials in all 50 states and Washington DC through email exchanges and/or phone conversations to confirm state stroke center designation policies and procedures. Information from all sources was compiled and subsequently categorized.

Results: From September 2022 to April 2023, we successfully received information from 46 contacts in 50 states and Washington DC that we attempted to reach. We identified five "phenotypes" of state designation processes: No Designation Process; Designated with National Certification; Designated Independently by State; Designated with National Certification or Independently by State; and Other. Most states required a national certification for designation, although 13 states had independent designation processes. Some states required hospitals seeking ASRH or equivalent designations to be designated independently by the state; others offered an option for ASRH or equivalent designation through a state process or with a national certification; and the rest offered options for PSC, TSC, and/or CSC designation through a state process or with a national certification. Many state designation processes underwent significant changes in recent years; states such as Idaho and Washington now offer ASRH designation by the state or a national accrediting body while New Jersey and New York no longer have independent state processes and now require a national certification for designation.

Conclusions: Our results suggest significant heterogeneity across state stroke center designation processes and significant changes to these processes in recent years. Our findings may help inform state departments of health, EMS agencies, and policymakers as they implement or update their own local and state processes to improve stroke care and patient outcomes.

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## 85 Publishing Trends in the Field of Emergency Department Observation Medicine: A Bibliometric Analysis

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Background: Emergency department observation units (EDOUs) have become an increasingly popular alternative to hospitalization for patients requiring further evaluation and management but not necessarily needing to be admitted. EDOUs are designed to provide extended periods of observation and treatment to patients, typically for up to 24 hours, to avoid unnecessary admissions and reduce healthcare costs. Yet, while the popularity of EDOUs has grown in recent years, there is still relatively little research on their efficacy.

Objectives: To perform a bibliometric analysis on emergency department observation units, identify trends, patterns, and key themes in research on this topic, and identify potential areas for future research.

Methods: Using SCOPUS by Elsevier and PubMed MEDLINE, a comprehensive literature review was conducted utilizing the keywords "emergency department observation unit" and "emergency department observation units" in the title and abstract. This bibliometric analysis included all original and review articles on emergency department observation units published until March 2023. Data abstracted from each article included publication year, the journal and its impact factor, research study design, study population, clinical relevance (clinical or non-clinical), and study topics. Research study design was further subdivided into prospective, quality improvement, retrospective, and study specific. Study specific articles involved surveys, interviews, or combinations of study designs. Data was imported into Excel, and frequencies for each outcome variable were determined.

Results: A total of 170 publications from 76 peer-reviewed journals were analyzed. The highest annual number of publications included was in the last decade, from 2010 to 2020. The most common study designs were retrospective (45.9%), study specific (25.9%), prospective (27.1%), and quality improvement (1.2%). Adults were the most frequently identified study population (56.5%), followed by pediatrics (20%) and both adults and pediatrics (13.5%). Publications were categorized as clinical (77.1%) and non-clinical (22.9%). The most common research topics were specific medical diagnoses [(n = 99, 58.2%; especially acute coronary syndrome (n = 15)], EDOU utilization (n = 90, 52.9%), and cost (n = 17, 10%).

Conclusions: This bibliometric analysis provides a comprehensive overview of the existing literature on emergency department observation units (EDOUs) and identifies key trends, patterns, and themes in research on this topic. The analysis revealed that the majority of research found on this topic was retrospective and focused solely on the efficacy of EDOU use for the management of specific diagnoses, such as heart failure and gastrointestinal pain. Overall, the findings suggest that EDOUs can be a valuable alternative to hospitalization for patients who require further evaluation and management. However, more research is needed to fully understand the effectiveness of EDOUs in improving patient outcomes and reducing healthcare costs, as well as to identify the optimal patient populations and clinical situations in which EDOUs are most effective. This analysis identifies several key areas for future research, including the need for larger multi-institutional/center studies that compare EDOUs to standard hospitalization, as well as studies that evaluate the impact of EDOUs on broader patient satisfaction, quality of life, and long-term outcomes.

No, authors do not have interests to disclose

## 86 Unfilled in Emergency Medicine: An Analysis of Open 2022 and 2023 Match Positions by Program Accreditation, Ownership, and Geography

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Objectives: Two recent National Resident Matching Program (NRMP®) Match cycles have resulted in a significant and rising number of unfilled emergency medicine (EM) residency positions. However, no existing data describes the characteristics of EM residency programs that successfully fill their positions before the Supplemental Offer Acceptance Program (SOAP®) versus those that do not. We sought to identify the risk of Accreditation Council for Graduate Medical Education (ACGME) accreditation duration, primary clinical site ownership status, and geography pertaining to filling positions before the SOAP®.

Methods: We performed an observational cohort study of EM residency programs participating in the 2022 and 2023 NRMP® Matches. Using ACGME data, Centers for Medicare & Medicaid Services Cost Reports, and Core-Based Statistical Areas data, we linked EM residency programs to their primary clinical site and identified ownership status (i.e., non-profit, for profit, and government). Our primary outcome

was the proportion of filled and unfilled positions before the SOAP®, by EM residency program and stratified by program duration of accreditation (> or ≤ 5 years) and primary clinical site ownership status. We also identified CBSAs in which EM residency programs were more than likely to be unfilled. We used the two-sided chi-square test for statistical analyses and present relative risk ratios between relevant groups.

Results: The 2023 NRMP® Match included 287 EM residency programs, offered 3,010 positions, and resulted in 132 programs not filling a total of 554 positions before the SOAP®. The 2022 NRMP® Match included 277 EM residency programs, offered 2,921 positions, and resulted in 69 programs not filling a total of 219 positions before the SOAP®. In 2023, 49 (72.1%) programs recently accredited within the last five years did not initially fill during the Match, reflecting a 1.85 (1.48-2.32, $c^2$ $p<0.001$) times greater risk than programs accredited more than five years prior (38.9%). In 2023, 31 (10.8%) programs were identified as having a for profit primary clinical site with 18 (58.1%) not initially filling during the Match, reflecting a 1.30 (0.94-1.81, $c^2$ $p=0.153$) times greater risk than programs with a non-profit or governmental primary clinical site (44.5%). CBSAs that had at least 50% of EM residency programs with at least one unfilled position included Detroit-Warren-Dearborn (12/15), Miami-Fort Lauderdale-West Palm Beach (5/9), and Philadelphia-Camden-Wilmington (6/12). We identified similar trends within the 2022 NRMP® Match.

Conclusions: During the 2023 NRMP® Match, nearly 3 in 4 EM residency programs accredited in the last five years and the majority of EM residency programs with a for profit primary clinical site did not fill positions completely. This work provides important foundational data amid recent Match data concerns within the specialty of EM.

No, authors do not have interests to disclose

## 87 Medication Assisted Treatment Program - Addressing Gaps in Linkages to Care

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Background: We examined the social determinants of health (SDOH) of patients entering an emergency department (ED) based Medication for Opioid-Use Disorder (MOUD) program. SDOH and gaps in care may predict which current and future patients will have difficulty remaining in treatment. Identifying these determinants will allow us to design program changes and interventions that will help patients remain in recovery.

Methods: We surveyed patients entering our MOUD program at two hospital-based EDs and two free-standing EDs from January to April 2022. We used trained addiction care coordinators (ACCs) and staff to use a standardized form to interview individual patients about the role of SDOH in their MOUD treatment program. We also conducted focus groups asking the same questions. The goal was to ascertain from our patients their perspective on the program and solicit feedback on social determinants of health and program barriers.

Results: Of the 60 OUD patients induced during our survey period, 19 (37.7%) participated in an individual or Focus Group interview. Sixteen patients (26.7%) completed all survey questions. The mean age was 42 years old, with 94% identified as Caucasian and 65% male. 94% of subjects found the ACCs helpful in providing follow-up care. 13% experienced transportation issues, and 6% had prescription difficulties. The vast majority found the MOUD program beneficial in coping with withdrawal symptoms, dealing with their addiction, and supporting recovery.

Conclusions: The telephone surveys and focus groups confirmed what emergency department clinicians intuitively know: the MOUD program and the work of the ACCs help patients with opioid use disorder recover from their disease. The program can improve by addressing barriers to getting transportation to appointments and prescriptions filled.

No, authors do not have interests to disclose

## 88 Emergency Department Visits Among Opioid Use Disorder Patients

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Objectives: The rate of opioid overdose in the United States continues to grow, with synthetic opioids being involved in majority of overdose deaths. There are over 1,000 emergency department (ED) visits every day from opioid misuse. Previous studies demonstrate consensus among ED physicians regarding the initiation of buprenorphine for opioid use disorder (OUD) treatment. However, there has not been extensive research investigating what contributes to OUD patients' ER utilization. This study sought to examine the impact of demographic and clinical characteristics on ED visits among OUD patients.

Methods: In this retrospective cohort study (n=110,237), patient claims data from September 2017 to March 2022 from IQVIA were analyzed. An index date was assigned for patients with either ≥1 claim for buprenorphine (including extended-release buprenorphine (BUP-XR) and transmucosal buprenorphine (TMBUP) products) or a diagnosis of OUD between March 2018 and September 2021. Three cohorts were created: BUP-XR (n=543), TM-Bup (n=52,569) and no-medication for OUD (MOUD) (n=57,125).

Characteristics for these patient cohorts were collected from a 6-month pre-index period. Inferential statistics and multivariate logistic regression were conducted to identify the predictors of four types of ED visits: any opioid overdose, synthetic opioid overdose, opioid withdrawal/detoxification, and all-cause ED visits in the 6-month post-index period. Regression models were controlled for demographics, comorbidities, geography, cost, opioid overdose, and medication history.

Results: Overall, OUD patients most likely to have an ED visit in post-index period were between 18-34 years (OR:1.16; CI:1.12-1.20), males (OR: 1.08, CI:1.05-1.11) or those who had an opioid overdose in the pre-index period (OR: 1.60; CI:1.43-1.80). OUD patients with asthma (OR: 1.28, CI:1.00-1.63) were more likely to have an opioid overdose ED visit than those without. Patients with chronic pain/fibromyalgia (OR: 3.21, CI:1.01-10.23) were more likely to have an ED visit for synthetic opioids overdose. Lastly, OUD patients with asthma (OR: 1.44, CI:1.35-1.52), chronic pain/fibromyalgia (OR: 1.82, CI:1.57-2.11), dementia/Alzheimer's disease (OR: 1.31, CI:1.12-1.53), epilepsy/seizure disorder (OR:1.56, CI:1.44-1.70), liver/gall bladder/pancreatic disease (OR: 1.23, CI:1.12-1.34), liver cirrhosis (OR: 1.23, CI:1.05-1.44) or schizophrenia (OR: 1.80, CI:1.68-1.94) were more likely to have an all-cause ED visit. None (0%) of the patients in the BUP-XR treatment cohort had an ED visit for an opioid overdose in the post-index period, compared to 629 patients (1.2%) of the TM-Bup cohort and 578 (1%) of the no-MOUD cohort. Patients in the BUP-XR cohort (OR: 0.45, CI:0.37-0.54) and the TM-Bup cohort (OR:0.82, CI:0.80-0.85) were less likely than those in the no-MOUD cohort to have an all-cause ED visit, however, patients in the TM-Bup cohort were more likely to have an opioid withdrawal/detoxification ED visit (OR:1.9, CI:1.7-2.2) compared to no-MOUD cohort.

Conclusions: This study demonstrates that while OUD patients who are male or between 18-34 years are more likely to have ED visits, there are significant risk factors such as history of opioid overdose and comorbidities that potentially play an essential role. Understanding these can accelerate treatment for those at-risk and potentially prevent subsequent acute events.

Yes, authors have interests to disclose
Disclosure: Indivior
Employee
Indivior
Disclosure: IQVIA
Employee
IQVIA

## 89 Use of Psychological Surveys to Predict Retention in Medication-Assisted Treatment Programs

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Objectives: Comorbid psychological health concerns may have an impact on the development of opioid use disorder (OUD) and subsequent treatment. We measured multiple psychological tests in patients with OUD entering a medication-assisted treatment (MAT) program at 4 emergency departments (ED) to ascertain improvements in the identification of OUD and retention in MAT treatment.

Methods: The primary outcome was retention rate in the program at 6 and 12 months. Secondary outcomes were levels of various clinical symptoms (e.g., depression, anxiety), substance use, and quality of life (QoL). Patients entered into an MAT program at 4 EDs over a 12-month period were enrolled. Patients were given surveys to

complete by telemedicine. Surveys included the mHealth App Usability Questionnaire (MAUQ), Difficulties in Emotional Regulation Scale (DERS), Protocol for Responding to and Assessing Patients Assets, Risks and Experiences (PRAPARE) and the Brief Addiction Monitor (BAM-R). The PHQ-8, GAD-7, LEC-5, ACE, and PCL-5 surveys were used to assess depression, anxiety, and traumatic stress. Descriptive statistics were obtained for all demographic, clinical, and other variables (predictors and outcomes) in the measurement plan. A correlation table was generated to examine associations among the variables. The primary outcome was retention in the MAT program at 6 and 12 months.

Results: There was a total of 64 patients who completed any baseline assessments, with 21 completing all assessments. The mean age of the patients was 33 years, ranging from 20 to 62 years old. 65% were male, 35% female. At baseline, patients' surveys indicated moderate symptom severity for both depressive symptoms (PHQ-8) and anxiety (GAD-7). PCL-5 scores showed significant traumatic stress levels. WHO-5 scores were lower than 13 indicating poor general well-being. There was a 47% (n=10) retention in the MAT program at 6 months and a 25% (n=5) retention at 12 months. Both depressive and anxiety symptoms improved at the 1, 3, and 6-month follow-ups indicating an improvement from moderate to mild symptoms. There were marginal improvements in the PTSD symptom score. General well-being improved from 40% at baseline to approximately a score of 14, or 56%, at the 1, 3, and 6-month follow up. PRAPARE14 (average annual income) correlated at .51 with 6-month retention. This suggests that people with relatively more financial means were more likely to remain in treatment at 6 months. LECHappened (# of types of trauma directly experienced by the person) correlated -.41 with 6-month retention. This suggests the more types of trauma someone experienced throughout their life, the less likely the person would remain in treatment at 6 months.

Conclusions: Psychological surveys of OUD patients entering an MAT program can help predict treatment retention. Higher-income and lower PTSD scores had a higher retention rate. Additionally, if MAT treatment is not trauma-informed, there likely will be more difficulty keeping patients with extensive trauma histories retained in treatment.

No, authors do not have interests to disclose

## 90 Addressing Substance Use Disorder to Decrease Hospital Readmissions and Improve Behavioral Health Patient Outcomes

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Background: Substance Use Disorder (SUD) is a medical condition that causes physical and emotional harm to people of all demographics and socioeconomic status (SES). Approximately one million Americans have died from drug overdose since 1999. Overdose from SUD has disastrous financial consequences, costing more than $78.5 billion in 2015 alone.

Objectives: The primary goal was to examine a cohort of emergency department (ED) patients with SUD, and identify related social needs that may be linked to hospital readmissions and Behavioral patients' health outcomes. Secondary objective was to evaluate the process designed to identify gaps in care of this cohort; as well as to examine a transitions-of-care (TOC) model designed to address gaps in care of underserved SUD patients, improve outcomes, select metrics to monitor progress, and identify a sustainability plan.

Methods: Setting: Nine acute care facilities in a large health care network in New Jersey. Population: The program participants were patients 18 yrs and older, seen in the ED and discharged with a diagnosis of SUD and/or serious mental illness (SMI). Races and Ethnicities include: Caucasian, Black or African American, Hispanic or Latino, Asian, and American Indian or Alaskan Native. Study Design: Retrospective data analysis. Program Process: A team of navigators in the Quality Improvement Program - New Jersey (QIP-NJ) screened uninsured and Medicaid recipients with an evidence-based Transition of Care (TOC) model to identify, enroll, and follow patients. Interventions offered included: care coordination (inpatient/outpatient), transportation, medications, and self-monitoring equipment. Patients were seen at the bedside, by TOC care coordinators and received telephonic follow-up calls after discharge, to ensure utilization of services. Statistical considerations: Continuous variables were summarized as median (interquartile range [IQR]) and categorical data were summarized as counts (percentages). Comparison of continuous variables used a two-sided Wilcoxon rank sum test. Comparison of categorical variables used a Chi-square test or Fisher's exact test, as appropriate.

Results: Over 11 months in 2022, among 830 patients seen in the ED, 687 (82.8%) enrolled into the QIP program. Of the 687, portions of Race, Ethnicity and Language, as well as Sexual Orientation and Gender Identity (REaL SOGI) data were statistically significant (Table 1). Most of the ED patients in our QIP cohort were on Medicaid insurance (55.5%). Of the 687 patients, 228 (33.2%) had substance use disorder (SUD). The rate of ED readmission decreased from the 30-day period prior to enrolling into QIP (26.8%) to the 30-day period post-enrolling into QIP (16.6%), which was statistically significant (P<0.0001). 93.0% of QIP participants completed SDOH screening (Table 2). SDOH services that were most provided ranged from transportation (23.0%) to social support (31.6%).

Conclusions: Several challenges were identified including local leadership engagement, establishing patient trust, and managing resources. Building strong relationships with community partners, securing needed resources, and empowering patients, were documented collateral benefits of the TOC model. A focus on trauma-informed care, therapeutic communication, cultural competency, and language congruency appeared to impact patient outcomes.

06:29 Friday, April 21, 2023 1

***Summary of Characteristics of QIP Enrolled ED patients (n=687)***

Table 1. Characteristics and Outcomes of ED Patients Enrolled in QIP, without SUD and with SUD Diagnosis

| | All ED (n=687) | ED with no SUD (n=459) | ED with SUD (n=228) | |
|---|---|---|---|---|
| Variable | Count (%) | Count (%) | Count (%) | P-value |
| Age (years) | | | | **0.0042** |
| Median (IQR) | 38.0 (30.0 – 49.0) | 39.0 (30.0 – 50.0) | 34.0 (29.0 – 45.0) | |
| Minimum – Maximum | 18.0 – 65.0 | (18.0, 65.0) | (18.0,64.0) | |
| Gender | | | | 0.6223 |
| Female | 220 (32.02) | 151(32.90) | 69(30.26) | |
| Male | 463 (67.39) | 306(66.67) | 157(68.86) | |
| Transgender | 4 (0.58) | 2(0.44) | 2(0.88) | |
| Race | | | | |
| American Indian or Alaska | 3 (0.44) | 2(0.44) | 1(0.44) | |
| Asian | 11 (1.60) | 7(1.53) | 4(1.75) | |
| Black or African American | 152 (22.13) | 86(18.74) | 66(28.95) | |
| Caucasian | 259 (37.70) | 176(38.34) | 83(36.40) | |
| Middle Eastern or North African | 12 (1.75) | 10(2.18) | 2(0.88) | |
| Other | 244 (35.52) | 174(37.91) | 70(30.70) | |
| Patient Declined/Unable to Obtain | 6 (0.87) | 4(0.87) | 2(0.88) | |
| Ethnicity | | | | 0.2178 |
| Not Spanish/Hispanic/Latino | 465 (67.69) | 302(65.80) | 163(71.49) | |
| Spanish/Hispanic/Latino | 218 (31.73) | 155(33.77) | 63(27.63) | |
| Patient declined/Unable to obtain | 4 (0.58) | 2(0.44) | 2(0.88) | |
| Insurance Type | | | | **0.0015** |
| Charity Care | 57 (8.30) | 40(8.71) | 17(7.46) | |
| Dual Medicaid/Medicare | 124 (18.05) | 92(20.04) | 32(14.04) | |
| Medicaid | 378 (55.02) | 229(49.89) | 149(65.35) | |
| Uninsured | 128 (18.63) | 98(21.35) | 30(13.16) | |
| ETOH Use Disorder | | | | **<.0001** |
| No | 388 (56.48) | 231(50.33) | 157(68.86) | |
| Yes | 299 (43.52) | 228(49.67) | 71(31.14) | |
| Substance Use Disorder (SUD) | | | | |
| No | 459 (66.81) | 459 (100.00) | -- | -- |
| Yes | 228 (33.19) | -- | 228 (100.00) | |
| Both (*SMI/SUD) | | | | 0.1438 |
| No | 168 (24.45) | 120(26.14) | 48(21.05) | |

06:29 Friday, April 21, 2023

2

***Summary of Characteristics of QIP Enrolled ED patients (n=687)***

| Table 1. Characteristics and Outcomes of ED Patients Enrolled in QIP, without SUD and with SUD Diagnosis | | | | |
|---|---|---|---|---|
| | All ED (n=687) | ED with no SUD (n=459) | ED with SUD (n=228) | |
| Variable | Count (%) | Count (%) | Count (%) | P-value |
| Yes | 519 (75.55) | 339(73.86) | 180(78.95) | |
| Readmission within 30 days (pre) | | | | 0.9904 |
| No | 503 (73.22) | 336(73.20) | 167(73.25) | |
| Yes | 184 (26.78) | 123(26.80) | 61(26.75) | |
| Readmission within 30 days (post) | | | | 0.8559 |
| No | 573 (83.41) | 382(83.22) | 191(83.77) | |
| Yes | 114 (16.59) | 77(16.78) | 37(16.23) | |
| Meds to Beds | | | | 0.4555 |
| No | 628 (91.41) | 417(90.85) | 211(92.54) | |
| Yes | 59 (8.59) | 42(9.15) | 17(7.46) | |
| Quit Center Referral | | | | **0.0002** |
| No | 166 (24.16) | 97(21.13) | 69(30.26) | |
| Non-smoker | 264 (38.43) | 202(44.01) | 62(27.19) | |
| Refused | 125 (18.20) | 74(16.12) | 51(22.37) | |
| Yes | 132 (19.21) | 86(18.74) | 46(20.18) | |
| *SMI: Serious Mental Illness | | | | |

06:29 Friday, April 21, 2023

3

***Summary of Characteristics of QIP Enrolled ED patients (n=687)***

| Table 2. Summary of Social Determinants of Health (SDOH) in ED patients in QIP, without SUD and with SUD Diagnosis | | | | |
|---|---|---|---|---|
| | All ED (n=687) | ED with no SUD (n=459) | ED with SUD (n=228) | |
| Variable | Count (%) | Count (%) | Count (%) | P-value |
| SDOH Screening | | | | 0.0537 |
| Completed | 639 (93.01) | 433(94.34) | 206(90.35) | |
| Not Completed | 48 (6.99) | 26(5.66) | 22(9.65) | |
| Housing | | | | **0.0096** |
| No | 512 (74.53) | 356(77.56) | 156(68.42) | |
| Yes | 175 (25.47) | 103(22.44) | 72(31.58) | |
| Food Insecurity | | | | 0.5952 |
| No | 494 (71.91) | 333(72.55) | 161(70.61) | |
| Yes | 193 (28.09) | 126(27.45) | 67(29.39) | |
| Transportation | | | | 0.1648 |
| No | 528 (76.86) | 360(78.43) | 168(73.68) | |
| Yes | 159 (23.14) | 99(21.57) | 60(26.32) | |
| Social Support | | | | 0.2213 |
| No | 470 (68.41) | 307(66.88) | 163(71.49) | |
| Yes | 217 (31.59) | 152(33.12) | 65(28.51) | |
| ETOH Recovery | | | | **0.0141** |
| No | 656 (95.49) | 432(94.12) | 224(98.25) | |
| Yes | 31 (4.51) | 27(5.88) | 4(1.75) | |
| Mental Health Services | | | | 0.6764 |
| No | 539 (78.46) | 358(78.00) | 181(79.39) | |
| Yes | 148 (21.54) | 101(22.00) | 47(20.61) | |
| Primary Care | | | | 0.5189 |
| No | 668 (97.23) | 445(96.95) | 223(97.81) | |
| Yes | 19 (2.77) | 14(3.05) | 5(2.19) | |
| Smoking Cessation | | | | 0.6226 |
| No | 649 (94.47) | 435(94.77) | 214(93.86) | |
| Yes | 38 (5.53) | 24(5.23) | 14(6.14) | |
| Substance Use Disorder (SUD) | | | | **<.0001** |
| No | 564 (82.10) | 401(87.36) | 163(71.49) | |
| Yes | 123 (17.90) | 58(12.64) | 65(28.51) | |
| | | | | |

No, authors do not have interests to disclose

## 91 Bridging to Better Substance Use Treatment: Implementation and Effectiveness of Statewide Emergency Department Opioid Use Disorder Treatment Programs in California

Samuels E, Rosen A, Kaleekal J, Speener M, Campbell A, Moulin A, Herring A/UCLA, Los Angeles, California, US

Background: Since 2019, CA Bridge has transformed emergency department (ED) opioid use disorder (OUD) treatment in California by providing coaching, resources, and technical assistance to California hospitals to implement low-threshold OUD care, including ED-initiated medication for opioid use disorder (MOUD), patient navigation, and take-home naloxone. After starting with an initial cohort of 52 hospitals, CA Bridge has worked with 278 hospitals across diverse practice settings to provide evidence-based addiction treatment and linkage to outpatient care.

Objective: Evaluate implementation and effectiveness of CA Bridge programs across 278 California hospitals.

Methods: We used retrospective programmatic data and a RE-AIM framework to examine the reach, effectiveness, adoption, and implementation of ED-initiated buprenorphine and substance use navigators (SUNs) at California hospitals participating in CA Bridge from April 2019 to February 2023. Data was evaluated descriptively in aggregate as proportions and counts. The number of patients seen by SUNs and administered and/or prescribed buprenorphine was calculated for each hospital at baseline and for the month with the highest reported value.

Results: From April 2019 to February 2023, 84.5% of California hospitals (278/329) received technical assistance to implement ED buprenorphine and SUN programs in rural, urban, academic, and community EDs. Of these, 90.3% (251/278) fully adopted and implemented the CA Bridge model: hiring SUNs, offering low-threshold MOUD in the ED, and dispensing naloxone. At 251 sites who fully implemented the CA Bridge model, SUNs were consulted during 234,446 ED visits for ED patients with a substance use-related visit. Among 183,304 encounters with patients with OUD, buprenorphine was administered and/or prescribed in 41.9% (76,800/183,304) of encounters. After implementation, the monthly average number of patients seen by SUNs at a participating EDs increased from 14 (95% CI: 5-24) to 102 (63-141), and the monthly average number of patients administered and/or prescribed buprenorphine increased from 5 (95% CI: 3-6) to 32 (95%CI: 24-40).

Conclusions: The CA Bridge model is a scalable intervention across diverse settings which can successfully identify patients with OUD and increase provision of MOUD and linkage to outpatient care using SUNs. Future work is needed to identify and evaluate implementation strategies to implement and disseminate this model in other states as part of a national strategy to improve treatment access and address the overdose crisis.

No, authors do not have interests to disclose

## 92 How Much Is Treatment? Healthcare Utilization Cost for Patients With Opioid Use Disorder

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Background: Rates of overdose-related deaths increased approximately 30% over the last 2 years. The volume of patients struggling with Opioid Use Disorder (OUD) has far-reaching implications for public health and the need to provide treatment for these patients has never been more important. However, access to treatment is not without barriers. Costs associated with Medication Assisted Treatment (MAT) for under and unemployed patients on public insurance have not demonstrated large returns on investment for health care systems. The purpose of our study was to conduct a financial analysis to determine the expense and sustainability of an emergency department (ED)-based MAT program.

Methods: This was a retrospective cohort study comparing two groups of OUD patients who entered through an ED-based MAT program administered at two urban EDs over a 3-year period. Cohort One was a control group of patients who had an OUD diagnosis and Cohort Two was a treatment group of patients who had an OUD diagnosis and were engaged in the ED-based MAT program. Administrative claims data were obtained using the patient's medical record number (MRN) and stratified by year (2018 – 2020). Costs of care were limited to direct departmental costs: personnel, benefits, costs of implants, medications, and supplies. Direct costs of care were netted against modeled net revenue to arrive at net revenue per MRN and per study cohort. Means (average of total encounters) were calculated for modeled net revenue, calculated direct cost of care, and calculated net revenue for both cases and controls for all reporting years at SH-AC and SH-BH.

Results: There were a total of 3,131 patients with OUD who received MAT. The control group consisted of 9,620 patients with an OUD diagnosis and were not treated through the MAT program. The average number of ED encounters per patient for the treatment group was 1.2 (95%CI: 1.27-1.37) compared to the

control group which was 1.8 (95% CI: 1.75-1.85) ($p<0.05$). Within the treatment group, the average revenue per encounter was $970 and the average cost per encounter was $493. Comparatively, the average revenue per encounter for the control group was $782 and the average cost per encounter was $414. Overall, the MAT program increased net revenue per OUD encounter by $109.

Conclusions: Although patients who received MAT in an ED setting accrued higher costs than the control group, there was higher revenue generated in the MAT group. ED encounters also decrease in the MAT group.

No, authors do not have interests to disclose

## 93 Novel Monitoring Dashboard for Patients Presenting to the Emergency Department With Chest Pain

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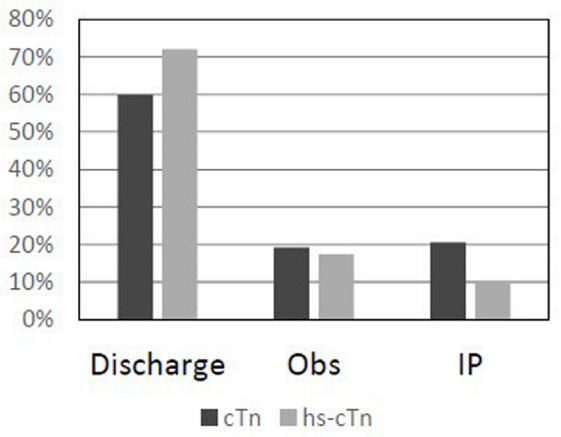
Objectives: More than eight million patients present to the emergency department (ED) each year with chest pain. Chest pain is responsible for 1 in 5 ED admissions to the hospital. It is estimated that only 1 in 20 patients who present to the ED with chest pain will have an acute life-threatening condition. Monitoring the outcome of patients with chest pain is a valuable quality assessment process. We set out to create an electronic tool that tracked the 90-day outcomes of all patients who presented to the ED with chest pain and no ST segment elevation on their electrocardiogram (ECG).

Methods: A six hospital network in PA constructed a multi-disciplinary team of stakeholders for this quality improvement project. A novel electronic "Chest Pain Dashboard" was created to capture all patients meeting the following inclusion criteria: chief complaint of chest pain documented by triage, ≥18 years of age, an ECG with no ST segment elevation, and at least one troponin measurement. Major adverse cardiovascular events (MACE) and the incidence of coronary artery revascularization procures (PCI or CABG) occurring during 90-day follow-up were identified. MACE included non-ST elevated Myocardial Infarctions (NSTEMI), ST elevated myocardial infarctions (STEMI), and all cause death. The incidence of all cause readmissions within 90 days was also captured. The dashboard used Structured Query Language to search the Epic Clarity database. After an encounter meeting the inclusion criteria was identified, it searched for MACE, coronary procedures and readmissions. Manual chart review and adjudication was performed on a subset of patients to confirm the dashboard was accurately capturing outcome data. The dashboard was reviewed frequently allowing users the ability to obtain data for quality and process improvement.

Results: The developed Chest Pain Dashboard provided rapid identification of patients and accurately identified MACE and other events. One year after implementation of the dashboard, 26,615 patients and their outcomes were captured in eight minutes and thirteen seconds in a query. The dashboard provided graphical representations of the data including the option to filter data based upon demographic information, ED disposition and time variables. As an example, it was used to extract data from one year before and after the network transitioned from Cardiac Troponin (cTn) to High-Sensitivity Cardiac Troponin (hs-cTn) as seen in Figure 1.

Conclusions: The novel Chest Pain Dashboard allowed for a time saving approach to assessing the outcomes of chest pain patients. Quick access and flexible formatting of information has the potential to improve the care process in a large group of patients. The data can be used for performance improvement and research.

**Figure 1:** Disposition with cTn and hs-cTn




Disposition is shown for the year before and after the network switched from Cardiac Troponin (cTn) to High-Sensitivity Cardiac Troponin(hs-cTn).

No, authors do not have interests to disclose

## 94 Save the Brain: A Door-To-Needle Time Multi-Modal Initiative at a Suburban Stroke Center

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Objectives: The aim of this project was to reduce Door-To-Needle (DTN) time to from 65minutes to 45 minutes in 75% or more of acute ischemic stroke patients treated with IV thrombolytics, aligning with the American Heart Association (AHA) and American Stroke Association (ASA) target.

Methods: This initiative was conducted at a suburban stroke-center-designated hospital with an Emergency Department (ED) that sees ~47,000 patients annually. The study population included patients with acute ischemic stroke where tenectaplase (TNK) was administered.

A 6-month observation period identified door-to-CT image (DTI) time contributed most to DTN delays. During the pre-imaging time, a patient is promptly registered, initial evaluation and venous access are conducted in a stabilization bay, and the patient is then transported to radiology.

Nursing and physician assessment practices varied in the pre-image period. Physicians conducted either full or partial stroke assessments. Some nurses placed one or two IVs with multiple attempts delaying care. EMS stretchers and monitors were sometimes utilized by nursing staff for transportation to the imaging room. In addition to these variable practices, a physician order was required to initiate a stroke order which was found to bottleneck imaging in some instances.

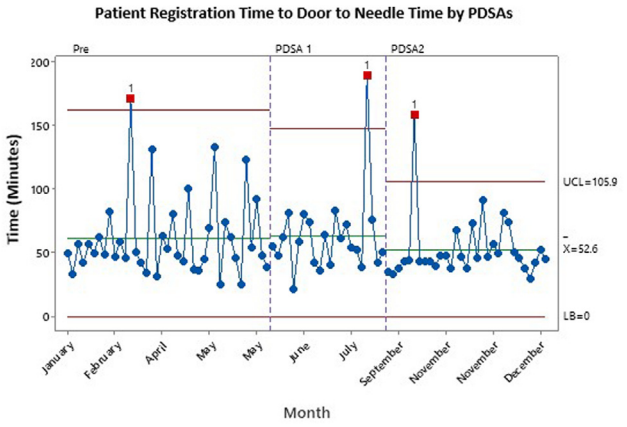
Interventions included the AHA and ASA recommendations for EMS prenotification and direct-to-CT protocol in PDSA cycle one. CT technicians would now be notified of possible strokes from the prehospital setting to ensure staff and scanner availability. Work roles were then standardized in PDSA cycle two. RNs were instructed to initiate the stroke order set if patients met BE FAST stoke criteria and were under 4.5 hours since last known well. They were also instructed to insert one peripheral intravenous line and keep patients on the EMS cart and monitors for CT transfer. Physicians were instructed to perform an airway, breathing, and circulation assessment and a brief neuro exam before imaging.

The baseline period occurred between January 1 to December 31, 2021. PDSA cycles one and two occurred between May and August 15 and August 16 to December 2022, respectively. High rates of boarding of ED patients and RN staffing shortages were unanticipated barriers during the study period. The primary outcome measure was the mean DTN time, defined as the sum of time from the time of patient registration to the time of TNK administration over the total amount of patients. The

process measure was mean DNI time, defined as the sum of time from the time of patient registration to the time of image initiation over the total amount of patients.

Results: 78 patients were analyzed in 2021 and 36 in the cycle two period. Mean DTN time decreased from 65 minutes at baseline to 53 minutes during cycle two, with a reduction in an upper control limit from 162 minutes to 106 minutes. DTN time variation decreased with a difference of differences of -4.87 between baseline and cycle two. Mean DTI time decreased from 33.2 minutes at baseline to 28.3 minutes during cycle two.

Conclusions: This multimodal intervention lead to a significant decrease in the average and variation DTN time through physician and nursing work standardization, pre-hospital notification, and a straight-to-CT initiative. Future initiatives include weight-board implementation, shifting CT order responsibilities, and standardization and education to EMS partners to allow prehospital.




No, authors do not have interests to disclose

## 95 Driving Quality Improvement Into the 21st Century: Creating a Quality Improvement Database (QID)

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Objectives: Data driven quality improvement (QI) research in emergency medicine is essential to better characterize diagnostic error rates, management delays or omissions, procedural complications, and safety events that compromise patient safety. Our team developed an EHR supported QI database (QID) for 3 emergency departments in our health system to identify a comprehensive list of cases for peer-review and to serve as a centralized repository for QI data and research across a multi-site ED practice. We report on the results for the year 2022 and characterize the scope of ED safety including diagnostic errors, misdiagnosis-related harms, procedural complications, and safety events in emergency departments (EDs).

Methods: This observational analysis utilized a QI database created using Research Electronic Data Capture (REDCap), a web-based application that allows for data capture for designing databases. Reports generated with pre-set parameters from EHRs (I.e., 72-hour returns, ED mortalities, ED Procedures, etc.) are uploaded into the database daily. Data from other reporting sources (i.e, patient complaints, MD referrals, etc.) are manually entered into database. The uploaded data is pre-screened for quality gaps by members of the peer review team and high-yield cases are referred to the Department's Continuous Quality Improvement Committee (CQIC). CQIC members meet bi-monthly to discuss and to score the curated cases based on an institutionally developed peer review rubric. Data analytics are then performed to assess the scale and scope of quality issues across the various departments.

Results: In 2022, 106 cases were entered into QID and scored by CQIC. Of the scored cases, 38.2% of cases did not have a quality gap, 33.3% of them had a missed diagnosis with 6.9% of cases scored as a delay in diagnosis. 13.8% of cases had issues with medical management. With regards to patient safety harm, 49 cases were precursor to safety events while 4 were scored as near miss safety events. 55 of 106 cases were scored as having associated harm with 2 cases considered serious safety events that necessitated reporting to the hospital safety committee and potentially to regulatory agencies.

Conclusions: There are a myriad of potential harms in the ED and this abstract sought to characterize harm using a structured database for case identification and a standard rubric for case review and scoring. Data from 2022 have shown us that though serious safety events are rare, diagnostic harms warrant further study.

No, authors do not have interests to disclose

## 96 Review of Intensive Care Unit Upgrades Within 24 Hours of Admission: A Quality Assurance Initiative

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Objectives: Patients admitted to a non-intensive care unit (ICU) and subsequently upgraded to an ICU within 24 hours of admission puts the patient, staff, and system at risk. An interdisciplinary review committee formed to systematically review these cases on a monthly basis. The committee aims to standardize the evaluation, minimize the burden of the review process, and develop structural tools to monitor emergency department (ED) performance and support hospital operations.

Methods: Each month, every upgrade admitted from one academic tertiary emergency department is identified, individually reviewed, coded through a standardized tool, and presented and discussed at the review committee meeting. The reason for upgrade (i.e. progression of disease, potentially preventable), primary diagnosis related to decompensation (i.e. sepsis, cardiogenic shock), and subsequent interventions required (i.e. invasive ventilation, vasopressors) are identified. The committee assigns a 'standard of care determination' and if not met, whether the gap or deviation in care was related to a systems and/or provider concern. Coded results of all monthly ICU upgrade cases are collated in a database to inform future quality improvement efforts.

Results: To date, the committee has reviewed 53 cases, with a median of 9 per month (0.8% of total ED admissions). Of the 30 (56.6%) cases of disease progression upgrades, 9 were due to respiratory failure, 6 to cardiogenic shock and 4 to sepsis. Of the 13 (24.5%) cases of potentially preventable upgrades, 3 were cases of sepsis, 2 of cardiogenic shock and 1 of respiratory failure.

Conclusion: This is a high yield quality assurance exercise with near 1 in 4 cases having a potential opportunity for improvement or education on the system and/or provider level. The development of this robust QI process could greatly contribute to innovative interventions to improve patient care during the transition from a patient's care in the ED to the ICU setting. This data has been used in ongoing and will continue to be to inform quality improvement efforts for critically ill patients in the emergency department.

No, authors do not have interests to disclose

## 97 Do Observation Unit Admissions for Patients With Renal Colic Help Prevent Return Visits to the Emergency Department

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Objectives: Renal colic is an increasingly common emergency department (ED) complaint affecting nearly 1 in 11 people in the United States. While some patients require admission for surgical treatment or further management, many patients can be safely discharged home with return precautions as long as they do not meet criteria for admission and their pain is adequately controlled. As such, return visits for renal colic are still possible and may reflect a worsening of the pathology or exacerbation of pain. We hypothesized that monitoring patients in an ED observation unit would reduce rates of return visits, as a longer initial treatment interval would potentially prevent a premature discharge.

Methods: This is a retrospective chart review of patients who presented to the ED and were diagnosed with renal colic during their encounter. Adult patients 21 years of age and older were identified from the electronic medical record based on chief complaint and ED diagnoses. Patients were excluded if they were admitted to the hospital during their index visit. During this study period, the ED operated an observation unit, and patients deemed appropriate for the observation unit were at the discretion of the treating ED physician in conjunction with the observation unit team. Patients meeting inclusion criteria for the study were divided into two groups: discharged from the ED or placed into observation. We then reviewed the electronic medical record to identify 30-day return visits for issues related to the kidney stone. Our primary outcome of interest was the rate of 30-day return visits, specifically looking to compare return visit rates in the observation group versus the ED treat and release group. Comparisons were made by calculating a difference in proportion with associated 95% confidence intervals. All other data presented are descriptive in nature.

Results: We identified 2215 patients that met inclusion criteria for the study. At this time, we have reviewed the charts of 236 patients. This abstract represents preliminary data with a full dataset to be complete at the time of presentation. Among the cohort described thus far, the median age is 47 (range 21-86) and 142 (62%) are male. A history of prior kidney stone was reported in 99 (43%) patients. There were 224 (94%) patients in the ED treat and release group and 12 (5%) in the ED observation group. The overall 30-day return visit rate was 28 (12%). The median number of days until the return visit was 2. The 30-day return visit rate in the ED treat and release group was 26/244 (12%, 95% CI 7-16%), and in the ED observation group was 2/12 = 17% (95% CI 1-37%). The difference in return visit rates was 5% (95% CI -26 to 16%).

Conclusions: In this preliminary data we report a rate of 30-day return visits of 12% overall, and rates among the ED discharge group and ED observation group are similar. With additional power, we will identify whether or not there is a significant difference among return visit rates among these two cohorts. These data may potentially inform on the benefit of observation care for ED patients with renal colic.

No, authors do not have interests to disclose

## 98 An Effective Method of Reducing Patient Left Without Being Seen Rates

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Objectives: The COVID pandemic created an unprecedented strain on emergency departments (ED) across the United States. This strain was caused by many issues, including significant nursing shortages, increased inpatient boarders within the ED, extended inpatient hospital admission times, etc. Under these circumstances, a substantial increase in left without being seen (LWBS) was noted on a national level. We sought to implement a novel approach to address high patient LWBS rates: the Patient Assessed Waiting Room (PAWR). The PAWR is a dedicated space large enough for a patient exam and lab draw. It can be a single space, a semiprivate space (similar to a patient hallway evaluation), or even a larger shared area with room dividers. The area was assigned a dedicated nurse and an ED technician for blood draws. There was no dedicated physician assigned to the PAWR. Physicians and physician assistants (PAs) in our EDs were strongly encouraged to use the PAWR to assess patients in the waiting room if wait times were anticipated to be greater than 60 minutes from patient's arrival.

Methods: This retrospective quality assurance review analyzed data six months pre- and post-implementation of the PAWR in five EDs within three cities in eastern Virginia. ED annual volumes ranged from 45,164 to 85,277. The total number of ED patient encounters, LWBS rate, and ED arrival to provider time were reviewed pre and post PAWR implementation.

Results: A total of 334,945 ED visits were reviewed (171,470 pre-PAWR and 163,745 post-PAWR) between 03/21/21 and 03/20/22. LWBS rates were found to be 5.02% pre-PAWR (8614) and 2.44% post-PAWR (3994). The post-PAWR LWBS was statistically significant ($P<0.001$; 95% CI 2.45% to 2.70%). There was an eight percent increase in patients seen by a provider in less than 29 minutes from ED arrival post-PAWR implementation (68,738 versus 58,231) ($P<0.001$; 95% CI 7.69% to 8.35%).

Conclusions: Decreasing ED patient wait times to see a provider is vital to lowering LWBS rates and has the potential to save lives as well as minimize lost revenue. Our data shows that implementation of a PAWR is an effective tool in significantly decreasing the LWBS rate and increasing the number of patients seen by an ED provider within the first 30 minutes of presentation.

No, authors do not have interests to disclose

## EMF 99 A Retrospective Study of a Novel Prediction Tool for Assessing Those at Risk for Firearm Violence

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Background: Our current hospital violence intervention program (HVIP) screening process is a novel tool implemented early in the trauma care process to facilitate additional supports and resources to victims of street violence. This work will have an important positive impact because it forms the foundation for improvement of the future prediction of such victims.

Objectives: The study objectives of this research include a comprehensive assessment of the use and validity of the street violence screening tool utilized in the emergency department (ED) for Violence Education Prevention Outreach Program (VEPOP) and development and administration of a survey of all ED staff regarding their use and barriers to utilization of the VEPOP screening tool.

Methods: A retrospective electronic medical record (EMR) chart review of all patient visits at a Level 1 Adult Trauma and Level 1 Pediatric Trauma ED was conducted from January 1, 2018 to January 31, 2022. A comprehensive assessment of the current use and validity of the street violence screening tool in the EDs was conducted. A survey to all staff at our institution who care for gun violence victims was conducted to ascertain their knowledge and perceptions of street violence screening in the ED, barriers to use of the screening tool, and their knowledge of firearm violence prevention. The educated and surveyed staff included ED nurses, ED physicians, ED residents, Surgery attendings, Surgery residents, Neurosurgery residents, Internal Medicine residents, Pediatric residents, and Family Medicine residents.

Results: A total of N=96,093 unique injury-related patient visits were identified during the 4-year period. 14,226 visits met the criteria for eligibility to be screened for street violence, for which 8,994 visits were screened, of which 1,658 were screened positive. Patients who were screened for street violence were more likely to be male (59.1% vs. 52.6%,), have leveled trauma activation, and have a firearm, stabbing, or blunt object related assault. The specificity of the VEPOP screening question was relatively high (89.4%), only approximately 47% of patient visits related to street violence were identified as such (Sensitivity=46.7%). More than half of the patient visits were classified as highly urgent. 16% of patient visits had prior gun violence injuries. 2.3% of firearm-related injury patients left against medical advice. 54.8% of those who were aware of VEPOP were not aware of the screening question, and 51.3% of those aware of the screening question were unaware of the VEPOP program. This demonstrates an opportunity to re-educate and establish the link between the screening question and the violence prevention and outreach program.

Conclusions: Hospital-based violence intervention programs (HVIPs) are aimed at addressing violence retaliation and recidivism. Our data shows that awareness and utilization could be improved. Our program could capitalize on teachable moments and reduce firearm violence. Our current HVIP is commendable. Our staff are dedicated and are aware of the importance of the screening. Our study sensitivity reiterates the need for re-education. It is vitally important to continually assess and reassess how HVIP is serving the community and how it is utilizing the tool. Our data shows that with the HVIP in place, violence prevention requires multiple hospital and community supports and education to be effective.

Table 1. Comparison of demographic and clinical characteristics of patient visits eligible for street violence screening (N=14,226) by screening status.

| Characteristic | Screened for Street Violence (N=8,994) | | Not Screened for Street Violence (N=5,232) | | |
|---|---|---|---|---|---|
| | N | % | N | % | P-Value |
| **Age in Years** | | | | | |
| < 10 | 261 | 2.9 | 440 | 8.4 | <0.0001 |
| 10-19 | 896 | 10.0 | 976 | 18.7 | |
| 20-29 | 1975 | 22.0 | 801 | 15.3 | |
| 30-39 | 1644 | 18.3 | 697 | 13.3 | |
| 40-49 | 1046 | 11.6 | 490 | 9.4 | |
| 50-59 | 1165 | 13.0 | 551 | 10.5 | |
| ≥ 60 | 2007 | 22.3 | 1277 | 24.4 | |
| **Gender** | | | | | |
| Male | 5314 | 59.1 | 2754 | 52.6 | <0.0001 |
| Female | 3680 | 40.9 | 2478 | 47.4 | |
| **Race** | | | | | |
| Black | 2788 | 31.0 | 1545 | 29.5 | 0.2364 |
| White | 5242 | 58.3 | 3140 | 60.0 | |
| Other | 839 | 9.3 | 476 | 9.1 | |
| Not Available | 125 | 1.4 | 71 | 1.4 | |
| **Ethnicity** | | | | | |
| Hispanic | 603 | 6.7 | 312 | 6.0 | 0.0647 |
| Not Hispanic | 8323 | 92.5 | 4867 | 93.0 | |
| Not Available | 68 | 0.8 | 53 | 1.0 | |
| **Primary Payor/Insurance** | | | | | |
| Private | 1505 | 16.7 | 997 | 19.1 | 0.0012 |
| Medicaid/Medicare | 6714 | 74.7 | 3831 | 73.2 | |
| Self-Pay | 462 | 5.1 | 225 | 4.3 | |
| Other | 313 | 3.5 | 179 | 3.4 | |
| **Emergency Severity Index** | | | | | |
| 1 (Most Urgent) | 367 | 4.1 | 269 | 5.3 | <0.0001 |
| 2 | 2906 | 32.4 | 1703 | 33.3 | |
| 3 | 4429 | 49.4 | 2267 | 44.3 | |
| 4 | 1190 | 13.3 | 829 | 16.2 | |
| 5 (Least Urgent) | 81 | 0.9 | 54 | 1.1 | |
| **Trauma Activation** | | | | | |
| Level I | 360 | 42.8 | 142 | 35.3 | 0.0003 |
| Level II | 108 | 12.8 | 34 | 8.5 | |
| Unleveled | 374 | 44.4 | 226 | 56.2 | |
| **Type of Assault** | | | | | |
| Firearm | 410 | 4.6 | 151 | 2.9 | <0.0001 |
| Stabbing | 827 | 9.3 | 348 | 6.7 | |
| Blunt Object | 414 | 4.6 | 151 | 2.9 | |
| Other Assault | 7290 | 81.5 | 4538 | 87.5 | |

Table 2. Demographic and clinical characteristics of firearm-related injury patient visits.

| Characteristic | Firearm Visits (N=705) | |
|---|---|---|
| | N | % |
| **Age in Years** | | |
| < 10 | 11 | 1.6 |
| 10-19 | 148 | 21.0 |
| 20-29 | 265 | 37.6 |
| 30-39 | 145 | 20.6 |
| 40-49 | 71 | 10.1 |
| 50-59 | 33 | 4.7 |
| ≥ 60 | 32 | 4.5 |
| **Gender** | | |
| Male | 603 | 85.5 |
| Female | 102 | 14.5 |
| **Race** | | |
| Black | 435 | 61.7 |
| White | 183 | 26.0 |
| Other | 79 | 11.2 |
| Not Available | 8 | 1.1 |
| **Ethnicity** | | |
| Hispanic | 65 | 9.2 |
| Not Hispanic | 624 | 88.5 |
| Not Available | 16 | 2.3 |
| **Primary Payor/Insurance** | | |
| Private | 96 | 13.6 |
| Medicaid/Medicare | 525 | 74.5 |
| Self-Pay | 71 | 10.1 |
| Other | 13 | 1.8 |
| **Emergency Severity Index** | | |
| 1 (Most Urgent) | 210 | 29.8 |
| 2 | 268 | 38.0 |
| 3 | 163 | 23.1 |
| 4 | 39 | 5.5 |
| 5 (Least Urgent) | 3 | 0.4 |
| Missing | 22 | 3.1 |
| **Trauma Activation** | | |
| Level I | 199 | 28.2 |
| Level II | 32 | 4.5 |
| Unleveled | 167 | 23.7 |
| Missing | 307 | 43.6 |
| **Discharged To** | | |
| Home | 594 | 84.3 |
| Another Facility | 39 | 5.5 |
| Expired | 54 | 7.7 |
| Left Against Medical Advice | 16 | 2.3 |
| Unknown | 2 | 0.3 |

Table 3. Circumstances of firearm injury patient visits.

| Characteristic | Firearm Visits (N=705) | |
|---|---|---|
| | N | % |
| **Year** | | |
| 2018 | 155 | 22.0 |
| 2019 | 148 | 21.0 |
| 2020 | 200 | 28.4 |
| 2021 | 188 | 26.7 |
| 2022* | 14 | 2.0 |
| **Season** | | |
| Spring | 146 | 20.7 |
| Summer | 232 | 32.9 |
| Fall | 166 | 23.6 |
| Winter | 161 | 22.8 |
| **Intent** | | |
| Assault | 418 | 59.3 |
| Self-harm | 26 | 3.7 |
| Unintentional | 238 | 33.8 |
| Undetermined | 16 | 2.3 |
| Legal Intervention | 7 | 1.0 |
| **VEPOP Screening Question** | | |
| Yes | 306 | 43.4 |
| No | 191 | 27.1 |
| Missing | 208 | 29.5 |
| **Type of Firearm** | | |
| Handgun | 98 | 13.9 |
| Rifle | 20 | 2.8 |
| Shotgun | 13 | 1.8 |
| Other | 64 | 9.1 |
| Not Available | 510 | 72.3 |
| **Location of Incident** | | |
| Residence | 145 | 20.6 |
| Business | 28 | 4.0 |
| Outdoor Common-space | 200 | 28.4 |
| Car | 38 | 5.4 |
| Wilderness | 9 | 1.3 |
| Other | 17 | 2.4 |
| Not Available | 268 | 38.0 |
| **Relationship of Victim/Suspect** | | |
| Domestic | 26 | 3.7 |
| Acquaintance | 33 | 4.7 |
| Self | 72 | 10.2 |
| Police | 7 | 1.0 |
| None | 80 | 11.4 |
| Not Available | 487 | 69.1 |
| **Circumstances of Incident** | | |
| Gang/Drive-by/Drug-related | 42 | 6.0 |
| Not Gang/Drive-by/Drug-related | 663 | 94.0 |
| **History of Gun Violence Injury** | | |
| Yes | 113 | 16.0 |
| No | 532 | 75.5 |
| Not Available | 60 | 8.5 |

*The year 2022 only includes visits for the month of January.

No, authors do not have interests to disclose

## 100 First Responder Experiences With a Novel Leave-Behind Naloxone Program: Results of a Pilot Qualitative Survey

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Objectives: Opioid overdoses are the leading cause of injury-related death in the US. Naloxone is a critical harm reduction tool to reduce opioid overdose-related mortality, but its access remains variable. Novel Leave Behind Naloxone (LBN) programs are a feasible strategy for first responders (FRs) to provide naloxone kits and training at the scene of an opioid overdose to patients and bystanders. Previous studies have assessed FRs' attitudes toward LBN programs prior to their implementation, but no literature describes FRs' direct experiences with such programs. The objective of this study was to describe FRs' experiences with LBN protocols, including facilitating factors and barriers to naloxone distribution and training, as well as interest in related education.

Methods: An online survey was distributed to FRs at 10 EMS agencies with recently implemented LBN protocols in southeast Michigan. The survey was developed using the Consolidated Framework for Implementation Research and included free-text and multiple-choice questions (MCQs). It was piloted by 2 board-certified EMS physicians and revised as needed for clarity. Participants were not compensated. IRB approval was obtained. An inductive coding approach was used to analyze qualitative data. Four reviewers independently reviewed the responses to identify codes and common patterns. A fifth reviewer reconciled discrepancies. Summary statistics were used to analyze demographic and MCQ data.

Results: The survey was distributed via email to 708 FRs. Of the 56 respondents, 70% identified as male, the median age was 35.5, the median work years was 10 (IQR 5-24), and 73% were trained in Advanced Life Support. Thirty-seven (73%) correctly described why LBN was implemented and 42 (79%) received related training. Only twelve (23%) had distributed an LBN kit. Facilitating factors included easily available kits, patients requesting a kit, and someone available to leave the kit with. Patient-related barriers included kit refusal, concern for legal consequences, and medical acuity. Provider-related barriers included forgetting, not knowing kits were available, and not having someone to leave a kit with. Respondents expressed interest in learning more about addiction (46%), harm reduction (48%), and the health needs of people who use drugs (PWUD) (40%).

Conclusions: This qualitative pilot study found a strong understanding of the LBN program among surveyed FRs. However, few respondents had actually distributed a kit. Several modifiable barriers, such as forgetting to leave a kit and not knowing kits were available, were cited. Almost half of respondents expressed interest in learning more about addiction and harm reduction. Though the survey response rate was low, likely due to many FRs' part-time and volunteer employment, we present novel data with signals to suggest multiple avenues for future study. Interventions to increase kit distribution could include reminders to leave a kit, possibly through documentation system alerts, and continuing education for FRs on harm reduction strategies. Future research directions may also include assessing the acceptability of receiving an LBN kit and training from FRs among PWUD.

**Table 1.** Facilitating factors and barriers to distributing leave-behind naloxone kits.

| | Topic | Representative quote |
|---|---|---|
| **Facilitator** | Kit easily available | "Kits are prepackaged...instructions in pamphlet form." |
| | Patient or family requested kit | "Kits are readily available and most people want one left with them." |
| | Someone was available to leave kit with | "The scene was calm and safe and the friend was well-versed on how to use Narcan." |
| **Barrier** | | |
| Provider-related | Forgetting to leave kit | "Out of sight out of mind ordeal." |
| | Not knowing kits were available | "Did not know it was an option." |
| | Not having someone to leave kit with | "No one was home...to leave naloxone behind." |
| Patient-related | Refusing kit | "The main roadblock is just getting people to accept it. There's a surprising amount of resistance from patients..but also from their family members and partners at times." |
| | Concern for legal consequences | "Accepting Narcan in front of people in uniform is a tacit admission of wrongdoing and will result in legal consequences." |
| | Medical acuity | "The patient was in critical condition, there was not enough time to provide a leave behind kit to family and explain how to use it." |

No, authors do not have interests to disclose

## 101 Implementation of a Pneumococcal Vaccination Process in the Emergency Department: A Multi-Disciplinary, Patient-Centric Approach

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Objectives: To implement a multi-disciplinary screening and administration process for pneumococcal vaccines within our large, urban academic emergency department (ED) to improve vaccination rates and develop a strategy for larger-scale public health initiatives.

Methods: We designed a screening process for patients presenting to the ED. Patients age 65 or older or ages 19-64 with immunocompromised conditions or chronic health conditions as specified by the CDC were eligible for screening. All ED staff (patient care technicians, nurses, providers, pharmacists) could screen patients using a paper form. Once screened, patients were offered a pneumococcal vaccination during their ED visit. The patient's provider was notified of the patient's interest in vaccination and would discuss this further with the patient as appropriate based on the patient's clinical condition and review of the patient's vaccination history. If the patient agreed, the patient was then vaccinated. Screening responses and vaccine administration were recorded on a bi-weekly basis. Results from 2/2023 through 4/2023 have been compiled.

Results: For around 260 patients screened by the multi-disciplinary team, 48% declined the vaccine, 35% would like at this visit, and 17% already had the vaccine. 88 vaccines have been given to date compared to a total of 27 documented vaccine administrations in the 10 months prior to screening implementation.

Conclusions: Vaccination and other public health outreach in the ED can reach patients that otherwise may not have contact with the health care system. For many patient populations, the ED may be more easily accessible even for those who are already integrated into the health care system. Further data analysis regarding our patient demographics is ongoing with continued efforts for a sustainable screening process to provide for at-risk patients who may otherwise go unvaccinated.

No, authors do not have interests to disclose

## 102 Improved Care for Survivors of Sexual Assault With an Electronic Health Record-Integrated Clinical Pathway

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Objectives: Caring for survivors of sexual assault is a sensitive and complex task, and prior studies have shown significant variation in adherence to CDC guidelines, especially with bacterial sexually transmitted infection (STI), HIV, and pregnancy prophylaxis. The authors implemented an electronic health record (EHR) integrated clinical pathway that reflected the most up-to-date evidence and institutional consensus and could be accessed by clinicians within existing workflows to guide clinical decisions and deploy specified orders. The objective was to examine the association between clinical pathway utilization and adherence to institutional best practice recommendations related to survivors of sexual assault.

Methods: The clinical pathway was introduced July 13, 2021, followed by multiple education initiatives including an EHR prompt to use the pathway which was added on September 8th, 2021. Patients who presented to one of twelve EDs within a single health system with a chief complaint of "sexual assault" or diagnosis of "sexual assault" between September 8, 2021, and January 23, 2023, were included. Admitted patients and those under 18 were excluded. We compared medical management of survivors based on whether the clinical pathway was utilized during that patient's visit. The primary outcome was adherence to CDC guidelines for empiric treatment of bacterial STIs. Secondary outcomes were completion of a pregnancy test, ordering pregnancy prophylaxis, and ordering of labs if a patient received HIV post-exposure prophylaxis (PEP). Outcomes related to pregnancy were assessed for female patients less than 55 years old. Characteristics of survivors were compared based on utilization of clinical pathway using Wilcoxon rank sum and Chi-square tests. Outcomes of interest were calculated using multivariate logistic regression adjusting for age, sex, and race where appropriate. All statistical analyses were carried out in R (version 4.2.2).

Results: A total of 232 patients received care after a sexual assault. Patients whose clinician used the pathway were more likely to identify as neither white nor black (Table 1). There were no other differences in patient demographics based on utilization of clinical pathway. Median age was 27 (IQR 22, 36); 215 (93%) were female (Table 1). The pathway was used in 46% (107) of ED visits. When clinicians used the pathway, patients were more likely to receive antibiotics and be prescribed the correct empiric treatment of STIs, have HIV PEP ordered, have labs drawn if given HIV PEP, have a pregnancy test ordered, and have pregnancy prophylaxis ordered (Table 2). When controlling for age, sex, and race, patients were almost four times as likely to be receive the correct empiric treatment of STIs (OR, 3.93; 95% CI, 2.26,6.98) and labs were more likely to be drawn for those who received HIV post-exposure prophylaxis (9.36; 2.09, 50.8). When adjusting for age and race, patients were almost three times more likely to receive a pregnancy test (2.98; 1.49, 6.21) and two times more likely to receive pregnancy prophylaxis (2.02; 1.13, 3.64).

Conclusions: The use of an EHR-integrated clinical pathway improved clinician adherence to national and institutional guidelines for management of survivors of sexual assault. Future research should look at the effect of an EHR-integrated care pathway on other aspects of survivor care like evidence kit collection and sexual assault advocate involvement.

**Table 1. Demographic Characteristics of Survivors Based on Pathway Usage**

| Characteristic | Didn't Use Pathway, N = 125 | Used Pathway, N = 107 | p-value |
|---|---|---|---|
| Age, Median (IQR) | 28 (22, 40) | 26 (22, 32) | 0.090[1] |
| Female, n (%) | 117 (94) | 98 (92) | 0.56[2] |
| Race, n (%) | | | 0.010[2] |
| Black | 29 (23) | 21 (20) | |
| Other | 17 (14) | 32 (30) | |
| White | 79 (63) | 54 (50) | |

[1] Wilcoxon rank sum test

[2] Pearson's Chi-squared test

**Table 2. Survivor Management Based on Pathway Usage**

| Characteristic | Didn't Use Pathway, N = 125[1] | Used Pathway, N = 107[1] | p-value[2] |
|---|---|---|---|
| Received any antibiotics, n (%) | 69 (55) | 91 (85) | <0.001 |
| Recieved CDC reccomended STI prophalaxis, n (%) | 45 (65) | 75 (82) | 0.013 |
| HIV PEP ordered, n (%) | 15 (12) | 61 (57) | <0.001 |
| Had indicated labs drawn if given HIV PEP, n (%) | 8 (53) | 51 (84) | 0.012 |
| Female under 55 YO, n (%) | 106 (85) | 95 (89) | 0.37 |
| Pregnancy test ordered, n (%) | 68 (64) | 81 (85) | <0.001 |
| Pregnancy prophalaxis ordered, n (%) | 38 (36) | 51 (54) | 0.011 |

[1] Percent is out number eligible, not total pop

[2] Pearson's Chi-squared test

No, authors do not have interests to disclose

## 103 Trends in Cannabis Use in New Jersey: Effects of COVID and Cannabis Legalization

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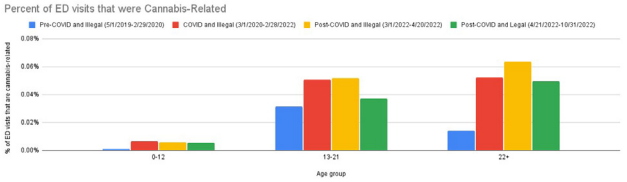
Objectives: With the recent legalization of cannabis in New Jersey and the subsequent licensing of cannabis dispensaries, cannabis access and usage were expected to increase. Concerns have arisen about potential adverse events related to cannabis use or misuse. Here we explore changes in trends and risk factors for cannabis-related harm in New Jersey (NJ) since legalization. We report temporal trends in both adult and pediatric cannabis-related visits at Hackensack University Medical Center's (HUMC) emergency department (ED), a tertiary care, academic institution.

Methods: Our study design was a retrospective chart review. We performed a temporal trend analysis via HUMC's electronic health record from 5/1/2019 to 10/31/2022. This time period covers the two years prior to cannabis legalization in NJ, including the Covid-19 pandemic as well as the first six months after cannabis legalization in the state. The pediatric charts identified were analyzed for the root causes of the adverse events leading to the need for ED care, and changes in the frequency of specific unsafe practices since cannabis legalization were tracked.

Results: We found that adult (age 22+) cannabis ED-related visits significantly increased after the start of the COVID pandemic and remained higher than pre-pandemic level for the remainder of the study periods ($p<0.0001$ for both incident rate of cannabis-related ED visits and proportion of total ED visits that were cannabis-related.) However, there was no significant change between the pandemic levels and the post-legalization period. Pediatric rates of cannabis-related ED visits did not vary significantly during the study period. The vast majority of visits for children ages 0-12 years were related to accidental cannabis exposures, whereas most visits for older children stemmed from intentional cannabis use. Approximately $^{3}/_{4}$ of the visits in the younger group were due to cannabis edibles, which in most cases involved ingestion of a household member's product.

Conclusions: As NJ became the first mid-Atlantic state to legalize adult recreational cannabis use, this project highlights unintended consequences from wider cannabis access in this state. Notably, cannabis use increased even prior to its legalization, presumably in response to the COVID pandemic and its attendant mental health effects. With the current substance abuse and mental health epidemics plaguing the US, rates of cannabis use disorder and its highlight of other concurrent psychiatric disorders are important topics for both clinicians and lawmakers to consider. Our results may help guide policies that facilitate safe cannabis use, while preventing cannabis-related harm.




No, authors do not have interests to disclose

## 104 It's a Philly Thing: Effect of Philadelphia Eagles' Super Bowl Participation on Emergency Department Utilization

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Objectives: Sporting events have been associated with decreased emergency department (ED) patient volume. The Philadelphia Eagles participated in the Super Bowl (SB) in 2018 and 2023, and anecdotal experience suggests any decrease in ED utilization may reverse in the hours following the SB. We seek to evaluate if the SB has been associated with a change in ED patient utilization. Furthermore, we hypothesize that the participation of the Philadelphia Eagles in the SB will be associated with an increase in ED utilization immediately following the conclusion of the SB.

Methods: Retrospective cohort analysis of patients presenting to the ED of an academic, tertiary-care, level 1 trauma center was performed. Charts examined spanned 2018 to present, a period that included six Super Bowls, including two in which the Philadelphia Eagles participated. We compared two groups of patients, those presenting to the ED on the day of the SB and those presenting to the ED when the SB was not occurring (non-SB). The non-SB group included patients presenting to the ED on the two Sundays following each SB Sunday during the study period. We matched SB and non-SB groups according to the four-hour periods prior to, during the playing of, and immediately following each SB as well as the two subsequent Sundays during which no NFL games were occurring. Subgroup analysis was performed according to the presence or absence of Philadelphia Eagles' participation in the SB. Primary outcome was number of ED patient registrations.

Results: 1697 patient encounters were examined, including 566 patients in the SB group (33%) and 1131 patients in the non-SB group (67%). No difference was found in total patients presenting to the ED between groups (94.3 vs. 94.3). There was a difference in ED utilization in the four hours immediately following the conclusion of the SB when the Eagles participated (44.5 vs. 25.5, $p<0.01$), however there was no difference in patients presenting following the SB when the Eagles did not participate (29.0 vs 25.5, $p=0.28$). There was also a trend toward fewer patients presenting to the ED prior to the SB (33.3 vs. 37.6, $p=0.23$) and during the SB (27.2 vs. 31.3, $p=0.08$); when the Eagles were involved, ED utilization was further decreased prior to the SB (28.0 vs. 37.6, $p=0.07$) and while the SB was occurring (24.5 vs. 31.3, $p=0.09$).

Conclusions: There was no difference in overall ED utilization during the twelve-hour period surrounding the Super Bowl at this academic, tertiary-care Philadelphia ED compared to a time- and day-matched period when the Super Bowl is not occurring, however when the Philadelphia Eagles participate in the Super Bowl, there is increased ED utilization in the four hours following the game's conclusion.

No, authors do not have interests to disclose

## 105 Intersectional Inequities in Emergency Medicine Resident Performance Assessments by Race and Sex

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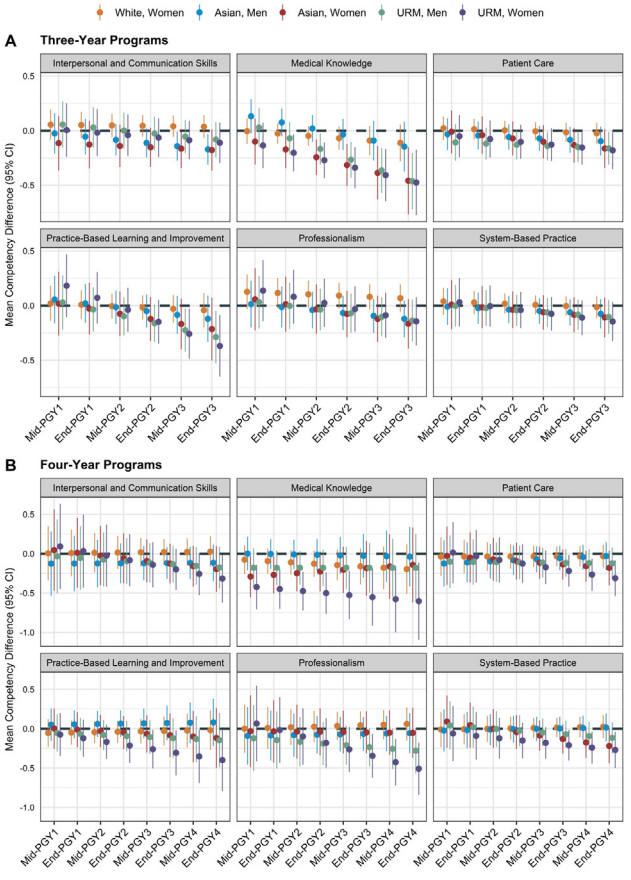
Background: Previous studies have demonstrated gender bias in performance assessments among emergency medicine (EM) residents. However, less work has focused on racial bias, or the intersectional impact of gendered racial bias on residency assessments.

Objectives: To estimate gendered racial bias in standardized EM resident milestone assessments.

Methods: Design: This is a retrospective cohort study using data from Accredited Council for Graduate Medical Education (ACGME) training programs. Setting: 128 emergency medicine residency programs in the United States. Participants: 2,708 EM residents training in ACGME-accredited programs (1,913 and 795 in three- and four-year programs, respectively) training from academic year 2014-2015 in 2017 or 2018. Analyses were conducted between June 2020 and January 2023. Exposure: Gendered racial bias as proxied by intersections of underrepresented in medicine (URM) status and gender identity. Main Outcomes: Mean Milestones scores across 6 core competency domains including Interpersonal and Communications Skills, Medical Knowledge, Patient Care, Practice-Based Learning and Improvement, Professionalism, and System-Based Practice. Overall assessment scores were calculated as the mean of the 6 competency scores.

Results: There were 16,634 assessments for 2,708 residents in 128 programs. The ethnoracial identity for most residents was White (68.6%), followed by Asian (17.2%) and URM (14.3%), with majority males (65.4%). We found that, compared to White men, URM women in three-year programs were rated increasingly lower in Medical Knowledge (-0.47, 95% CI: -0.77, -0.17), Patient Care (URM women: -0.18, 95% CI: -0.35, -0.01), and Practice-Based Learning and Improvement (-0.37, 95% CI: -0.65, -0.09) by the postgraduate year (PGY) 3 year-end assessment. URM women were also rated lower in all 6 competencies in four-year programs over the assessment period. Similar but more attenuated differences were detected for URM men, Asian women, and Asian men but at later assessment periods and in specific program lengths. We also observed similar trends for the overall assessment score.

Conclusions: URM women residents were consistently rated lower than White men during residency, which may reflect gendered racial discrimination in physician competency assessments.




No, authors do not have interests to disclose

## 106 Toward a Real-Time AI Assistant for Characterizing and Mitigating Language Bias in Emergency Medicine Notes

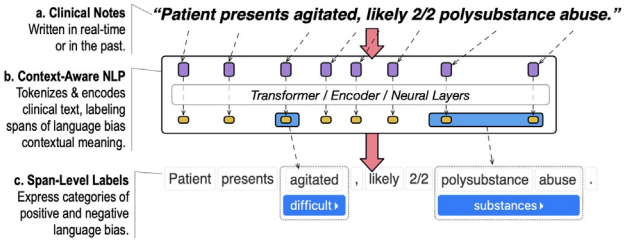
Friedman S, Boley S, Friedman S, Sidebottom A, Van Eyll B/Emergency Care Consultants, Minneapolis, Minnesota, US

Objectives: The language within emergency medicine (EM) provider notes can express positive, humanizing patient characteristics as well as negative or stigmatizing language, and is influenced in part by clinicians' implicit biases. Prior work suggests that reading stigmatizing language in charts influences clinicians' expectations—and pain management strategies—of the patient in question. Other work concludes that stigmatizing language occurs more frequently in charts of underrepresented racial or ethnic patient populations. The present study assesses whether a modern machine learning approach can tag and characterize categories of positive and negative biased phrases in a context-sensitive setting, using a dataset of over 30,000 provider notes.

Methods: Over 30,000 EM charts were pulled, and a team of medical experts and machine learning experts, identified six language categories of focus: difficult (challenging patient); compliant; noncompliant; compliment (positive descriptors); financial (financial difficulties, homelessness, frequent visits); and substances (abusing or seeking). The team identified and annotated phrases of these categories in 2,000 chart sentences, and then trained a neural machine learning system to detect and categorize biased phrases within context. An example of how the program interprets and labels text is seen in Figure 1. We measure its accuracy with precision, recall, and F1-score (harmonic mean of precision and recall).

Results: In a dataset split of 90% for training and 10% for testing, the machine learning approach achieved per-category F1 scores of 0.92 (compliant), 0.88 (compliment), 0.89 (difficult), 0.89 (financial), 0.81 (noncompliant), and 0.93 (substances), with an average F1 of 0.90, average precision of 0.89, and average recall of 0.90.

Conclusions: The machine learning program achieved a relatively high level of accuracy in finding language from the six categories of interest. The variability of F1 scores over language categories indicates that some categories manifest more consistently, e.g., the common "polysubstance abuse" for the substances category versus the multitude of ways to express noncompliant behaviors. These scores suggest that machine predictions are correct 90% of the time (precision) and 89% complete in its labeling (recall). Whether this is suitable for use as a tool for training and clinical practice is an empirical question for future usage studies with clinicians.




No, authors do not have interests to disclose

## 107 Exploring Diversity, Equity, Inclusion and Antiracism in Humanitarian Academic Organizations: A Preliminary Mixed Methods Study

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Objectives: Humanitarian academic organizations operate within oppressive global structures including the patriarchy, racism, homophobia, transphobia, and colonialism. In an effort to operationalize diversity, equity, inclusion and antiracism (DEI+A) principles, we developed a preliminary scoping study to identify strategic priorities.

Methods: The Balanced Scorecard was used as the theoretical model to outline four core processes: financial, stakeholder, organizational (internal functions), and learning and growth. We designed a mixed method study to explore optimal DEI+A priorities at the organization level. We conducted an online survey and 25 semi-structured qualitative interviews among organizational staff and leadership, and 16 semi-structured qualitative interviews with respondents working in DEI+A at affiliated institutions. Audio recordings were transcribed by Otter.ai, interviews were coded using NVIVO based on grounded theory, and IRB exemption was obtained.

Results: Key strategic objectives, priorities, and values for the four core processes were identified (Table 1). Themes reflected organization-wide functions that are within organizational leadership's control and scope.

Conclusions: Next steps include expanding the study to analyze each theme, developing quantifiable indicators for each of the four core functions, and pursuing further generalizability.

**Table 1. Strategic Priorities, Objectives, and Values by core function**

| Balanced Scorecard Core Process | Strategic Priorities, Objectives, and Values |
|---|---|
| Finance | - Grant applications focus on DEI+A projects that serve diverse communities and address local inequities<br>- Proposal ideation and writing in collaboration with local partners<br>- Distribution of funding going to majority World<br>- Financial reporting respects communities<br>- Restriction of sponsors funding work that perpetuates inequities<br>- Equitable financial control and management among diverse partners<br>- Diversity of donors and sponsors<br>- Due diligence around DEI+A practices of donors and sponsors |
| Stakeholder | - All programs prioritize DEI+A<br>- Diversity of program stakeholders<br>- Local and diverse partners<br>- Non-exploitative and bidirectional benefits for all stakeholders<br>- Equal decision making power among partners<br>- Program accessibility (cultural, disability, digital, etc.)<br>- Equitable authorship, training, and mentorship opportunities |
| Organization | - Local and diverse vendors, consultants, and facilitators<br>- Fair pay for local vendors, consultants, and facilitators<br>- Communications reach diverse audiences and local communities<br>- Communications promote DEI+A and respect for local and diverse communities<br>- Strategy developed with local and diverse voices<br>- DEI+A strategy developed<br>-Accessibility considerations incorporated in all internal functions (meetings, buildings, etc.) |
| Learning and Growth | - Diverse recruitment, hiring, and retention<br>- International partners involved in hiring<br>- Salary disparities addressed<br>- Mentorship of diverse, local, and junior staff<br>- Learning culture around DEI+A<br>- Inclusion and belonging, psychological safety addressed<br>- Accountability for oppressive actions<br>- Empowerment to report oppressive events |

No, authors do not have interests to disclose

## 108 I RANT: Training Session on Novel Intervention Tool Increases Residents' Recognition of and Confidence in Addressing Microaggressions

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Objectives: Our hypothesis was that a training session on a novel microaggressions intervention protocol could significantly improve emergency medicine residents' ability to identify a microaggression correctly and their confidence in intervening by using the I RANT protocol. The I RANT protocol was created as a novel bystander intervention tool that specifically serves the unique needs of patient interactions in emergency medicine.

Methods: The I RANT protocol was created by the research team as a novel tool that is scripted, succinct, and targeted making it specific for emergency medicine encounters. This tool will fill a gap as it is applicable for a brief patient encounter and by utilizing a new approach in focusing on bystander intervention. The full description of the I RANT protocol can be found in table 1 attached. The I RANT protocol is designed to be utilized by a third-party bystander for intervention on behalf of a coworker being affected by a microaggression. The institution's IRB determined the study was exempt. The training session consisted of a traditional didactic lecture, small group discussion, and standardized patient (SP) encounter. Components of the lecture included microaggressions definitions, examples, and the I RANT protocol. Small groups were utilized as time for residents to share personal experiences with microaggressions. The SP encounters each had a microaggression imbedded into the scenario that was not disclosed to residents up front. Trained faculty monitored the SP encounters and evaluated how well residents were able to implement the I RANT protocol and provide feedback. Outcomes were assessed via anonymous pre- and post-surveys of residents. Residents were also given a pre- and post- multiple-choice test on identification of microaggressions.

Results: Twenty-five residents participated in the training session. There was an even distribution of PGY1, PGY2 and PGY3 residents. The majority were male (59%), White (80%), heterosexual (96%), and between the ages of 26-30 (61%). The most common political leaning was fiscally and socially conservative (32%) followed by fiscally conservative and socially liberal (24%). Residents significantly increased ability to correctly identify a microaggression as evidenced by improvement in test scores from 84% to 95.8% (Fisher exact test statistic value is 0.0026; $p < 0.05$) on prevs post- test. The resident's self-reported confidence in having the appropriate tools that they need and feeling comfortable with intervening on microaggressions as assessed via a 5-point Likert scale on pre- and postsurvey increased from mean 3.2 to 3.96 ($p = 0.0015$) following the training.

Conclusions: The research team created the I RANT protocol as a novel microaggressions intervention tool. There was a significant improvement in residents' recognition of and confidence in addressing microaggressions following a targeted training session on the I RANT protocol. Future research will focus on evaluating retention of knowledge and interprofessional training sessions on the I RANT protocol.

**Table 1 - I RANT Microaggressions Intervention Tool**

| | |
|---|---|
| **I - Introduction** | Uniform across all encounters: "You might not have meant it this way, but some people would find that comment hurtful". |
| **R - Role** | Clearly state the role of the recipient |
| **A - Affirm** | Affirm the recipient with a positive comment |
| **N - Negate** | Negate the offensive comment |
| **T - Transition** | Transition the conversation back towards relevant patient care |

No, authors do not have interests to disclose

## 109 Understanding the Relationship Between Experiences With Healthcare Discrimination and Emergency Healthcare Delay Among Intersex Adults

Wang J, Kanzaria H, Dalke K, Nachnani R, Flatt J/University of California, San Francisco, San Francisco, California, US

Objectives: Intersex people, also referred to as people with Differences in Sexual Development, are individuals who were born with gonadal, chromosomal, and/or anatomic traits that fall outside of traditional conceptions of the sex binary. Qualitative studies among intersex individuals have revealed that some intersex individuals delay seeking healthcare when needed due to past experiences with discrimination in healthcare settings. The relationships between healthcare discrimination and emergency healthcare utilization patterns have not been studied quantitatively among intersex populations. The goal of this study was to examine the association between experiences with healthcare discrimination and emergency healthcare delay among intersex adults.

Methods: We recruited a non-probability sample of intersex adults (n=178) living in the United States through in-person outreach at the Androgen Insensitivity Syndrome-Differences of Sex Development Support Group conference in Chicago, Illinois, social media advertising, and targeted outreach to members of online intersex support groups. Inclusion criteria included being 18 years of age and older, diagnosis of an intersex variation, and currently residing in the United States. From July-September 2018, participants completed an online survey asking about demographic information (age, race, gender identity, income), ever having been denied or given lower quality medical care, ever having been denied or given lower quality mental healthcare, and ever having delayed emergency healthcare. We utilized multivariable logistic regressions, adjusting for race, gender, age, and income to examine the associations between experiences with healthcare discrimination and delaying emergency healthcare.

Results: Of all participants, 27.1% were people of color, 74.2% identified as a gender minority, average age was 37.6 (SD: 14.3; Range: 18-78), and 25.9% reported an annual income less than $20,000. Intersex adults who reported ever being denied or given lower quality medical care had nearly 10 times greater odds (OR: 9.67; 95%CI: 4.58-20.41; $p<.01$) of reporting delaying emergency healthcare than those who were never denied or given lower quality medical care. Those who reported ever being denied or given lower quality mental healthcare had over 7 times greater odds (OR: 7.77; 95% CI: 3.08, 19.60; $p<.01$) of reporting delaying emergency healthcare than those who were never denied or given lower quality mental healthcare.

Conclusions: In this national sample of intersex adults living in the United States, experiences with healthcare discrimination were associated with reporting delaying emergency healthcare. Resulting delays could have profound behavioral and physical health consequences for intersex adults and should be evaluated in future studies. Emergency healthcare providers should adopt patient care practices that are inclusive of intersex individuals. Additionally, interventions aimed at decreasing healthcare discrimination towards intersex patients and fostering trust between intersex communities and the healthcare system should be studied.

No, authors do not have interests to disclose

## 110 The Association Between Race and Emergency Medical Services Patient Offload Times

DiCesare D, Duan Y, Fitzpatrick D, Kubena A, Zuver C/Orlando Health, Orlando, Florida, US

Objectives: In prehospital and emergency medicine, racial inequalities have been well documented, including increased wait times, less frequent pain medication administration, and hospital transport destination decisions. With more prevalent hospital overcrowding causing increased EMS offload delays, we sought to determine whether racial differences affected EMS offload times across multiple hospital systems in Central Florida.

Methods: We retrospectively reviewed over 47,000 EMS transports by Orange County Fire Rescue, a large EMS agency in Central Florida. Patients were transported to over 20 different hospitals across four hospital systems, including free-standing emergency departments, tertiary care centers, and community hospitals. Offload times were calculated from time of hospital arrival to nurse signature during patient handoff. Race, age, and chief complaint were extracted directly from the EMS report. We performed an analysis of variance test to assess differences in offload times for each race. A subgroup analysis was also performed to evaluate differences in offload times for each race when compared to similar chief complaints and age ranges. Given the vast number of chief complaints, we chose to analyze chest pain, shortness of breath, and abdominal pain.

Results: Average offload times by race were Asian 17.1 minutes, African American 16.1 minutes, White 16.9 minutes, Hispanic 15.8 minutes, Other 15.7 minutes (p-value $<0.05$). Also, small differences in offload delays were noted in our subgroup analysis of age and chief complaint. However, differences in offload times never surpassed more than 2 minutes for each subgroup, and no race was consistently offloaded faster or slower than others.

Conclusions: Although minor differences in offload times were noted between Asian, African American, White, Hispanic, and Other races, these differences were small and never exceeded 2 minutes. Thus, although offload times did show local variation amongst different races, it is unlikely that these delays resulted in clinically significant changes in care.

| Age Groups | Race | Average Offload Time (Min) | # of Patients |
|---|---|---|---|
| Total | Asian | 17.14 | 611 |
| | African American | 16.13 | 12480 |
| | White | 16.89 | 18455 |
| | Hispanic | 15.76 | 11190 |
| | Other | 15.66 | 3240 |
| | | | |
| 0-17 | Asian | 14.23 | 39 |
| | African American | 13.81 | 1019 |
| | White | 13.22 | 633 |
| | Hispanic | 13.19 | 811 |
| | Other | 12.61 | 221 |
| | | | |
| 18-44 | Asian | 14.17 | 138 |
| | African American | 15.01 | 5285 |
| | White | 15.22 | 4463 |
| | Hispanic | 14.82 | 3924 |
| | Other | 15.00 | 1051 |
| | | | |
| 45-64 | Asian | 15.51 | 135 |
| | African American | 16.85 | 3330 |
| | White | 16.67 | 5563 |
| | Hispanic | 15.62 | 2968 |
| | Other | 15.13 | 813 |
| | | | |
| 65+ | Asian | 19.62 | 299 |
| | African American | 18.21 | 2843 |
| | White | 18.29 | 7796 |
| | Hispanic | 17.54 | 3486 |
| | Other | 17.23 | 1154 |

No, authors do not have interests to disclose

## 111 Potential Impact of Application of the Canadian Syncope Risk Score

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Objectives: The decision to hospitalize patients presenting to the emergency department (ED) with syncope is highly variable, and many hospitalizations for this condition are low yield. The Canadian Syncope Risk Score (CSRS) is a recently developed, internationally validated risk stratification score that identifies patients presenting with syncope who have a low risk for 30-day serious adverse events and therefore may not require hospitalization. This ongoing retrospective study aims to evaluate the potential impact that application of the CSRS would have on patients with syncope who were admitted to any emergency department of a large regional hospital system.

Methods: We identified patient visits for syncope at 13 EDs within a large hospital system between February 2019 and January 2020, in which the ED clinical impressions entered in the electronic health record included ICD-10 diagnosis code R55. We performed an initial exclusion of clinical impressions for near syncope or pre-syncope, mental status change from baseline, intoxication at ED presentation, pregnant patients, and visits with any serious diagnosis requiring intervention that would preclude use of the CSRS. We then excluded patients with a disposition other than admission or observation and randomized the list of visits. We reviewed charts starting at the first row of this randomized list, excluding visits where syncope occurred $>24$ hours prior to ED arrival, loss of consciousness was $>5$ minutes, or history indicated no syncope occurred, and will continue until a sample size of 200 included patient visits is achieved. We extracted data from included patient charts to calculate CSRS scores and obtain medical history and patient laboratory data. We will calculate the proportion of admitted patients whose CSRS was -2, -1, or 0, indicating low or very low risk of 30-day serious adverse event, both system-wide and stratified by practice setting (academic vs. community).

Results: We identified 5718 adult patients with any ICD-10 visit diagnosis of syncope (R55) who presented to EDs between 2/1/2019 and 1/31/2020. In total, 1219 patient visits were excluded via ICD-10 codes: 280 because of a serious diagnosis before leaving the ED, 168 for mental status changes or intoxication, and 771 for presyncope or near syncope. Of the remaining 4499, 1719 had a disposition of admission or observation and were included for randomization to chart review. In an initial pilot analysis, 32 of 40 (80%) of patients were included following chart review. We will present the proportion of 200 included patients whose CSRS was $<1$, along with a 95% confidence interval for this proportion, and compare this proportion between academic and community hospitals. We will also compare the population of admitted patients with low or very low CSRS in comparison to those admitted with higher CSRS ($\geq 1$) with respect to admission type (admitted vs. observation), age, sex, medical history, and laboratory results.

Conclusions: We will identify the proportion of patients admitted for syncope in a large regional hospital system with a low or very low CSRS. These results can inform wider adoption of the CSRS in EDs, which could decrease practice variation reduce admission rates for patients with syncope. These potential discharges may represent opportunities to reduce low-yield hospital utilization and costs, providing benefit for both patients and hospital systems.

No, authors do not have interests to disclose

## 112 Use of an Electronic Clinical Decision Support Tool for Emergency Department Oral Anticoagulation Prescribing for Acute Atrial Fibrillation: Step One of a Step-Wedge Cluster-Randomized Clinical Trial

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Objectives: Atrial fibrillation (AF) is the most common arrhythmia; often first diagnosed in the emergency department (ED). AF increases the risk of stroke; appropriate oral anticoagulation (OAC) prescribing can reduce the risk by 64%. The ED is a prime target for initiating stroke prophylaxis with the use of clinical decision support (CDS) tools to guide shared decision-making. To assess the implementation of a CDS tool, we examined the management and prescribing practices for ED patients with new-onset AF.

Methods: This is step one of a step-wedge cluster-randomized clinical trial implementing a CDS tool into the electronic health record (EHR). Step one is a link in the EHR to the CDS tool in an external browser, which summarizes personal stroke ($CHA_2DS_2$-VASc) and bleeding risk for a patient with AF. Each step of the trial lasts for one year. Data collected is from three urban EDs—an academic tertiary care center and two community hospitals. Using the EHR research data warehouse, patients were selected if they had a primary diagnosis of AF or paroxysmal AF during an ED visit between January 2020 and April 2023 and age $>17$ years; excluded for high bleeding risk, or valvular heart disease. Data abstracted from the EHR included demographics,

co-morbidities, medications, EKG, vital signs, and disposition. Eight trained chart reviewers verified abstracted EHR data and manually collected data from the EHR to assess stroke risk, bleeding risk, and other factors that may be predictive in OAC prescription. We performed descriptive statistics and used Fisher's Exact and Chi-Square tests to assess associations between OAC prescription, patient characteristics, and pre- and post-CDS tool implementation.

Results: Of the 2,993 diagnosed with AF, 517 participants met the inclusion criteria (mean age 58, male n=292 (56.48%%)). During the baseline period, one community ED prescribed OACs significantly less than the other two sites (p=0.0088). The mean $CHA_2DS_2$-VASc score was 1.97 in the baseline period and 2.01 during step 1 (p=0.82). Providers prescribed or adjusted OAC for 47.31% (n=88) of patients during the baseline period and 60.98% (n=75) during step 1 (p=0.0202). Providers cited the use of a clinical guideline in deciding to prescribe OAC 41.98% (n=165) at baseline and 54.47% (n=67) in step 1 (p=0.0170).

Conclusions: Most patients seen in the ED for a diagnosis of AF or paroxysmal AF did not receive stroke prophylaxis during the baseline period. After implementing the CDS tool, the mean $CHA_2DS_2$-VASc score was not significantly different, but the majority of eligible patients were prescribed stroke prophylaxis. Significantly, more providers cited the use of a guideline in step 1 compared to the baseline. The implementation of an accessible and streamlined CDS tool in the EHR may increase adherence to guidelines and thereby, improve long-term clinical outcomes for patients who need stroke prophylaxis.

No, authors do not have interests to disclose

## 113 A Retrospective Analysis of Intravenous Diltiazem With or Without a Drip for Atrial Fibrillation in the Emergency Department

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Objectives: Emergency clinicians frequently manage atrial fibrillation (AF) with rapid ventricular response in the emergency department (ED), and commonly, they use a bolus of intravenous (IV) diltiazem followed by a continuous infusion (drip). However, diltiazem drips are resource-intensive, and there is a paucity of data to support their routine use. Therefore, we sought to compare the rate control efficacy and safety outcomes for AF patients who received an IV diltiazem bolus followed by a diltiazem drip vs. those who received a diltiazem bolus followed by oral rate control medication or no other rate control medication in the ED.

Methods: We performed a retrospective cohort study comparing outcomes of ED patients with AF in our hospital system who received a diltiazem drip after an IV diltiazem bolus to those who did not receive a drip. We included patients who had an ED diagnosis of AF and received an IV diltiazem bolus for AF for a heart rate (HR) > 100. We excluded patients who were transferred to our ED, who had incomplete vital signs, or who received other IV medications for AF rate or rhythm control in the ED. Demographic data, ED diagnoses, and hospital length-of-stay (LOS) were obtained by a specialist in information technology. A manual chart review was performed to obtain the medical history, medications administered, and vital signs before and after medications. For our primary outcome, we used multivariable logistic regression to determine the adjusted odds ratio for having a HR < 100 at the time of ED disposition for patients receiving a diltiazem drip compared to those who did not. Secondarily, we compared the rates of hypotension after treatment, hospital LOS, and need for intensive care unit (ICU) stay.

Results: Between January 1, 2020, and June 30, 2021, there were 1027 patients with an ED diagnosis of AF in our hospital system. Of those, 331 met criteria for enrollment - 167 received an IV diltiazem bolus without a subsequent drip, and 164 received a diltiazem bolus followed by a drip. The mean highest HR before treatment was 145 (SD 20.3) in the drip group vs. 134 (SD 19.3) in the no drip group. There were no statistically significant differences in other baseline characteristics between groups. The unadjusted analysis showed no statistically significant differences between groups in the percentage of patients with HR < 100 at ED disposition (64.1% [no drip] vs. 61.0% [drip]), hypotension after treatment (4.8% [no drip] vs. 3.0% [drip]), or need for ICU care (8.4% [no drip] vs. 12.2% [drip]). On multivariable analysis, the adjusted odds ratio for having HR < 100 at the time of ED disposition for patients in the drip group was 0.90 (95% CI 0.56 to 1.44). The unadjusted median hospital LOS was longer in the drip group compared to the no drip group: 72.1 hours vs. 47.8 hours. On multivariable analysis, the adjusted median LOS for patients receiving a drip was 19.8 hours (95% CI 9.5 to 37.8 hours) longer than those not receiving a drip.

Conclusions: The use of a diltiazem drip after an IV diltiazem bolus was not associated with better outcomes as compared to not receiving a drip. Thus, oral rate control after an initial IV bolus should be considered to reduce resource utilization. However, it is possible that a diltiazem drip was used more frequently in sicker patients, which may not have been fully accounted for in our analysis. These data are preliminary, and a larger study is currently ongoing.

No, authors do not have interests to disclose

## 114 High-Sensitivity Troponin Velocity for the Detection of Acute Coronary Syndrome

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Objectives: Most high-sensitivity troponin algorithms for the emergency department (ED) evaluation of possible acute coronary syndrome (ACS) rely on serial testing with specific predetermined intervals to calculate the troponin "delta". We evaluate the use of an alternative, more flexible approach for calculating change in troponin over the actual collection interval, termed the troponin "velocity," for prediction of major adverse cardiac events (MACE) at 30 days.

Methods: We performed a prospective, observational study after implementation of high-sensitivity troponin at a high volume, urban ED over a 7-month period beginning July 2019. A convenience sample of 821 patients undergoing ACS evaluation were enrolled during their initial visit; clinical variables and troponin values were collected, and the primary outcome of MACE was assessed by telephone and chart review at 30 days. The negative predictive value (NPV) of substituting velocity > 2.5 ng/L/hr for delta > 2 ng/L in the European Society of Cardiology (ESC) 1-hour evaluation algorithm was determined.

Results: Of 1,122 patients screened, 292 declined and 9 were excluded based on eligibility criteria (e.g. prior heart transplant), leaving 821 enrolled. [RLS1] The ESC/velocity algorithm classified 312 patients as low risk, of whom 4/297 (1.4%) had 30-day MACE. Of patients meeting higher risk criteria, 40/343 (11.7%) had MACE, as did 1/147 (0.7%) of those who were unclassifiable by the algorithm, yielding a negative predictive value (NPV) of 98.7% (95% CI: 96.6-99.6%). The ESC/delta algorithm, implemented with +/- 30-minute acceptable interval, produced 30-day MACE rates of 1/228 (0.4%) in low-risk patients, 40/343 (11.7%) in higher risk patients, and 4/216 (1.9%) in unclassifiable patients, for an NPV of 99.6% (95% CI: 97.6-100%).

Conclusions: The velocity-based approach in the framework of the ESC algorithm performed similarly to the delta-based approach in predicting MACE at 30 days. The velocity-based approach may be advantageous and provide more flexibility as specimen collection within strict time intervals can be challenging within the ED setting.

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## 115 Rapid Outpatient Evaluation for Patients With HEART Score 4/5 Safely Reduces Admissions

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Objectives: Given current workforce shortages and capacity strains on health systems, delivering the right care at the right time is more vital than ever. While patients with chest pain and a HEART score of 4 or 5 are often placed in the hospital for further evaluation, data exists showing these patients have a very low rate of acute myocardial infarction (AMI) and death. We report outcomes of an Outpatient Chest

Pain Pathway (OCPP) aimed at safely reducing hospitalizations via rapid outpatient cardiology follow-up.

Methods: This is a prospective observational study evaluating the safety and efficacy of OCCP using a convenience sample of patients who presented to one of our emergency departments (EDs) between January 2022-May 2022. A multidisciplinary team consisting of cardiology and emergency medicine providers created the OCPP and gained approval from hospital leadership as a local standard of care. ED patients with chest pain and HEART score 4/5 with nonischemic EKGs and normal initial and 4-hour troponins could be discharged with 48-72-hour cardiology follow-up at the discretion of treating clinicians. Primary outcomes included rates of AMI and death at 30 days. Secondary outcomes included rates of hospitalization at index ED visit and coronary revascularization at 30 days. Patients were included if over age 18 and had a HEART score of 4 or 5 documented by treating ED clinicians. Patients were excluded if they left AMA, had an elevated troponin, or STEMI. Outcomes were assessed via chart reviews performed by 4 unblinded medical students and physicians.

Results: From January-May 2022, 189 patients with HEART score of 4 (140pts) or 5 (49 patients) were discharged from ED. 84 were female, and 105 were male. The average age was 64.7. 69/189 had a history of coronary artery disease/AMI and 18/189 had a history of congestive heart failure. 0/189 patients had an AMI, NSTEMI, or STEMI at 30 days post index ED visit. 1/189 patients died at 30 days, a 92-year-old who 8 days post discharge had a seizure, aspiration event, and hypoxic respiratory failure. The 30-day rate of AMI/death was 0.5%. 103/189 patients were referred for emergent cardiology follow-up, with 75 patients presenting for their appointment. Cardiology ordered 25 stress tests/coronary CTAs, 5 of which were positive, and 7 patients had coronary catheterization with 4 patients receiving stents. No CABGs were performed at 30 days. ED discharge rates of patients with a HEART score of 4/5 increased from 15% in 2018 (106/711) to 23% (192/835) in 2022.

Conclusions: Utilizing emergent outpatient cardiology follow-up for ED CP patients and a HEART score of 4/5 is a safe and effective method to reduce hospitalizations.

No, authors do not have interests to disclose

## 116 Diltiazem vs. Metoprolol for Atrial Fibrillation With Rapid Ventricular Response

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Objectives: Atrial fibrillation (A-fib) with rapid ventricular response (RVR) is the most commonly treated cardiac arrhythmia in the emergency department. Current American Heart Association guidelines recommend either intravenous (IV) diltiazem or intravenous metoprolol as the preferred management for patients with A-fib and RVR who are hemodynamically stable. The purpose of this study was to determine whether IV diltiazem or IV metoprolol should be the preferred drug to treat patients with A-fib with RVR with a heart rate (HR) > 150 in the emergency department. In this study we assessed three outcomes from the database: 1) mortality 2) heart rate > 120 and 3) admission to the ICU.

Methods: In this retrospective propensity matched study using the United States Collaborative Network of 56 academic medical centers/healthcare organizations in the TriNetX database. There were 4,607 patients treated with diltiazem and 6,543 patients treated with metoprolol for A-fib with HR > 150 between April 6, 2003, and April 6, 2023. Propensity score matching was performed on basic demographic information (age, sex race/ethnicity) and eight pre-existing medical diagnoses associated with mortality: hypertension, diabetes, acute and chronic renal failure, obesity, heart failure, prior cardiac arrest, ischemic heart disease and malignant neoplasm of the bronchus/lung. Outcomes were assessed in the 1-7 days following treatment.

Results: After propensity score matching there were 7,888 patients with A-fib and RVR, resulting in 3,944 patients in each treatment group. Patients treated with IV diltiazem had a significantly lower 7-day mortality rate (3.8% vs 5.0%; RR 0.748; 95% CI 0.607–0.922; p= 0.006), were less likely to have HR > 120 within 1-7 days after treatment (34.0% vs 43.6%; RR 0.779; 95% CI 0.736–0.824; p< 0.0001) and were less likely to be admitted to the ICU (13.3% versus 20.1%; RR 0.661; 95% CI 0.598–0.732; p< 0.0001) when compared with IV metoprolol. The unmatched population of 11,150 patients (prior to propensity matching) showed similar significant trends favoring diltiazem over metoprolol for all outcomes.

Conclusions: In this large retrospective propensity matched multicenter study using real world evidence from academic medical centers/healthcare organizations, IV diltiazem demonstrated a lower mortality rate, better rate control and fewer admissions to the intensive care unit. The favorable mortality and safety profiles in this large study - approximately 10 times larger than prior studies - along with previous randomized controlled trials, all support the preferential use of IV diltiazem over IV metoprolol for atrial fibrillation with rapid ventricular response.

**Tables**

**Table 1: Demographics and Diagnosis Before and After Propensity Score Matching**

| | Before Propensity Score Matching | | After Propensity Score Matching | |
|---|---|---|---|---|
| | Cohort 1 | Cohort 2 | Cohort 1 | Cohort 2 |
| Total Patients | 4,607 | 6,543 | 3,944 | 3,944 |
| Age at Index | 64.9 +/- 13.6 | 66.5 +/- 12.5 | 65.7 +/- 13.2 | 66.1 +/- 12.8 |
| Female | 2,096 (45.5%) | 2,838 (43.4%) | 1,773 (45.0%) | 1,782 (45.2%) |
| Male | 2,511 (54.5%) | 3,705 (56.6%) | 2,171 (55.0%) | 2,162 (54.8%) |
| White | 3,461 (75.1%) | 4,740 (72.4%) | 2,934 (74.6%) | 2,990 (75.8%) |
| Unknown Ethnicity | 1,641 (35.6%) | 2,879 (44.0%) | 1,507 (38.2%) | 1,470 (37.3%) |
| Not Hispanic or Latino | 2,716 (59.0%) | 3,304 (50.5%) | 2,223 (56.4%) | 2,264 (57.4%) |
| Hispanic or Latino | 250 (5.4%) | 360 (5.5%) | 214 (5.4%) | 210 (5.3%) |
| Black or AA | 447 (9.7%) | 503 (7.7%) | 353 (9.0%) | 332 (8.4%) |
| Asian | 136 (3.0%) | 201 (3.1%0 | 123 (3.1%) | 123 (3.1%) |
| Unknown Race | 555 (12.0%) | 1,088 (16.6%) | 521 (13.2%) | 493 (12.5%) |
| **Diagnosis** | | | | |
| Hypertensive Diseases | 2,621 (56.9%) | 4,846 (74.1%) | 2,514 (63.7%) | 2,473 (62.7%) |
| Diabetes Mellitus | 1,148 (24.9%) | 2,260 (34.5%) | 1,090 (27.6%) | 1,099 (27.9%) |
| Acute Kidney Failure and Chronic Kidney Disease | 1,006 (21.8%) | 2,911 (44.5%) | 1,006 (25.5%) | 1,021 (25.9%) |
| Overweight and Obesity | 967 (21.0%) | 1,904 (29.1%) | 920 (23.3%) | 890 (22.6%) |
| Heart Failure | 998 (21.7%) | 2,578 (39.4%) | 993 (25.2%) | 1,004 (25.5%) |
| Cardiac Arrest | 44 (1.0%) | 233 (3.6%) | 44 (1.1%) | 47 (1.2%) |
| Ischemic Heart Diseases | 1,285 (27.9%) | 2,957 (45.2%) | 1,272 (32.3%) | 1,294 (32.8%) |
| Malignant Neoplasm of Bronchus and Lung | 190 (4.1%) | 371 (5.7%) | 188 (4.8%) | 186 (4.7%) |

AA = African American

**Table 2: Outcomes before Propensity Score Matching**

| | Cohort 1 | Cohort 2 | RR (95% CI) | P-Value |
|---|---|---|---|---|
| **Death** | 3.6% | 6.3% | 0.571 (0.478, 0.682) | p<0.0001 |
| **HR > 120** | 33.5% | 45.1% | 0.743 (0.708, 0.780) | p<0.0001 |
| **ICU admission** | 12.5% | 20.8% | 0.603 (0.551, 0.660) | p<0.0001 |

RR = Relative Risk; CI = Confidence Interval

**Table 3: Outcomes after Propensity Score Matching**

| | Cohort 1 | Cohort 2 | RR (95% CI) | P-Value |
|---|---|---|---|---|
| **Death** | 3.8% | 5.0% | 0.748 (0.607, 0.922) | p=0.006 |
| **HR > 120** | 34.0% | 43.6% | 0.779 (0.736, 0.824) | p<0.0001 |
| **ICU admission** | 13.3% | 20.1% | 0.661 (0.598, 0.732) | p<0.0001 |

RR = Relative Risk; CI = Confidence Interval

No, authors do not have interests to disclose

## 117 Patient and Emergency Department Medical Staff Factors Associated With Abdominal Computed Tomography Scan Utilization in United States Emergency Departments to Evaluate Adults With Diarrhea

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Objectives: Adults with diarrhea are frequently evaluated in emergency departments (EDs) in the US, although estimates of the frequency of these visits are lacking. Also not known is how often computed tomography (CT) is employed in the evaluation of these patients. We estimated the frequency with which abdominal/pelvic CT scanning was ordered for adult ED patients with diarrhea. Furthermore, we identified patient (demographic, clinical, hospital, and geographic) and ED medical staff factors associated with obtaining abdominal/pelvic CT scans for this population. We also compared the frequency of five serious abdominal/pelvic conditions (appendicitis, pancreatitis, diverticulitis, gallbladder diseases, and ulcerative colitis)

diagnosed during the ED visit by whether an abdominal/pelvic CT scan had been performed.

Methods: We conducted an analysis of the National Hospital Ambulatory Medical Care Survey (NHAMCS) (2016-2020) for patients ≥ 18 years old presenting with diarrhea at the ED. NHAMCS is conducted by the US Centers for Disease Control and Prevention (CDC) and the National Center for Health Statistics. We created logistic regression models to identify patient and ED medical staff factors associated with abdominal/pelvic CT utilization.

Results: Of the 696,488,905 million visits to US EDs from 2016 to 2020, diarrhea accounted for 17,385,762 visits (2.4%), of which 31.4% (5,459,234 visits) included abdominal/pelvic CT scanning. Those most frequently undergoing CT scanning were 58-67 years old, female, and non-Hispanic White. In the multivariable analysis (Table), the following patient and ED medical staff factors were associated with greater CT utilization: visits by patients in the age groups 38-47, 48-57, 58-67 and 69-77 years old, as compared to 18-27 years old; visits involving an ED attending physician only, as to compared to involving an attending physician and resident, ED resident only, or physician assistant or nurse practitioner only; patients with abdominal pain; and patients with hypotension, as compared to those with normal or elevated blood pressure or hypertension. Non-Hispanic Blacks were less likely than non-Hispanic Whites to undergo CT scanning. The proportions of adult ED visits for diarrhea when CT scans were ordered were similar for patients diagnosed with appendicitis, gallbladder diseases, and ulcerative colitis, but were greater for those with pancreatitis (2.95% vs. 1.06%; $p<0.05$). Of the 0.07% of adult ED visits by patients diagnosed with diverticulitis, all underwent CT scanning.

Conclusions: Abdominal/pelvic CT scans were obtained for approximately one-third of all adult visits for diarrhea in US EDs between 2016 and 2020. CT scan utilization for ED visits for diarrhea was associated with patient age, race/ethnicity, an evaluation by attending physicians only, and the presence of abdominal pain and hypotension. Some of these factors might be suggestive of patients with more complex or serious conditions. However, our findings raise concerns about potential racial biases influencing CT scan ordering for non-Hispanic Black patients that cannot be resolved with the data available for this study. Additional prospective studies that link ordering practices with clinical outcomes will be needed to assess the appropriateness of abdominal/pelvic CT scans for patients with diarrhea, which in turn can inform clinical practice guidelines, protocols, and strategies to optimize the use of CT scans for diarrhea.

**Patient and ED medical staff factors associated with abdominal/pelvic CT scan utilization among adult ED patients with diarrhea (NHAMCS-ED 2016-2020)**

| Factors | Univariable/Unadjusted | | Multivariable/Adjusted | |
|---|---|---|---|---|
| | OR | 95% CI | OR | 95% CI |
| **Age groups (years)** | | | | |
| ≥18-27 (Reference group) | | | | |
| ≥28-37 | 1.14 | (0.69-1.87) | 1.45 | (0.85-2.50) |
| ≥38-47 | 1.90 | (1.28-2.84) | **2.07** | **(1.21-3.54)** |
| ≥48-57 | 1.48 | (0.98-2.25) | **2.61** | **(1.52-4.47)** |
| ≥58-67 | 2.44 | (1.50-3.97) | **3.71** | **(1.89-7.27)** |
| ≥68-77 | 2.09 | (1.29-3.38) | **2.96** | **(1.44-6.11)** |
| ≥78 | 1.91 | (1.19-3.07) | 1.74 | (0.77-3.99) |
| **Sex** | | | | |
| Female (Reference group) | | | | |
| Male | 1.21 | (0.97-1.51) | 1.26 | (0.92-1.71) |
| **Race and ethnicity** | | | | |
| Non-Hispanic White (Reference group) | | | | |
| Non-Hispanic Black | 0.62 | (0.46-0.84) | 0.52 | **(0.37-0.75)** |
| Hispanic | 0.85 | (0.60-1.19) | 0.75 | (0.44-1.28) |
| Non-Hispanic other | 0.79 | (0.43-1.44) | 0.49 | (0.19-1.25) |
| **Residence** | | | | |
| Private home (Reference group) | | | | |
| Nursing home | 1.18 | (0.54-2.61) | 1.84 | (0.56-6.05) |
| Unstably housed | 1.19 | (0.42-3.41) | 1.00 | (0.36-2.82) |
| **Health insurance or payor type** | | | | |
| Private insurance (Reference group) | | | | |
| Medicare | 1.39 | (0.99-1.93) | 1.15 | (0.67-1.98) |
| Medicaid | 0.87 | (0.61-1.25) | 0.90 | (0.60-1.37) |
| Self-pay | 1.05 | (0.56-1.97) | 1.53 | (0.83-2.79) |
| **US geographic region of ED** | | | | |
| Northeast (Reference group) | | | | |
| Midwest | 1.31 | (0.85-2.03) | 1.12 | (0.66-1.90) |
| South | 1.26 | (0.82-1.94) | 1.24 | (0.71-2.16) |
| West | 1.39 | (0.91-2.11) | 1.24 | (0.67-2.28) |
| **ED medical staff who evaluated patient** | | | | |
| Attending physician only (Reference group) | | | | |
| Attending physician with resident | 0.74 | (0.48-1.14) | 0.95 | (0.55-1.66) |
| ED resident only | 1.93 | (0.36-10.3) | 3.12 | (0.63-15.39) |
| Physician assistant or nurse practitioner | 1.12 | (0.83-1.52) | 1.26 | (0.85-1.86) |
| Consultant involved in visit | 1.89 | (1.36-2.62) | 1.18 | (0.58-2.42) |
| **Clinical features** | | | | |
| Fever (≥38 °C) | 0.89 | (0.69-1.14) | 0.86 | (0.59-1.23) |
| Nausea | 0.91 | (0.72-1.16) | 0.90 | (0.65-1.26) |
| Vomiting | 0.94 | (0.75-1.17) | 1.16 | (0.83-1.62) |
| GI bleeding | 2.17 | (1.28-3.68) | 1.68 | (0.82-3.46) |
| Abdominal pain | 3.88 | (2.94-5.11) | **4.43** | **(3.07-6.37)** |
| **Vital signs** | | | | |
| **Respiratory rate (breath/minute)** | | | | |
| Normal (12-20) (Reference group) | | | | |
| Tachypnea (>20) | 0.74 | (0.49-1.11) | 0.98 | (0.55-1.76) |
| Bradypnea (<12) | 0.49 | (0.07-3.30) | 0.26 | (0.04-1.83) |
| **Pulse (beat/minute)** | | | | |
| Normal (60-100) (Reference group) | | | | |
| Tachycardia (>100) | 0.91 | (0.46-1.57) | 0.94 | (0.64-1.37) |
| Bradycardia (<60) | 0.84 | (0.46-1.57) | 0.69 | (0.26-1.82) |
| **Blood pressure (mm Hg)** | | | | |
| Normal (Reference group) | | | | |
| Elevated | 1.51 | (0.92-2.47) | 1.22 | (0.65-2.31) |
| Hypertension type 1 | 1.54 | (1.03-2.29) | 1.23 | (0.76-1.99) |
| Hypertension type 2 | 1.67 | (1.08-2.59) | 1.09 | (0.65-1.82) |
| Hypotension | 2.35 | (1.48-3.71) | 2.45 | **(1.33-4.52)** |

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No, authors do not have interests to disclose

## 118 Reliability of Continuous Noninvasive Hemoglobin Monitoring in Healthy Participants During En Route Care Training

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Objectives: The objective of this study was to assess the percentage of vital sign measurements with successful capture of noninvasive hemoglobin measurement by pulse CO-oximetry (SpHb) measurements in healthy subjects utilizing a novel electronic data capture mechanism from usual patient movement items (PMI) during Air Force training flights.

Methods: We conducted a feasibility study enrolling healthy participants who had hemodynamic monitoring during usual Critical Care Air Transport (CCAT) flight training exercises from 2022 to 2023. Usual CCAT monitoring equipment was used and pulse oximeters had the capability to measure SpHb. The study team downloaded case files from patient monitors after each training exercise utilizing Battlefield Assisted Trauma Distributed Observation Kit (BATDOK$^{TM}$) Case Export to wirelessly connect to the patient monitor. We calculated point and precision estimates for the percentage of time for successful SpHb capture during the exercise and compared this to pulse oximetry ($SpO_2$) capture.

Results: We enrolled 23 healthy participants with mean monitoring durations of 134 minutes (SD 51 min) on the ground and 78 minutes (SD 29 min) in flight. Mean SpHb measurements on the ground were 13.7 g/dL (SD 2.2 g/dL) compared to mean SpHb in flight of 13.5 g/dL (SD 2.6 g/dL). SpHb values were successfully captured in the patient case log for 97.8% of 6,282 possible measures on the ground and 97.3% of 3,759 possible measures in flight. Mean intervals of missing SpHb data were 139 seconds (SD 83 sec) on the ground (n=21 intervals) and 259 seconds (SD 180 sec) in flight (n=11 intervals). $SpO_2$ was captured for 99.3% and 98.5% of possible measurements on the ground and during flight, respectively.

Conclusions: SpHb reliably captured continuous, noninvasive hemoglobin measurements using usual CCAT patient movement items in healthy participants

during both ground and flight training. BATDOK Case Export successfully imported case files from CCAT patient monitors.

Yes, authors have interests to disclose

Disclaimer: The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of the Air Force, Department of the Army, Department of Defense, or US Government.

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## 119 Investigating Factors Influencing Diagnostic Safety in Emergency Department Patients Using Decision Trees

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Objectives: Diagnostic decision-making in the emergency department (ED) is a complex cognitive process involving high uncertainty, making it susceptible to diagnostic errors. The use of data-centric approaches can aid with the identification of factors contributing to diagnostic errors. One of these approaches is Classification and Regression Tree (CART). Our objective in this project is to apply previously validated diagnostic error triggers to patient ED encounters and use machine learning to compare trigger-positive and trigger-negative cases and help identify factors that influence diagnostic safety.

Methods: We evaluated a cohort of ED visits (all ages, 2017-2019) to identify factors contributing to ED diagnostic error in two phases. In phase one we used the SAS HPSPLIT procedure (CART) to identify important features related to a visit being trigger-positive or trigger-negative. The model was initially based on all data to identify important features using a 10-fold cross-validation method. In the second phase we built a model using the features from phase one and applied the trained model to the manually reviewed cases. We predicted being trigger-positive or trigger-negative and compared them against cases with confirmed errors (Error Yes/No) to compute diagnostic test accuracy and positive and negative predictive values (PPV, NPV).

Results: There were 125,342 unique ED encounters including 119,456 trigger-negative and 5,886 trigger-positive. A total of 720 events were manually reviewed (291 trigger-negative, 429 trigger-positive), and 32 of these cases had an identified diagnostic error. The overall rate of diagnostic error for these reviewed cases was 4.4% (95% CI 3.2 to 6.2%). After performing the first phase, an accuracy of 0.953, an F1 score of 0.036, and an AUC of 0.677 was achieved. The second phase resulted in an accuracy of 0.672, F1 score of 0.737, and AUC of 0.713. After the second phase, our PPV was 5.1% (CI 3.2 to 7.7%), NPV was 96.6% (CI 93.8 to 98.3%), sensitivity was 68.8%, and specificity was 40.8%. Top predictive factors are presented in Figure.

Conclusions: Our proposed classifier based on phase two had an accuracy of 42% in separating the error-positive and error-negative cases. It was successful in highlighting predictive performance of multiple factors including ICD codes, chief complaints, age, and number of labs and lab panels completed in the ED. Diagnostic errors were uncommon, and application of predicted features did not improve the PPV. Transparency in the reporting of the methods is key for future implementation of science and dissemination of findings. Future work would be to evaluate the performance of this model on a larger set of clinically annotated data.

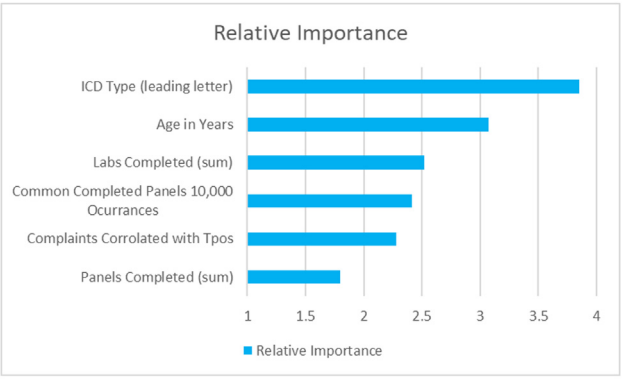


Figure: Top predictive features identified using CART

No, authors do not have interests to disclose

## 120 Mining Electronic Health Records to Identify Key Factors Influencing Diagnostic Errors in the Emergency Department

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Objectives: Screening for diagnostic errors in the emergency department (ED) includes the use of electronic health record (EHR) triggers to identify patients with certain patterns of care, such as escalation of care or return ED visits. Once errors are identified, data analytics and machine learning techniques can be applied to evaluate factors associated with trigger positive and negative cases and evaluate the accuracy with confirmed diagnostic errors. Association rule mining (ARM) is a data mining technique that uses prior knowledge of frequent item set and aims to extract frequent item set, meaningful correlation, or causal structure within data. Our objectives were to extract rules that govern the relationship between the patient and systems factors and risk of being trigger-positive.

Methods: A total of 119,456 trigger-negative (T-neg) cases were matched against 6,127 trigger-positive (Tpos) cases, resulting in a total of 12,254 observations. A small subset of this data was reviewed for existence of diagnostic errors (Yes: 33, No: 682). Patient demographic information (eg age, gender) and ED encounter parameters (eg time, Chief complaints, labs, diagnosis codes) were extracted from the EHR for each ED encounter. All data was passed through a series of preprocessing steps, including discretization of continuous variables, converting string values into categorical, and summarizing categorical data into similar groups, and finally replacing all null values with a new "unknown" categorical value. After preprocessing, we performed two experiments. In the first experiment we used the matched dataset to train an Apriori algorithm (arules package in R) to identify the governing rules that separate T-pos from T-neg labels. The trained rules (model) were then tested on the reviewed dataset to investigate the performance of predictions against the annotated error labels. In the second experiment, we ran the Apriori algorithm on the reviewed cases and set the target prediction to be the "Error" column. We then explored how well the top extracted features were in predicting the right error label on the same dataset.

Results: In the first experiment, the extracted rules were able to predict the T-neg and T-pos labels with a high predictive performance (PPV) (PPV: 0.82, Acc: 0.45). The same model performed poorly with respect to the Error label (PPV: 0.05, Acc: 0.72). The model in the second experiment was much more accurate (Acc: 1, PPV: 1) using all extracted rules suggesting overfitting. We then enforced the number of rules to only the top 50 rules, to investigate the amount of information carried by these selected rules, where there was a significant drop in the performance (Acc: 0.91, PPV: 0.32).

Conclusions: We investigated the use of ARM techniques on a trigger-labeled dataset and its potential application in extraction of a small subset of governing rules that can be used in identification of diagnostic errors in the ED. The fact that our model (extracted rules) had high PPV of 0.82 in separating T-pos from Tneg but had a very low PPV of 0.05 with respect to Error indicates potential challenges in the definition of Trigger labels. The hope was to increase the prediction performance, so more reliable sets of rules can be identified. Our experiments also highlight the effect of having a very limited number of confirmed Error-positive cases in limiting our learning process and propose further in-depth analyses.

No, authors do not have interests to disclose

## 121 Clinical Utility of a Brain Activity-Based Biomarker for the Triage of Head Injured Patients in the Emergency Department

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Objectives: Computed tomography (CT) scan remains the standard of care for evaluating traumatic brain injury (TBI) in emergency departments (EDs). Studies have reported that over 85% of head injured patients receive CT scans in the ED, yet 91% of these scans are found to be negative. Not only does this practice expose these patients unnecessarily to radiation, but it also increases the use of this resource, lengthens throughput times in the ED. This study integrates an FDA cleared EEG-based AI derived algorithm for assessing the likelihood of intracranial hemorrhage in head injured patients at triage. In a multisite independent prospective FDA validation study using this biomarker, investigators reported 98.6% sensitivity to detecting the likelihood of ≥1cc blood, with specificity many times higher than that of the standard clinical decision rules, and negative predictive value (NPV) of 98.2%. Objectives of this retrospective study were to examine the impact of integrating this AI derived EEG-based biomarker tool in the triage assessment select head injured patients on head CT scan rates.

Methods: Male and female emergency patients between the ages of 18-85 years who presented with mild closed head injury within 3 days of injury, with a GCS of 15, and who were being evaluated for possible CT imaging received a BrainScope assessment at the discretion of the ED provider were included for study. 5-10 minutes of EEG were recorded from each patient using a BrainScope handheld device from a disposable headset with sensors on the frontal and frontal-temporal regions. The assessment took approximately 15-20 minutes from set up to results. Outcomes included rate of CT diversion for BrainScope negative patients; and patient satisfaction (rated Y/N for satisfied with their care) for an initial group of 16 patients.

Results: A total of 179 patients (mean age of 37.3 years; SD +/- 13.62, 73% female) received BrainScope assessments between April 2021-December 2023. Patients with negative results indicating a low likelihood of intracranial bleed were the focus of this analysis. Of 179 total subjects, 104 (58.1%; 95% CI 50.8-65.1%) BrainScope negative patients were discharged without receiving a CT scan. All 16 (100%; 95% CI 79.4-100%) BrainScope pilot subjects were satisfied with their care.

Conclusions: In mild head injured patients, use of an EEG-derived AI algorithm at triage was shown to be associated with a decrease in CT imaging in 58% of patients with negative findings on the device. An initial group of patients surveyed indicated 100% satisfaction of care. The potential impact on reduced length of stay (LOS) with integration in triage is currently being investigated.

Yes, authors have interests to disclose

Disclosure: BrainScope

Consultant/Advisor

BrainScope

## 122 The Effect of Contrast Rationing on the Development of AKI During the Global Contrast Shortage

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Objectives: The use of iodinated contrast media (ICM) is essential for diagnostic performance of computed tomography (CT) imaging. Historically, ICM has been associated with acute kidney injury (AKI). For this reason, ICM is withheld from patients with reduced renal function. Recent observational studies have failed to find an association between ICM and AKI, calling into question this practice. Due to ethical concerns, prospective randomized studies are impossible. In April of 2022, the global supply of ICM was disrupted. Secondary to the resultant shortage, our hospital adopted rationing measures. This rationing presented a unique opportunity to examine the relationship of ICM and AKI. This study aimed to test the hypothesis that there would be no association between the rationing of ICM and the incidence of AKI.

Methods: An IRB approved, multi-center retrospective cohort analysis compared the incidence of AKI in patients who presented before (March 1 to April 30, 2022) and during (June 1 to July 31, 2022) ICM rationing. Adult patients who had a CT of the abdomen performed at 1 of 6 emergency departments and who had at least 2 creatinine measurements, at least 24 hours apart, were included. Data were abstracted from the electronic medical record, including: age, sex, race, comorbid conditions (hypertension, diabetes mellitus, chronic kidney disease, congestive heart failure), acuity score, ICM administration, disposition, and creatinine levels (within 7 days of presentation). The maximum change in creatinine was determined by subtracting the maximal creatinine obtained with the initial creatinine. The primary outcome was the development of AKI, defined as an increase in creatinine of ≥ 0.3 mg/dl or a percentage increase in creatinine ≥ 50%. The incidence of AKI was compared between groups and an adjusted odds ratio was calculated. Subgroup analysis compared the incidence of AKI by whether contrast was administered, as well as stratified by initial estimated glomerular filtration rate (eGFR). Continuous and categorical data were analyzed using t-tests and Chi-Square analysis respectively.

Results: A total of 2,168 patients met inclusion criteria, 1082 before and 1086 during contrast rationing. There was no significant difference in age, gender, comorbid conditions, disposition, or initial eGFR between groups. In the pre-rationing group, 87.7% of patients received ICM compared to 42.7% in the rationing group (p=<0.001). There was no significant difference in the development of AKI between the pre-rationing and rationing groups (11.1% vs. 11.0%, p=0.9213). When adjusted for age, sex, race, comorbidities, and triage acuity, patients in the pre-rationing group were 10.0% more likely to develop AKI (aOR 1.10 95% CI 0.6351.906, p=0.7333), which was not statistically significant. Results are further displayed in Table 1.

Conclusions: An intervention aimed at rationing, and therefore significantly reducing, ICM administration, did not result in a significant difference in the development of AKI. Given ethical concerns precluding the randomization of ICM administration, the global contrast shortage allowed for a unique study design that ameliorates the bias that has confounded previous studies. The results of this study further support recent studies which have failed to find that ICM confers a risk of renal damage, indicating that withholding this important diagnostic modality is unjustified by available evidence.

**Table 1: The Development of AKI Before and During Contrast Rationing**

| | Pre-Rationing (n=1082) | | | Rationing (n=1086) | | *p* |
|---|---|---|---|---|---|---|
| Overall n(%) | 120 (11.1) | | | 119 (11.0) | | 0.9213 |
| The Development of AKI Stratified by Contrast Administration and Baseline eGFR, n(%) | | | | | | |
| **Baseline eGFR** | Contrast 949 (87.7) | No-contrast 133 (12.3) | *p* | Contrast 464 (42.7) | No-contrast 622 (57.3) | *p* |
| Any eGFR | 97 (10.22) | 23 (17.29) | 0.1015 | 39 (8.41) | 80 (12.86) | 0.0200 |
| >45 mL/min/1.73m² | 34 (4.9) | 1 (3.45) | 0.7945 | 15 (3.99) | 6 (1.59) | 0.0450 |
| ≤45 mL/min/1.73m² | 22 (19.13) | 1 (6.67) | 0.2341 | 12 (21.43) | 14 (16.87) | 0.4988 |
| <30 mL/min/1.73m² | 41 (56.94) | 21 (23.60) | <.0001 | 12 (37.50) | 60 (37.27) | 0.9801 |

No, authors do not have interests to disclose

## 123 Increasing Diversity in Emergency Medicine Through a Summer Fellowship

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Background: Pipeline programs play a key role in increasing diversity in medicine, which is critical to improving care for patients of all backgrounds. They also allow students underrepresented in medicine (UIM) to cultivate community and feel supported, thereby improving long-term professional well-being. The University of California, San Francisco (UCSF) Emergency Medicine UIM Fellowship program provides research, mentorship, and clinical opportunities for UIM students interested in emergency medicine (EM). We explored students' perceived barriers to pursuing a career in EM and evaluated the preliminary effectiveness of our program.

Methods: UIM students from across the United States were invited to apply to a six-week EM-focused summer fellowship at UCSF. Ten students were selected and participated in clinical, procedural, and research-oriented didactics. Students were also paired with research and career mentors to collaborate with during and beyond the program. Students completed anonymous pre- and post-program surveys, as well as qualitative exit interviews.

Results: Students demonstrated increased self-reported confidence in procedural (p=0.01), clinical (p=0.02), and research skills (p=0.05) after completion of the program. All students reported UIM-specific mentorship as "extremely important" or "very important" to their career trajectory in EM. Interviews yielded three main themes describing barriers to an EM career. Participants reported: (1) numerous interpersonal challenges throughout their journey including imposter syndrome, lack of representation, and experiences with discrimination; (2) significant financial barriers, including difficulty affording educational resources; and (3) lack of formalized mentorship opportunities and reliance on self-made networks for academic support to succeed in their academic trajectories. Finally, participants described a (4) reliance on

pipeline programs, such as this fellowship, to alleviate many of the aforementioned challenges and to provide opportunities for UIM-centered community-building.

Conclusions: This program successfully increased interest in EM amongst UIM students and boosted their confidence in procedural, clinical, and research skills. Our evaluation demonstrated that providing students with UIM-focused mentorship and community-building spaces are important ways to address common barriers to pursuing a career in EM. These same principles can be used by other institutions to develop pipeline programs that continue the important work of diversifying the EM workforce.

No, authors do not have interests to disclose

## 124 Resident Career Decisions in Emergency Medicine: A Qualitative Study

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Objectives: Post-residency career choices are complex decisions that involve personal, professional, and financial preferences, and may be influenced by training program characteristics. It is unclear how residents navigate these important career decisions during Emergency Medicine (EM) residency training. We explored EM resident career decision-making and resident perspectives on how residency programs can best support their career planning.

Methods: We performed a qualitative study using a constructivist-interpretivist paradigm and conducted semi-structured interviews at seven Accreditation Council for Graduate Medical Education (ACGME) accredited EM residency programs. Participating sites included diverse locations and training formats. We used purposive sampling to reflect the diversity of trainees with regard to gender identification, year of training level, and current career plans. Two researchers independently performed a thematic analysis of interview transcripts.

Results: We interviewed 11 residents and identified three overarching concepts: 1. Exposure to career options, 2. Career decisions mediated through personal and external influences, and 3. Program-level support for career decisions. Residents described being exposed to career options through formalized curricula such as required rotations, career fairs, and subspeciality tracks. They also highlighted the importance of access to faculty with diverse areas of clinical and academic expertise. Many noted that exposure was often self-driven and described how they deliberately sought mentorship and actively participated in potential areas of career interest. Even with participants' varied career plans, we identified three major themes in their career decisions: influential factors, people involved, and processes of decision-making. Influential factors included personal interests, goals, and values as well as practice characteristics, financial considerations, timing, and opportunity costs. Mentors and family were highly involved in resident career decisions. Residents often utilized reflection and conversations with mentors and peers in their decision-making process. Some also reported a need to get creative with their plans to meet desired goals and outcomes. Participants recommended that programs provide exposure to diverse options early in training, protect time for career education, as well as ensure adequate mentorship and a supportive community. Participants also suggested specific content such as exposure to various career paths in EM, prior graduates' paths, job search logistics, and methods to support transition to a post-residency lifestyle. Participants also identified critical mentorship and advising strategies such as supporting resident self-direction, requiring broad career exposure within the curriculum, designing flexibility in electives for career exploration, and requiring periodic reflection for career planning.

Conclusions: This study illuminates important factors involved in resident career decision-making and how programs can support their trainees in this important process. Essential components include diverse experiences and building a reflective mentorship environment.

No, authors do not have interests to disclose

EMF

## 125 The Geographic Alignment of Emergency Physician Birth State, Medical School State, Residency Training State and Current Practice State

Haas M, Hopson L, Kayko C, Haggins A, Burkhardt J/University of Michigan, Ann Arbor, Michigan, US

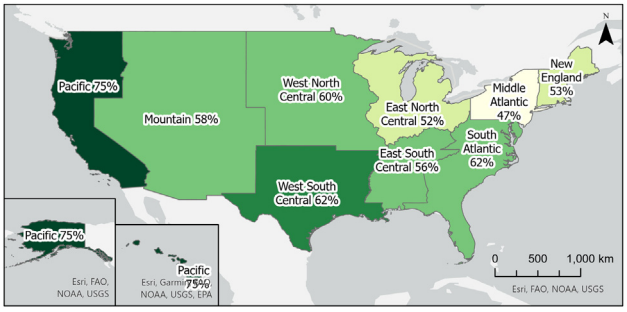
Background: The emergency medicine workforce geographic distribution poorly aligns with areas of the US with scarce access to healthcare. Decision-making for practice location is influenced by individual preferences; however, it is unclear how external factors such as exposure to different geographic settings influence where emergency physicians (EPs) practice.

Objectives: We sought to understand geographic associations with practice locations and specifically to what extent location of birth state, medical school and residency programs align with where EPs elect to practice clinically. We hypothesized that a large percentage of individuals would practice in the same state of previous exposures, and that EPs would be more likely to currently practice in regions where they completed residency training.

Methods: We performed a cross-sectional study utilizing the 2021 American Medical Association Masterfile data on self-designated EM physicians (N=59,588). We examined alignment between birth state, medical school state, and residency training state, with current practice state as defined by office location. We also investigated the percentage of EPs who currently practice in the same U.S. Census division as their residency program, to aggregate for states with minimal or no EM residency training positions and to account for small movements across state borders. We excluded EPs categorized as residents, fellows, clinically inactive, on temporary assignments (e.g., locums), and those with missing location data.

Results: Following application of exclusion criteria, 34% (10367/30637) of EPs were currently practicing in their birth state, 37% (12904/34706) of EPs were currently practicing in the same state as their medical school, and 45% (15615/34818) of EPs were currently practicing in the same state as their residency program. Younger and early career EPs' current practice state were more likely to align with their birth and residency state, with the strongest association between residency training state and current practice state. Women (47.1%) were significantly more likely than men (44.0%) to practice in the same state as residency training ($p<.001$); however, overall effect size is small. Of the nine U.S. Census divisions, the Pacific division had the highest percentage of division of residency training matching the division of current practice (75%) and the MidAtlantic had the lowest (47%). Results from multivariable logistic regression analysis showed that the odds of alignment between residency training division and current practice division were significantly higher for the Pacific division compared to all others (all ps <.001), even after age and sex were statistically controlled. Figure 1 indicates percentages of EPs for which residency training location fell in the same division as current practice location for each U.S. Census division; a darker shade of green indicates a higher alignment.

Conclusions: Over a third of EPs practice in their state of birth, medical school, and/or residency training, with the highest alignment between residency training state and current practice state. There are also strong regional trends with the Pacific division showing the highest levels of concordance. This study highlights the influence of background and geographic exposures on practice location. Further research is needed to better understand how various factors are weighted to optimize recruitment of EPs to medically under-resourced areas.




No, authors do not have interests to disclose

## 126 National Survey of Staffing Patterns of Non-ACGME Fellowships at 4-Year Residency Programs

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Objectives: Emergency Medicine (EM) training in the United States varies greatly, with varying lengths of residency training (3 vs 4 years) and numerous fellowships offered both accredited and non-accredited by the Accreditation Council for Graduate

Medical Education (ACGME). Due to the lack of a unifying governing body, non-ACGME fellowships have variable hiring processes and clinical expectations for graduates of 3 vs 4-year programs. There is no standardized policy that dictates whether or not a fellow graduate of a 3-year EM program is allowed to staff a resident at a 4-year EM program. There are currently no best practices or guidelines from the literature that inform how most programs address this possible scenario. In this study, we sought to evaluate the staffing patterns of non-ACGME fellowships at 4-year residency programs.

Methods: This was a cross-sectional survey evaluating fellowship staffing practices at 4-year EM residency program accredited by the ACGME. We identified 4-year EM programs using the EMRA Match List and the AAMC ERAS Directory. We then used the SAEM Fellowship Directory and each program's EM residency website to compile a list of non-ACGME fellowships and the contact information for their respective fellowship directors. We specifically focused on non-ACGME fellowships due to variability in institutional policy that stems from the lack of a unifying governing body that standardizes requirements across programs. We utilized an online survey platform, Qualtrics, to develop and distribute our survey. This survey was distributed between January and April 2023 using a listserv followed by targeted emails to fellowship directors. Data was summarized using descriptive statistics.

Results: We identified 54 four-year EM residency programs in the United States. Of the 54, 32 offered at least one non-ACGME fellowship with a total of 128 fellowships identified. The survey was sent to 128 fellowship directors (FDs) and we received 98 responses for a response rate of 76.6%. After adjusting for opt-outs we collected 88 responses in total (88/119) for an adjusted response rate of 73.9%. 75% of respondents (66/88) stated that they hire or match graduates of 3-year EM programs for their respective fellowships. An additional 4.55% (4/88) identified that they have not yet but would consider matching or hiring a graduate of a 3-year EM program. 80% (56/70) of respondents indicated that they allow their fellows who graduated from 3-year EM programs staff with certain residents. Of the programs that do hire or match graduates of 3-year EM programs, 72.1% (44/61) reported that there are no special requirements outside of being hired that their fellows must meet. Department policy was the most frequently cited reason for programs to not hire fellows from 3year programs (14/30). 41.2% (7/17) of respondents indicated that not hiring fellows graduating from 3-year programs negatively impacted their recruitment of new hires in general.

Conclusions: A majority of fellowship programs at 4-year residency programs both recruit graduates of 3-year programs and allow them to staff residents of lower PGY status. There is, however, variability in the requirements and locations in which fellows are able to staff residents. This survey data informs programs on how comparable fellowship programs recruit and how to develop staffing practice patterns that fit the needs of their fellows and residents.

No, authors do not have interests to disclose

## 127 Program Director Longevity in Emergency Medicine Residencies: A 40 Year Analysis

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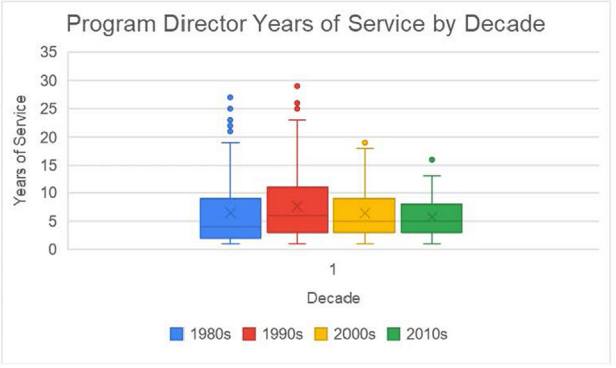
Objectives: The practice of emergency medicine (EM) and the responsibilities of the EM residency program director (PD) have changed since EM first became a specialty in 1972. Challenges in clinical practice, decreased protected time for residency faculty educators, and increasing program administrative requirements have added to the substantial workload of the PD role in recent years. We sought to assess trends in PD duration of service over the last 40 years and evaluate relationships between duration of service and important factors such as PD start year, geographic region, and year of program initial accreditation.

Methods: We retrospectively analyzed program data from the American Medical Association Graduate Medical Education Directory and Emergency Medicine Residents' Association Match database. We abstracted data using a standardized form including year, program, PD name, geographic region, and year of initial program accreditation. We calculated descriptive statistics and used linear regression to assess the impact of PD start year, region, and year of program initial accreditation on PD duration of service. We excluded data from PDs who began their role in the year 2020 or later. For the regression analysis we further excluded data from PDs who had incomplete data or served as PD at multiple institutions.

Results: We gathered data on 783 unique PDs between 1983 and 2022. We excluded data from 47 PDs who began their roles between 2020 and 2022. The overall mean PD duration of service was 6.42 years +/- 4.77 (range 1-29). Mean duration of service by decade of start date was 6.49 years +/- 6.07 in the 1980s, 7.6 years +/- 5.83 in the 1990s, 6.40 years +/- 4.30 in the 2000s, and 5.66 years +/- 3.13 in the 2010s (Figure). For the regression analysis we excluded data from an additional 52 PDs who served at multiple institutions and 25 who did not have complete data. Both PD start year (B = -0.033; p = 0.023; 95% CI [-0.062, -0.005]) and program initial accreditation year (B= -0.044; p = 0.002; 95% [-0.072, -0.016]) significantly predicted duration of PD service. Region did not significantly predict duration of PD service (B = 0.196; p = 0.221; 95% CI [-0.119, 0.511]).

Conclusions: Duration of service as a PD is decreasing in recent decades. Both PD start year and year of initial program accreditation significantly predict duration of service as PD. Future research must be done to better understand this phenomenon and uncover strategies to promote PD longevity.




No, authors do not have interests to disclose

## 128 Effect of COVID-19 Pandemic on Emergency Medicine Resident Education

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Objectives: United States residency programs have didactic and clinical experience requirements for certification/licensure. At the onset of the COVID-19 pandemic, isolation and social distancing mandates required many activities to be remote. We aim to describe the impact the pandemic had on emergency medicine (EM) resident education and future plans and compare it with non-EM residents.

Methods: This was a cross sectional study using an anonymous survey. The study was IRB exempt and informed consent was obtained. The survey was distributed electronically to residents at a single institution via departmental mailing lists (EM, surgery, internal medicine, OB/GYN and pathology). Outcomes were summarized by count and percentage. Univariable and multivariable logistic regression models were used to assess associations between the pre-chosen covariates.

Results: A total of 121 residents completed the survey. EM (41) and non-EM (80) residents were comparable in gender, age, marital status and postgraduate year in training. Non-EM residents were more likely to have an increase in work hours while EM resident hours were unchanged. On univariable analysis, married/domestically partnered residents and those in non-surgical specialties were more likely to meet training requirements (OR, 2.71; 95% CI, 1.04 to 7.21; p = 0.041) (OR, 4.04; 95% CI, 1.53 to 10.97; p = 0.005) respectively. On multivariable analysis, residents whose mental health was not negatively impacted were more likely to keep the current teaching practices compared to those with negative impact (OR, 2.43; 95% CI, 1.02 to 6.05; p = 0.046). A majority of residents both EM and non-EM indicated that the pandemic negatively affected their mental health. Although not statistically significant, most residents indicated they did not change their post-residency plans secondary to the pandemic. In EM, 7/41 indicated they changed plans; 43% will pursue fellowship when that was not their original intent.

Conclusions: Our survey showed residents perceived the COVID-19 pandemic had a negative effect on their mental health and education. EM residents did not differ from non-EM residents in most areas; EM residents did not have to increase their overall work hours while non-EM residents did. Some EM residents changed career

plans because of the pandemic. There is room for future study on the results of those choices, including the commitment and satisfaction of those who changed paths.

No, authors do not have interests to disclose

## 129 A Novel Teaching Intervention Improves Comfort With Delivering Serious News in Emergency Medicine Trainees

Harvey C, Kadri A, Chen C, Cranford J, Taylor L, Mendez M/University of Michigan, Ann Arbor, Michigan, US

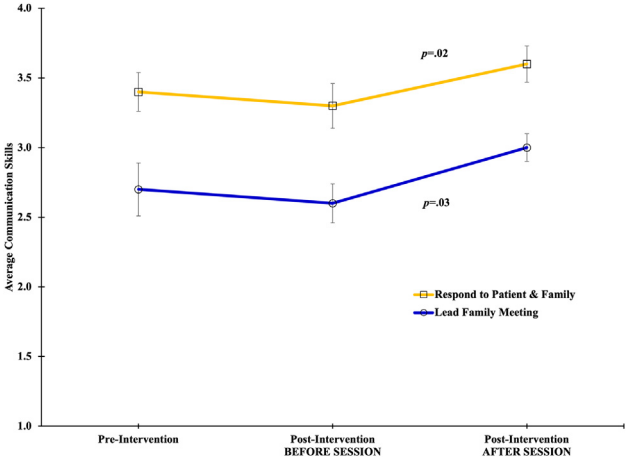
Objectives: Delivering serious news (DSN) is one of the most challenging tasks for physicians, which is intensified by stressors unique to the emergency department (ED), such as time constraints, limited information, and lack of established patient-provider relationship. Emergency medicine (EM) trainees often deliver serious news with little to no formal communication skills training. MTalk is an educational tool for healthcare providers at Michigan Medicine to learn communication skills for serious illness discussions in a psychologically safe environment. The purpose of this study was to evaluate learner comfort with DSN after implementation of MTalk into EM residency orientation.

Methods: First-year EM trainees participated in a novel curriculum utilizing experienced faculty facilitators and trained actors to realistically simulate a common ED scenario requiring serious news discussion. During the 2-hour session, facilitators led a brief didactic session followed by simulation with the actors, with immediate feedback provided. Participants completed a pre- and post-survey of several 4-point Likert-type items to assess their comfort level with leading a family meeting, delivering serious news, and recognizing emotion and responding with empathy.

Results: Sixteen first-year EM trainees participated in the teaching intervention. Learner comfort with leading a family meeting, recognizing emotion, and responding with empathy increased after the session, though the differences were not statistically significant (p=0.16 and p=0.27, respectively). When comparing learner comfort before and after the session based only on the post-survey data, there were statistically significant increases in communication skills (p=0.03 and p=0.02, respectively). The majority of learners rated the overall education quality as excellent (87.5%) and found the effectiveness of actors in simulating real encounters extremely effective (78.6%). All strongly agreed or agreed that additional communication training sessions should occur.

Conclusions: Despite the small sample size, improved comfort with DSN after a novel teaching intervention was reported among first-year EM trainees. Interestingly, learners rated their pre-intervention comfort with DSN lower on the post-survey compared to the pre-survey. Since most learners rated the actors extremely effective, this could be because the realistic emotional encounter affected their response. Lack of exposure or education surrounding DSN may have also contributed. Learner satisfaction with the education quality and methods was high, likely due to actor effectiveness, actionable feedback, and/or psychological safety.

Next steps: Future work includes increasing the number of sessions for additional skills training, investigating skill retention following the session, and expansion into other EM learner groups, such as faculty development or medical student clerkship.




No, authors do not have interests to disclose

## 130 Older Adult Patient Engagement in Advanced Care Planning

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Objectives: Advanced care planning (ACP) is a process that involves clarifying and documenting an adult's values, preferences, and goals regarding future medical care. This includes an individual's preferences surrounding cardiopulmonary resuscitation (CPR) and a ventilator. Research from the 1990s and 2000s found that most older adults had not engaged in ACP. As the last two decades have seen significant progress in education and communication surrounding end of life decision making, we sought to describe older adult engagement in ACP in this changed landscape.

Methods: We surveyed a convenience sample of emergency department (ED) patients aged ≥65 years in our tertiary ED on their engagement with ACP and sources of information about cardiopulmonary resuscitation (CPR). Group differences were evaluated using chi-square analysis and logistic regression modeling was employed to assess potential predictors of ACP engagement.

Results: 149 patients participated in the study; 54% (n=81) were male, mean age 75 years (range 65-100). 59% (n=88) reported having an ACP document. Few participants discussed their wishes about CPR (38%, n=57) or a ventilator (13%, n=19) with a doctor, but 66% (n=99) had spoken with family about their wishes. Patients who reported receiving information about CPR from a medical provider (17%, n=92) were more likely to have had ACP conversations with loved ones (p=0.004) and to have discussed their CPR wishes with a doctor (p=0.002).

Conclusions: In this survey of ED older adult patients, a majority of participants reported having ACP documents. While most older adult patients reported having conversations about their wishes surrounding CPR and a ventilator with their families, a minority of participants had discussed their wishes with a doctor. Patients who had received education about CPR from a medical provider were more likely to be engaged in advanced care planning. Findings suggest that doctors should work to engage their older adult patients in ACP conversations and future research focused on increasing the number of older adults with ACP documents is warranted.

No, authors do not have interests to disclose

## 131 Addressing Palliative Medicine Knowledge Gaps Amongst Emergency Medicine Providers: A Quality Improvement Project

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Objectives: Emergency Providers (EPs) across the United States face high volumes of End-of-Life (EOL) patients and must make rapid decisions regarding symptom management and disposition for these patients. A recent study showed that 75% of patients aged 65 and older visited an emergency department (ED) in their last 6 months of life, and 51% in the last month (1). Furthermore, early goals of care conversations (specifically, within days 0-1 of admission) are associated with reduced hospital costs and reduced hospital length of stay (2). Therefore, it is increasingly important to educate EPs on how to provide palliative care in the ED. Our study aimed to identify gaps in EP palliative medicine knowledge and provide them with original learning modules to help address those knowledge gaps.

Methods: Questionnaires were distributed to EPs at six Atrium Health affiliated hospitals in North Carolina. The hospitals were a mix of community and academic sites. The questionnaires included demographic information, basic palliative medicine clinical questions, and questions regarding EP comfort with implementing core palliative medicine principles in the ED on a 5-Point Likert Scale. Thirteen original video learning modules were created which highlighted the most frequently missed questions and concepts from the quiz. These modules were then distributed to the EPs at these institutions.

Results: A Total of 70 EPs completed at least part of the questionnaire, with 58 completing the entire questionnaire. Fifteen (21%) were either resident or fellow, ten were APPs (14%), and forty-four were attending physicians (64%). The most frequently missed questions involved opioid conversions (6.8% correctly answered a question involving opioid equivalent dosing), dyspnea management at the end-of-life (28.8% correctly answered a question regarding drug type and dosage for dyspnea management at the EOL), and the North Carolina Portable DNR Form (45.8% correctly answered a question regarding management of a patient with a signed Portable DNR Form). Nearly 45% of participants indicated that they are unaware of

the process necessary to access ACP documents in the EMR and are uncomfortable interpreting those documents.

Conclusions: Palliative medicine is an important aspect of ED care, especially with the increasing number of EOL patients that EPs are encountering. Through our questionnaire, we found that EPs could improve their core palliative medicine knowledge, and we created learning modules to help address those knowledge gaps. Further research can be conducted to see if our learning modules lead to decreased hospitalizations for patients at the EOL, and if they increase EP palliative medicine knowledge, comfort, and skill.

No, authors do not have interests to disclose

## 132 Geriatric Emergency Department Guidelines 2.0: A Systematic Review of Emergency Department-Based Geriatric Medication Programs to Reduce Potentially Inappropriate Medications and Adverse Events

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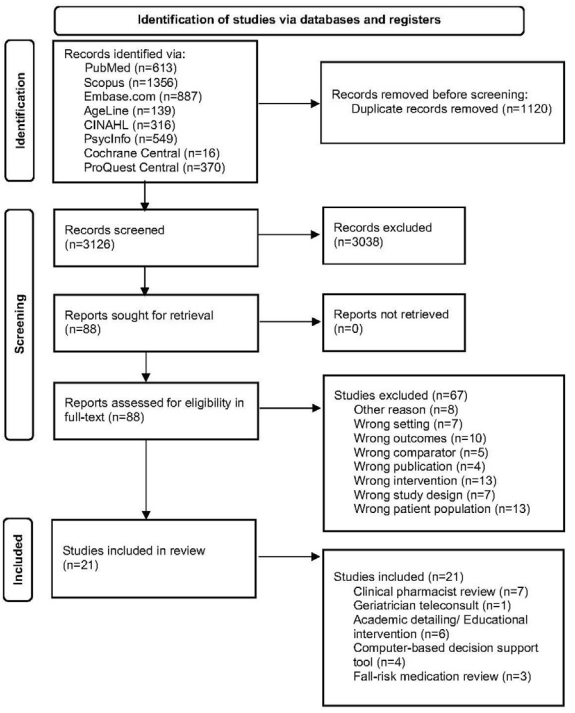
Objectives: Older adults aged ≥65 years are at high-risk for adverse drug events (ADEs) due to polypharmacy, co-morbidities, and aging physiology, which leads to adverse health outcomes. Thus, the 2014 Geriatric Emergency Department (ED) Guidelines recommends screening for polypharmacy and potentially inappropriate medications (PIMs). Many ED studies have evaluated the impact of geriatric medication program interventions to optimize safe medication practices for older ED adults. We conducted a systematic review of published literature to identify which ED-based geriatric medication programs are effective at reducing PIMs and ADEs.

Methods: We created a search strategy to identify studies that analyzed the impact of ED-based geriatric medication programs that provide support for ED clinicians to avoid PIMs. We searched the published literature using PubMed, Scopus, Embase, AgeLine, CINAHL, PsycInfo, Cochrane Database of Systematic Reviews, and ProQuest Central in July 2022. Studies were included if they focused on geriatric (aged ≥65 years) medication programs, defined broadly as educational, pharmacist review, or decision support tools that aid ED clinicians when prescribing medications either while the patient is being treated in the ED or at the time of discharge. Outcomes of interest included prescribing rates, deprescribing rates, comparison of pre- and post-intervention PIM rates, or adverse event rates. Abstract screening and full-text review were independently conducted by two researchers, with a third team member acting as an adjudicator. Each study was assessed for risk of bias (ROB). Then, we summarized the primary literature regarding the utility of ED-based geriatric medication programs to reduce PIMs.

Results: The search strategy identified 3,126 unique studies. A total of 21 studies were included in this systematic review evaluating the following interventions: 7 clinical pharmacist review, 1 geriatrician teleconsult, 6 academic detailing/ educational intervention, 4 computer-based decision support (CDS) tool, and 3 fall-risk medication review. Nearly half of studies had moderate/some concerns of ROB and one-third had serious/high ROB. Qualitatively, there was little to no evidence that a clinical pharmacist review decreases subsequent healthcare utilization; however, a few studies showed decreased hospital admission and length of stay. One study demonstrated that geriatrician teleconsult enhanced deprescribing of PIMs, medication changes, and dose reductions. CDS tools consistently improved recommended dose administration, promoted deprescribing of inappropriate medications, and decreased prescribing of inappropriate prescriptions with high acceptance rate from physicians. There was mixed evidence that educational interventions and academic detailing enhances prescribing practices. Unfortunately, when examining falls as an outcome, medication programs have not seemed to impact fall rates significantly.

Conclusions: For discharged older ED patients, CDS tools alone or in combination with ED clinician education have a measurable impact on safe geriatric prescribing practices. A multidisciplinary team, involving a pharmacist and/or geriatrician, may also benefit patients requiring hospital admission. This systematic review supports continued geriatric medication management in updating the Geriatric ED Guidelines 2.0. EDs should consider implementing CDS tools or multidisciplinary teams to improve prescribing practices for older ED patients.

Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flowchart




No, authors do not have interests to disclose

## 133 In-Home Urgent Care for Elderly, Poly-Chronic Patients and Emergency Department Utilization

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Objectives: Safe disposition of elderly, poly-chronic patients once in an emergency department (ED) is challenging and, for safety reasons, often results in an inpatient admission or observational stay. We reviewed the incidence of ED utilization twenty-eight (28) days following an urgent visit episode of care index visit, by an in-home mobile medical group primarily managing elderly, poly-chronic patients that operates in 28 states providing both longitudinal and urgent care during and after normal business hours.

Methods: Retrospective review of patients who had an urgent visit (UV) and any follow-up visits between 11/1/2021 to 10/31/2022 to determine emergency department utilization. An ED visit was determined to have occurred using completed claims data. Landmark is a full risk medical group that receives all claims from multiple payors, mostly Medicare part C. Following an urgent visit patients may be seen again to ensure treatment efficacy with higher clinical complexity patients encouraged to have more touches. The primary outcome was ED utilization 28 days post index UV. Secondary outcomes where reasons for ED utilization and ED utilization based on case complexity assigned by the provider at the urgent visit and frailty scores.

Results: 59,240 urgent visits occurred between 11/1/2021 to 10/31/2022. 25% of patients went to the ED within 28 days following the UV with an inpatient admission rate of 39.8% as validated by claims data. 10% (5339) were considered high complexity cases, 34% (19841) medium complexity and 42% (24736) low complexity. 14-day post urgent visit episode of care closure ED visit rates were 45%, 26% and 20% for high, medium, and low complexity patients respectively. 15% (8724) who weren't assigned a complexity had an ED visit 25% of the time within 14-days post urgent visit episode of care closure (Table 1). 6.9% of patients seen for an in-home UV were sent directly to the ED and 56% of all patients seen for a UV presented to the ED within 4 days (Graph 1). Average time to an ED visit post index urgent visit was 4.5, 8.3 and 9.9 following a UV for high, moderate, and low clinical complexity respectively. The number of clinical touches following the index visit didn't vary a lot between complexities.

We had frailty scores on 98.8% of patients who had a UV with those considered high and medium complexity having a higher frailty score than those with a low complexity. In contrast the claims-based frailty index for these patients was higher for high, medium, and low complexity at 0.35, 0.26 and 0.18. 47% of the visits were done in the home by a provider, 21% using a non-provider in the home most often a paramedic and 32% via tele video or telemedicine. The top 3 UV clinical classifications software (CSS) categories were COPD (6%), UTI (6%) and heart failure (4%) (Table 2). 64% of UV's occurred during regular business hours, 19% weekday after hours and 18% on weekends.

Conclusions: Elderly, poly-chronic patients seen in the home for an urgent visit present to the ED $^{1}/_{4}$ of the time within 28 days of that index visit. Over half of all ED visits presented within 4 days. Both clinical complexity and frailty predicted higher ED utilization post UV. The number of visits following the index UV didn't vary among those with higher or lower clinical complexities.

**Table 1**

**Index Urgent Visits**

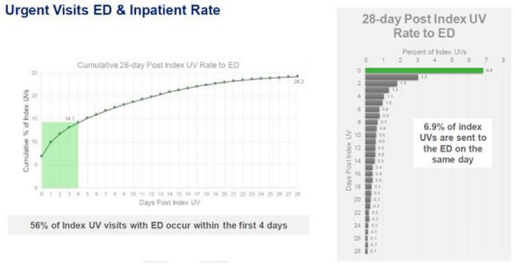
- 59,240 index UV Visits were completed between 11/1/2021 to 10/31/2022.
- UV EOC with High and Low complexities have 40% and 15% 14-day post index ED/IP rate, respectively. Single UV Visits have a 25% 14-day post index ED/IP rate.
- Higher complexity index UV cases have marginally higher RAF and clinical frailty scores.

| Anticipated Complexity | | Avg. Touches Post Index UV[1] | 14-day Post EOC Closure | | 14-day Post Index UV visit | | Avg. Risk Adjustment Factor Score[3] | Avg. Clinical Frailty Score[4] | Avg. Claims Based Frailty Score[5] |
|---|---|---|---|---|---|---|---|---|---|
| | | | ED/IP rate | Avg. days to ED/IP[2] | ED/IP rate | Avg. days to ED/IP | | | |
| Total Index UV | 59,240 | 0.9 | 25% | 4.21 | 21% | 7.3 | 3.3 | 4.4 | 0.20 |
| High (3+ visits) | 5,939 (10%) | 0.9 | 45% | 4.38 | 40% | 4.5 | 3.4 | 4.5 | 0.35 |
| Medium (2-3 visits) | 19,841 (34%) | 1.1 | 26% | 4.82 | 20% | 8.3 | 3.3 | 4.5 | 0.26 |
| Low (1-2 visits) | 24,736 (42%) | 1 | 20% | 5.46 | 15% | 9.9 | 3.2 | 4.4 | 0.18 |
| Single UV (No complexity) | 8,724 (15%) | 0 | 25% | 2.47 | 25% | 2.5 | 3.4 | 4.5 | 0.10 |

Data as of 4/12/23

1. # of touches post index UV includes all follow ups within EOC – Index UV is not included in this count.
2. Only calculated when EDIP occurs within 14 days of EOC closure (n=6,702)
3. RAF Score is calculated for 86.1% of index UV Visits (n= 50,963). RAF score is based on the month of Index UV.
4. Frailty Score is calculated for 98.8% of index UV Visits (n=58,512)
5. Kim DH, Schneeweiss S, Lipsitz LA, Glynn R, Rockwood K, Avorn J. Measuring Frailty in Medicare Data: Development and Validation of a Claims-Based Frailty Index. J Gerontol A Biol Sci Med Sci. 2018; 73: 980-987. doi: 10.1093/gerona/glx229. PMID: 29244057; PMCID: PMC6018883 (Suggested cut-points: non-frail <0.15, pre-frail 0. 15 to <0.25, mildly frail 0.25 to <0.35, moderately frail 0.35 to <0.45, and severely frail ≥0.45. The latter three categories could be combined as frail (≥0.25)

**Graph 1**




Yes, authors have interests to disclose
Disclosure: Landmark Health
Employee
Landmark Health

## 134 "What Matters" in the Emergency Department: A Prospective Analysis of Older Adults' Concerns and Desired Outcomes

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Objectives: The Age-Friendly Health Systems initiative is based on the 4Ms framework – What Matters, Medication, Mentation and Mobility. Prior work has shown the feasibility of "What Matters" conversations with individual older patients in the emergency department (ED), yet larger scale studies have not been completed identifying priority concerns and desired outcomes of older adults seeking emergency care. The objective of this study was to describe "What Matters" to older adults seeking ED care and identify patient characteristics associated with older adults meeting their desired outcomes.

Methods: We conducted a secondary analysis of data collected for the Geriatric Emergency care Applied Research Standardization Study (GEARSS), a multicenter-prospective observational study in three geographically diverse health systems' EDs. Inclusion criteria included English-speaking ED patients 65+ years of age with an available follow-up mechanism, while exclusion criteria included patients that were clinically unstable, on psychiatric hold, in respiratory isolation, or with decisional impairment without a legally authorized representative. Research assistants collected "What Matters" data on standardized forms and followed up at two timepoints: 0 days (index ED visit) and 90 days. The "What Matters" questions focused on older adult concerns and desired outcomes for their emergency care. Participants were asked at 90 days if their desired outcomes were met. Older adults could select several pre-specified answer choices and provide free-text responses. We identified the three most common concerns and desired outcomes among older adults seeking emergency care. We then constructed multivariate logistic regression models to determine the association between achievement of the desired outcome and predictor patient characteristics.

Results: In total, 1,013 older adults were enrolled with the most common concerns including 1) symptom identification or persistence, 2) ability to take care of oneself, and 3) end-of-life. During emergency care, the most common desired outcomes were: 1) getting well and symptom resolution, 2) obtaining a diagnosis, and 3) functional independence. At 90 days after the index ED visit, the 667 older adults who completed follow-up were most concerned with 1) the ability to take care of oneself, 2) obtaining medication and managing chronic conditions, and 3) symptom identification and/or persistence. At 90 days, 441 (66.2%) felt that their desired outcomes were met. Frailty (aOR=0.56, 95% CI: 0.38 to 0.83, p<0.01), college level education (aOR=0.60, 95% CI: 0.42 to 0.88, p=0.01), and Medicaid insurance status (aOR=0.66, 95% CI: 0.43 to 10.00, p=0.05) were characteristics associated with older adults not meeting their desired outcomes.

Conclusions: When answering "What Matters" questions in the emergency department, older adults were most concerned with symptom identification, caring for oneself, and end-of-life, with these concerns evolving over time. At 90 days post ED visit, two-thirds of older adults who were asked "What Matters" had their desired outcomes met.

No, authors do not have interests to disclose

## 135 Early Femoral Arterial Access in Trauma: Does it Make a Difference?

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Objectives: Early common femoral arterial (CFA) access allows for more accurate blood pressure (BP) monitoring in the critically injured patient and is often the rate-limiting step for endovascular tools like REBOA. We hypothesized that early CFA access could be placed without impeding resuscitation efforts or increasing time to hemostasis.

Methods: We performed a prospective, observational cohort study using video review for trauma patients presenting with significantly abnormal physiology, comparing those who received an arterial line to those who did not. CFA lines were placed at the discretion of the trauma team leader, who was later surveyed to determine if the arterial line placement significantly affected management decisions or impeded the resuscitation. Video review facilitated the collection of initial treatments, vital signs, patient disposition, and procedural details (timestamps of specific procedure steps and operator characteristics).

Results: 98 patients were enrolled between March 2022 and March 2023, and 73 trauma resuscitations were available for video review. There was no difference between those who had CFA access (n=25) placed and those who did not (n=48) with respect to signs of life on arrival (p=0.78), prehospital transport (p=0.08), and vital signs. The mean time from arrival to start of CFA line placement was 13.3 min (SD 8.1 min) and the mean time from start to finish of the procedure was 7.9 min (SD 4.3 min). Those who had CFA access placed were more likely to have a higher injury severity score (p=0.03), a lower Glasgow Coma Scale (p=0.02), and a higher volume of plasma transfused in the trauma bay (p=0.03). Ultrasound use was associated with higher first-pass success (p=0.03) and was about 2.8 min faster, though not statistically significant (p=0.06). Systolic BPs measured by arterial lines were 14.0 mmHg lower than noninvasive measurements (p=0.05), while invasive mean arterial pressure was 17.4 mmHg lower than cuff measurements (p<0.01). Although patients with CFA access spent about 13 min longer in the trauma bay (p<0.01) and had a time to incision of approximately 7 min longer (p=0.04), there was a trend towards shorter time to hemostasis in patients that had CFA lines (171.4 vs 211.7 min, p=0.21). 6- and 24-hour mortality were similar in both groups (OR 0.35, CI 0.07-1.71 and OR 0.3, CI 0.08-1.07, respectively). Twelve trauma team leaders completed the post-resuscitation survey. Of those, eight respondents (75%) believed that the CFA

changed management with respect to either disposition, need for REBOA, or blood product administration. None of the respondents believed that CFA placement impeded the resuscitation. No complications related to arterial access were noted.

Conclusions: In this cohort, early CFA access was more likely to be placed in more severely injured patients, was associated with shorter time to hemostasis, and was more likely to affect management decisions. Invasive measurements of SBP and MAP were lower than noninvasive measurements. There were no significant differences in mortality and no adverse events were observed due to arterial line placement. Randomized trials will be required to assess the direct impact of CFA access on patient resuscitation and outcomes.

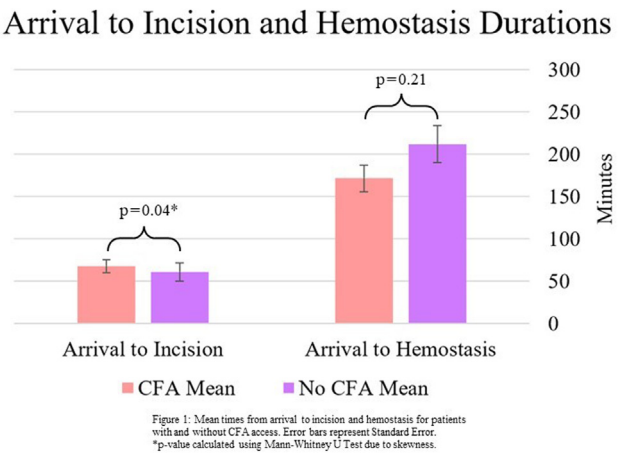


Figure 1: Mean times from arrival to incision and hemostasis for patients with and without CFA access. Error bars represent Standard Error. *p-value calculated using Mann-Whitney U Test due to skewness.

No, authors do not have interests to disclose

## 136 Illustrating Quality Improvement in Extended Focused Assessment With Sonography in Trauma Through a Tailored Educational Intervention

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Objectives: To improve the competency of Post Graduate Year (PGY) 1-3 Emergency Medicine (EM) residents at visualizing the most sensitive region in each view of the Extended Focused Assessment with Sonography in Trauma (EFAST) when assessing for free fluid in trauma patients through an educational intervention.

Methods: We conducted a quality analysis of all EFAST studies performed by residents (PGY 1-3) for patients presenting as trauma activations to our emergency department (ED), an urban level 1 trauma center, from August 2022 through October 2022. Variables collected included adequacy of images by EFAST component and overall adherence to the EFAST protocol. Adequate images were defined as those that captured the most sensitive region of each EFAST view and the use of appropriate labels. Views were considered adequate if evaluation of lung sliding bilaterally, circumferential pericardial effusion, Morison's pouch and caudal tip of the liver in the right upper quadrant (RUQ), suprasplenic space in the left upper quadrant (LUQ), and posterior and posterolateral regions adjacent to the bladder in the pelvis were visualized. Studies were deemed adequate if all views were saved and appropriately labeled. Incomplete, unlabeled, or undocumented studies were automatically deemed inadequate. Two independent emergency ultrasound (EUS) fellowship-trained faculty members or active EUS fellows reviewed images and when agreement was present, the label of adequate or inadequate was applied to the study reviewed. Initial deficiencies informed the subsequent educational intervention tailored to residents. The intervention involved a forty-minute didactic session delivered to residents and teaching attendings. Original illustrations clearly emphasizing areas of focus for each view of the EFAST were produced and affixed to US machines as a reference while scanning. Data for three months after this intervention was then collected to evaluate the efficacy at improving image quality.

Results: In the initial 3-month period, our providers saved images with all of the most sensitive regions clearly able to be evaluated 33% of the time. The adequacy rate of appropriately viewing the heart for circumferential pericardial effusion was 82%, the pelvis was 80%, the RUQ was 77%, and lung sliding was 75%. The most challenging view for our providers was the LUQ view with an adequacy rate of 55%. Preliminary results post-intervention show that our providers doubled their competency in obtaining a complete adequate EFAST. The adequacy rate of the LUQ view was 68% post-intervention. Furthermore, the adequacy rate of appropriately visualizing the heart, the pelvis, the RUQ, and the lungs was greater than 92% for each image.

Conclusions: Our findings suggest that educational illustrations tailored to departmental standards helped improve overall quality of EFAST examinations in our ED. Reference standards affixed to US machines can help improve overall quality of US scans. Similar tactics might be applied to other examinations where quality is of significant importance to ensure patient care.

No, authors do not have interests to disclose

## 137 Evaluating Outcomes and Disparities for Police "Scoop and Run" vs Emergency Medical Services Transport for Firearm Injury Patients

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Objectives: Penetrating trauma associated with firearm injury requires time-sensitive treatment. In Philadelphia, a policy known as "scoop and run" allows law enforcement officers to transport shooting victims in their police cars to nearby hospitals immediately without waiting for Emergency Medical Services (EMS). Prior studies evaluating the effectiveness of scoop and run have produced conflicting findings in the policy's ability to improve outcomes for patients sustaining gunshot wounds (GSWs). We sought to evaluate the impact of scoop and run transport on length of stay and hospital mortality, hypothesizing that patients brought to the hospital by police directly would have shorter lengths of stay (LOS) and lower in-hospital mortality. Additionally, we sought to evaluate if disparities exist across patient demographics between police and EMS transport.

Methods: We conducted a retrospective analysis of patients with firearm injuries presenting to seven hospitals in our Philadelphia-area academic health system between Jan. 2016 and Sept. 2022. We used firearm-specific ICD codes to identify patients treated for GSWs. Patient age, sex, race, ethnicity, method of transportation to presenting hospital, length of stay, and mortality during hospital stay were extracted directly from the EHR. We used independent samples T-tests and chi-square analysis to compare differences in these parameters between police and EMS transport groups.

Results: The cohort included 782 patients with GSWs (mean age = 33; 23% female; 80% non-white) with a mean length of stay of 4.2 days and in-hospital mortality of 8.2%. Of those, 159 (20.3%) were transported by EMS and 63 (8.1%) were transported by police car. There was no significant difference in patient age ($p = 0.15$), race (% Black; $p = 0.41$), or ethnicity (% with Hispanic, Latinx, or Spanish origin; $p = 0.36$) between police and EMS transport groups (Police: mean age = 30.2 years [S.D. = 12.7], 60.3% Black, 17.2% Hispanic/Latinx/Spanish origin vs. EMS: mean age = 33.2 years [S.D. = 14.2], 66.4% Black, and 12.8% Hispanic/Latinx/Spanish origin). There was a significant difference in patient sex between police and EMS transport groups (% male; $p = 0.02$; Police: 93.7% male; EMS: 81.1% male). There was no significant difference in LOS between police and EMS transport groups ($p = 0.19$; Police: mean LOS = 2.6 days [S.D. = 4.9] vs. EMS: mean LOS = 4.0 days [S.D. = 7.9]). There was also no significant difference in mortality between police and EMS transport groups ($p = 0.471$; Police: 19.0% mortality vs. EMS: 15.1% mortality).

Conclusions: Male patients with GSWs were more likely to be transported by police than female patients. We found no significant differences in other parameters between the EMS and police cohorts, including LOS and mortality. Additional studies that consider possible confounders like proximity to hospital and injury severity are needed to evaluate the impact of the scoop and run policy on firearm injury patient outcomes.

No, authors do not have interests to disclose

## 138 Association Between Emergency Medical Services Care and Hospital Admission for Trauma Patients Presenting to the University Teaching Hospital in Kigali, Rwanda

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Objectives: Injuries cause significant morbidity and mortality worldwide and disproportionately so in low- and middle-income countries (LMIC). Emergency medical services (EMS) play an integral part in injury care; however, prehospital data from Africa are limited, which may preclude advancement of systems and patient outcomes. This study evaluated the associate between EMS care of injured persons and hospital admission at the University Teaching Hospital (CHUK) in Kigali Rwanda.

Methods: This was a prospective cross-sectional study looking at adult injury patient presenting to CHUK emergency department (ED) between January and June 2022. Patients were compared by transport modality (EMS or self-presented) and ED disposition (admitted, discharged) including demographics and past medical history. Kampala trauma scores were used as a measure of injury severity. Multivariable regression was also performed using STATA version 17.

Results: A total of 528 injured patients were enrolled and analyzed. Of these 114 (21.5%) arrived by EMS. Male patients were the majority (74%) and were more likely to be brought by EMS than female patients (87% vs 13%, $p<0.05$). Most patients (86%) did not have any prior medical conditions. There was higher injury severity as measured by Kampala trauma scores for patients who were transported by EMS ($p<0.001$). Patients brought by EMS were more likely to be admitted to the hospital than patients who self-presented (AOR 2.63, 95% CI 1.69, 4.09). Patients over the age of 65 years (AOR 2.62, 95% CI 1.07, 6.43) and patients who presented to the hospital during the COVID pandemic (AOR 1.57, 95% 1.07, 2.31) were also more likely to be admitted to the hospital. Finally, patients with higher injury severity scores were also more likely to be admitted (AOR 10.16, 95% CI1.22, 84.43).

Conclusions: In this study of injured persons in the LMIC of Rwanda, there were increased odds of admission for trauma patients who were brought to the emergency department by EMS. Trauma patients were brought in by ambulance to the hospital also had a higher burden of injury. This is important to note for enhancing EMS care for such patients, for the emergency department physicians and nurses when triaging such patients and determining resource allocation.

| | Unadjusted OR (95% CI) | Adjusted OR (95% CI) |
|---|---|---|
| Transport | | |
| Transported by EMS | 2.46 (1.63, 3.73) | 2.63 (1.69, 4.09) |
| Not Transported by EMS | 1.00 | 1.00 |
| Sex | | |
| Male | 1.36 (0.92, 2.02) | 1.22 (0.8,1.86) |
| Female | 1.00 | 1.00 |
| Age | | |
| 18-24y | 1.00 | 1.00 |
| 25-44y | 1.02 (0.65, 1.62) | 0.99 (0.62, 1.6) |
| 45-64y | 1.00 (0.56, 1.79) | 1.06 (0.58, 1.95) |
| 65y + | 2.20 (0.96, 5.04) | 2.62 (1.07, 6.43) |
| Past Medical History | | |
| Any PMH | 0.87 (0.51, 1.50) | 0.84 (0.47, 1.52) |
| No PMH | 1.00 | 1.00 |
| Unknown PMH | 1.83 (0.63, 5.37) | 1.62 (0.52, 5.11) |
| Kampala Trauma Score | | |
| 10-12 | 7.17 (2.71, 18.9) | 10.16 (1.22, 84.43) |
| 13-16 | 1.00 | 1.00 |
| COVID | | |
| Pre-COVID | 1.00 | 1.00 |
| During COVID | 1.66 (1.17, 2.39) | 1.57 (1.07, 2.31) |

Table 1. Multivariable regression of odds of admission to the hospital after transport by ambulance

No, authors do not have interests to disclose

## 139 Helmet or No Helmet? An Analysis of Ski- and Snowboard-Related Head Trauma

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Objectives: There is a relative paucity of data regarding the severity of and morbidity resulting from head injuries in helmeted and un-helmeted skiers and snowboarders. This study examines the effect of helmet use on clinical outcomes in snowsport-related head trauma as reported in the National Trauma Databank (NTDB).

Methods: We conducted a retrospective cohort study on patients presenting to level 1 & 2 trauma centers with snowsport-related injuries from 2018-2019. Subjects were identified in the NTDB using ICD-10 codes. Polytrauma was excluded. We compared demographics, injury patterns, and clinical outcomes between helmeted and unhelmeted patients. Outcomes included death, severity of TBI, and ICU length of stay. Moderate TBI was defined as GCS 9-12, and severe TBI as GCS 8 or less. The association of helmet use and outcomes was assessed using multiple regression models adjusted for age, race, emergency department transport, and positive alcohol screen. $P<0.05$ was statistically significant.

Results: We identified 540 ski and snowboard-related trauma patients with isolated head trauma, 286 (55%) were helmeted, and 230 (45%) were unhelmeted. Unhelmeted skiers screen positive for alcohol more often than helmeted skiers, 50.9% versus 33.2% respectively ($p<0.01$). Differences in injury patterns between helmeted and unhelmeted patients were not statistically significant (Table 1). Helmeted patients were less likely to suffer severe TBI than unhelmeted patients (aOR: 0.25 [0.10, 0.61], <0.01). There was no significant difference between helmeted and unhelmeted patients with respect to mortality, moderate TBI, hospital or ICU length of stay (Table 2).

Conclusions: In isolated ski and snowboard-related head trauma reported to the NTDB, unhelmeted patients had a higher risk of severe TBI. The risk of moderate TBI, mortality, and ICU length of stay was not found to be significantly different between helmeted and unhelmeted patients. Lack of helmet use was associated with higher rates of alcohol use. Despite limitations to retrospective data, our findings suggest that helmet use is likely protective against severe TBI. Further research is needed to determine to what extent helmet use is associated with a decrease in other clinical outcomes such as death and ICU length of stay.

Table 1: Demographics and Injury Patterns

| Demographics | Helmet n=286 | No Helmet n=230 | P-value |
|---|---|---|---|
| Age, median (IQR) | 22 (15 - 40) | 23 (18 - 33) | 0.19 |
| Ski, n (%) | 80 (28.0) | 67 (29.1) | 0.77 |
| Male, n (%) | 245 (86.7) | 193 (83.9) | 0.58 |
| Alcohol screen positive, n (%) | 95 (33.2) | 117 (50.9) | <0.01 |
| Head injury, n (%) | | | 0.09 |
| TBI (Subdural, epidural, subarachnoid, intraparenchymal hemorrhage, cerebral edema, and blunt head trauma) | 111 (38.8) | 77 (33.5) | |
| Concussion | 119 (41.7) | 87 (37.8) | |
| Skull fracture | 4 (1.4) | 13 (5.7) | |
| Facial Trauma | 21 (7.3) | 17 (7.4) | |
| Head laceration/ abrasion | 31 (10.8) | 36 (15.7) | |

Table 2: Primary Outcomes

| Outcome | | Relative Risk [95% CI] | Adjusted Relative Risk [95% CI] | P-value |
|---|---|---|---|---|
| Traumatic Brain Injury | *Severe* | OR=0.24 [0.11, 0.52] | OR=0.25 [0.10, 0.61] | <0.01 |
| | *Moderate* | OR=0.48 [0.17, 1.36] | OR=0.49 [0.17, 1.46] | 0.2 |
| Death | | OR=0.11 [0.01,0.92] | OR=0.17 [0.02, 1.51] | 0.11 |
| Length of stay | *Hospital* | RR=0.70 [0.52, 0.95] | RR=0.81 [0.63, 1.04] | 0.1 |
| | *Intensive Care Unit* | RR=0.79 [0.56, 1.12] | RR=0.88 [0/68, 1.16] | 0.37 |

No, authors do not have interests to disclose

## 140 A Descriptive Analysis of Patients Undergoing Prehospital and Emergency Department Surgical Airways: Characteristics and Outcomes

Mathews A, McLeod K, Lacy A, High K, Brywczynski J, McKinney J, Wrenn J, Jones I, Stubblefield W/Vanderbilt University Medical Center, Nashville, TN, Nashville, Tennessee, US

Objectives: The surgical airway is a high acuity, low occurrence procedure. Data on outcomes following this procedure are limited. The primary objective of this study was to describe immediate complications, late complications, and global disability at

discharge in patients who underwent a surgical airway procedure in the prehospital or emergency department (ED) setting.

Methods: We conducted a retrospective chart review of patients (≥ 14 years) at an academic medical center who underwent a surgical airway procedure in either the study site ED, the prehospital setting prior to arrival, or in an external ED prior to transfer between June 1, 2008, and July 1, 2022. Patients were identified using a keyword search of our prehospital text page database from June 1, 2008, to July 1, 2022, as well as clinical notes from our institutional, electronic medical record (EMR) from January 1, 2018 to July 1, 2022. Manual chart review identified true cases and determined study eligibility. We collected patient and procedure characteristics including demographics, comorbidities, indication for surgical airway, pertinent physical exam findings, and procedure technique. Outcomes included immediate complications, delayed in-hospital complications, and global disability as defined by Modified Rankin Score (mRS) at discharge.

Results: Sixty-three patients were identified. Immediate complications included mainstem intubation (46.0%) and bleeding that required direct pressure (23.4%). Overall, 29 patients (46%) died (mRS=6) after arrival to the hospital. Of the patients who survived to hospital admission, 25 (48%) had an airway-related complication. Nine complications were deemed directly related to the technical components of the procedure. Of the patients who survived to discharge, 18 (52.9%) had a mRS of four or five indicating a moderately severe disability requiring assistance or severe disability requiring nursing care, respectively.

Conclusions: Procedural complications, mortality, and high levels of global disability were common following a surgical airway procedure in the prehospital or ED setting. Most patients surviving to discharge had a moderately severe or severe global disability.

William B. Stubblefield declares grant funding from NIH NHLBI. No other authors have declarations.

## 141 Comparing Aerosol Exposure and Prevention Strategies During Bystander, Pre-hospital, and Inpatient Cardiopulmonary Resuscitation

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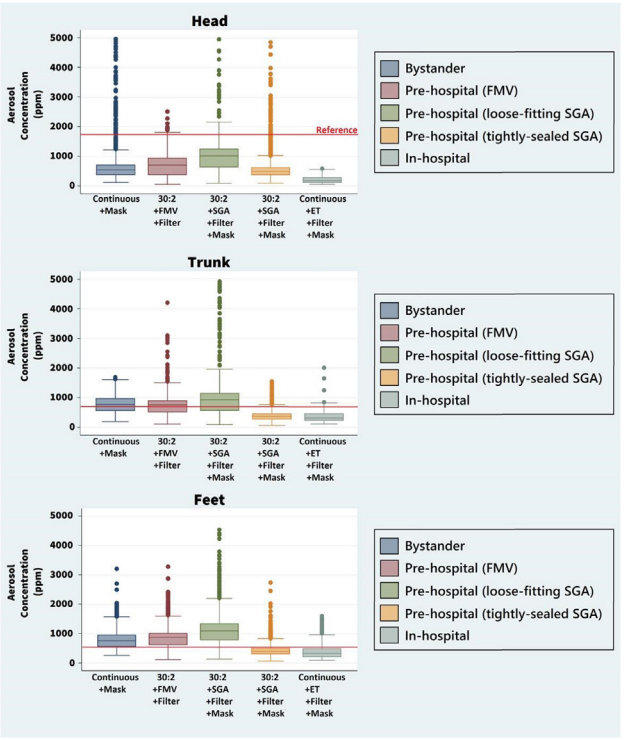
Objective: To evaluate aerosol exposure risk and preventing strategies during cardiopulmonary resuscitation of bystander, pre-hospital, and in-hospital CPR.

Methods: This study compared the hands-on only CPR, CPR with surgical mask or N95 mask, and with nonrebreather mask at 15 L/min. 30:2 compression-ventilation ratio CPR was tested with face-mask ventilation (FMV), FMV with high efficiency particulate air (HEPA) filter; supraglottic airway (SGA), SGA with surgical mask, SGA with HEPA filter, or SGA with both. Continuous CPR was tested with endotracheal tube (ET), ET with surgical mask, HEPA filter, or both. The aerosol concentration at the head, trunk, and feet of the mannequin were measured to evaluate the exposure for different role during CPR.

Results: Hands-on only CPR with surgical or N95 mask covering can reduce the aerosol exposure by 22.02% and 39.77% at the head, 1.03% and 38.50% at the trunk, 32.79% and 45.57% at the feet, respectively. FMV when used with HEPA filter during 30:2 CPR, reduced aerosol concentration 27.76% at the head, 22.35% at the trunk, and 28.02 at the feet, respectively. SGA when used with surgical mask during 30:2 CPR, HEPA filter, or both, increased the aerosol at trunk 28.28%, 17.45%, 31.03%, respectively. When ET was tested during continuous CPR, HEPA filter and HEPA filter plus surgical mask, reduced 58.44% and 72.66% at the head, 60.77% and 53.73% at the trunk, 73.49% and 71.43% at the feet respectively.

Conclusions: The surgical mask and N95 mask coverings reduced aerosol exposure for bystander CPR. FMV with HEPA filter is effective to reduce the aerosol exposure during the 30:2 CPR. ET when applied with HEPA filter, or both HEPA filter and surgical mask, can significantly reduce the aerosol exposure for health care personnel who managed the airway, chest compression, and the rest of the CPR team members. However, SGA could be disattached during 30:2 CPR and cause more aerosol exposure for the chest compressor and should be used with caution even with HEPA filter. A tight-sealed SGA should be carefully managed throughout pre-hospital transportation.




No, authors do not have interests to disclose

## 142 Novel Hyperangulated Laryngoscope Capable of Use in a Soiled Airway

Moschella R, Raithel M, Grzywinski M, Bassin B/University of Michigan, Ann Arbor, Michigan, US

Objectives: Video laryngoscopy (VL) with a hyperangulated blade offers better visualization of key airway structures and has been shown to increase intubation success on the first attempt. A limitation of VL is obstruction of the camera by airway contaminants including blood, vomitus, and saliva. Contamination of the camera renders VL ineffective and requires withdrawal of the blade for cleaning or a transition to another intubation strategy. Failed attempts at intubation are associated with increased risk of aspiration, cardiovascular collapse, and death. Three emergency medicine residents at an academic medical center identified the need for a hyperangulated laryngoscope that is capable of operating in a soiled airway. The residents partnered with a team of senior bioengineering students to develop a prototype device. The team developed a single-use hyperangulated laryngoscope that allows the clinician to manipulate the laryngoscope blade, clear airway contaminants, and clean the camera surface with a single hand (Figure 1). The objective of this study was to assess laryngoscopy preferences and interest in our novel device among physicians who routinely intubate.

Methods: An observational needs assessment study was conducted to evaluate laryngoscopy preferences and interest in the novel device. A convenience sample of residents and faculty were given a brief introduction to the clinical challenge and prototype. Participants then tested the prototype on a soiled airway model. A brief survey was administered to assess their preferences for airway management and obtain feedback on the novel device. Each question was assessed using a five point Likert scale.

Results: Nine emergency medicine residents, one emergency medicine fellow, and five emergency medicine faculty were recruited into the study. Two otolaryngology attendings and one anesthesia attending also participated. Figure 2 provides an overview on laryngoscope preference. Compared to faculty, residents preferred hyperangulated VL for first line intubation strategy and anticipated difficult airway. Figure 3 demonstrates that both residents and faculty were interested in the increased functionality of our novel hyperangulated laryngoscope.

Conclusions: The team has created a novel hyperangulated laryngoscope with augmented functionality that can be used in a soiled airway. Our single center

experience suggests that the future EM workforce will have an increased preference for hyperangulated VL. Our device is well positioned to overcome the current limitations of the existing equipment. Next steps include additional customer discovery and design iteration.

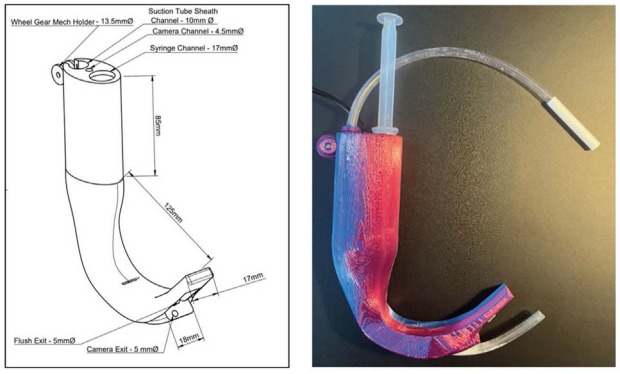



Figure 1. A mechanical drawing of the prototype laryngoscope and the functional prototype.

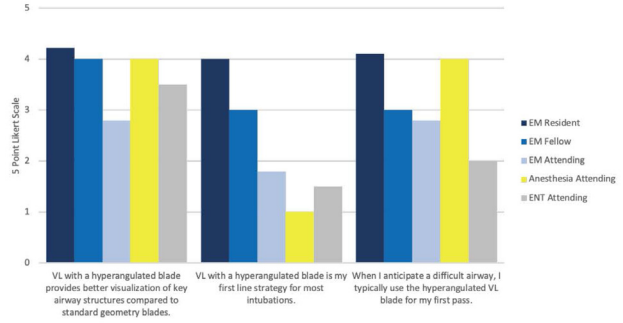



Figure 2. Laryngoscopy preferences of emergency medicine residents and faculty.

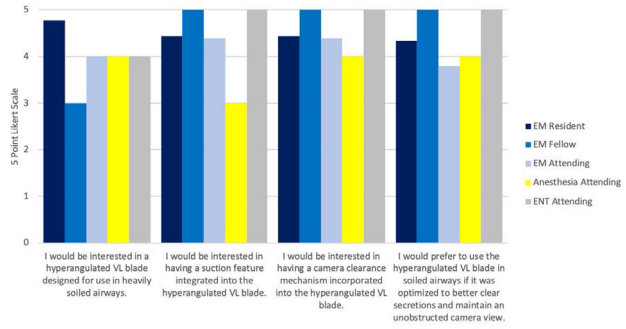



Figure 3. Interest in hyperangulated VL laryngoscope with increased functionality.

No, authors do not have interests to disclose

## 143 A Randomized Control Trial to Assess Effectiveness of Apnoeic Oxygenation Using Low-Flow or High-Flow Nasal Cannula to Prevent Desaturation During Endotracheal Intubation

Waheed S, Kapadia N, Khan M, Raheem A/Aga Khan University, Karachi, Sindh, PK

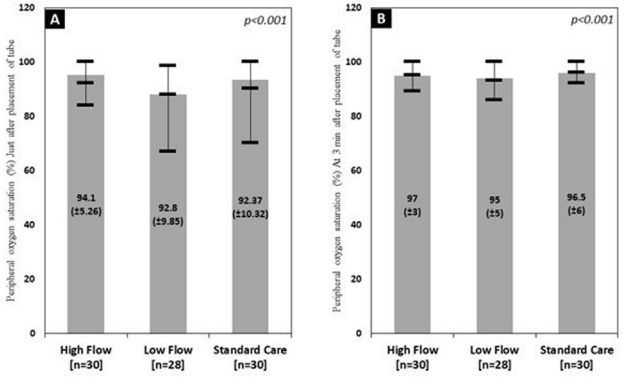
Background: Apneic oxygenation is a process of delivering continuous oxygen through nasal cannula during direct laryngoscopy. The oxygen that is delivered through these nasal cannulas is either low flow or high flow. The effectiveness of apneic oxygenation has been shown through systematic reviews and randomized controlled trials, a comparison of high-flow versus low-flow oxygen delivery combined with head side elevation to improve glottic visualization has not been tested through a superiority study design.

Objective: The objective of this study was to assess the superiority of low flow versus high flow combined with head side elevation against the usual practice of endotracheal intubation in the emergency room.

Methods: The study is a three arm, open label, parallel-group, instituting blocked randomization technique conducted in the emergency department of Aga Khan University. The primary outcomes were lowest noninvasive oxygen saturation measurement during direct laryngoscopy and 3 minutes after placement of the endotracheal tube and first pass success rate. The intervention constitutes head side elevation up to 30 degrees together with high flow or low flow oxygen delivery through nasal cannula. Primary analysis was intention to treat. The sample collection was stopped after 1 year of data collection. The trial is registered at ClinicalTrials.gov Registry NCT04242537 and approved by the ERC 2019-0726-2463. The project is URC grant funded 192 002ER-PK.

Results: Thirty adults were enrolled in high flow and standard arm while 28 adults were enrolled in low flow arm with all having comparable patient characteristics and a mean age of 51.74 (± 15.96). Lowest noninvasive oxygen saturation after placement of endotracheal tube was 95 [99 - 90] in high flow, 96.5 [100 92.5] in low flow and 95 [99 - 91] in standard arm. Similarly non-invasive oxygen saturation 3 minutes after placement of endotracheal tube was 98 [100 - 96] in high flow, 99 [100 - 93] in low flow and 99 [100 - 95] in standard arm. Post intubation non-invasive oxygen saturation < 92% was seen in 4 [12.9%] in high flow, 16 [57.1%] in low flow and 7 [20%] in standard arm with a p-value of <0.001. The safe apnea time of high flow arm was 10 (30±10), low flow arm 30 (40±20) and standard arm 17 (42±05).

Conclusions: The combination of high-flow or low flow nasal cannula with head side elevation prevent desaturation and increase safe apnea time, suggesting a role for it as a recommended airway management strategy for adults in the emergency department




No, authors do not have interests to disclose

## 144 Overweight and Obesity Is Associated With Significantly Increased Risk of Receiving an Intervention in Emergency Department Procedural Sedations

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Objectives: Procedural sedation (PS) is frequently used in the emergency department (ED) for the relief of pain and anxiety in patients undergoing diagnostic & therapeutic procedures. There is currently no large-scale study regarding the incidence, types, or severity of adverse events (AE) or interventions with the use of ED PS among overweight or obese patients.

Methods: Retrospective review of adult (≥ 22 years old) ED patients from 2015 – 2021 at 20 hospitals (tertiary care center & 19 affiliate hospitals in 2 states) undergoing

PS. AEs were complications: respiratory rate < 8 breaths/min, apnea, systolic blood pressure > 200 mmHg, heart rate < 60 or > 100 beats/min, & SpO2 < 90% plus side effects (SE): emesis, nausea, emergence reaction, paradoxical reaction, itching/rash, cough, myoclonus, hiccups. CDC standard BMI calculator was utilized to classify adult patients. Adults were divided into healthy or underweight & overweight or obese groups. Data was entered into a Redcap database. R was used for statistical analysis with $P < 0.05$ statistically significant.

Results: Of 2916 adult patients, 2072 were overweight or obese (BMI ≥ 25.0) at the time of sedation. These patients had a mean (± SD) age of 58.0 (± 17.4) years, 45.8% male. The 844 patients that were healthy or underweight (BMI < 25.0) had a mean (± SD) age of 55.6 (± 21.0) years, 43.0% male. Age was significantly higher ($p < 0.001$) for healthy or underweight vs. overweight or obese groups, but there was no significant difference for gender (p=0.167). In the underweight or healthy group, 38 patients (4.5%) had a SE, 118 (14.0%) a complication, total 156 (18.5%) AE. In the overweight or obese group, 97 patients (4.7%) had a SE, 324 (15.6%) a complication, total 421 (20.3%) AE. 72 healthy or underweight patients (8.5%) received at least one intervention: airway repositioning (16/844 = 1.9%), airway suctioning (1/844 = 0.1%), bag valve mask (33/844 = 3.9%), supplemental oxygen (27/844 = 3.2%), anti-emetic medication (14/844 = 1.7%), benzodiazepines (0), other IV medications (0), IV fluid bolus (1/844 = 0.1%), nasopharyngeal airway (5/844 = 0.6%), oral airway (0), intubation (0). 235 overweight or obese patients (11.3%) received at least one intervention: airway repositioning (69/2072 = 3.3%), airway suctioning (2/2072 = 0.1%), bag valve mask (110/2072 = 5.3%), supplemental oxygen (85/2072 = 4.1%), anti-emetic medication (37/2072 = 1.8%), benzodiazepines (5/2072 = (0.2%), other IV medications (5/2072 = 0.2%), IV fluid bolus (10/2072 = 0.5%), nasopharyngeal airway (3/2072 = 0.1%), oral airway (1/2072 = 0.05%), intubation (1/2072 = 0.05%). The overweight or obese group had a significantly greater risk of receiving an intervention (p=0.014), but not SEs (p =0.815), complications (p=0.244), or AEs (p=0.266).

Conclusions: Overweight or obese patients are at significantly increased risk for receiving an intervention, but not SEs, complications, or AEs during ED PS. ED providers should be aware of the increased risks when performing PS in overweight or obese patients.

Table 1. Comparison of ED patients undergoing PS: healthy & underweight vs. overweight & obese adults (N = 2916 patients).

| | Healthy & Underweight (BMI < 25.0) | Overweight & Obese (BMI ≥ 25.0) | P-Value |
|---|---|---|---|
| Number | 844 | 2072 | - |
| Age ≥ 22 | 55.6 (± 21.0) | 58.0 (± 17.4) | p < 0.001 |
| Gender (N Male) | 363 (43.0%) | 949 (45.8%) | p = 0.167 |
| Side Effects (SE) | 38 (4.5%) | 97 (4.7%) | p = 0.815 |
| Complication | 118 (14.0%) | 324 (15.6%) | p = 0.244 |
| Adverse Event (AE) | 156 (18.5%) | 421 (20.3%) | p = 0.266 |
| Interventions | 72 (8.5%) | 235 (11.3%) | p = 0.014 |
| • Airway Repositioning | 16 (1.9%) | 69 (3.3%) | * |
| • Airway Suctioning | 1 (0.1%) | 2 (0.1%) | * |
| • Bag Valve Mask | 33 (3.9%) | 110 (5.3%) | * |
| • Supplemental Oxygen | 27 (3.2%) | 85 (4.1%) | * |
| • Antiemetic Medication | 14 (1.7%) | 37 (1.8%) | * |
| • Benzodiazepines | 0 (0%) | 5 (0.2%) | * |
| • Other IV Medications | 0 (0%) | 5 (0.2%) | * |
| • IV Fluid Bolus | 1 (0.1%) | 10 (0.5%) | * |
| • Nasopharyngeal Airway | 5 (0.6%) | 3 (0.1%) | * |
| • Oral Airway | 0 (0%) | 1 (0.05%) | * |
| • Intubation | 0 (0%) | 1 (0.05%) | * |

* - sample size too small to calculate significance

No, authors do not have interests to disclose

## 145 Prospective Validation of Difficult Airway Physiological Score to Predict Patients With Serious Outcomes Undergoing Endotracheal Intubation in the Emergency Department

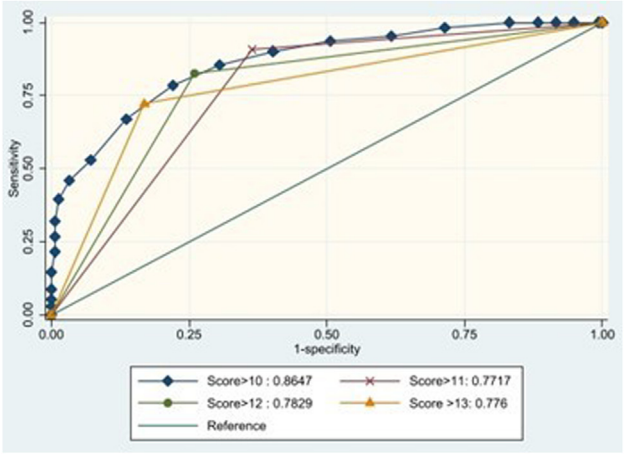
Waheed S, Razzak J, Khan N, Raheem A, Mian A/Aga Khan University Hospital, Karachi, Sindh, PK

Objectives: Patients with significant physiological abnormalities have a higher risk of cardiovascular collapse and death following intubation and during positive pressure breathing in physiologically demanding airways. This study prospectively validates the Difficult Airway Physiological Score (DAPS) for adult patients requiring endotracheal intubation.

Methods: This prospective cohort study was done in the emergency department of Aga Khan University in Pakistan from August 2021 to December 2022. The airway score was derived using retrospective data. Model performance was assessed using the train-test splits method. The score sensitivity and specificity were calculated at various cutoffs. Post-intubation hypotension and desaturation were the main outcomes. Our score includes 12 variables: gender, age, time of intubation, hypotension, respiratory distress, vomiting, shock index >0.9, pH <7.3, fever, anticipated decline, GCS <15, and agitation. ROC analysis and area under the curve assessed score validity. Youden's J statistic calculated additive score's discriminating variables using sensitivity, specificity, PPV, and NPV.

Results: We screened 350 patients and 326 patients [males 123 (37%) and females 203 (62%)] were included. The sample was divided as per the difficult airway physiological score into high-risk (>10) n=194, mean age 52(±18) years and low-risk (<10) n=132, 47.7(±17.4) years. The shock index was >0.9 in 128 (66%), while it was <0.9 in the majority of the low-risk n=111 (84%), p-value <0.001. Similarly, in high-risk patients, pH <7.3 was seen in 70(36.1%) compared to 4(3%), p-value <0.001. Post-intubation cardiac arrests was observed in 56(17.2%) of which 45(23.2%) were in high risk and 11(8.3%%) were in low-risk, (p-value <0.001). Hypotension was the most serious outcome in the high-risk group 100(51.5%) compared to 32(24.2%) in low-risk, p-value <0.001. The DAPS of 10 had an area under the curve of 0.865 (0.71-0.84). The sensitivity of the score was 78.5% (71.7%-84%), specificity 77.9% (70.7%-83.8%), positive predictive value of 80% with an accuracy of 78.2%.

Conclusions: The Difficult Airway Physiological Score performed with high sensitivity and specificity in this validation cohort and can be a valuable tool to help risk stratify patients at risk of physiological instability following endotracheal intubation in our emergency department.




No, authors do not have interests to disclose

EMF

## 146 Development and Pilot Testing of a Novel Artificial Intelligence and Care Coach Intervention for Persons Living With Cognitive Impairment and Care Partners Experiencing Emergency Department Care Transitions

Gettel C, Gil H, Dorai C, Galske J, Chera T, Keefe K, Stern E, DeFrancesco E/Yale University School of Medicine, New Haven, Connecticut, US

Objectives: Little data exists to date regarding effective interventions to improve emergency department (ED)-to-community care transitions for persons living with cognitive impairment (PLWCI) and their care partners. We sought to develop, refine, and pilot test the innovative pairing of artificial intelligence (AI) enabled digital advisors and an occupational therapist-led care coach intervention to improve ED-to community care transitions for PLWCI and their care partners.

Methods: We used a mixed-methods, multi-phased approach to develop the intervention, with PLWCI and care partners sampled from the LiveWell Dementia Specialists network. In the first phase, we developed and iteratively revised a codebook and conducted recorded, semi-structured focus groups using a standardized guide. Two researchers coded the professionally transcribed data using a combined deductive and inductive approach and analyzed transcripts to identify dominant themes and representative quotations. In the second phase, we performed a 2-day design thinking workshop using a user-centered design approach, involving PLWCI, care partners, health care professionals, community-based partner organizations, technologists, and AI experts. In the final phase, we pilot tested the paired intervention among PLWCI and care partners experiencing ED-to-community care transitions, assessing: 1) intervention outcomes including engagement, feasibility, acceptability, usability, and appropriateness, and 2) patient- and care partner-centered outcomes including care plan adherence, care partner burden, healthcare utilization, quality of life, and connection to community services.

Results: In the first phase, we performed two focus groups, involving a total of 16 participants, and generated empathy maps regarding the ED experience, the subsequent ED-to-community care transition, and the role of technology. PLWCI and care partners expressed: 1) concerns that their unique needs related to cognition were not addressed in the ED setting, 2) frustration with the ED discharge process and their perceived ability to follow-up in the outpatient setting and obtain desired resources, and 3) openness to the incorporation of AI to facilitate successful ED-to-community care transitions. In the design thinking workshop phase, we identified perceived barriers and facilitators for intervention adoption during open forum discussions and depicted the current 'As Is' and the desired 'To Be' states regarding ED-to-community care transitions. To date, we have pilot tested the intervention among 7 study participants.

Conclusions: PLWCI and care partners were integrally engaged in the co-creation of a two-component novel intervention to improve ED-to-community care transitions.

No, authors do not have interests to disclose

## EMF 147 Improving Asthma Referrals Following Pediatric Emergency Department Care

DeLaroche A, Spencer P, Wind A, Brennan C, Baydoun Z/Children's Hospital of Michigan, Detroit, Michigan, US

Objectives: Children with poorly controlled asthma benefit from subspecialty care but identifying these children in the emergency department (ED) to best align outpatient referrals with the limited available resources can be challenging. The Pediatric Asthma Control and Communication Instrument for the Emergency Department (PACCI- ED) improves providers' assessment of asthma control. The aim of this study is to determine whether use of this instrument increases the proportion of pediatric patients referred to outpatient asthma care following an acute asthma visit.

Methods: This randomized controlled trial is being conducted in an urban pediatric ED. Providers randomized to the intervention group view the parent completed PACCI-ED and a one-page summary of referral recommendations aligned with asthma severity whereas providers randomized to the control group provide usual discharge care. Children aged 5 to 11 years treated for an acute asthma exacerbation and discharged home from the ED are assigned to a group based upon the assignment of the treating ED provider. Data collection includes demographics, the PACCI-ED, and ED referrals. The anticipated sample size is 128 patients to detect an increase from our 10% baseline referral rate to 30% with 80% power and a 95% confidence interval. Descriptive statistics were calculated for this preliminary analysis and comparisons between groups were assessed using Chi-square with a p-value $<0.05$ considered statistically significant.

Results: A total of 51 providers consented to participate [pediatric emergency medicine physicians (24, 47.1%), pediatricians (14, 27.5%), and advanced practice providers (13, 25.5%)]. As of March 2023, 76 patients were enrolled but of these, 8 were hospitalized after participation; thus, 68 patients were included in these analyses. Child demographics were similar between groups with a median age of 7 years. Most patients in both groups were male (control 71.9%, intervention 66.7%, p=0.64), with public insurance (control 65.6%, intervention 58.3, p=0.66). Parent demographics were also similar between groups, as most children were accompanied by a single (control 53.1%, intervention 69.4%, p=0.4), female (control, 77.8%, intervention 77.8, p=0.72), biological parent (control 93.8%, intervention 83.3%, p=0.42), with high school level education (control 45.2%, intervention 69.4%, p=0.15), and an annual household income of <$50,000 (control 85.1%, intervention 72.4%, p=0.70). Patients in the control and intervention group did not differ on indicators of asthma morbidity, including ED visits in the prior 12 months (control 53.1%, intervention 63.9%, p=0.37), hospitalization in the past 12 months (control 18.8%, intervention 27.8%, p=0.38), and lifetime intensive care hospitalization (control 15.6%, intervention 13.9%, p=0.84). The current level of asthma control based upon the PACCI-ED was similar between groups, with most patients being partly controlled or uncontrolled (control 71.9%, intervention 83.3%, p=0.25). In contrast to the control group, a higher proportion of patients in the intervention group were referred to outpatient asthma care upon ED discharge (80.0% versus 31.6%, p <0.001). All referrals were to a pediatric asthma subspecialist.

Conclusions: Children seeking acute asthma care have poor asthma control but use of the PACCI-ED with outpatient referral recommendations improves ED discharge referrals to subspecialty asthma care.

No, authors do not have interests to disclose

## EMF 148 Moving Beyond "I Know It When I See It": A Qualitative Study to Develop a Behavioral Definition of the Master Adaptive Learner for Emergency Medicine Trainees

Hopson L, Branzetti J, Gisondi M, Regan L/University of Michigan, Ann Arbor, Michigan, US

Objectives: The Master Adaptive Learner (MAL) conceptual model postulates that learners develop adaptive expertise through a cycle of self-regulated learning. Despite a robust theoretical basis, the actual observable behaviors and actions MALs use to learn are not well elucidated. Without a clear definition of MAL behaviors, we cannot reliably differentiate MALs from non-MALs nor assess curricular interventions to develop MALs. We sought to define observable behaviors that characterize MALs within emergency medicine (EM) training.

Methods: Using a constructivist approach to grounded theory, we analyzed one-on-one, semi-structured interviews with expert EM educators. We used purposive sampling to recruit participants, and the final number of interviews was determined by thematic saturation. We asked these experts to describe observable MAL and non-MAL behaviors and to identify factors in the clinical learning environment that may influence these behaviors.

Results: We identified 3 major themes describing MAL behaviors: (*1) critical interrogation of practice; (2) intellectual risk taking and (3) intentional curation of learning resources*. ***Critical Interrogation of Practice*** encompasses several behaviors including: learner-driven feedback conversations; independent synthesis of clinical information for diagnostic, therapeutic, and teaching purposes; appropriate deviation from algorithms based on their conceptual understanding of core principles; intentional use of case variation and hypothetical questioning; and continuous refinement of decisions based on new data. MALs also engage in ***Intellectual Risk Taking*** that furthers their development by communication of clinical decision-making processes even at the risk of being wrong; openly engaging with errors and gaps to foster their development; and intentionally seeking out uncomfortable experiences. ***Intentional Curation of Learning Resources*** refers to the deliberate use of educational products and a consortium of trusted individuals who serve as mentors and sounding-boards for their development. We identified a fourth theme that was related to MAL development and agency: ***Learning Environment Modulates Behaviors.*** Specifically, active promotion of psychological safety is necessary for learners to acknowledge gaps and take intellectual risk. This safety is mediated through trusting relationships and expert supervisors serve both as stewards of the CLE and as co-learners and role-models.

Conclusions: We present several behaviors that allow identification of MALs within emergency medicine trainees These data expand our understanding of MAL behaviors and may allow for more precise categorization and selection of individuals for study of targeted curricular interventions and meaningful learning outcomes.

No, authors do not have interests to disclose

EMF

# 149

## Lung Ultrasound Does Not Predict Hypoxia in Cohorts of Ambulatory Patients With COVID-19

Theodoro D, Coneybeare D, Adhikari S, Lema P, Chamarti S, Acuña J, Ancona R, Patterson J, Renz N, Ablordeppey E/Washington University School of Medicine, St. Louis, Missouri, US

Objectives: No bedside imaging tools exist that foretell respiratory clinical decompensation among ambulatory patients diagnosed with novel coronavirus (COVID-19) infection. Bedside point-of-care ultrasound (POCUS) applications include lung examination but the prognostic capabilities of lung POCUS (L-POCUS) to predict respiratory decompensation has not been systematically studied. Our objective was to determine if an L-POCUS score can predict hypoxia among a non-hypoxic, ambulatory population of patients infected with COVID-19.

Methods: This was a diagnostic case-control study at 3 academic, tertiary care emergency departments across different regions of the United States (East, Midwest, Southwest). We collected a convenience sample of non-hypoxic subjects with confirmed COVID-19 deemed candidates for ED discharge and followed outcomes for 40 days. We scored each subject at 7 locations per hemi-thorax with L-POCUS. Each location was scored by findings in the pleura and lung parenchyma with a maximum of 84 points. Findings included: thickened pleura (1 point); discontinuous pleura (2 points); 1-≤3 B-lines (1 point), >3 B-lines (2 points), coalesced B-lines (3 points) and subpleural consolidations (6 points). The same scanning investigator then estimated the likelihood of hypoxia using clinical "gestalt" by classifying participants into "low," "medium," or "high" risk. Cases were defined as hypoxia (<92% by pulse oxygenation) from 2 hours after index visit presentation to day 40. Participants were followed by telephone plus home pulse oximeter and by chart review. We evaluated L-POCUS as follows: identified the optimal cut-off score (calculated sensitivity and specificity at each potential cut-off score and the respective squared Euclidean distance between the two to identify the minimum distance), predicted hypoxic event using the L-POCUS optimal cut-off score, and evaluated its utility with receiver operating characteristic curve (ROC) and area under the curve (AUC). We additionally used ROC and AUC to evaluate "clinical gestalt" prediction of a hypoxic event.

Results: We enrolled 166 subjects but 14 were excluded due to lost to follow-up. Demographics of 152 patents included: median age of 41 years (IQR 31-56); 84 (55%) female, 93 (61%) African American, and 45 (30%) White. At index visit 113 (74%) were discharged home and 37 (24%) admitted with 1 (1%) admitted to an ICU. Median BMI was 29 (IQR 25-35). We classified 51 of 152 as cases of hypoxia (33.6%, 95% CI: 26.2-41.7); 101 served as controls. Median time to first hypoxic event was 2.0 days (IQR: 0.0-9.0). Phone follow up was completed for 116/152 (76.3%) of patients. Of 36 followed by medical record, 8 (22.2%) became hypoxic. L-POCUS scores were higher for cases (median = 13.0, IQR: 4.5-28.5, range: 0.0-62.0) than controls (median = 5.0, IQR: 2.0-12.0, range: 0.0-53.0). The L-POCUS optimal cut-off score was 13 which had a sensitivity of 0.53 and specificity of 0.76 and the AUC was 0.65 (95% CI 0.57-.073). At this level the correctly classified proportion was 68% (95% CI: 0.60, 0.76). When evaluating "clinical gestalt" as a predictor variable, (Low/Medium vs High) the AUC was 0.57 (95% CI: 0.51-0.63).

Conclusions: Among non-hypoxic COVID-19 patients, an L-POCUS scoring rubric was not a strong predictor for a hypoxic event within 40 days. Similarly, clinical gestalt after L-POCUS poorly predicted future hypoxia.

Yes, authors have interests to disclose

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Consultant/Advisor

Consultant-GE and Exo Ultrasound Spinger Publishing-Royalties DOD funding

EMF

# 150

## Pilot Study of an Innovative Model to Provide Multi-modal Cognitive Behavioral Theory-Informed Physical Therapy (CBT-PT) for Neck and Back Pain in the Emergency Department

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Objectives: Neck and back pain are very common reasons for emergency department (ED) visits. Despite evidence of only modest effectiveness and significant safety risks, treatment is frequently limited to opioid and non-opioid medications. Cognitive Behavioral Theory-Informed Physical Therapy (CBT-PT) combines CBT-based pain coping skills training (e.g., relaxation techniques, activity pacing) with PT assessment and treatment as a multi-modal nonpharmacologic intervention, which has been shown to improve pain in outpatient settings. This pilot study assessed the feasibility, acceptability, and preliminary effects of CBT-PT for ED patients presenting with neck and/or back pain.

Methods: We enrolled a convenience sample of adult patients presenting with neck and/or back pain to an urban tertiary care ED in North Carolina (80,000 ED visits per year). We used a two-arm prospective cohort design with assignment to (1) CBT-PT intervention or (2) control, based on physical therapist availability. Both groups received usual care for pain at the discretion of their ED provider. Feasibility was assessed with enrollment rate; acceptability was assessed with patient satisfaction on a 5-point Likert scale; and preliminary effects were measured with pain numeric rating scores (0-10 NRS) and PROMIS-29 physical function and pain interference scores before and 24-48 hours after the ED intervention.

Results: 86 participants (mean 46 +/- 16.1 years; 58% female) were enrolled from July 2022 to April 2023, with 49 (57%) receiving the CBT-PT intervention. 55% of participants identified as Black and 13% as Hispanic; 15% reported no health insurance. On average, 1-2 participants were enrolled during each 8-hour enrollment day, indicating sufficient feasibility. Using a 1-5 Likert scale (5=highest satisfaction), CBT-PT participants reported a mean satisfaction score of 3.7 (SD 1.2) on average; indicating intervention acceptability. Preliminary effect sizes are shown in the Table.

Conclusion: Delivering CBT-PT to patients in an ED setting was feasible, acceptable, and had promising preliminary effects on physical function and pain interference. CBT-PT should be explored as a novel treatment for improving neck and back pain outcomes in the ED, and our findings provide strong support for a future efficacy trial.

**Table: Change in Pain and Function from Baseline to 24-Hour Follow-Up**

| Change in average pain in past 24 hours | CBT-PT (N=49) | Control (N=37) | Total (N=86) |
|---|---|---|---|
| Mean (SD) | -0.9 (1.9) | -2.4 (2.3) | -1.6 (2.2) |
| Median (IQR) | -1 (-2, 0) | -3 (-4, 0) | -1 (-3, 0) |
| Range | (-5, 3) | (-8, 2) | (-8, 3) |
| **Change in current pain** | | | |
| Mean (SD) | -1.3 (2.4) | -2.2 (2.4) | -1.7 (2.4) |
| Median (IQR) | -1 (-2, 0) | -1.5 (-4, -1) | -1 (-3, 0) |
| Range | (-7, 5) | (-9, 1) | (-9, 5) |
| **Change in PROMIS physical function** | | | |
| Mean (SD) | -0.7 (3.7) | -1.5 (4.8) | -1.0 (4.2) |
| Median | 0 (-2, 1) | 0 (-4.5, 1.5) | 0 (.3, 1) |
| Range | (-13, 6) | (-11, 8) | (-13, 8) |
| **Change in PROMIS pain interference** | | | |
| Mean (SD) | -0.6 (5.4) | 1.5 (5.7) | 0.3 (5.6) |
| Median | 0 (-3, 1) | 0 (-1, 6) | 0 (-2, 3) |
| Range | (-12, 15) | (-12, 13) | (-12, 15) |

No, authors do not have interests to disclose

## 151 Emergency Department-Based Social Determinants of Health Screening and Referral Program to Deliver Whole Patient Care

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Objectives: Social Determinants of Health (SDoH) account for 80-90% of modifiable contributors to health outcomes, associated with increased ED visits and hospital admissions. Both the Joint Commission and CMS have recently created new requirements to ensure that patients are screened for SDoH. ED screening for SDoH is a means to identify patients with social needs and supports whole person care, ensuring that patients' clinical and social needs are both addressed.

Methods: In September 2022, New York-Presbyterian's Center for Community Health Navigation (CCHN) in partnership with the Dalio Center for Health Justice (CHJ) and Weill Cornell Medicine's (WCM) Department of Emergency Medicine, piloted an ED-based SDoH screening and referral program. It leverages an existing patient navigator (PN) program to identify and address social needs among referred patients. The CCHN PN program offers culturally sensitive education and support, connects patients to financial resources, and arranges follow-up appointments. In this new program, patients referred to the PNs are now screened for needs in the following 3 domains: food, housing, and transportation. Patients determined to be *low-risk* are offered a customized list of local community-based organization (CBO) resources. Patients determined to be *rising- or high-risk* are offered the option to work more closely with a PN for in-depth assessment of specific social needs and direct connection to a CBO or other resources to address the identified need(s). These patients receive weekly follow up calls for four weeks to ensure that services are in progress, and again at two months post-ED encounter. If during follow-up the patient's identified social needs are not addressed, additional support is offered.

Results: Between September 8, 2022, and January 17, 2023 1,259 WCM ED patients were screened by the ED PN team. 165 patients (13%) were identified as having an SDoH need. Of these, 43 patients (3%) were stratified as low risk and 122 (10%) as rising- or high-risk. Patients' identified low-risk SDoH needs were 16 (37%) food, 15 (35%) housing, and 25 (58%) transportation insecurity. Patients' identified rising or high-risk SDoH needs were 38 (31%) food, 57 (47%) housing, and 75 (62%) transportation insecurity. 35 (81%) low-risk patients were provided with community resources. 71 (58%) rising- or high-risk patients were referred to CBOs; to date, 30 (42%) of these patients confirmed the CBOs addressed their needs.

Conclusions: The results of this pilot demonstrate the feasibility of incorporating an SDoH assessment and follow-up process into an existing emergency medicine workflow, when appropriate staff are identified and empowered to administer the assessment and connect patients to resources when needs are identified. Healthcare systems should consider leveraging pre-existing staff and programs to screen for SDOH risk in ED patients. Developing partnerships with multiservice CBOs will ensure vulnerable patients will be connected to resources designed to impact the patient's SDOH and longitudinal health trajectory. The early success demonstrated in this pilot informed the program's subsequent implementation at 4 additional New York City EDs. Further work will be needed to determine if this screening process impacts ED utilization and broader health outcomes.

No, authors do not have interests to disclose

## 152 Can Data Sciences Advance the Collection, Identification, and Usage of Social Determinants of Health in the Emergency Department to Improve Patient Outcomes? A Scoping Review

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Objectives: Social determinants of health (SDOH) are critical drivers of health disparities and patient outcomes. Although data science techniques hold promise for improving the collection, identification, and utilization of SDOH factors in emergency department (ED) patients, challenges remain in their implementation. This scoping review aims to characterize the application of artificial intelligence approaches in integrating SDOH data in the ED setting and identify areas for improvement.

Methods: We conducted a comprehensive literature search of studies published between 2015-2022, utilizing Medline (Ovid), Embase (Ovid), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, and Education Resource Information Center (ERIC) databases. We specifically focused on studies employing data science techniques for capturing, utilizing, or modeling SDOH in the context of emergency departments or emergency related care conditions. Two independent reviewers with training and expertise in emergency medicine and clinical informatics evaluated each title and abstract, with conflicts resolved through iterative review. We extracted and synthesized data from this review that included author(s), year of publication, location, purpose, method of study, cohort demographics, setting of patient care, and results/outcomes.

Results: From 1047 screened studies, 26 met the inclusion criteria, with 9/26 exclusively examining ED patients. Emergency medicine conditions investigated spanned a wide range, including sepsis, acute myocardial infarction, asthma, and heart failure. Machine learning (ML) approaches, employed in 23 studies, included random forest, CART, support vector machines, neural networks, and natural language processing (NLP). NLP was the most predominant approach (11/26), including techniques such as bag of words and term frequency-inverse document frequency (TF-IDF). The majority of studies examined multiple SDOH domains (16/26), including homelessness/housing insecurity (6/26) and neighborhood/built environment (5/26). The majority of outcomes measured predictive model performance (10/26) , but also examined ED visits/revisits (6/26), in-hospital mortality (2/26), readmissions (1/26), and algorithmic bias (1/26).

Conclusions: This scoping review identified literature employing multiple data science techniques, particularly ML and NLP, for advancing the integration of SDOH data into patient care among emergency medicine. Nearly one quarter of the studies identified exclusively focused on the ED patient population with model performance as the most common measured outcome. Efforts should be made to standardize SDOH data collection, develop robust algorithms that account for unique patient populations, and explore strategies for interdisciplinary collaboration to optimize SDOH data usage for improved patient outcomes and mitigating health disparities.

No, authors do not have interests to disclose

## 153 Social Domains of Needs Score on Predicting Hospital Admissions for Patients in a Community Paramedicine Program

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Objectives: Social determinants of health play a key role in patient's wellness, impacting recovery from illness and accessibility of healthcare resources. Yet, few tools incorporate social determinants of health in predicting an individual's likelihood of readmission to the emergency department (ED) or hospital. The objective of this study was to determine if social determinants of health captured in a Domain Assessment Needs Score (DAS) could predict the number of ED visits and acute hospital readmissions at 30-days for high-risk patients enrolled in a community paramedic program (CPP).

Methods: Eligible patients were referred to the CPP as part of a readmission prevention initiative primarily between July 1, 2022, and April 30, 2023. All patients referred to the CPP were given a DAS score at their initial CPP visit. The DAS is a cumulative total based upon four scored categories 1) medical neighborhood, which assesses access to care, getting needed services, experience with providers, coordination of services, and medical neighborhood 2) self-management, which assesses engagement and coping, adherence, mental health history, mental health symptoms 3) social support, which assesses home environment, job, leisure activity, social support, relationships, and social risk and 4) medical status which assesses disease chronicity, severity of symptoms, diagnostic and therapeutic challenges, and utilization. Scores for the DAS range from 0 – 57, higher score indicating more extensive CPP intervention (Minimal=0-20, Brief=21-27, Standard=2834, Extensive=35-57). We tracked ED visits and hospital admissions 30 days post CPP initiation and DAS scores. Logistic regression was used to assess the relationship between total DAS score and domain categories of the DAS on 30-day ED visits and hospital admissions.

Results: The majority of the 77 patients with a domain score were female (54.5%) and White (93.5%), with an average age of 72.3 years (STD=11.6). Individuals had on average 2.5 ED visits (Range = 0 - 12) in the six months prior to enrollment in the CP program and DAS score assessment. Nearly a third (29.8%) had at least one ED visit within a month following CPP initiation. Individuals reported an average baseline DAS of 31 (STD=11.4). Adjusted and unadjusted odds ratios did not indicate significant association between total DAS score and ED visits and hospital readmissions one month following DAS scoring. There was also no significant association between

individual DAS categories scores and ED visits and hospital readmissions one month following DAS scoring.

Conclusions: We found that domain category scores of the DAS did not predict ED visits or hospital admissions at 30 days. Our statistical analysis was limited due to small sample size. This builds on our previous research showing the CPP population has high DAS scores as well as LACE+ scores, however, neither score predicts acute hospitalizations 30-days post CPP. Hospital readmissions have primarily been the focus of CPP programs, since these represent the costliest event to the health care system, especially if preventable, and affect quality of life for patients. Future research should focus on how CPPs address social determinants of health and how predictive scores may help CPPs address patient needs and hospital utilization.

| | Unadjusted | | Adjusted | |
|---|---|---|---|---|
| Variable | OR | 95% CI | OR | 95% CI |
| Gender | | | | |
| Male | 1.891 | 0.705-5.704 | 1.834 | 0.678-4.962 |
| Female | ref | ref | ref | ref |
| Race | | | | |
| White | 1.76 | 0.186-16.664 | 1.672 | 0.17-16.456 |
| Black | ref | ref | ref | ref |
| Age | 0.986 | 0.946-1.029 | 0.99 | 0.948-1.034 |
| Medical Neighborhood Score | 0.956 | 0.847-1.079 | 0.935 | 0.818-1.068 |
| Social Support Score | 0.923 | 0.827-1.029 | 0.915 | 0.817-1.025 |
| Self-Management Score | 0.931 | 0.804-1.078 | 0.937 | 0.804-1.093 |
| Medical Status Score | 1.073 | 0.916-1.258 | 1.065 | 0.897-1.265 |
| Domain Score Total | 0.978 | 0.935-1.023 | 0.971 | 0.924-1.021 |

No, authors do not have interests to disclose

## 154 Food Insecurity and Social Determinants of Health in an Urban Academic Emergency Department

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Objectives: Food insecurity is associated with frequent emergency department (ED) utilization. Objectives of our study were to establish the prevalence of food insecurity in an urban, academic ED, characterize the relationship between food insecurity and other social determinants of health (SDH), improve immediate and long-term food access, and evaluate the efficacy of a nutritional health literacy intervention.

Methods: This cross-sectional study was conducted in an urban academic ED waiting room over a four-month period. All adult patients were screened for food insecurity with the validated Hunger Vital Sign tool during predetermined intervals. Patients age <18 years, with impaired decision-making, or high acuity complaints were excluded. Demographic data were collected, and coexisting SDHs were evaluated with the validated American Academy of Family Physicians Social Needs Screening Tool. Fresh meals were provided for immediate hunger relief. A custom resource map was used to identify food banks nearest to the participants' primary residence. Participants were connected to a community partner for Supplemental Nutrition Assistance Program (SNAP) registration. Health literacy intervention included a 30-minute teaching session with information on portion sizes, recommended daily intake amounts, and reading nutrition labels. Pre- and immediate post- surveys assessed confidence levels in identifying nearby food banks, SNAP registration, and making healthy choices on a 5-point Likert scale. Knowledge gain regarding health literacy was assessed with multiple-choice questions. Analysis of the paired non-parametric data was performed in JASP software using Wilcoxon signed-rank tests.

Results: Among participants (n=83), 62.6% screened positive for food insecurity. Mean age of food insecure patients was 49.6 years (SD 13.9), and 61.5% were male. Our cohort was 69.2% Black/African American, 19.2% Hispanic, 9.6% White, and 1.9% Asian. Evaluation of coexisting SDHs revealed that 85.7% of food-insecure patients reported barriers related to transportation, 76.2% had difficulty with bill payments, 67.3% were unemployed, 60.0% were experiencing homelessness, 32.7% could not afford water/oil/electricity services, 30.8% did not complete high school, and 11.5% had difficulty accessing childcare. There were statistically significant increases in participants' mean confidence levels for identifying nearby food banks (pre 2.83; post 4.31; $p<0.001$), SNAP registration (pre 2.90; post 3.84; $p<0.001$), and making healthy choices (pre 3.83; post 4.69; $p<0.001$). Accurate responses significantly increased for knowledge-based questions about nearest food banks (pre 38.46%; post 88.46%; $p<0.001$), portion sizes (pre 46.15%; post 78.85%; $p<0.001$), sodium intake (pre 25.49%; post 67.39%; $p<0.001$) and reading nutrition labels (pre 52.17%; post 84.78%; $p<0.001$).

Conclusion: A high percentage of our food insecure patients experience concomitant challenges with other social determinants of health. The prevalence of food insecurity in this urban ED was 5x higher than county-level prevalence, and 8x higher than state-level prevalence. Educational intervention improved nutritional health literacy and food resource awareness. Our data suggests that the ED can be a valuable point of intervention for patients experiencing food insecurity. Future directions include assessing the effectiveness of these interventions on improving long-term food security.

No, authors do not have interests to disclose

## 155 Socioeconomic Determinants of Health on Rates of Appendicitis and Computed Tomography for Diagnosis in United States Emergency Departments

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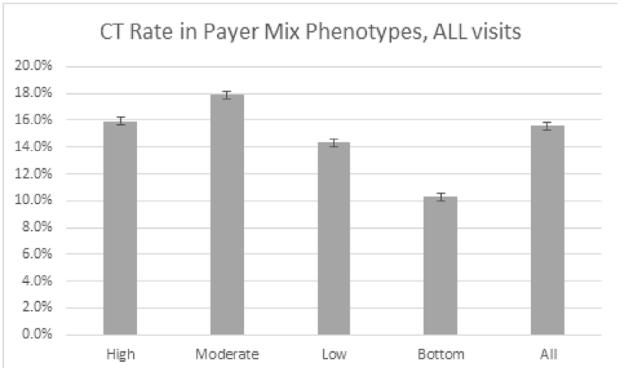
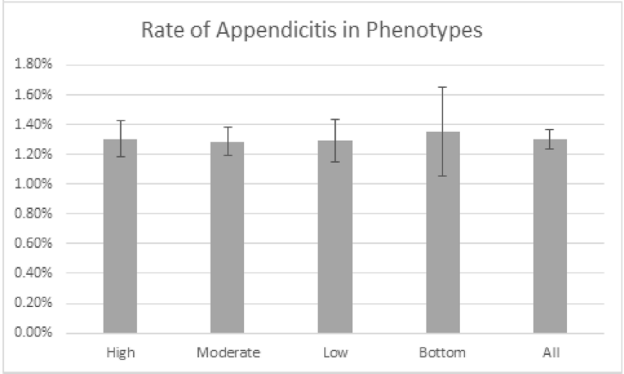
Background: There is increasing public awareness of socioeconomic determinants (SED) of health as a modifiable risk factor to improve patient and population outcomes. Little is known on how SEDs impact rates of appendicitis and use of diagnostic modalities in the emergency department (ED). Given that overuse of computed tomography (CT) can strain public health resources, and saddle underinsured patients with unnecessary medical debt, an understanding of how rates of diagnosis and use of CT in appendicitis would be helpful to understand the scope of the problem.

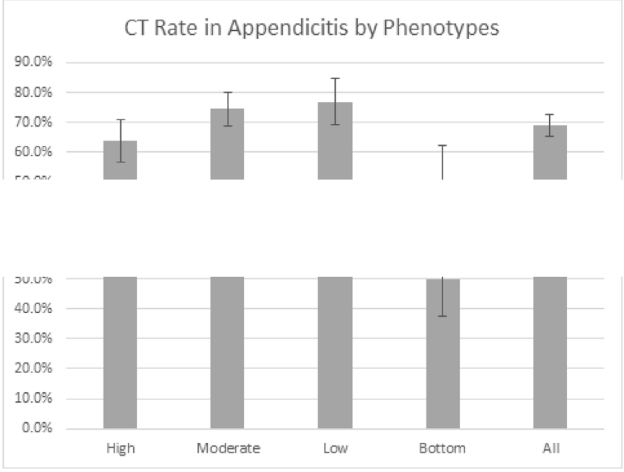
Methods: The National Hospital Ambulatory Care Survey – Emergency Department (NHAMCS-ED) was queried from 2007-2018. The aggregated SED of patients presenting to participating survey sites was estimated by performing hierarchical clustering of insurance payor mix of each site. This methodology is described in an accompanying abstract. Resulting insurance cluster "phenotypes" were graded from High (largest proportion of private insurance) to Bottom (largest proportion of Medicaid). Appendicitis diagnosis rate and CT utilization rate were compared against each SED phenotype.

Results: In the grouped years there were 259,276,000 total visits, of which 3,340,000 visits (1.3%) captured appendicitis. 44,522,000 visits (17.2%) had an abdominal CT. During that time period, a total of 3,210 sites participated, 846 clustered at a High SED (49.5% private insurance), and 413 clustered at Bottom SED (63.5% Medicaid). Overall CT rate was highest in the Moderate SED (17.9%), and lowest in the Bottom SED (10.3%). Appendicitis diagnosis rate was not substantially different in the phenotypes, between 1.29 – 1.35%, and was not statistically different by ANOVA ($p=0.95$). CT use in diagnosed appendicitis was 49.8% in the Bottom phenotype, and 74.4% in the Moderate phenotype. This was statistically significant by ANOVA ($p<0.0001$).

Conclusions: Appendicitis does not have a plausible reason to present at variable rates between SED phenotypes. This was demonstrated by a stable rate across clusters. Use of CT, both in all visits, and specifically in appendicitis diagnosis, was substantially higher in SED phenotypes with ascending privilege. This requires dedicated studies beyond was the NHAMCS dataset can accomplish.




No, authors do not have interests to disclose

## 156 Assessing Perceptions of Social Determinants of Health (SDoH) Screening in the Emergency Department Among Patients and Providers

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Background: The emergency department (ED) functions as society's medical "safety net," where all patients are evaluated and treated regardless of insurance status, ability to pay, or social situation. Social determinants of health (SDoH), such as access to healthy food, safe shelter, and transportation, are an important part of overall health, compliance with treatment regimens, and utilization of healthcare resources. While there is a growing national movement to address SDoH, there is a paucity of published evidence on whether patients and clinicians are supportive of SDoH screenings, especially in the ED.

Objectives: We aim to (1) Understand how ED patients perceive screening for various SDoH in the ED, (2) Understand how ED physicians, advanced practice providers, nurses, and social workers (providers) perceive screening for various SDoH in the ED.

Methods: Prospective survey data of patients and providers working in the Brigham and Women's Hospital (BWH) and Brigham and Women's Faulkner Hospital (BWFH) EDs was collected, aggregated, and measured. Social needs queried include: (1) access to healthy food, (2) housing, and (3) transportation, (4) ability to afford utilities, (5) feeling safe at home, (6) loneliness, (7) medical literacy, (8) employment, and (9) drug addiction. Medicaid patients were recruited from the BWH ED while they were present for treatment. For patients who provided consent, research assistants (RAs) supplied a short password-protected RedCap survey on a tablet computer. Recruitment emails were sent to BWH and BWFH ED providers. BWH or BWFH ED staff interested in participating in the study completed a short anonymous RedCap survey.

Results: Despite 41.6% of patients stating they have never experienced the social needs queried, greater than half of patients surveyed think the healthcare system should ask all patients about access to healthy food (59.2%), housing (68.8%), and transportation (60.8%), ability to pay basic utilities (66.4%), feeling safe at home (55.2%), feeling alone or isolated (50.4%), medical literacy (55.2%), and drug addiction (54.4%). Almost all patients (98.4%) think that Mass General Brigham should use social needs information to improve care for its patients and dedicate part of its budget to help patients with their social needs (90.4%), even if helping with social needs could increase a patient's healthcare costs (72%).

Providers had even higher overall rankings than patients with the majority attesting they have had patients present to the ED in the past year with all the social needs queried and believing each social need questioned may impact health. Only one out of 60 providers surveyed did not believe the health system should help its patients with social needs. Most providers believed the health system should help its patients with access to healthy food (63.3%), housing (75%), and transportation (76.7%), ability to pay basic utilities (78.3%), feeling safe at home (80%), medical literacy (90%), and drug addiction (90%).

Conclusions: The results of this study support the practice of ED screening for social needs from both patient and provider perspectives. Patients and providers in this survey also stressed the importance of healthcare systems helping to address social needs. Therefore, it will be important that alongside screening programs, programs to address social needs are funded and built.

No, authors do not have interests to disclose

## 157 An Assessment of the Prevalence of Clostridium Tetani in the Environment

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Objectives: Tetanus is a deadly bacterial disease characterized by intense, painful muscle spasms (tetany). To prevent tetanus, emergency clinicians routinely administer tetanus vaccines as part of wound care management for patients who are not fully immunized based on the theory that *Clostridium tetani* (*C. tetani*) is widely present in the environment. However, since many people with minor wounds do not seek medical care, and the number of recent tetanus cases is very small, it is possible that *C. tetani* is not as common in the environment as previously thought. No study has evaluated this since 1926. We therefore sought to determine the prevalence of *C. tetani* in modern day urban soil and public spaces.

Methods: We sampled soil, rusted metal, concrete, and dog feces to determine the prevalence of *C. tetani* in Miami-Dade County, Florida. We collected soil samples and swabs from four locations: two public parks, an elementary school, and a university campus. We assessed for the presence of *C. tetani* in each sample using quantitative polymerase chain reaction (qPCR). We tagged a subset of samples with *C. tetani* DNA to confirm the accuracy of the testing method.

Results: In total, we collected 200 samples for analysis of which 37 (18.5%) tested positive for *C. tetani* DNA. Among the 140 samples taken from the soil, just 1 (0.7%) tested positive for *C. tetani* DNA. Of the 40 samples of metal and concrete surfaces, 30 (75%) tested positive for *C. tetani*, and 6 (30%) of the 20 samples from dog feces tested positive for *C. tetani*. We tagged 62 samples with *C. tetani* DNA to assess the sensitivity of our test, and 42 (67.7%) of those tested positive for *C. tetani*.

Conclusions: We found that *C. tetani* is frequently present on metal and concrete surfaces. *C. tetani* was rarely identified in soil samples, but it is possible that a substance in the soil interfered with our assay such that we underestimated the presence of *C. tetani* in soil. Nonetheless, our data suggest that a wound from a metal or concrete surface should be considered higher risk for tetanus than a wound from soil.

No, authors do not have interests to disclose

# 158 The Emergency Department as An Entry Point for Patients With Mpox: Opportunities for Improvement

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Background: On July 23rd, 2022, the World Health Organization (WHO) declared monkeypox (Mpox) a Public Health Emergency of International Concern (PHEIC). Much of the published literature heralds from sexual health/HIV clinic reports, with little known about the experience of these patients in the ED, where almost a third of patients initially presented for care.

Methods: This is a single-center, mixed-methods study of patients presenting to The Johns Hopkins Health System (JHHS) emergency departments with laboratory-confirmed Mpox (Orthopoxvirus Qual NAT). Demographics, clinical presentation and process outcomes were extracted using retrospective chart review. All patients received telephonic follow-up approximately six months after their index visit and were interviewed by clinicians using a semi-structured script in order to assess their experiences. Interviews were coded using three overarching concepts to identify "individual," "clinical," and "system" level barriers and facilitators to care delivery.

Results: Since June 2022, a total of 47 patients tested positive for Mpox in JHHS EDs; most identified as male (46, 98%), and as black or of African American race (27, 57%). Patients most commonly presented with "rash" (33, 70%) and "fever" (16, 34%), while "rectal pain" (8, 17%) and "known exposure" (12, 26%) were less frequent. For patients whose HIV status was known, almost half were living with HIV (18/39, 46%). Of those tested for co-infection, over a third had syphilis (10/27, 37%), followed by gonorrhea or chlamydia (2/30, 7%). Many patients (36, 77%) reported intercourse with another man as their suspected transmission route. Most patients (30/47, 64%) had previously been seen in another health care setting for the same presenting complaint, and only a quarter of patients were admitted (11, 23%), with reasons of pain, bleeding, and HIV/AIDS-related complications. Upon querying post-discharge follow-up at 30 days, many patients had no follow-up care (20, 43%); the remainder returned for follow-up with infectious disease specialists (14, 30%) or at primary care clinics (13, 27%). Of the 47 patients who received Mpox care in the ED, 13 patients agreed to be interviewed regarding their ED visit and overall experience of having Mpox. At the individual level, patients reported "feeling like a zoo animal" and "people think it is the gay disease." When describing the impact of their Mpox diagnosis, many reported feelings of depression, isolation, and anxiety as direct consequences (n=8, 62%), as demonstrated in statements such as "I felt disgusted with myself" and "it was mentally challenging not knowing what was going to happen to me." At the clinical level patients voiced concerns over the lack of information regarding follow-up, isolation, and vaccine eligibility (n=7, 53%). At a system level, care coordination and the lack of access to services (7, 53%) was the biggest concern.

Conclusions: As a new public health emergency, much was unknown about Mpox during the early phases of this international crisis. Patients who received care in this ED voiced insufficient counseling and education regarding their diagnosis and reported feeling stigmatized. Given this vulnerable patient population and the transient nature of service delivery in the ED, efforts must be made to prioritize effective public health messaging and define pathways for linkage to care, especially during early outbreak response when much uncertainty exists.

Yes, authors have interests to disclose

Disclosure: Cepheid

Grant Support

Cepheid

# 159 A Rapid Host-Based Test Integrating TRAIL, IP-10 and CRP Differentiates Bacterial from Viral Infection in Acute Febrile Patients: Apollo Double-Blind Clinical Validation Study

Bachur R, Kaplan S, Arias C, Ballard N, Halabi S, Klein A, Motov S, Ryan LM, Weissman A, Rothman R/Boston Children's Hospital, Boston, Massachusetts, US

Objectives: Patients with acute febrile bacterial and viral infections often present similarly in acute care settings. Host-based diagnostics have the potential to aid physicians in differentiating the most common broad causative etiology of infection, i.e., bacterial versus viral infection, and thus could improve management decisions. Here we determined the diagnostic accuracy and estimated the potential usefulness of a rapid host protein-based test (called MMBV) for differentiating bacterial from viral infections in patients who presented to either the emergency department (ED) or urgent care center (UCC).

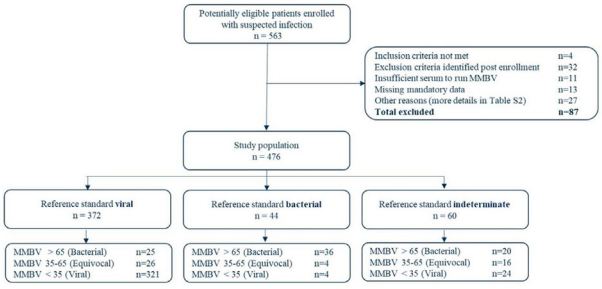
Methods: Prospective, double-blinded study to establish the diagnostic accuracy of MMBV, a test based on computational integration of TRAIL, IP-10 and CRP. MMBV was measured using a new rapid measurement platform. Patients were enrolled from 9 EDs and 3 UCCs in the U.S. and Israel. Patients aged > 3 months presenting with fever and clinical suspicion of acute infection were considered eligible. Given there is no gold standard for differentiating bacterial from viral infections, MMBV results (categorized as bacterial or viral or equivocal) were compared against a reference standard infection etiology derived by expert panel adjudication of infection type. Experts were provided with comprehensive patient data, including laboratory, microbiological, radiological and follow-up care information obtained via a follow-up call. The potential impact of MMBV on clinical care was estimated by comparing potential MMBV-driven versus actual antibiotic decisions.

Results: There were 563 adults and children enrolled (Figure 1A); 87 were excluded leaving 476 patients in the study population (314 adults, 162 children). The predominant clinical syndrome was respiratory tract infection (60.5% upper, 11.3% lower). Area under the curve (AUC) for MMBV was 0.95 (95% confidence interval, CI: 0.90-0.99), significantly outperforming procalcitonin (AUC 0.70, 95%CI: 0.61-0.79) (Figure 1B). MMBV yielded sensitivity of 90.0% (95%CI: 80.3-99.7), specificity of 92.8% (95%CI: 90.0-95.5) and negative predictive value of 98.8% (95% CI: 96.8-99.6); 7.2% of cases yielded equivocal MMBV scores. An estimated reduction in unwarranted antibiotics of 2.2-fold was determined based on potential MMBV-driven versus actual practice decisions, without a significant impact on underuse.

Conclusions: MMBV distinguished bacterial from viral infection with high sensitivity and specificity. Future implementation of MMBV in ED and/or UCC for patients with suspected acute infections could potentially reduce antibiotic misuse (underuse and overuse).

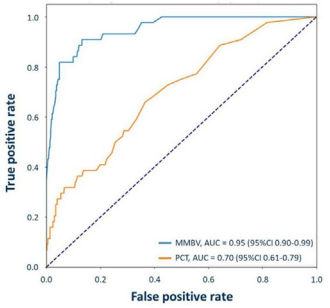
Figure 1

A. Patient flow.




Note that 'viral' includes non-infectious cases and 'bacterial' includes bacterial and viral co-infections.

B. Performance of MMBV versus PCT in differentiating between bacterial and viral infection, n=416.




MMBV outperformed PCT ($p < 0.0001$). AUC, area under the receiver operator characteristic curve; CI, confidence interval; PCT, procalcitonin.

Yes, authors have interests to disclose
Disclosure: MeMed
Consultant/Advisor
MeMed
Disclosure: MeMed
Consultant/Advisor
MeMed

# 160 Comparisons of Hospital Mortality Between Sepsis Patients of Bacteremia With and Without Antimicrobial Resistance: A Propensity Score Matching Cohort Study Between 1996 and 2022

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Background: Currently, resistance to antimicrobials in patients with sepsis is prevalent, increasing the difficulty in treatment. The cumulative positive blood culture rate in emergency departments (EDs) is estimated to be 10 % in Asian populations. Bacteremia with resistance to antimicrobials plays an important role in sepsis, including hospital mortality and major adverse sepsis events (MASEs), such as septic shock, acute respiratory failure, intensive care unit admission, and acute kidney injury (AKI).

Objectives: This study aimed to compare the hospital outcomes between sepsis patients of bacteremia with and without resistance to antimicrobials.

Methods: This study was conducted at two medical centers between 1996 and 2022. The blood cultures here were drawn in the ED. The study subjects with bacterial sepsis were classified into the antimicrobial resistance and non-antimicrobial resistance groups according to blood culture results. The demographic characteristics, underlying comorbidities, MASEs, Sequential Organ Failure Assessment (SOFA) scores, main infection sites, laboratory data, and hospital mortality were compared between the two groups. Propensity score matching by age and sex between the two groups was performed to reduce the selection bias. Univariate and multivariate Cox regression analyses for clinically important variables were performed to determine the adjusted hazard ratio (aHR) with 95% confidence interval (CI) for total hospital mortality, particularly for sepsis patients of bacteremia with and without resistance to antimicrobials. The Kaplan– Meier analysis was performed to compare differences in total hospital mortality.

Results: In this study, 15,401 patients with sepsis admitted to the ED were identified. After propensity score matching in a ratio of 1:10, the antimicrobial resistance group contained 139 bacteremic sepsis patients, whereas the non-antimicrobial resistance group contained 1,390. The mean Charlson Comorbidity Index score was 5.44 $\pm$ 3.34 in the antimicrobial resistance group and 5.41 $\pm$ 3.29 in the non-antimicrobial resistance group ($P = 0.93$). The mean SOFA score was 11.42 $\pm$ 3.41 in the antimicrobial resistance group and 10.37 $\pm$ 3.36 in the non-antimicrobial resistance group ($P < 0.001$). Although patients with antimicrobial resistance were more likely to experience septic shock (75.54% vs. 58.63%) and showed higher total hospital mortality (61.87% vs. 45.83%) than those without antimicrobial resistance (both $P < 0.001$), the antimicrobial resistance group did not have statistically higher proportions of patients with AKI (13.53% vs. 11.36; $P = 0.54$) and those with respiratory failure (40.29% vs. 34.82; $P = 0.23$). Concerning hospital mortality, in the univariate analysis, the crude HR for patients with antimicrobial resistance was 1.383 (95% CI: 1.090–1.754; $P = 0.008$). After adjusting for all clinically confounding variables, antimicrobial resistance remained associated with increased hospital mortality (aHR = 1.498 (95% CI: 1.012–2.219); $P = 0.04$). In the Kaplan–Meier analysis with the log-rank test, sepsis patients of bacteremia with antimicrobial resistance had a lower hospital survival rate, irrespective of the length of hospital stay (7, 14, and 28 days).

Conclusions: This large cohort study demonstrated that sepsis patients of bacteremia with antimicrobial resistance are more likely to have septic shock and in-hospital mortality. Further studies are required to improve the treatment strategy.

**Table 1.** Demographic characteristics, baseline comorbidities, hospitalization courses, procedures, main infection sites, and laboratory data in sepsis patients of bacteremia with and without antimicrobial resistance after propensity score matching according to age and sex.

| Variables | Antimicrobial resistance (n = 139) | Non-antimicrobial resistance (n = 1,390) | $p^1$ |
|---|---|---|---|
| **Demographic characteristics** | | | |
| Age [mean (SD)] | 70.29 (15.65) | 70.4 (14.67) | 0.94 |
| Sex [Males, n (%)] | 101 (72.66) | 1011 (72.73) | 1 |
| BMI [mean (SD)] | 22.75 (4.02) | 23.44 (3.92) | 0.09 |
| **Mortality [n (%)]** | 86 (61.87) | 637 (45.83) | <0.001 |
| **Comorbidities [n (%)]** | | | |
| Myocardial infarction | 14 (10.07) | 120 (8.63) | 0.68 |
| Congestive heart failure (CHF) | 37 (26.62) | 219 (15.76) | 0.002 |
| Peripheral vascular disease | 18 (12.95) | 83 (5.97) | 0.003 |
| Cerebrovascular disease | 51 (36.69) | 373 (26.83) | 0.02 |
| Dementia | 18 (12.95) | 136 (9.78) | 0.30 |
| Chronic pulmonary disease (COPD) | 42 (30.22) | 391 (28.13) | 0.67 |
| Rheumatic disease | 8 (5.76) | 76 (5.47) | 1 |
| Peptic ulcer disease | 45 (32.37) | 487 (35.04) | 0.59 |
| Mild liver disease | 22 (15.83) | 174 (12.52) | 0.33 |
| Diabetes without chronic complication | 42 (30.22) | 330 (23.74) | 0.11 |
| Diabetes with chronic complication | 22 (15.83) | 169 (12.16) | 0.27 |
| Hemiplegia or paraplegia | 4 (2.88) | 40 (2.88) | 1 |
| Renal disease | 73 (52.52) | 499 (35.9) | **<0.001** |
| ESKD | 14 (10.07) | 77 (5.54) | **0.05** |
| CKD | 59 (42.45) | 422 (30.36) | **0.005** |
| Any malignancy, including lymphoma and leukemia | 48 (34.53) | 411 (29.57) | 0.26 |
| Moderate or severe liver disease | 13 (9.35) | 142 (10.22) | 0.86 |
| Metastatic solid tumor | 21 (15.11) | 407 (29.28) | **<0.001** |
| AIDS/HIV | 0 (0) | 5 (0.36) | 1 |
| Charlson Comorbidity Index score [CCI, mean (SD)] | 5.44 (3.34) | 5.41 (3.29) | 0.93 |
| SOFA score [mean (SD)] | 11.42 (3.41) | 10.37 (3.36) | <0.001 |
| Septic shock [n (%)] | 105 (75.54) | 815 (58.63) | <0.001 |
| Respiratory failure [n (%)] | 56 (40.29) | 484 (34.82) | 0.23 |
| Acute kidney injury (AKI) [n (%)] | 18 (13.53) | 153 (11.36) | 0.54 |
| Length of ED stay [hours, mean (SD)] | 22.88 (29.67) | 33.61 (47.03) | <0.001 |
| ICU admission | 83 (59.71) | 652 (46.91) | 0.005 |
| **Procedures [n (%)]** | | | |
| Endotracheal intubation | 29 (20.86) | 284 (20.43) | 0.99 |
| Noninvasive positive ventilation | 38 (27.34) | 310 (22.3) | 0.21 |
| Cardiac catheterization | 13 (9.35) | 42 (3.02) | <0.001 |
| Central venous catheter insertion | 99 (71.22) | 689 (49.57) | <0.001 |
| Hemodialysis | 40 (28.78) | 224 (16.12) | <0.001 |
| Urgent | 26 (18.71) | 147 (10.58) | 0.006 |
| Maintenance | 14 (10.07) | 77 (5.54) | 0.05 |
| Blood transfusion | 107 (76.98) | 944 (67.91) | 0.04 |
| **Main infection sites [n (%)]** | | | |
| Central nervous | 3 (2.16) | 15 (1.08) | 0.22 |
| Respiratory | 50 (35.97) | 449 (32.3) | 0.43 |
| Cardiovascular | 3 (2.16) | 21 (1.51) | 0.47 |
| Gastrointestinal/biliary tract | 28 (20.14) | 281 (20.22) | 1 |
| Genitourinary | 33 (23.74) | 416 (29.93) | 0.15 |
| Soft tissue/musculoskeletal | 10 (7.19) | 61 (4.39) | 0.20 |
| Device-related | 11 (7.91) | 70 (5.04) | 0.21 |
| Others | 37 (26.62) | 253 (18.2) | 0.02 |
| **Laboratory data [mean (SD)]** | | | |
| WBC (/μL) | 13522 (9657) | 12554 (9424) | 0.25 |
| Hemoglobin (g/dL) | 10.06 (2.47) | 11.42 (2.65) | <0.001 |
| Platelet ($\times 10^3$/μL) | 196 (146) | 183 (135) | 0.27 |
| Albumin (g/dL) | 2.66 (0.61) | 2.74 (0.7) | 0.23 |
| Total bilirubin (mg/dL) | 1.86 (3.66) | 1.97 (3.54) | 0.74 |
| Creatinine (mg/dL) | 3.07 (3.02) | 2.32 (2.15) | 0.005 |
| CRP (mg/dL) | 13.73 (10.29) | 13.11 (10.91) | 0.55 |
| Procalcitonin (ng/mL) | 22.97 (31.76) | 21.17 (31.96) | 0.65 |
| Lactate (mmol/L) | 32.69 (31.89) | 34.45 (31.55) | 0.54 |

| | | | |
|---|---|---|---|
| **Bacteria spectrum** | | | |
| Gram Positive Coccus | 81 (58.27) | 446 (32.09) | <0.001 |
| Gram Negative Bacillus | 73 (52.52) | 916 (65.9) | 0.002 |
| Mixed flora | 11 (7.91) | 47 (3.38) | 0.01 |

[1] Student's t-test for continuous variables and the chi-square test for categorical variables. *P*-values < 0.05 are shown in bold.

**Table S1.** Demographic characteristics, baseline comorbidities, hospitalization courses, procedures, main infection sites, and laboratory data in patients with bacterial sepsis with and without antimicrobial resistance.

| Variables | Antimicrobial resistance (n = 139) | Non-antimicrobial resistance (n = 4,630) | $p^1$ |
|---|---|---|---|
| Demographic characteristics | | | |
| Age [mean (SD)] | 70.29 (15.65) | 67.59 (15.83) | 0.05 |
| Sex [Males, n (%)] | 101 (72.66) | 2793 (60.32) | 0.004 |
| BMI [mean (SD)] | 22.75 (4.02) | 23.6 (4.05) | 0.03 |
| Mortality [n (%)] | 86 (61.87) | 2006 (43.33) | <0.001 |
| Comorbidities [n (%)] | | | |
| Myocardial infarction | 14 (10.07) | 335 (7.24) | 0.27 |
| Congestive heart failure (CHF) | 37 (26.62) | 668 (14.43) | **<0.001** |
| Peripheral vascular disease | 18 (12.95) | 212 (4.58) | **<0.001** |
| Cerebrovascular disease | 51 (36.69) | 1062 (22.94) | **<0.001** |
| Dementia | 18 (12.95) | 343 (7.41) | **0.02** |
| Chronic pulmonary disease (COPD) | 42 (30.22) | 1111 (24) | 0.11 |
| Rheumatic disease | 8 (5.76) | 273 (5.9) | 1 |
| Peptic ulcer disease | 45 (32.37) | 1442 (31.14) | 0.83 |
| Mild liver disease | 22 (15.83) | 552 (11.92) | 0.21 |
| Diabetes without chronic complication | 42 (30.22) | 1075 (23.22) | 0.07 |
| Diabetes with chronic complication | 22 (15.83) | 504 (10.89) | 0.09 |
| Hemiplegia or paraplegia | 4 (2.88) | 104 (2.25) | 0.56 |
| Renal disease | 73 (52.52) | 1451 (31.34) | **<0.001** |
| ESKD | 14 (10.07) | 244 (5.27) | **0.02** |
| CKD | 59 (42.45) | 1207 (26.07) | **<0.001** |
| Any malignancy, including lymphoma and leukemia, except for malignant neoplasm of skin | 48 (34.53) | 1313 (28.36) | 0.14 |
| Moderate or severe liver disease | 13 (9.35) | 416 (8.98) | 1 |
| Metastatic solid tumor | 21 (15.11) | 1110 (23.97) | 0.02 |
| AIDS/HIV | 0 (0) | 13 (0.28) | 1 |
| Charlson Comorbidity Index (CCI) score [mean (SD)] | 5.44 (3.34) | 4.71 (3.22) | 0.009 |
| SOFA score [mean (SD)] | 11.42 (3.41) | 10.15 (3.41) | <0.001 |
| Septic shock [n (%)] | 105 (75.54) | 2606 (56.29) | <0.001 |
| Respiratory failure [n (%)] | 56 (40.29) | 1565 (33.8) | 0.13 |
| Acute kidney injury (AKI) [n (%)] | 18 (13.53) | 552 (12.24) | 0.75 |
| Length of ED stay [hours, mean (SD)] | 22.88 (29.67) | 31.04 (42.51) | 0.002 |
| ICU admission | 83 (59.71) | 2155 (46.54) | 0.003 |
| Procedures [n (%)] | | | |
| Endotracheal intubation | 29 (20.86) | 905 (19.55) | 0.78 |
| Noninvasive positive ventilation | 38 (27.34) | 989 (21.36) | 0.11 |
| Cardiac catheterization | 13 (9.35) | 130 (2.81) | <0.001 |
| Brain computed tomography | 61 (43.88) | 1443 (31.17) | 0.002 |
| Central venous catheter insertion | 99 (71.22) | 2249 (48.57) | <0.001 |
| Hemodialysis | 40 (28.78) | 687 (14.84) | <0.001 |
| Urgent | 26 (18.71) | 443 (9.57) | <0.001 |
| Maintenance | 14 (10.07) | 244 (5.27) | 0.02 |
| Blood transfusion | 107 (76.98) | 3008 (64.97) | 0.004 |
| Main infection sites [n (%)] | | | |
| Central nervous | 3 (2.16) | 44 (0.95) | 0.16 |
| Respiratory | 50 (35.97) | 1336 (28.86) | 0.08 |
| Cardiovascular | 3 (2.16) | 83 (1.79) | 0.74 |
| Gastrointestinal/biliary tract | 28 (20.14) | 936 (20.22) | 1 |
| Genitourinary | 33 (23.74) | 1470 (31.75) | 0.06 |
| Soft tissue/musculoskeletal | 10 (7.19) | 171 (3.69) | 0.06 |
| Device-related | 11 (7.91) | 211 (4.56) | 0.10 |
| Others | 37 (26.62) | 804 (17.37) | 0.007 |
| Laboratory data [mean (SD)] | | | |
| WBC (/μL) | 13522 (9657) | 12963 (13351) | 0.51 |
| Hemoglobin (g/dL) | 10.06 (2.47) | 11.38 (2.63) | <0.001 |
| Platelet (×$10^3$/μL) | 196 (146) | 182 (124) | 0.28 |
| Albumin (g/dL) | 2.66 (0.61) | 2.76 (0.7) | 0.11 |
| Total Bilirubin (mg/dL) | 1.86 (3.66) | 1.98 (3.75) | 0.71 |
| Creatinine (mg/dL) | 3.07 (3.02) | 2.25 (2.19) | 0.002 |
| CRP (mg/dL) | 13.73 (10.29) | 12.83 (10.83) | 0.37 |
| Procalcitonin (ng/mL) | 22.97 (31.76) | 23.06 (34.84) | 0.98 |
| Lactate (mmol/L) | 32.69 (31.89) | 35.06 (31.67) | 0.39 |

| | | | |
|---|---|---|---|
| **Bacteria spectrum** | | | |
| Gram Positive Coccus | 81 (58.27) | 1354 (29.24) | <0.001 |
| Gram Negative Bacillus | 73 (52.52) | 3176 (68.6) | <0.001 |
| Gram Positive Bacillus | 1 (0.72) | 165 (3.56) | 0.09 |
| Mixed flora | 11 (7.91) | 179 (3.87) | 0.03 |

[1] Student's t-test for continuous variables and the chi-square test for categorical variables. *P*-values < 0.05 were shown in bold.

**Table 2.** Cox regression model for measuring the crude and adjusted hazard ratios with 95% confidence intervals (95% CIs) for hospital mortality in sepsis patients of bacteremia with and without antimicrobial resistance.

| Variables | Mortality | | | |
|---|---|---|---|---|
| | Crude HR (95% CI) | Crude *p* | Adjusted HR (95% CI) | Adjusted $p^1$ |
| Antimicrobial resistance | 1.383 (1.090–1.754) | 0.008 | 1.498 (1.012–2.219) | 0.04 |
| SOFA score | 1.131 (1.105–1.159) | <0.001 | 1.078 (0.989–1.174) | 0.09 |
| Septic shock (inotropic or vasopressor agent use) | 2.037 (1.706–2.433) | <0.001 | 1.286 (0.653–2.536) | 0.47 |
| Respiratory failure | 0.938 (0.809–1.087) | 0.39 | 0.585 (0.423–0.808) | 0.001 |
| AKI | 1.443 (1.152–1.808) | 0.001 | 1.466 (0.95–2.262) | 0.08 |
| Length of ED stay (hours) | 0.997 (0.995–0.999) | <0.001 | 1 (0.996–1.004) | 0.99 |
| ICU admission | 1.238 (1.064–1.44) | 0.006 | 0.906 (0.538–1.527) | 0.71 |
| Main infection sites | | | | |
| Central nervous | 1.852 (1.08–3.178) | 0.03 | 1.579 (0.44–5.668) | 0.48 |
| Respiratory | 1.215 (1.045–1.414) | 0.01 | 1.091 (0.761–1.564) | 0.63 |
| Cardiovascular | 1.26 (0.753–2.108) | 0.38 | 1.694 (0.824–3.482) | 0.15 |
| Gastrointestinal/biliary tract | 0.994 (0.836–1.182) | 0.95 | 0.844 (0.577–1.236) | 0.38 |
| Genitourinary | 0.439 (0.361–0.533) | <0.001 | 0.351 (0.204–0.602) | <0.001 |
| Soft tissue/musculoskeletal | 0.65 (0.472–0.894) | 0.008 | 0.459 (0.203–1.037) | 0.06 |
| Device-related | 0.603 (0.432–0.842) | 0.003 | 0.809 (0.403–1.624) | 0.55 |
| Others | 0.825 (0.69–0.988) | 0.04 | 0.837 (0.562–1.247) | 0.38 |
| Laboratory data | | | | |
| WBC (/μL) | 1 (1–1) | 0.76 | 1 (1–1) | 0.03 |
| Hemoglobin (g/dL) | 0.962 (0.935–0.989) | 0.007 | 0.959 (0.902–1.019) | 0.18 |
| Platelet (×$10^3$/μL) | 0.998 (0.997–0.999) | <0.001 | 0.998 (0.997–1) | 0.03 |
| Albumin (g/dL) | 0.659 (0.588–0.739) | <0.001 | 0.697 (0.52–0.934) | 0.02 |
| Total Bilirubin (mg/dL) | 1.035 (1.015–1.056) | <0.001 | 1.009 (0.969–1.05) | 0.68 |
| Creatinine (mg/dL) | 1.042 (1.013–1.073) | 0.005 | 1.011 (1.008–1.013) | <0.001 |
| CRP (mg/dL) | 1.009 (1.002–1.017) | 0.02 | 0.988 (0.972–1.005) | 0.16 |
| Procalcitonin (ng/mL) | 1.004 (1–1.008) | 0.03 | 1.003 (0.998–1.008) | 0.27 |
| Lactate (mmol/L) | 1.021 (1.018–1.023) | <0.001 | 1.009 (1.004–1.014) | <0.001 |

[1] Adjusted for demographic characteristics, SOFA score, septic shock, respiratory failure, AKI, length of ED stay, ICU admission, main infection sites, and laboratory data. *P*-values < 0.05 were shown in bold.

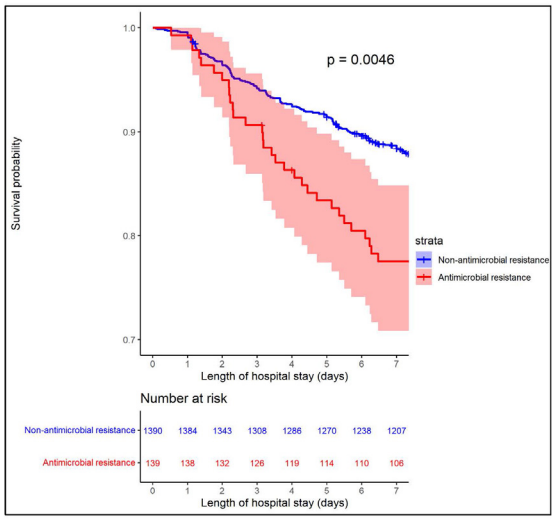



**Figure 1.** Kaplan–Meier analysis with the log-rank test to describe the first 7-day survival curves between sepsis patients of bacteremia with and without antimicrobial resistance.

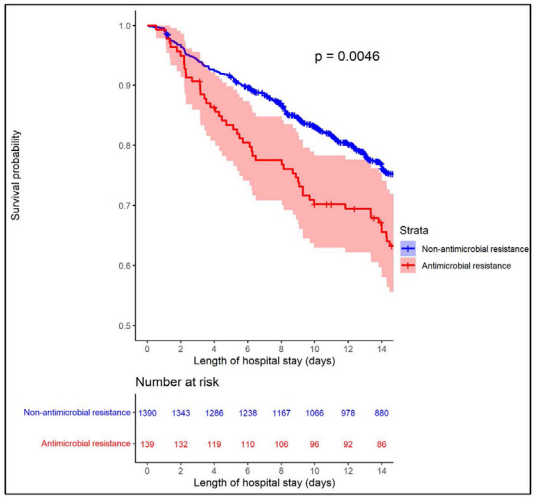



**Figure 2.** Kaplan–Meier analysis with the log-rank test to describe the first 14-day survival curves between sepsis patients of bacteremia with and without antimicrobial resistance.

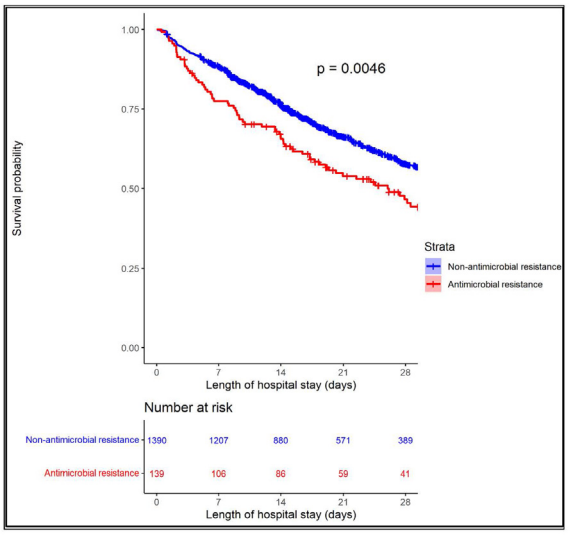



**Figure 3.** Kaplan–Meier analysis with the log-rank test to describe the first 28-day survival curves between sepsis patients of bacteremia with and without antimicrobial resistance.

No, authors do not have interests to disclose

## 161 A Host Response Test (MMBV) for Differentiating Between Bacterial and Viral Infection Has Potential to Improve Antibiotic Stewardship in Patients With Suspected Sepsis

Angel A, Eden E, Avioz NZ, Gottlieb T, Navon R/MeMed, Haifa, Israel

Objectives: Sepsis is a global health problem, associated with a significant number of deaths, burden, and healthcare costs. Patients with Systemic Inflammatory Response Syndrome (SIRS) represent possible sepsis cases (17.5% incidence). As of 2018, > 50% of SIRS patients were prescribed antibiotics, and 35.6% were broad-spectrum antibiotics. MeMed BV® (MMBV) is a host-based rapid diagnostic test that computationally integrates levels of three blood soluble biomarkers (TRAIL, IP-10, and CRP) to indicate the likelihood of bacterial infection. Leveraging our understanding of the host response in sepsis to improve clinical practice is not yet fully realized. This study evaluates the accuracy of the MMBV and synergism with other diagnostic tools in patients with suspected sepsis.

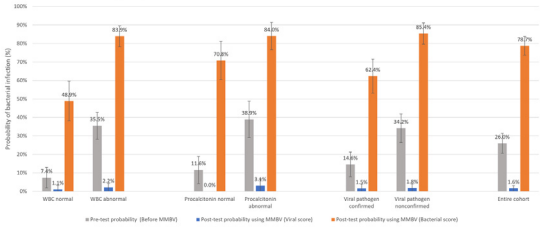
Methods: This retrospective multi-cohort analysis was conducted on patients from 7 independent validation studies that were recruited across 22 sites in the US, Europe, and Israel. Inclusion criteria were patients with confirmed infection and $\geq$2 age-adjusted SIRS criteria. Reference standard infection etiology was based on adjudication by independent expert panels who were provided with comprehensive patient data and follow-up but were blinded to MMBV results. Pre-defined score thresholds were $0 \leq score < 35$ indicated viral (or other nonbacterial) infection, $35 \leq score \leq 65$ indicated equivocal, and $65 < score \leq 100$ indicated bacterial infection (or coinfection). MMBV performance was compared to standard tests such as white blood count (WBC), procalcitonin (PCT), and viral detection tests (PCR or antigen).

Results: Out of 3,874 patients, 1,126 (29.1%) met 2 or more SIRS criteria and were unanimously adjudicated to have either viral (75.1%) or bacterial (24.9%) infection. The resulting analysis cohort comprised 20.9% adults with a median age of 42 years (interquartile range, IQR: 30-64 years) and 79.1% children with a median age of 2.3 years (IQR: 1.1-4 years). Females were 45.4%, and 67.2% were hospitalized with a median duration of 4 days (IQR: 3-6 days). MMBV yielded a sensitivity of 95.8% (95% Confidence Interval, CI: 92.6%-97.9%), specificity of 90.9% (95%CI: 88.7%-92.9%), positive predictive value of 78.7% (95%CI: 73.8%-83%), and negative predictive value of 98.4% (95%CI: 97.1%-99.2%), with 10% equivocal cases. In cases with low pre-test probability of bacterial infections (WBC or PCT within normal range or positive microbiological confirmation of viral

pathogen), bacterial MMBV score increased bacterial infection probability by 4.5-7 fold ($p<0.001$). Conversely, in cases of abnormal WBC, PCT, or no evidence of viral pathogen, viral MMBV score decreased bacterial infection probability by 9-19 fold ($p<0.001$; figure 1). The overall antibiotic treatment rate was 43.2%, with overuse in 25% of viral patients and underuse in 2.1% of bacterial patients. Assuming integration of MMBV to antimicrobial stewardship, the overall antibiotic prescription could potentially be reduced to 28.1%, overuse to 6.3%, and underuse to 0.4%.

Conclusions: MMBV differentiates between bacterial (including co-infections) and viral causes of acute infection in patients with suspected sepsis, offering additive diagnostic value on top of other existing tests and holds potential to improve antimicrobial stewardship.

**Figure 1**- Diagnostic capability of the MMBV combined with standard of care diagnostic (SOC) tests to differentiate between Bacterial and viral infection




*Abnormal WBC is defined based on age-adjusted cutoff as established by the International pediatric sepsis consensus conference (ICCPS); abnormal Procalcitonin defined as ≥0.25 ng/ml
**Analysis was performed after excluding 113 (10%) patients with equivocal score. Including a total of 1013 patients, of them: 336 patients with normal WBC, 667 patients with abnormal WBC; 380 patients with normal procalcitonin, 294 patients with abnormal procalcitonin, 431 patients with confirmed viral pathogen, and 582 patients with no confirmation of viral pathogen

Yes, authors have interests to disclose
Disclosure: MeMed
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Disclosure: MeMed
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Disclosure: MeMed
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## 162 A National Emergency Department Registry for Mpox

Dashler G, Castro D, Schechter-Perkins E, May L, Faryar K, Doerning R, Duber H, Rothman R, Hsieh Y-H, Hansoti B/Johns Hopkins University School of Medicine, Baltimore, Maryland, US

Background: In the US, nearly 50% of all patients with Mpox (previously monkeypox) initially presented to an emergency department (ED) for care. Cases at single institutions were few, making understanding of demographic trends for this novel outbreak challenging. The Emergency Medicine Transmissible Infectious Diseases and Epidemics (EMTIDE) Consortium developed infra-structure and processes for a pooled data repository of patients who presented to the ED diagnosed with Mpox, in order to define epidemiologic trends and inform future practice and policy for ED response to emerging infectious disease outbreaks.

Methods: Multi-center national retrospective chart review of patients with laboratory confirmed Mpox (Orthopoxvirus Qual NAT) presenting to EDs across five health systems in the U.S. Clinical variables included demographics, HIV co-infection, and disposition.

Results: A total of 124 patients from across 5 sites are included in the cohort; most patients were male (121, 98%) and relatively young (median age 34 years; 19-57). There was wide variation in race, access to followup, and insurance status across sites. Patients most commonly presented with "rash" (98, 79%), "exposure to Mpox" (28, 23%), "fever" (42, 34%) and "STI-related symptoms" (20, 16%). For patients whose HIV status was known, half were living with HIV (58/112, 52%). Of those tested for co-infection, (26/72, 36%) had syphilis followed by gonorrhea or chlamydia (6/50, 12%). Almost all patients were discharged from the ED (109, 88%).

Conclusions: Clinical guidelines and patient information tools for ED patients with Mpox should focus on younger men and include guidance on how to access post-discharge services for those without insurance. Coinfection with HIV or other sexually transmitted infections (STIs) was common, warranting extensive STI evaluation for all patients with suspected Mpox. Given the high prevalence of HIV in patients with mpox, HIV treatment status should be ascertained.

Table 1: Demographics/Characteristics of Multi-center ED Mpox Cohort

| | All Sites N=124 | Johns Hopkins Health System N=47 | UC Davis N=9 | Boston Medical Center N=11 | University Hospitals N=18 | University of Washington N=39 |
|---|---|---|---|---|---|---|
| **Age** | | | | | | |
| Median age in years (range) | 34 (19-57) | 35 (20-57) | 35 (20-57) | 35 (20-57) | 30 (19-51) | 34 (21-55) |
| **Race** | | | | | | |
| Black/African American | 55 (44%) | 27 (58%) | 2 (22%) | 4 (36%) | 15 (82%) | 7 (18%) |
| White | 46 (37%) | 11 (23%) | 4 (45%) | 4 (36%) | 1 (6%) | 26 (67%) |
| Asian | 2 (2%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (6%) | 1 (3%) |
| Other | 15 (12%) | 9 (19%) | 3 (33%) | 0 (0%) | 0 (0%) | 3 (8%) |
| Unknown | 6 (5%) | 0 (0%) | 0 (0%) | 3 (28%) | 1 (6%) | 2 (4%) |
| **Ethnicity** | | | | | | |
| Non-Hispanic/Latino | 79 (64%) | 39 (83%) | 7 (78%) | 6 (55%) | 0 (0%) | 27 (70%) |
| Hispanic/Latino | 27 (22%) | 8 (17%) | 2 (22%) | 5 (45%) | 0 (0%) | 12 (30%) |
| Unknown | 18 (14%) | 0 (0%) | 0 (0%) | 0 (0%) | 18 (100%) | 0 (0%) |
| **Sex assigned at birth** | | | | | | |
| Male | 121 (98%) | 46 (98%) | 8 (89%) | 11 (100%) | 17 (94%) | 39 (100%) |
| Female | 3 (2%) | 1 (2%) | 1 (11%) | 0 (0%) | 1 (6%) | 0 (0%) |
| **Insurance Status** | | | | | | |
| Private | 34 (27%) | 19 (41%) | 1 (11%) | 0 (0%) | 0 (0%) | 14 (36%) |
| Medicaid | 37 (30%) | 16 (34%) | 0 (0%) | 0 (0%) | 0 (0%) | 21 (54%) |
| Uninsured | 14 (12%) | 11 (23%) | 1 (11%) | 0 (0%) | 0 (0%) | 2 (5%) |
| Medicare | 9 (7%) | 1 (2%) | 6 (67%) | 0 (0%) | 0 (0%) | 2 (5%) |
| Unknown | 30 (24%) | 0 (0%) | 1 (11%) | 11 (100%) | 18 (100%) | 0 (0%) |
| **HIV Status** | | | | | | |
| Positive | 58 (47%) | 18 (38%) | 7 (78%) | 3 (27%) | 6 (33%) | 24 (62%) |
| Negative | 54 (44%) | 21 (45%) | 1 (11%) | 7 (64%) | 12 (67%) | 13 (33%) |
| Unknown | 12 (9%) | 8 (17%) | 1 (11%) | 1 (9%) | 0 (0%) | 2 (5%) |
| **Disposition** | | | | | | |
| Discharge | 109 (88%) | 42 (89%) | 7 (78%) | 11 (100%) | 16 (89%) | 33 (85%) |
| Admitted | 15 (12%) | 5 (11%) | 2 (22%) | 0 (0%) | 2 (11%) | 6 (15%) |

Yes, authors have interests to disclose
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Disclosure: Roche
Consultant/Advisor
Roche
Disclosure: Abbott
Honoraria
Abbott

## 163 Corticosteroid Therapy Effect on Biphasic Reaction in Children With Anaphylaxis

Bonadio W, Pradarelli B, Ng Y, Welsh C/Mount Sinai, New York, New York, US

Background: Children commonly experience anaphylactic reactions. Whether corticosteroid therapy [CS] can prevent biphasic reaction [BPR] is unclear.

Objective: Determine if CS therapy impacts rate of BPR in children with anaphylaxis who receive intramuscular epinephrine [IM EPI].

Methods: Review consecutive cases of anaphylaxis in an emergency department [ED] during an 8-year period. All received IM EPI/CS; followed by monitoring for 4-6 hours. BPR analysis was divided into 2 intervals, based on timing of medication effect: 1] IM EPI PHASE: <4 hours after IM EPI/CS [IM EPI effect operative/CS effect pending]; and 2] CS PHASE: >4 hours after IM EPI/CS [CS effect operative/ IM EPI

effect waned]. We compared BPR rates during the 2 intervals to determine the selective effects of IM EPI vs CS.

Results: Of 242 anaphylaxis cases, 216 [93%] received both IM EPI/CS; 36 patients [16%] manifested BPR [84% received pre-hospital IM EPI] requiring >1 additional dose of IM EPI. All BPR occurred during the IM EPI phase of therapy; no patient manifested BPR requiring additional IM EPI during the CS phase of therapy [p <0.001]. No patient returned to the ED with recurrent anaphylaxis within 72 hours after discharge.

Conclusion: One in 6 children with anaphylaxis experience a biphasic reaction after receiving IM EPI. Children with anaphylaxis and symptomatic resolution 4-6 hours following therapy initiation have low risk for subsequently developing BPR. BPR rate in those receiving IM EPI and CS is significantly less >4 hours vs <4 hours after initiating therapy.

Table. Patient characteristics - 307 cases of anaphylaxis treated with IM EPI and CS.

| Variable | *N* [%] |
|---|---|
| Patient age range | 3 months - 19 years |
| Patient gender: | |
| • Male | 163 |
| • Female | 144 |
| Median ED length of stay | 4.7 hours |
| Anaphylaxis trigger: | |
| • Food exposure | 283 [93%] |
| • Unknown | 17 |
| • Environmental exposure | 2 |
| • Drug-related | 5 |
| Management received – all cases: | |
| • IM EPI | 307 |
| • pre-hospital IM EPI | 174 [57%] |
| • CS | 307 |
| • H1 and/or H2 antagonist* | 294 [95%] |
| BPR cases^: | |
| • total | 43 [14%] |
| • received >1 dose of IM EPI | 43 |
| • received >2 doses of IM EPI | 7+ |
| • received pre-hospital IM EPI | 38 [88%] |
| • BPR during the initial 4 hours after initiating therapy | 43 |
| • BPR during the interval 4-48 hours after initiating therapy | 0 |
| Inpatient hospitalization | 10 |
| Deaths | 0 |

* H1 antagonist = diphenhydramine; H2 antagonist = famotidine
+ all doses of IM EPI were given during the initial 0-4 hours after initiating ED therapy
^ within 48 hours after initial anaphylaxis presentation

No, authors do not have interests to disclose

## 164 The Diagnostic Utility of Hip Ultrasound in the Diagnosis of Septic Arthritis of the Hip in Pediatric Patients

Lopreiato N, Marquez-Lara A, Rizzo S, Minoughan C, Duan Q, Ramalingam W/Walter Reed National Military Medical Center, Bethesda, Maryland, US

Objectives: Septic arthritis of the hip (SA) is an uncommon cause of hip pain in children, but one that has devastating consequences if untreated. Differentiating septic arthritis from other causes of hip pain such as transient synovitis (TS) is vital, and previous studies have established laboratory and clinical criteria (Kocher criteria) to aid in the diagnosis of SA. The use of hip ultrasound is useful in the diagnosis of a hip effusion, but the role of hip ultrasound in the diagnosis of SA is not fully known. The purpose of this study is to determine if the presence of a hip effusion on ultrasound augments the predictive value of previously established criteria for SA.

Methods: A retrospective review of 366 patients who presented to our intuition with concern for SA and obtained a hip ultrasound. Presenting history, hospital course, laboratory values, and final diagnosis were recorded. Septic arthritis was confirmed by culture, gram stain, or cell count. In the 253 patients who met inclusion criteria, univariate analysis was used to examine the difference between SA and non-SA patients for previously established Kocher criteria and effusion on ultrasound. Statistical significance was assessed using Chi-squared test or Fisher's exact test if expected cell count was less than 5.

Results: The univariate analysis showed that the effusion on ultrasound and all five Kocher criteria were significantly different ($p < 0.05$) between SA and non-SA patients. Percentages of patients meeting one or two Kocher criteria were significantly different ($p < 0.05$) comparing SA with non-SA patients regardless of adding ultrasound results. The effusion on ultrasound was not significantly different between SA and TS patients. Among SA and non-SA patients, effusion on ultrasound and four of five Kocher criteria were significantly associated ($p < 0.05$) with the odds of having SA. The mean probability of being diagnosed as SA showed a significant increase ($p = 0.01$) among the confirmed SA patients from 42.2% to 48.5% after including ultrasound results in the model.

Conclusions: The presence of an effusion on ultrasound did not aid in the differentiating SA from TS in patients who met ≤2 Kocher criteria. Ultrasound did increase the predictive value of diagnosing SA in patients when $^{3}4$ Kocher criteria are met. This study helps refine the indication for obtaining an ultrasound in the workup for septic arthritis of the hip in children.

**Table 1: Multivariable Analysis Comparing Septic Arthritis and Non-Septic Arthritis**

| | | 95% CI | | |
|---|---|---|---|---|
| Variable | Odds Ratio | Lower | Upper | P-value |
| Effusion on Ultrasound | 8.83 | 2.41 | 32.37 | 0.0010 |
| CRP >2.0mg/dl | 12.02 | 3.70 | 39.08 | <.0001 |
| ESR >40 | 1.10 | 0.37 | 3.30 | 0.8665 |
| WBC >12,000 cells/mL | 3.27 | 1.22 | 8.74 | 0.0184 |
| Tmax >38.5c | 4.31 | 1.21 | 15.34 | 0.0244 |
| Refusal to bear weight | 6.47 | 1.28 | 32.72 | 0.0239 |

No, authors do not have interests to disclose

## 165 Laboratory Predictors of Illness Severity in Multisystem Inflammatory Syndrome in Children

Minor M, Miseo CM, Eskin B/Atlantic Health System, Morristown, New Jersey, US

Objectives: Multisystem inflammatory Syndrome in Children (MIS-C) is a new entity described in association with COVID-19. There is a diagnostic challenge in identifying children with MIS-C who are at high risk for becoming critically ill. A previous study examined predictors of severe illness in children with MIS-C. Nearly 20% had an abnormal troponin or brain natriuretic peptide (BNP) despite normal echocardiograms. Our objective was to examine whether troponin and/or BNP levels predict the severity of the clinical course of patients with MIS-C and, in particular, which children are more likely to require vasopressor support and/or prolonged ICU stay.

Methods: Design: Retrospective cohort. Setting: A single center children's hospital. The emergency department (ED) has an annual volume of 33,000 and the pediatric intensive care unit (PICU) has 15 beds. Population: Patients under the age of 21 admitted through the ED to the children's hospital from 3/1/2020- 7/31/2022. Patients were identified using International Classification of Disease (version 10) MIS-C codes. Patients for whom the diagnosis of MIS-C was uncertain, based on the chart review, were excluded. Data analysis: We extracted the following data from the charts: age, gender, admission to the PICU, length of stay (LOS) in the PICU, use of vasopressors, and initial and highest values for troponin and BNP. Troponins > 0.015 ng/ml were considered elevated. We used the Chi-squared and Mann-Whitney U tests for analysis, with $p<0.05$ considered statistically significant. IRB consent was obtained.

Results: Of the 43 charts reviewed, 38 were determined to have MIS-C. Median age was 10 years (interquartile range: 7, 12). Twenty-three (60%) required vasopressors, 27 (71%) had an elevated troponin at some point during admission, and 5 (13%) were intubated. All but 2 patients had BNP values over 300. Elevated first troponin showed a trend for use of vasopressors ($p = 0.07$). For highest troponin levels,

patients with elevated levels were more likely to be treated with vasopressors (75% and 20% of patients with elevated and normal troponin levels, respectively, were given vasopressors; difference = 55%, 95% confidence interval: 25%, 85%). There was no correlation between length of ICU stay and initial BNP nor initial or highest troponin levels. However, when the highest BNP levels during hospitalization were examined, and patients were divided into the two groups with the lowest and highest values, the difference in ICU LOS was statistically significant (medians of 0 days vs. 4 days, $p < 0.05$). The cutoff for BNP level to predict ICU LOS was 7850.

Conclusions: In children who are diagnosed with MIS-C, elevated troponin is predictive of a more severe clinical course with more children requiring vasopressor use. Elevated BNP, (> 7850) was associated with increased LOS in the PICU. Therefore, in patients with these laboratory findings, it may be useful to have closer monitoring in an institution with the ability to provide ICU level care.

No, authors do not have interests to disclose

## 166 Real World Evidence Demonstrates Safety and Performance of Intraosseous Vascular Access, Including for Longer Duration of Use in Pediatric Patients

Philbeck T, McDonald J, Ross C/Teleflex Medical Incorporated, Morrisville, North Carolina, US

Objectives: The Arrow EZ-IO Intraosseous Vascular Access System (Teleflex Medical Incorporated, Morrisville, NC, USA) is indicated in the United States and Canada for intraosseous (IO) access anytime in which vascular access is difficult to obtain in emergent, urgent or medically necessary cases for up to 24 hours. For patients ≥12 years old, the device may be extended for up to 48 hours when alternate intravenous access is not available or reliably established. In the European Union (EU), it is indicated for intraosseous access anytime in which vascular access is difficult to obtain in emergent, urgent or medically necessary cases and may be left in place for up to 72 hours. To support the EU Medical Device Regulation 2017/745 requirement to demonstrate safety and performance of medical devices, a two-phase retrospective chart review study was conducted in 2021 and 2022.

Methods: A multicenter retrospective chart-review study was designed: Phase I was to demonstrate the general safety and performance of the Arrow EZ-IO in all patients for whom IO access was needed. Phase II was to demonstrate the same in pediatric patients (only) when used for more than 24 hours. The primary endpoint was the success rate for achieving IO access; and a secondary endpoint was the rate of adverse events. The study protocol was reviewed by a central institutional review board, and an exempt determination was issued. Sample size calculation determined at least 90 cases would be needed to meet endpoint requirements, but data from additional pediatric cases were collected in Phase II.

Results: In two phases, real world data for 177 cases were captured. Among those, 71 patients (41.1%) were adult, and 106 (58.9%) were pediatric—for this study defined as <18 years of age. Of all cases, 60.5% were male. The overall success rate for achieving IO access and infusion was 96.5%. Adverse events occurred in 1.7% of device interactions; none were serious or previously unreported. The median duration of use was 44 hours. See Table for more information regarding duration of use. All subjects with duration of use ≥24 hours were pediatric. Among the 58 patients for whom the device was used for up to 48 hours, as intended, one non-serious adverse event (1.7%) occurred.

Conclusions: The Arrow EZ-IO is safe and effective for providing vascular access in both adult and pediatric patients. This is the first characterization of device safety and performance when used in the pediatric population for longer dwell times, with no serious complications reported.

**Duration of device use (dwell time)**

| Dwell Time | Number of Subjects |
|---|---|
| <24 hours | 17 |
| 24 to 48 hours | 41 |
| 48.1 to 72 hours | 23 |
| 72.1 to 96 hours | 4 |
| >96 hours | 18 |

*(Note: Duration of use data were not available for all patients in the study)*

Yes, authors have interests to disclose
Disclosure: Teleflex Medical Incorporated
Employee
Teleflex Medical Incorporated
Disclosure: Teleflex Medical Incorporated
Employee
Teleflex Medical Incorporated
Disclosure: Teleflex Medical Incorporated
Employee
Teleflex Medical Incorporated

## 167 Risk of Serious Bacterial Infections in Febrile Infants Aged 7-90 Days With COVID-19

Greenhow T, Somers M, Zhang J, Nguyen T, Vinson D, Mark D, Rauchwerger A, Reed M, Ballard D/Kaiser Permanente Northern California, San Francisco, California, US

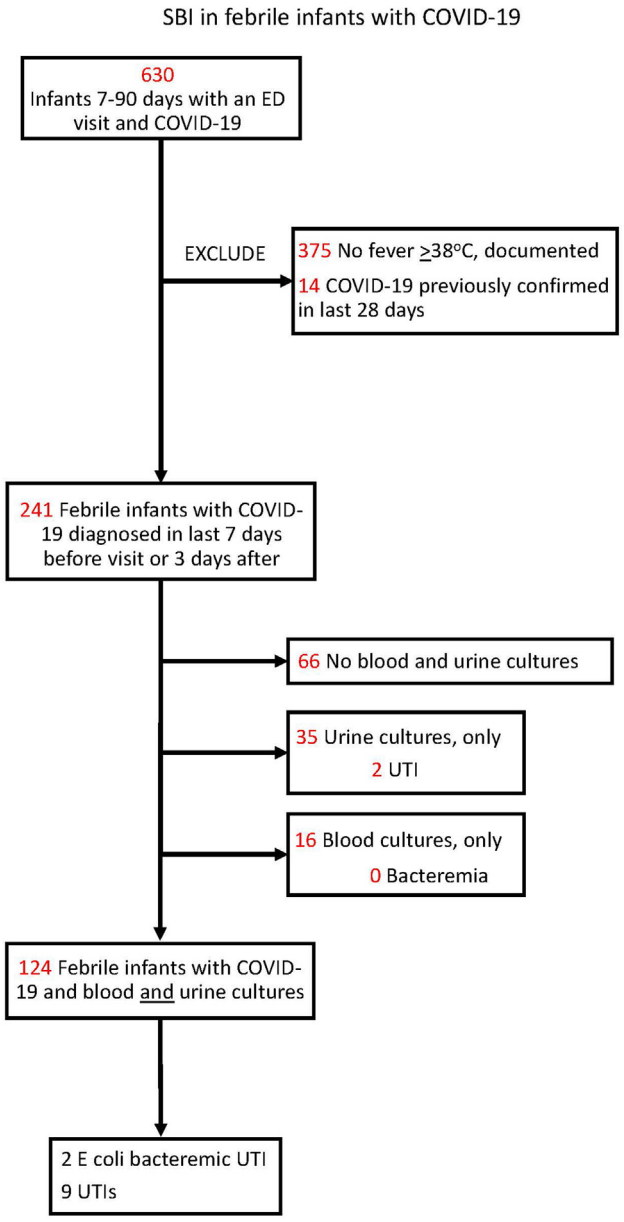
Background: Infants with COVID-19 may present to the emergency department (ED) with symptoms such as fever, poor feeding, respiratory distress, and hypoxia. In febrile infants, the rate of concomitant serious bacterial infection (SBI) with acute COVID-19 is unclear. We reviewed the frequency of SBI in febrile infants with COVID-19 presenting to one of 21 EDs in a large health care delivery system in northern California.

Methods: We retrospectively reviewed the electronic health records of all infants aged 7-90 days with COVID-19 (confirmed by diagnosis code or SARS-CoV-2 positive PCR) from 07/01/20 to 08/31/22 who received a COVID-19 diagnosis within 7 days prior to or 3 days after an ED visit. Our primary outcome was ED work up with an SBI diagnosis, defined as urinary tract infection (UTI), bacteremia, or bacterial meningitis. Infants without fever (i.e., maximum ED temperature < 38° C) or with prior COVID-19 within 8-28 days prior to the index ED visit were excluded. We screened for 7-day follow up after the index ED visit for possible missed SBI. We collected data on blood, urine, and cerebrospinal fluid culture results, and receipt of antibiotics. UTI, bacteremia, and bacterial meningitis were defined by culture review.

Results: Six-hundred and thirty infants with acute COVID-19 were seen in the ED. (Figure 1) Of those, 375 (60%) had no documented fever, and an additional 14 (2%) were excluded because they had a prior diagnosis of COVID-19 within 8-28 days prior to the ED visit. Of the 241 febrile infants, 66 (27%) did not have blood and urine cultures obtained and none received antibiotics. Of these 66, two (3%) had a repeat ED visit within 7 days and neither was diagnosed with an SBI. Eight percent (8%) of infants with urine collected had a UTI on urine culture. Of the 124 infants with both blood and urine collected, two infants (age 42 and 49 days respectively) had an *Escherichia coli* bacteremic UTI. There were no cases of isolated bacteremia or bacterial meningitis. Of 241 febrile infants, 31 received empiric antibiotics, all of whom had obtained both blood and urine cultures. The only oral antibiotic prescribed without preceding parenteral antibiotic was cephalexin in three infants. Eleven infants received ceftriaxone alone, three received ampicillin with gentamicin, and three received parenteral ampicillin alone. Three additional infants received ceftriaxone followed by cephalexin and one additional infant received ceftriaxone followed by oral amoxicillin.

Conclusions: Febrile infants with COVID-19 are at low risk for invasive bacterial infections but do have some risk for concomitant UTI. Of those tested in our cohort, 1.6% had a bacteremic UTI and 7% had an isolated UTI. This is likely an overrepresentation of actual incidence as there was no evidence that any of the infants who presented without fever or did not receive an ED evaluation had an SBI. These

data suggest that the evaluation of febrile, previously well, and well-appearing infants aged 7-90 days with COVID-19 could be limited to a urinalysis with urine culture.




No, authors do not have interests to disclose

## 168 Brief Hospitalizations and Readmissions Among Children With Complex Chronic Conditions

Garrity B, Lyons T, Melvin P, Stack A, Huth K, Cook S, Berry J/Boston University Medical Center, Boston, Massachusetts, US

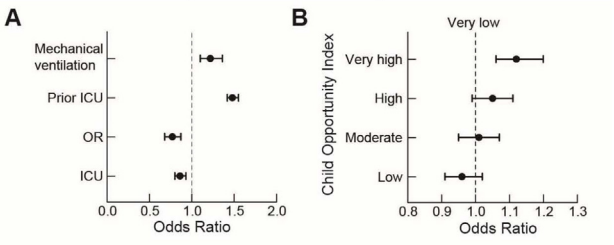
Objectives: Pediatric hospitals have been experiencing unprecedented volume and bed shortages. Children with complex chronic conditions (CCCs) have frequent emergency department (ED) visits and hospitalizations. The objective of this study was to assess reasons for emergency department visits leading to hospital admissions one-night length-of-stay in children with CCCs.

Methods: Retrospective analysis of 234,255 admissions of children with a CCC who had a <2-day admission 1/1/2016 to 12/31/2021 in 44 children's hospitals in the Pediatric Health Information System. We examined most common diagnoses, procedures, and CCCs. We conducted a multivariate analysis to examine risk factors for children readmitted within 7 days of their index hospitalization. Covariates included demographics, child opportunity index, ICU admission, operation during admission, mechanical ventilation, number of CCCs, and prior ICU admission within the past year.

Results: Most children in the cohort were 5-12 years old (28.2%, n=65,948), followed by 1-4 years (25.4%, n=59,434) and 13-17 (22.6% n=52,852). 52.5% had Medicaid insurance. The most common CCC with brief hospitalization was technology dependence (n=61,303), followed by neurologic and neuromuscular (n=54,486), and gastrointestinal conditions (n=51,615). Among the cohort, 8.17% of children were admitted to ICU and 2.77% went to the operating room. The most common admission diagnoses were diabetic ketoacidosis (5.6%, n=13,178), dehydration (3.1%, n=7,299), and sickle cell anemia crisis (2.0%, n=4,675). 2.9% of the cohort returned to the emergency department within 7 days of their brief hospitalization, 5.2% was readmitted, and 16.6% of those readmissions were to the ICU. Child opportunity index (COI) was significantly associated with 7-day readmission rates, with children having very high COI having 1.12 times the odds of being readmitted, compared to children with very low COI ($p<0.001$). Children admitted to the ICU (OR 0.86, 0.08-0.93) and children who went to the operating room (OR 0.77, 0.68-0.87) had significantly lower odds of being readmitted within 7 days ($p<0.001$), whereas children with mechanical ventilation (OR 1.22, 1.10-1.36) and prior ICU admissions (OR 1.48, 1.42-1.55) had significantly higher odds ($p<0.001$) (Figure 1).

Conclusions: 24% of hospitalizations for children with CCCs are brief. 7-day readmission rates after brief hospitalizations for children with CCCs are low. Brief hospitalizations may represent opportunities for preventable and avoidable emergency department visits and hospital admissions for children with CCCs.

Figure 1: Risk factors for 7-day readmission after a brief hospitalization




No, authors do not have interests to disclose

## 169 Who Is Coming In? Evaluation of Physician Performance Within Multi-Physician Emergency Departments

Sangal R, Teresi R, Dashevsky M, Ulrich A, Tarabar A, King M, Venkatesh A/Yale University, New Haven, Connecticut, US

Objective: We sought to examine the relationship between physician performance metrics based upon the speed of co-attendings concurrently staffing the emergency department (ED).

Methods: Retrospective study between January 2018 and February 2020. We used a neural network to generate patient predicted patient length of stay (LOS) and compared it to actual LOS to calculate a novel measure of physician speed. We constructed linear regression models to examine the relative change in physician performance based on the speed of an ED co-attending across outcomes including LOS, patients per hour, imaging utilization, admission rate and 72-hour returns.

Results: Eighty physicians and 212,902 ED visits were included. Overall, patients assigned to the fastest physicians have a 17.8% [13.5%, 22.0%] shorter LOS but a 2.9% [0.2%, 5.6%] longer LOS when the fastest co-attendings are working. The fastest physicians see 0.21 [0.13, 0.28] more patients per hour but see 0.08 [0.04, 0.11] fewer patients per hour when the fastest co-attendings are present. The fastest physicians order 0.18 [0.13, 0.23] fewer radiology tests per patient, but 0.05 [0.04, 0.07] more tests when the fastest co-attendings are present. Associations were similarly robust but in the oppositive direction when the slowest co-attendings are present. The speed of co-attendings had no significant association on the attending admission rate or 72-hour return rate.

Conclusions: Physicians have slower throughput and more imaging ordered when faster co-attendings are present and faster throughput and less imaging ordered when slower co-

attendings are present. Administrators should consider these relationships when designing staffing models that may have substantial impact upon ED operational performance.

No, authors do not have interests to disclose

## 170 Length of Stay Is Associated With Lower Patient Experience Ratings for Emergency Clinicians

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Objectives: Given the current emphasis on patient-centered care, emergency physicians are seeking ways to improve patients' experience in the emergency department (ED). Length of stay (LOS) in the ED has consistently shown an association with patient experience ratings, however there is limited literature on this relationship at the clinician level.

Methods: This was a cross-sectional observational study of 240 ED clinicians' average LOS and patient experience scores which took place across a regional healthcare system in the Midwestern United States from July 1, 2020, through June 30, 2022. We performed both a univariate and a multivariate regression to assess for a correlation between our primary patient experience measure, Net Promoter Score (NPS), and mean LOS at the clinician level. In the multivariate regression, we controlled for triage acuity level, hospital site, gender, nocturnist status, clinician type (physician or physician assistant/nurse practitioner), and percent computed tomography (CT) utilization by the clinician.

Results: We found a significant negative association between clinicians' average LOS and NPS scores, such that every minute increase in LOS was associated with a decrease in NPS of 0.07 ($p = 0.001$). This association was unchanged in the multivariate model.

Conclusions: In this cohort of 240 clinicians within a regional healthcare system, longer average patient LOS was associated with lower patient experience scores. Further study is warranted to determine safe, effective, and patient-centric ways to improve ED throughput and decrease patient LOS.

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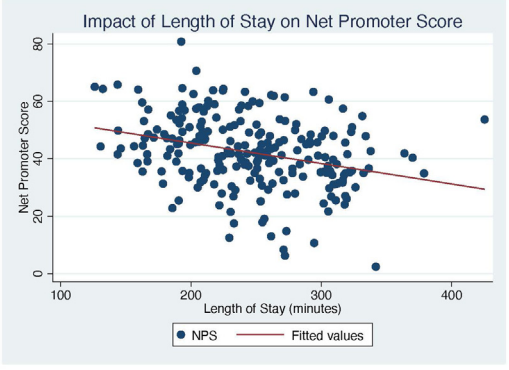


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No, authors do not have interests to disclose

## 171 Characteristics Associated With Patient Satisfaction Scores in the Emergency Department

Zitek T, Weber L, Rotiman A, Corbea C, Sherman D, Nunez T, Puron L, Warren N, Kresch F, Farcy D/Mount Sinai Medical Center, Miami Beach, Miami Beach, Florida, US

Objectives: Many hospitals now place a great emphasis on patient satisfaction scores, and individual clinicians may be rewarded or reprimanded based upon how well patients rate their experience under their care. However, it is likely that many factors beyond the clinician's control influence satisfaction scores for patients seen in the emergency department (ED). There is a paucity of data regarding how factors not related to patient care or interactions are associated with patient satisfaction scores. Thus, we sought to determine which patient demographic characteristics and other unalterable system factors are associated with patient satisfaction scores.

Methods: We performed a retrospective analysis of ED patients from our hospital system who subsequently completed a patient satisfaction survey about their visit. Our hospital system consists of three EDs — one academic, community ED with emergency medicine residents and two freestanding EDs that are staffed only by attending physicians and advanced practice providers. A specialist in information technology (IT) provided us with a random selection of 450 patient visits from the year 2022 in which the patient was seen in one of the EDs in our hospital system. Through a combination of direct abstraction by an IT specialist and manual chart review, we collected the following data points: patient demographics, preferred language marital status, ED site visited, time of ED arrival, resident involvement in the care (yes or no), and emergency severity index. Additionally, we recorded the patient's response to the question, "How likely would you be to recommend this facility to family and friends?". Answers are scaled from 0-10 with 10 being "extremely likely". Patients who score a 9 or 10 are considered "promoters." We calculated the percentage of patients with each characteristic who were promoters. We also used multivariable logistic regression to determine which factors are associated with a higher or lower chance of the patient being a promoter.

Results: Although all 450 patients returned the patient satisfaction survey, 33 (7.3%) did not answer the key question (regarding how likely they are to recommend the facility) to allow for analysis. Of the 417 patients who answered that question, 326 (78.2%) recorded a score of 9 or 10 (promoters). Table 1 demonstrates the frequency with which patients with various characteristics were promoters. Notably, the patient group with the highest percentage of promoters was adults > 65 years old (90.5% promoters. Additionally, on multivariable analysis, there was a statistically significant association between age > 65 and being a promoter with an adjusted odds ratio of 4.0 (95% CI 2.0-8.6). The patient group with the lowest percentage of promoters was the group who arrived to the ED during the night shift (70% promoters). On multivariable analysis, arrival during the night shift narrowly missed having a statistically significant association with giving a score of 9 or 10, with an adjusted odds ratio of 0.47 (95% CI 0.20-1.1).

Conclusions: Patients over the age of 65 are more likely to give a positive patient satisfaction score than younger patients. Patient satisfaction scores are lower for patients who arrive to the ED during night shift, but it is unclear if arrival during the night is an independent predictor of lower satisfaction scores. We are currently gathering additional data on this topic for clarification.

**Table 1**: The percentage of ED patients who recorded a score of 9 or 10 to the question "how likely would you be to recommend this facility to family and friends?", stratified by characteristic. Also shown are the adjusted odds ratios for providing a score of 9 or 10.

| Characteristic | Score 9 or 10 (%) | Adjusted odds ratio for scoring 9 or 10[a] |
|---|---|---|
| **Location** | | |
| Main ED (n = 272) | 206 (75.7%) | Reference |
| Freestanding ED 1 (n = 76) | 59 (77.6%) | 0.77 (0.33-1.8) |
| Freestanding ED 2 (n = 69) | 61 (88.4%) | 1.7 (0.62-4.9) |
| **Patient age** | | |
| Pediatric (n = 23) | 14 (60.9%) | 0.39 (0.14-1.09) |
| Adult 18-64 years (n = 257) | 188 (73.2%) | Reference |
| Adult > 65 years (n = 137) | 124 (90.5%) | 4.0 (2.0-8.6) |
| **Patient gender** | | |
| Male (n = 165) | 129 (78.2%) | 1.1 (0.64-1.9) |
| Female (n = 252) | 197 (78.2%) | Reference |
| **Patient race** | | |
| White (n = 308) | 245 (79.6%) | Reference |
| Black (n = 42) | 33 (78.6%) | 1.4 (0.58-3.8) |
| Other (n = 54) | 39 (72.2%) | 1.0 (0.51-2.2) |
| **Ethnicity** | | |
| Hispanic (n = 232) | 180 (77.6%) | 0.69 (0.36-1.3) |
| Non-Hispanic (n = 173) | 139 (80.3%) | Reference |
| **Patient preferred language** | | |
| English (n = 289) | 219 (75.8%) | Reference |
| Not English (n = 128) | 107 (83.6%) | 1.9 (0.96-3.9) |
| **Patient primary residence** | | |
| Out of state (n = 32) | 26 (81.3%) | 1.4 (0.53-4.0) |
| Local (n = 385) | 300 (77.9%) | Reference |
| **Patient Marital Status** | | |
| Married (n = 172) | 140 (81.4%) | 0.78 (0.43-1.39) |
| Not married (n = 239) | 185 (77.4%) | Reference |
| **Arrival time shift**[b] | | |
| Day (n = 158) | 158 (84.8%) | Reference |
| Swing (n = 209) | 157 (75.1%) | 0.62 (0.34-1.1) |
| Night (n = 50) | 35 (70.0%) | 0.47 (0.20-1.1) |
| **Resident involvement** | | |
| Seen by a resident (n = 179) | 131 (73.2%) | 0.73 (0.36-1.4) |
| Not seen by a resident (n = 238) | 195 (81.9%) | Reference |
| **Emergency Severity Index** | | |
| 1, 2, or 3 (n = 282) | 217 (77.0%) | Reference |
| 4 or 5 (n = 134) | 108 (80.6%) | 1.0 (0.58-1.9) |

[a] Determined using multivariable logistic regression; results reported as odds ratio (95% CI).
[b] Day shift defined as 6 am to 2 pm; swing shift 2 pm to 10 pm; night shift 10 pm to 6 am.

No, authors do not have interests to disclose

## 172 Who Fills Out Emergency Department Patient Satisfaction Surveys?

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Objectives: Patient satisfaction is now an important means by which emergency clinicians are assessed, and patient satisfaction scores are sometimes linked to clinician pay. However, only a small fraction of patients seen in the emergency department (ED) who are sent satisfaction surveys actually complete them, reducing the usefulness of the data they provide. No prior published studies have tried to determine patient characteristics that predict completion of patient satisfaction surveys. Therefore, we sought to determine which patient characteristics are associated with an increased chance that a patient completes a patient satisfaction survey.

Methods: We performed a retrospective cohort analysis of patients who presented to one of the EDs in our hospital system and were sent a patient satisfaction survey. Our hospital system includes one academic, community hospital and two freestanding EDs (one in a more affluent area and one in a more economically disadvantaged area). A specialist in information technology (IT) provided us with a random sample of 2000 patient visits using patients who were discharged from one of our 3 EDs between January 1, 2022, and June 30, 2022. For each patient visit, we collected the following data points using a combination of direct abstraction by an IT specialist and manual chart review: ED visited (main hospital or freestanding ED), patient age, gender, race, preferred language, primary residence, time of arrival, marital status, and emergency severity index for that visit. We also searched our hospital's patient satisfaction database, maintained by National Research Corporation (NRC) Health, to determine which patients completed a patient satisfaction survey. We performed a multivariable logistic regression analysis using the variable listed above to determine which were associated with an increased or decreased chance that the patient filled out a patient satisfaction survey.

Results: Among the random sample of 2000 patient visits, 1213 (60.7%) were from our main ED and 787 (39.4%) were from one of our freestanding EDs. Patients ranged in age from 0-99 years old, including 163 (8.2%) pediatric and 466 (23.3%) aged over 65. All patients were sent satisfaction surveys, and 231 (11.6%) completed a survey. As shown in Table 1, adults > 65 years old and married individuals had the highest survey completion rates at 15.0% and 14.5%, respectively. However, on multivariable analysis, only married individuals had a statistically significant association with increased satisfaction survey completion rate (adjusted odds ratio 1.4 [95% CI 1.02-1.9]). The freestanding ED that is located in a more economically disadvantaged area had a lower rate of patient satisfaction survey completion, and on multivariable analysis, had an adjusted odds ratio of 0.65 (95% CI 0.41-0.99) for satisfaction survey completion.

Conclusions: Among the assessed patient characteristics, only being married was independently associated with a higher rate of satisfaction survey completion. Also, patients who presented to one of our freestanding EDs were less likely to complete the patient satisfaction survey than patients who presented to the other EDs; this may be related to unassessed socioeconomic differences. We are currently working on a larger study to confirm these findings.

**Table 1**: The percentage of ED patients who completed a patient satisfaction survey by characteristic, and the adjusted odds ratios for completing a survey.

| Characteristic | Completed survey (%) | Adjusted odds ratio for completing survey[a] |
|---|---|---|
| **Location** | | |
| Main ED (n = 1213) | 150 (12.4%) | Reference |
| Freestanding ED 1 (n = 403) | 47 (11.7%) | 0.84 (0.57-1.2) |
| Freestanding ED 2 (n = 384) | 34 (8.9%) | 0.65 (0.41-0.99)* |
| **Patient age** | | |
| Pediatric (n = 163) | 15 (9.2%) | 1.0 (0.54-1.7) |
| Adult 18-64 years (n = 1371) | 146 (10.6%) | Reference |
| Adult > 65 years (n = 466) | 70 (15.0%) | 1.3 (0.93-1.8) |
| **Patient gender** | | |
| Male (n = 885) | 95 (10.7%) | 0.86 (0.65-1.1) |
| Female (n = 1115) | 136 (12.2%) | Reference |
| **Patient race** | | |
| White (n = 1446) | 171 (11.8%) | Reference |
| Black (n = 248) | 26 (10.5%) | 0.85 (0.52-1.3) |
| Other (n = 255) | 27 (10.6%) | 0.83 (0.52-1.3) |
| **Patient preferred language** | | |
| English (n = 1390) | 165 (11.9%) | Reference |
| Not English (n = 600) | 66 (11.0%) | 0.93 (0.65-1.3) |
| **Patient primary residence** | | |
| Out of state (n = 253) | 21 (8.3%) | 0.64 (0.38-1.01) |
| Local (n = 1736) | 210 (12.1%) | Reference |
| **Arrival time shift**[b] | | |
| Day (n = 784) | 93 (11.9%) | Reference |
| Swing (n = 891) | 113 (12.7%) | 1.1 (0.80-1.5) |
| Night (n = 325) | 25 (7.7%) | 0.70 (0.43-1.1) |
| **Patient Marital Status** | | |
| Married (n = 641) | 93 (14.5%) | 1.4 (1.02-1.9)* |
| Not married (n = 1326) | 135 (10.2%) | Reference |
| **Emergency Severity Index** | | |
| 1, 2, or 3 (n = 1305) | 157 (12.0%) | Reference |
| 4 or 5 (n = 688) | 73 (10.6%) | 0.88 (0.64-1.2) |

[a] Determined using multivariable logistic regression; reported as odds ratio (95% CI).
[b] Day shift defined as 6 am to 2 pm; swing shift 2 pm to 10 pm; night shift 10 pm to 6 am.
* Statistically significant association.

No, authors do not have interests to disclose

## 173 Quantifying the Impact of Hospital Boarding on Patient Outcomes and Downstream Hospital Operations

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Background and Objectives: For years, the Centers for Medicare and Medicaid Services required public reporting of median ED boarding times, however this measure was retired in 2021 based upon the mixed results of a systematic review of ED boarding upon patient outcomes that included many studies with small sample size or limited measurement of outcomes. Moreover, these studies did not address that boarding time is endogenous, which can lead to a biased estimation. Our objective was to examine the bias-corrected association between boarding and common hospital quality outcomes.

Methods: A retrospective analysis of 2 EDs at an academic system from July 2017 to February 2020. Extracted data included EHR patient demographic data, throughput

timestamps, treatment team, and ED and hospital census levels. Boarding was defined as a continuous variable. Primary outcomes were 30-day ED revisit, escalation during boarding, in-hospital mortality, and hospital length of stay (LOS). We quantify the association between boarding and downstream outcomes using a two-step instrumental variable regression adjusting for ED and inpatient census, patient visit covariates, and treatment team.

Results: 425,703 ED visits were included of which 130,251 (30.6%) were admitted. Average (SD) boarding time was 4.3 (4.9) hours. One additional boarding hour leads to an increase in the patient's hospital LOS by 1.3% (95% CI 0.8%, 1.8%, $p < 0.001$). We also find that patients have an increase in escalation of care probability of 0.3% (0.2%, 0.4%, $p < 0.001$). A subgroup analysis examining patients with an ICD-10 code in the category of infectious diseases who were younger than 65 years were estimated to have a 4.1% (-9.1%, 0.8%, $p < 0.1$) reduction in their hospital LOS with each additional boarding hour. In contrast, patients under 65 years with an ICD-10 code in the category of metabolic diseases had an increase in their predicted hospital LOS of 4.8% (1.6%, 7.9%, $p < 0.01$) for every hour boarding. We did not find boarding having significant impact on ED revisit within 30 days and in-hospital mortality.

Conclusion: We find evidence that the association between boarding and total hospital length of stay varies between reasons for admission, indicating that patients with select clinical conditions may be uniquely at risk for harms from ED crowding and boarding. This initial evidence helps us understand the causal impact of boarding on clinical outcomes across patient groups.

No, authors do not have interests to disclose

## 174 Price Transparency and Variation in Emergency Department Visits by Payer Type: A Nationwide Analysis

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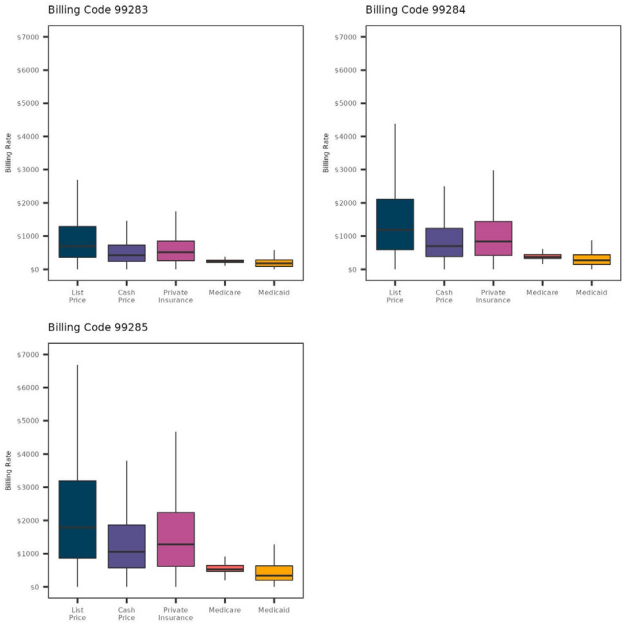
Objectives: Health care costs in the United States are significantly higher than similar countries and continue to be a top expense category for American families. A contributor to this problem is emergency department (ED) visits. Until recently, prices of these visits were not available publicly. Following the approval of a CMS Hospital Price Transparency Regulation that took effect in 2021, hospitals are now required to make public a chargemaster with average prices of "shoppable services." Nationwide analyses of these data for ED visits based on payer type (list price, cash price, private or employer-based, Medicare Advantage, and Managed Medicaid) have yet to be performed. Our objective is to analyze facility fees for low, moderate, and high-complexity ED visits, corresponding with Current Procedural Terminology (CPT) codes 99283, 99284, and 99285, based on payer type.

Methods: Prices for ED visits in the 4th quarter of 2022 were analyzed from a publicly available dataset from Turquoise Health. Payer type was categorized as one of five groups: list price, cash price, private or employer-based insurance, Medicare Advantage, and Managed Medicaid. Our main endpoints were mean and median prices for each payer type. Multiple regression was used for comparisons and charges were log-transformed to account for asymmetric data distributions. Regression models were both unadjusted and adjusted for billing state, hospital rating, and total number of hospital beds.

Results: A total of 489,847 ED prices were analyzed. These were divided into 159,232 (32.5%) low-complexity (CTP 99283), 161,537 (33.0%) moderate-complexity (CPT 99284), and 169,078 (34.5%) high-complexity (CPT 99285) billing codes. The median list prices for low, moderate, and high-complexity billing code levels were $696, $1,189, and $1,784, respectively (Figure). After adjusting for billing state, hospital rating, and number of hospital beds, the Managed Medicaid charge had the largest difference from list price across all three billing codes (low: % diff = -79.0%; moderate: % diff = -81.2%; high: % diff = -82.8%, $p < 0.001$ for all). Private or employer-based insurance had the smallest difference from list price but was statistically significant across all billing codes (low: % diff = -39.5%; moderate: % diff = -41.4%; high: % diff = -42.4%, $p < 0.001$ for all). After accounting for billing state, payer type, and number of beds, a 1-point increase in hospital rating was associated with a 4.2% increase in low (95% CI: 3.7% – 4.6%, $p < 0.001$), 4.2% increase in moderate (95% CI: 3.7% – 4.7%, $p < 0.001$), and 3.2% increase high (95% CI: 2.6% – 3.7%, $p < 0.001$) complexity billing code prices. In the same adjusted regression, an increase of 20 hospital beds was associated with a 0.6% increase in low (95% CI: 0.5% – 0.6%, $p < 0.001$), a 0.5% increase in moderate (95% CI: 0.5% – 0.6%, $p < 0.001$), and a 0.8% increase in high (95% CI: 0.8 – 0.9%, $p < 0.001$) complexity billing code prices.

Conclusion: Facility fee prices for different complexity levels of ED visits vary significantly among payer categories. Relative to list prices, private or employer-based insurance plans have the lowest discount rate, while Medicare Advantage and Managed Medicaid plans have the largest discount rates. Additional studies of other costs associated with ED visits and how we can best protect our patients' financial wellbeing are warranted.




No, authors do not have interests to disclose

## 176 A Preliminary Assessment of Emergency Department Utilization and Trends by Patients Experiencing Homelessness

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Objectives: The objective of this study is to perform a preliminary analysis of emergency department (ED) utilization by individuals experiencing homelessness to identify trends and utilization patterns in terms of chief complaints, comorbidities, workups performed, and connection to social services. Ultimately, we hope to offer further insight into ways that ED providers can better support this vulnerable population.

Methods: A retrospective review was performed using the medical record numbers (MRNs) of 57 homeless patients ages $\geq 18$ who were previously identified in a needs assessment survey conducted at an urban ED. We extracted data from the medical record for ED encounters between January 2021 and December 2022, focusing on the number of ED visits, chief complaints, workups completed, prevalence of comorbid conditions, and whether social work was consulted. Patient data is expressed as frequencies and percentages for categorical variables and mean and standard deviation for continuous variables. Differences between patient characteristics and number of ED visits was assessed via Fisher's Exact test, with a threshold for significance of $p<0.05$; further data collection and statistical analysis is currently in process.

Results: The analytic sample comprises 57 homeless individuals, whose ED visits (n=474) were tracked. The patients were primarily male (80.7%) with an average age of 42.8 years at the start of the study period. Patients were primarily Black (70.2%), followed by White (21.1%), Hispanic (5.3%), and Multi-Racial (3.5%). Thirty-one patients (54.4%) had a documented substance use disorder and 43 (75.4%) had a recorded mental illness. Most patients (56.1%) had 2 or more co-occurring comorbidities. Differences in the amount of ED visits ($<10$, or $10 \geq$) over the study period were also analyzed. Statistically significant differences in the amount of ED visits were found among differing racial/ethnic groups (p-value: 0.017, Table 1a). A subset analysis was conducted among patients who had a pre-

existing mental illness, substance use disorder, or co-occurring conditions, and an association with number of ED visits. This association was non-significant (p-value: 0.164, Table 1b). More than half of all patients were not seen by a LCSW (60.3%). Most patients had several labs done with 39.9% having 5 or more, and 24.5% having between 1-4. The most common chief concern reported by patients was mental health related concerns (44.3%).

Conclusion: Patients experiencing homelessness often have limited healthcare access, causing the ED to be a safety net for medical care and social support. This study demonstrated that an overwhelming majority of homeless patients presented with mental health-related chief complaints, some returning to the ED dozens of times within the same year for similar complaints. Many potentially redundant workups were completed, with inconsistent linkage to social work and resources. Further data collection and analysis using multilevel regression strategies is underway to better characterize needs of the homeless community who utilize the ED for care, as this can lessen the burden on the healthcare system and hopefully identify opportunities for improvement in caring for this population.

Table 1a. Distribution of Patient Characteristics by Number of ED Visits

| Patient Characteristics (N=57) | | Total Sample | < 10 ED Visits | ≥ 10 ED Visits | P-value* |
|---|---|---|---|---|---|
| | | N (%) | N (%) | N (%) | |
| Total | | 57 (100) | 31 (54.4) | 26 (45.6) | |
| Sex | Male | 46 (80.7) | 24 (77.4) | 22 (84.6) | 0.738 |
| | Female | 11 (19.3) | 7 (22.6) | 4 (15.4) | |
| | | | | | |
| Race/Ethnicity | White | 12 (21.1) | 10 (32.3) | 2 (7.7) | 0.017 |
| | Black | 40 (70.2) | 20 (64.5) | 20 (76.9) | |
| | Hispanic | 3 (5.3) | 0 (0) | 3 (11.5) | |
| | Multi-Racial | 2 (3.5) | 1 (3.2) | 1 (3.9) | |
| Age | < 40 | 26 (45.6) | 12 (38.7) | 14 (53.9) | 0.294 |
| *Mean 42.8 (SD: 12.7)* | ≥ 40 | 31 (54.4) | 19 (61.3) | 12 (46.2) | |
| Presence of Pre-existing Comorbidities | | | | | |
| Hypertension | Yes | 15 (26.3) | 8 (25.8) | 7 (26.9) | 1.00 |
| | No | 42 (73.7) | 23 (74.2) | 19 (73.1) | |
| | | | | | |
| CAD/CHF | Yes | 7 (12.3) | 4 (12.9) | 3 (11.5) | 1.00 |
| | No | 50 (87.7) | 27 (87.1) | 23 (88.5) | |
| | | | | | |
| Asthma/COPD | Yes | 11 (19.3) | 6 (19.4) | 5 (19.2) | 1.00 |
| | No | 46 (80.7) | 25 (80.7) | 21 (80.8) | |
| | | | | | |
| Substance Use Disorder | Yes | 31 (54.4) | 17 (54.8) | 14 (53.8) | 1.00 |
| | No | 26 (45.6) | 14 (45.2) | 12 (46.2) | |
| | | | | | |
| Mental Illness | Yes | 43 (75.4) | 21 (67.7) | 22 (84.6) | 0.217 |
| | No | 14 (24.6) | 10 (32.3) | 4 (15.4) | |
| | | | | | |
| Number of Comorbid Conditions | 0 | 4 (7.0) | 2 (6.5) | 2 (7.7) | 1.00 |
| | 1 | 21 (36.8) | 21 (67.7) | 17 (65.4) | |
| | 2+ | 32 (56.1) | 8 (25.8) | 7 (26.9) | |
| | | | | | |
| Death during study period | Yes | 3 (5.3) | 1 (3.2) | 2 (7.7) | 0.587 |
| | No | 54 (94.7) | 30 (96.8) | 24 (92.3) | |
| * Fisher's Exact Test | | | | | |

Table 1b. Distribution of Patient Pre-Existing Conditions (Mental Illness & Substance Use Disorder) by Number of ED Visits

| Condition | Total | Number of ED Visits | | P-value* |
|---|---|---|---|---|
| | | < 10 | ≥ 10 | |
| | N (%) | N (%) | N (%) | |
| Mental Illness | 22 (41.5) | 12 (41.4) | 10 (41.7) | 0.164 |
| Substance Use Disorder | 10 (18.9) | 8 (27.6) | 2 (8.3) | |
| Both MI & SUD | 21 (39.6) | 9 (31.0) | 12 (50.0) | |
| * Fisher's Exact Test | | | | |

No, authors do not have interests to disclose

## 177 Utilization of Hospital Payor Mix as an Estimate for Socioeconomic Status in a National Database

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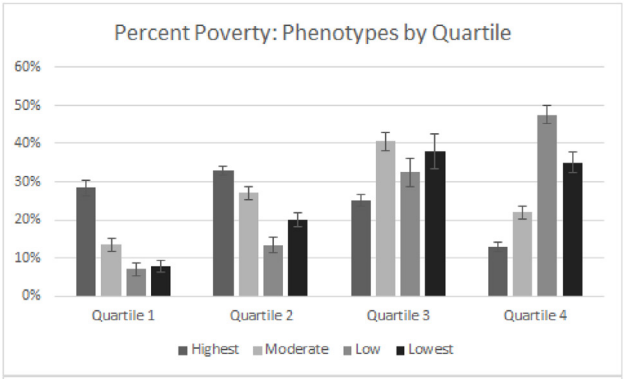
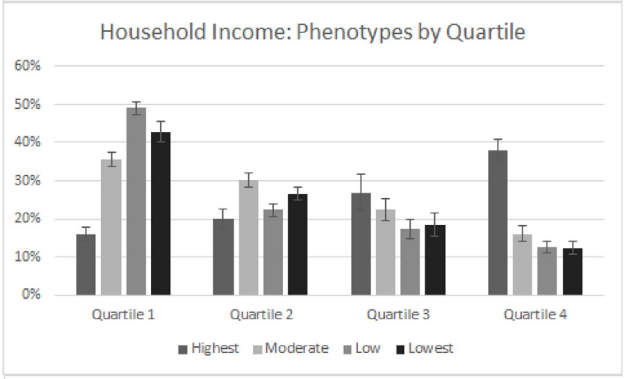
Background: Increasing attention is being paid to socioeconomic determinants of health as potentially modifiable risk factors in disease outcomes. The National Hospital Ambulatory Medical Care Survey – Emergency Department sample (NHAMCS-ED) is a common tool used in researching national trends in medical care in United States Eds. However, it only included direct measures of socioeconomic determinants (SED) from 2006 until 2010, providing only a limited window to measure SEDs. However, Payor mix at participating hospital sites can be measured all years, providing a possible estimate of SEDs in all years of NHAMCS-ED data.

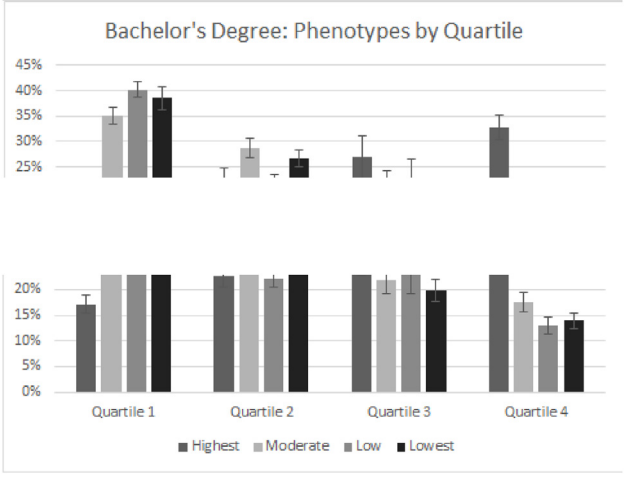
Methods: In the years 2006-2010, the NHMACS-ED included for each patient's zip code the percent below the poverty line, the median household income, and the percent with a bachelor's degrees, as reported in national quartiles. Visits from these years were aggregated by participating data collection site, and the payor mix of each site was tabulated, focusing on Medicare, Medicaid, Private Insurance, and No Insurance (charity care, self-pay, etc). Payor mix clusters were determined by hierarchical clustering. Payor mixes clusters were assigned a priori by investigators on a spectrum of presumed high to low SED and compared to measured SEDs in collected years.

Results: The five years had an average of 345.4 participating sites per year, which statistically represented nationally an average of 4,738.4 sites per year. A total of 175,351 rows statistically represented 625,671,000 visits. In collected years, 21.4% of all visits were from the highest quartile of poverty, 30.7% were from the lowest quartile of income, and 31.1% were from the lowest quartile of completing higher education. The hierarchical clustering revealed 4 payor mix "phenotypes" in the data, which the investigators ranked Highest as having the most Private insurance (51.5%), to Lowest as having the most uninsured (32.9%). Figure 1 shows comparison of measured SEDs with payor mix phenotypes as elaborated in the clustering.

Conclusions: Hospital Payor Mix Clustering is a tool that can be used to estimate SED exposure that may be contributing to national medical trends as captured in the NHAMCS-ED. Of note, somewhat contrary to initial a priori assignment, the highest poverty, the lowest income, and the lowest higher education was present in the phenotype with the most Medicaid insurance (63.5%). In retrospect, this becomes obvious, as it corelates to a well-documented issue that certain patients may not be poor enough to qualify for Medicaid, but still cannot afford insurance.




No, authors do not have interests to disclose

## 178 Emergency Department Food Insecurity Screening, Food Voucher Distribution, and Referral Utilization: A Prospective Cohort Study

Ulintz A, Patel S, Anderson K, Pang P/The Ohio State University, Columbus, Ohio, US

Objectives: Food insecurity is prevalent among emergency department patients and is associated with frequent acute care use and increased all-cause mortality. Emergency department-based food insecurity screening identifies patients who may benefit from community-based referrals, but many patients have difficulty connecting to these resources after discharge. Co-locating resources for social needs near the emergency department represents one solution, though little evidence supports this model. We sought to quantify the prevalence of food insecurity in one emergency department and characterize the use of a food voucher redeemable at the hospital's co-located food market and outpatient referrals for patients experiencing food insecurity.

Methods: This prospective cohort study was conducted at an urban, academic, county emergency department. We included emergency department patients 18 years or older who presented on weekdays between 0800-2000 from July 1-October 31, 2022. We excluded patients who were minors, required resuscitation upon arrival, presented with acute psychosis, or were unable to provide consent in English. We assessed patients for eligibility upon arrival in triage and approached eligible participants for consent once moved to a private emergency department room. Consented participants completed a written version of the two-question Hunger Vital Sign™ screening tool. Participants who screened positive for food insecurity received a uniquely numbered $30 food voucher redeemable at the hospital's co-located food market, primary care referral, social work referral, and printed food insecurity resources. We used a RedCap database to record the patient's medical record number, screening tool responses, and voucher number. At 30-day intervals, we queried hospital food market receipt records to determine if a voucher was redeemed and performed chart review for primary care or social work visits following referral. The primary outcome was prevalence of food insecurity; secondary outcomes included the proportion of food vouchers redeemed and the proportion of individuals evaluated by a social worker or primary care physician within 30 days of emergency department identification of food insecurity. We performed descriptive data analysis using JMP17 Pro.

Results: We approached 396 eligible individuals, of which 271 consented and completed the screening tool. Most respondents were middle-aged (median 44 years, IQR 30-58 years) and identified as male (n=139, 51%), Black/African American (n=183, 67%) and non-Hispanic (n=257, 94%). We observed a food insecurity prevalence of 51% (n=148); 133 respondents (46%) worried about food running out before having money to buy more, 140 respondents (48%) reported food not lasting long enough and not having money for more, and 117 respondents (41%) reported both concerns. We distributed 147 vouchers (99% of individuals screening positive) and observed 66 redemptions (45% of distributed vouchers). Only 10% (n=14) of all respondents with food insecurity were evaluated by primary care or social worker within 30 days.

Conclusions: Food insecurity prevalence and patient acceptance of food vouchers were both high, but less than half of all food vouchers were redeemed at the hospital's co-located food market and few patients obtained 30-day follow-up. This implies the presence of barriers to addressing food insecurity in the emergency department that resource co-location alone does not solve.

No, authors do not have interests to disclose

## 179 Serving the Homeless in the Emergency Department Setting

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Objectives: The field of emergency medicine (EM) is situated at the intersection of medicine and society and are tasked with serving the many needs of the public. One example is serving individuals facing homelessness. Patients in this category account for a disproportionate number of visits and expenditures in the emergency departments (ED) and the health care system. Additionally, these patients have higher rates of morbidity and mortality than non-homeless persons, likely due to the effects of underlying social determinants of health. A recent literature review showed that there were no evidence-based guidelines or curriculum to aid ED providers who care for these patients. This project aimed to fill this gap by better understanding how to treat patients experiencing homelessness and developing guidelines to be used by other EDs nationally.

Methods: EM physicians and nurses at the University of Louisville Hospital completed a 10-question survey regarding their perspectives on providing care to patients experiencing homelessness. There were 41 respondents consisting of nurses, resident physicians, and attending physicians. Additionally, 24 interviews were conducted with a variety of community members who represented several important local stakeholders who provide healthcare and critical housing resources. Finally, a public deliberation involving EM physicians, nurses, administrators and community stakeholders was completed in order to consider both values and evidence in the construction of our guidelines for this complex social policy issue.

Results: Survey results demonstrated 88.9% of respondents felt that "Treating patients experiencing homelessness is an area in which the field of EM can improve." 64.5% of respondents affirmed that they felt "confident in my knowledge on the factors that may be contributing to homelessness." Only 37.8% felt "confident in my ability to educate patients experiencing homelessness on post-care including follow-up care." Only 17.8% felt "confident in my ability to provide housing resources to patients experiencing homelessness." Numerous themes were found from coding the 24 interviews including strategies for not only meeting healthcare needs but also basic needs and who is responsible

for connecting these individuals to resources. Significant discussion in the public deliberation resulted in proposed strategies to enhance our care. These included better data collection and management mechanisms, necessary personnel (e.g., 24/7 social work coverage) needed, education and training to reduce stigma, better understanding of local resources and connections to these resources, being aware of healthcare and housing options for our patients, recognizing types of documentation (e.g, z-codes) to improve the inefficient cycle of repeat visits, among many more tactics.

Conclusions: Homelessness is a complex social, political, and health issue that often challenges ED providers. At the University of Louisville Hospital, an urban academic tertiary care center that serves a population in which > 10,000 people face homelessness annually, many EM providers feel underqualified to provide the assistance that many of these patients require. We have learned valuable information throughout each phase of this project to be more informed of where we are and how we can improve the quality of care to patients experiencing homelessness.

No, authors do not have interests to disclose

## 180 Eligibility of Emergency Department Patients for Public Benefit Programs: A Survey

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Objectives: Each year, more than $80 billion in public benefits – including assistance with food, income, housing, and healthcare – goes unclaimed across the US. Medical-financial partnerships are collaborations between financial services organizations and healthcare providers to reduce financial stress for low-income patients. The emergency department (ED) offers a novel opportunity to engage patients regarding benefits. However, it is unknown whether ED patients are eligible for unclaimed benefits or whether this discussion is acceptable in the ED setting. Our objectives were to assess 1) eligibility of ED patients for public benefits and 2) acceptability of hospital-based support for benefits enrollment.

Methods: We conducted a survey of patients at two large, academic EDs in Philadelphia from April to September 2022. Participants were at least 18 years old; had Medicaid, Medicare, or no health insurance; lived in Philadelphia; and were deemed to be in stable condition. Participants completed a previously piloted survey that queried demographics, experience with benefits, and preferences for enrollment support. The survey also linked to a web-based application (Benefits Launch Express) that screened eligibility for 18 distinct state and federal benefits. We used descriptive statistics to summarize survey results.

Results: Of 283 patients approached, 80 (28%) declined to participate and 203 (72%) completed the survey. Participants had mean age of 47 years (SD 16). 136 (67%) identified as female, and 170 (84%) reported Black race. 147 (72%) had Medicaid, 49 (24%) had Medicare, and 7 (3%) had no insurance. The mean number of benefit programs in which participants were already enrolled was 4.4 (SD 1.7). Participants were eligible for a mean of 4.9 (SD 2.4) additional benefits. The most common unclaimed benefits were the Earned Income Tax Credit (n = 177, 87%), Low-Income Home Energy Assistance Program (n = 122, 60%), and Property Tax/Rent Rebate (n = 69, 34%). 151 (74%) participants were amenable to receiving help from a hospital-based team to enroll in benefits, although more (n = 158, 77%) expressed interest in enrollment during a follow-up phone call rather than in the ED or hospital (n = 63, 31%).

Conclusions: In two urban EDs, most patients with public or no insurance were eligible for additional state and federal benefits and indicated that support for benefits enrollment from a hospital-based team was acceptable.

No, authors do not have interests to disclose

EMF

## 181 Evaluation of Insurance Type as a Proxy for Patient-Level Socioeconomic Status in the Pediatric Emergency Department: A Pilot Study

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Objectives: Administrative data are often utilized for research in emergency medicine (EM). Insurance status (ie, public versus private) is commonly used as an indirect measure of socioeconomic status (SES).

However, it is unknown how well insurance status corresponds to direct SES measures, such as education and income. Our objective was to determine whether insurance status can function a sufficient proxy for SES when conducting EM research in administrative datasets by replicating a recent study documenting the association between race and diagnostic imaging in the emergency department (ED) and comparing adjusted results when using insurance as a covariate versus direct SES measures (education and income).

Methods: We conducted an observational, cross-sectional pilot study of patients aged 5 to 17 years (inclusive) seeking care in the ED of a quaternary care children's hospital from August 15, 2022, through March 23, 2023, who self-identified at triage as either non-Hispanic White or non-Hispanic Black. Insurance status (public versus private), demographics, and diagnostic imaging conducted in the ED were extracted from the electronic medical record. SES was measured by a questionnaire capturing highest level of caregiver education (dichotomized less than Bachelor's degree vs Bachelor's or greater) and previous year household income (dichotomized as <$75k vs ≥$75k). We calculated test characteristics (sensitivity and specificity) of insurance status using caregiver education and income as reference standards. We then estimated three logistic regression models, all with any imaging as the dependent variable and race as the independent variable, and each of insurance status, education, and income as the covariate.

Results: 300 patients were enrolled (50% White, median age 11 years [interquartile range: 9 – 15], 56% male). Among caregivers, 165 (55%) had at least a bachelor's degree, 175 (61%) had an annual income ≥$75k and 203 (57%) had private insurance. Test characteristics of insurance status are displayed in the Table. Overall, insurance status misclassified 23% and 15% of patients, when using education and income, respectively, as reference standards. When adjusted for insurance status, the odds of receiving imaging were 67% greater among White patients (OR (95% confidence interval) = 1.67 (0.69, 4.05)). However, with education and income as covariates, the estimates were 2.36 (0.84, 6.67) and 2.29 (0.72, 7.24), respectively.

Conclusions: Insurance status can misclassify patients' true SES measures and, when used as a control in statistical models, results in residual confounding toward the null. This pilot study suggests that EM studies utilizing administrative datasets that use insurance status as a covariate may underestimate their results. These findings require confirmation in larger samples.

Test characteristics of insurance status among pediatric emergency department patients (n=300)[1]

| Reference Standard | Insurance[2] | | Sensitivity (95% CI) | Specificity (95% CI) |
|---|---|---|---|---|
| | Public | Private | | |
| **Education** | n | n | | |
| Less than Bachelor's | 90 | 43 | | 67.7 (59.0, 75.5) |
| Bachelor's or Greater | 25 | 140 | 84.9 (78.5, 90.0) | |
| **Annual Household Income** | | | | |
| <$75,000 | 91 | 23 | | 79.8 (71.3, 86.8) |
| ≥$75,000 | 19 | 156 | 89.1 (83.6, 93.3) | |

[1] n=2 and n=11 patients did not provide education and income data, respectively

[2] Public: Medicaid or other government-funded programs; Private: coverage by any privately-held company

No, authors do not have interests to disclose

## 182 Emergency Department Characteristics Associated With Pediatric Behavioral Health Readiness

Foster A, Hoffmann J, Li J, Hewes H, Crady R, Duffy S, Ludwig L, Johnson M, Schreiber M, Saidinejad M/University of California, San Francisco, San Francisco, California, US

Objectives: The emergency department (ED) serves as a safety net for children with behavioral health (BH) conditions. Over the past several decades, ED utilization by children in BH crisis has increased significantly. The National Pediatric Readiness Project (NPRP) is a quality improvement initiative aiming to ensure that all EDs have policies, guidelines, resources, and pediatric emergency care coordinator(s) (PECC) available to provide high-quality emergency care to all children, inclusive of those with BH conditions. The NPRP performed assessments of pediatric readiness across United States (US) EDs in 2013 and in 2021. Our objectives were to assess changes in the frequency of presence of BH and social policies among participating EDs between the 2013 and 2021 assessments and to identify ED characteristics associated with having BH policies in 2021.

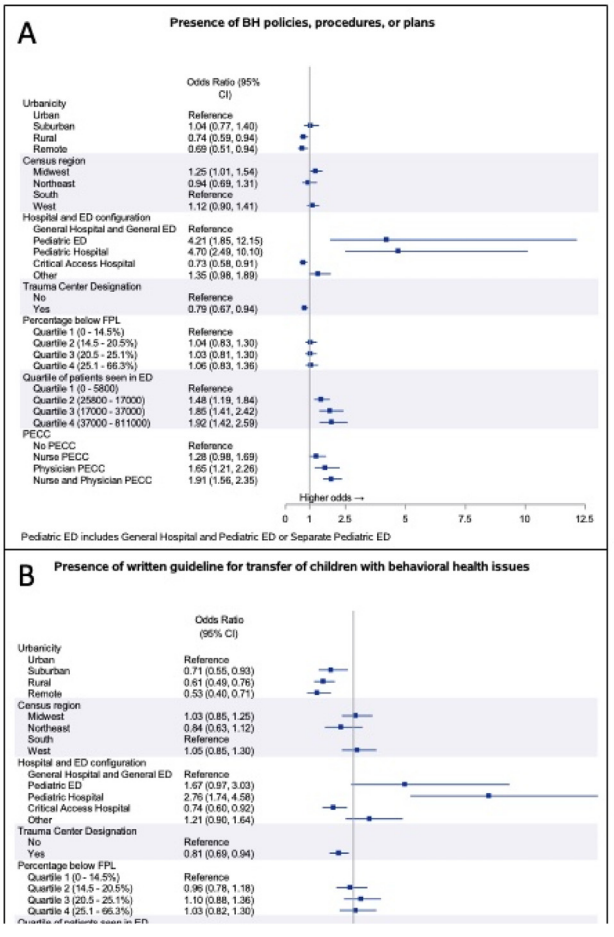
Methods: We conducted a planned sub-analysis of 2013 and 2021 NPRP assessment survey items pertaining to pediatric BH. For comparison of answers to BH and social-related

questions from 2013 and 2021 assessments, only hospitals that responded to both assessments were included. We then reviewed 3 2021 NPRP BH-related questions: presence of BH policies, procedures, or plans; presence of a written guideline for transfer of children with BH issues; and access to BH resources for children in the event of a disaster. Multivariable logistic regression was used to evaluate associations between ED- and hospital-level characteristics and individual BH-related survey items.

Results: Almost 71% (3646/5150) of US EDs responded to the NPRP 2021 assessment. Of the EDs that responded, 59.5% were general hospitals, 90.4% had a general ED, 63.0% were urban, 50.7% had low annual pediatric ED volume (<1800 visits), and 45.6% had a PECC. There were 2,639 hospitals that provided answers to both 2013 and 2021 assessments. The percentage of EDs with behavioral or social policies, procedures, or plans increased from 49.0% in 2013 to 73.0% in 2021. The presence of a written guideline for the transfer of children with BH conditions increased from 56.0% to 66.0% of responding EDs. BH policies and a written guideline for transfer for children with BH issues were present less often among rural, remote, critical access, and trauma center-designated hospitals. Compared to hospitals with no PECC, hospitals with both a nurse and physician PECC were associated with presence of BH policies, procedures or plans (adjusted odds ratio [aOR] 1.91, 95% CI 1.56, 2.35), written guidelines for the transfer of children with BH issues (aOR 1.69, 95% CI 1.40, 2.04), and access to BH resources for children in the event of a disaster (aOR 2.11, 95% CI 1.54, 2.91) (Figure 1).

Conclusions: The frequency of having pediatric BH policies increased among US EDs from 2013 to 2021, but substantial gaps remain among hospitals that are rural, remote, critical access, and trauma center-designated. Having a nurse and physician PECC may facilitate having BH policies. Given the ongoing pediatric BH crisis, having established pediatric BH policies and guidelines is critical to the provision of high-quality emergency care.

Figure 1. ED- and hospital-level factors associated with (A) presence of behavioral policies, procedures, or plans (B) presence of written guideline for the transfer of children with behavioral health issues (C) access to behavioral health resources for children in event of a disaster.




No, authors do not have interests to disclose

## 183 A.P.B. DUMBLEDORE Study. Algorithm Pecarne to Bowl over raDiation and brush Up Management of Brain injury in wardLy Emergency Department: Outcomes and cRowding improved

Savioli G, Ceresa I, Longhitano Y, Piccini GB, Manzoni F, Voza A, Zanza C, Bellou A/ IRCCS Policlinico San Matteo, Pavia, Italia, Pavia, Qualunque, IT

Objectives: evaluate the application of the PECARN TBI algorithm in the real life of a European teaching hospital in order to decrease the number of head CT performed. Secondary objectives were: (i) to highlight trauma dynamics, (ii)to analyze presentation symptoms, (iii) to evaluate the impact of adhesion to this protocol on the crowding, length of stay and boarding time in the emergency department (ED).

Methods: We conducted a retrospective study on children aged ≤15 years admitted to our ED for mild traumatic brain injury (TBI) from the 1st of January 2016 to the 31st December 2019. We collected data concerning anamnesis, demographics, main complaint, causal factors, ED-times processes, outcomes in term of intracranial injuries (ICI) and injuries requiring neurosurgery (NSI).

Results: 1372 children with mild TBI were included (table1). The majority of patients were male (59.8%) and ≥ 2 years of age (63.2%). 85% were spontaneous arrivals, 15% were transported by ambulance or were transfer from spoke hospitals. 1% of children arrived as major trauma and therefore was assigned triage-code1, 7.5% received a Triage-code-2; 2.5% a Triage-code-3; 89% a Triage-code-4 in the absence of bleeding risk factors and dangerous symptoms. The main complaint was headache, often accompanied by nausea (1283 patients); 46 patients presented wounds requiring suturing; 13 presented with severe trauma; 3 had neurological disorders; 3 presented with dizziness; 3 presented with syncope. The other signs and symptoms were generalized as malaise. Concerning the causal factors of the TBI: 792 children arrived due to domestic injury; 119 for school injury; 239 due to injury in other places (playground ...); 15 for having received violence from others; 88 for road accidents; 87 for sports accidents; and 29 underwent trauma during a morbid state (as fever). Neurosurgical consultation was the most common interventions in the ED (59.4%). Only 4.3% of patients required neuroimaging and 7 children had cerebral hemorrhage; only 1 required immediate neurosurgical intervention (table 3 & 5). We did not find any correlation between the time processes, crowding indices (waiting times, process

times, LOS) and the request for CT. The univariate and multivariate analyzes showed that older children (> 2 years old) were more likely to have a CT (table6). The likelihood of undergoing CT increases significantly for more severe triage codes. There were no re-entries for bleeding. Concerning crowding input factors: waiting times were of 40 minutes for triage-code-4 patients; 35 minutes for triage-code-3; 27 minutes for triage-code-2; while for the triage code-1 direct entry is provided. Concerning throughput factors: the mean process-time was 2 hours, slightly longer for triage-codes 1 and 2 for which it was 3 hours. The patients in need were subsequently kept for surveillance in the pediatric observation unit. Concerning output factors: the mean ED-LOS was 155 minutes. The mean ED-LOS for the triage-code was 150.27 for the triage-code-4; 163.80 min for triage-code-3; 204.40 minutes for triage-code-2; and 154.33 for triage-code-1. No patients experienced exit blocks, only 4 patients (0.3%) presented boarding. The average boarding time was 72 minutes. The boarding total time of the whole period was 291 min (tables 3 and 5).

Conclusions: The adoption of the PECARNE algorithm allowed a low volume of brain CT scan with good clinical outcomes and did not increase crowding.

Tables

Table 1: Baseline patient characteristics (n=1371)

| Variable | n | % |
|---|---|---|
| Age (<2 years) | 504 | 36 |
| Sex (Male) | 818 | 59,75 |
| *Transportation mode* | | |
| Ambulance | 87 | 6.36 |
| Hospital ambulance | 4 | 0.29 |
| Public force | 4 | 0.29 |
| self | 1162 | 84.88 |
| Basic rescue | 87 | 6.36 |
| Advance rescue with doctor | 15 | 1.10 |
| Helicopter rescue | 2 | 0.15 |
| Intermediate rescue with nurse | 7 | 0.51 |
| *Triage acuity* | | |
| triage code - I | 15 | 1,1 |
| triage code – II | 102 | 7,4 |
| triage code – III | 33 | 2,4 |
| triage code – IV | 1219 | 88,9 |
| Triage code V | 0 | 0 |
| Major trauma | 13 | 0,9 |
| *Main symptom complained* | | |
| headache nausea or vomiting | 1282 | 93.64 |
| syncope | 3 | 0.22 |
| wounds | 45 | 3.29 |
| Major trauma | 13 | 0.95 |
| dizziness | 15 | 1.10 |
| syncope | 4 | 0.29 |
| other signs and symptoms faded as general malaise | 3 | 0.22 |
| bleeding | 1 | 0.07 |
| *causal factors* | n | % |
| domestic | 792 | 57.85 |
| school | 119 | 8.69 |
| other places | 239 | 17,46 |
| violence | 14 | 1.02 |
| road | 88 | 6,43 |
| sporty | 87 | 6.36 |
| morbid state | 29 | 2.12 |

Table 2: exams performed

| *imaging required* | | |
|---|---|---|
| | n | % |
| cranial CTs | 4 | 0.29 |
| cervical CTs | 1 | 0.07 |
| cerebral CTs | 50 | 3.65 |
| Massive facial CTs | 4 | 0.29 |
| Rx skull | 28 | 2.05 |
| Nasal bone x-ray | 98 | 7.16 |
| Cervical column x-ray | 39 | 2.85 |

| *specialist visits required* | | |
|---|---|---|
| | n | % |
| visit neurosurgery | 815 | 59.53 |
| eye examination | 27 | 1.24 |
| maxillo facial visit | 3 | 0.22 |
| pediatric surgery visit | 80 | 5.84 |
| ENT visit | 143 | 10.45 |

Table 3: crowding indices

| **Input factors** | | |
|---|---|---|
| | **Waiting time (min)** | |
| | Mean (sd) | Median (iqr) |
| **Triage code 4&5** | 40.57 (42.75) | 25.97 (12.13; 53.5) |
| **Triage code 3** | 35.15 (36.31) | 23.58 (9.87; 47.1) |
| **Triage code 2** | 27.63 (25.80) | 19.36 (8.67; 42.8) |
| **Triage code 1** | 4.55 (3.95) | 3.9 (1.7; 6.33) |
| **Throughput factors** | | |
| | **Time Doc to exam (min)** | |
| | Mean (sd) | Median (iqr) |
| **Triage code 4&5** | 18.19 (31.66) | 5.85 (2.15; 18.13) |
| **Triage code 3** | 8.44 (8.94) | 5.82 (2.58; 11.02) |
| **Triage code 2** | 18.09 (22.75) | 10.43 (3.27; 24.28) |
| **Triage code 1** | 6.41 (8.22) | 5.28 (0.87; 6.2) |
| | **Process time (min)** | |
| | Mean (sd) | Median (iqr) |
| **Triage code 4&5** | 109.81 (74.97) | 94.32 (55.65; 144.05) |
| **Triage code 3** | 128.65 (69.41) | 113.65 (85.9; 160.37) |
| **Triage code 2** | 176.77 (148.66) | 143.87 (80.97; 221.15) |
| **Triage code 1** | 152.54 (96.15) | 145.33 (86.47; 227.2) |
| | **LOS time (min)** | |
| | Mean (sd) | Median (iqr) |
| **Triage code 4&5** | 150 (85.14) | 135.15 (89.95 ; 189.35) |
| **Triage code 3** | 163 (78.81) | 166.48 (108.15; 210.25) |
| **Triage code 2** | 204.40 (152.70) | 67.69 (109.05 ; 256.2) |
| **Triage code 1** | 154 .78 (92.77) | 147.83 (88.17; 239.67) |
| **Output factors** | | |
| Boarding (n - %) | | 4 (0.29%) |
| Exit Block (n - %) | | 0 - (0%) |
| boarding total time (min) | | 291.05 |
| time boarding, median [iqr] (min) | | 72.67 (53.87 - 91.66) |
| boarding minimum time (min) | | 37.28 |
| boarding maximum time (min) | | 108.42 |

*Continuous data are reported as mean (sd) or as median (iqr)*

Table 4: outcomes

| **outcomes** | **n** | **%** |
|---|---|---|
| **dimission** | 1257 | 91,7 |
| **hospitalized** | 72 | 5,3 |
| **transferred** | 1 | 0,1 |
| **left without being seen** | 27 | 2,0 |
| **refuses hospitalization** | 14 | 1,0 |

| | | |
|---|---|---|
| **re-entries for bleeding** | 0 | 0 |
| **Intra cranical bleeding** | 7 | 0.51 |
| **need for neurosurgery** | 1 | 0.07 |

Table 5: time elapsed from the medical examination to the examination request (TDE: Time Doc to Exam)

| exams performed | REQUEST time from the medical examination |
|---|---|
| ***imaging required*** | ***(MIN)*** |
| cranial tc | 9,7 |
| cervical CT | 2,0 |
| cerebral tc | 21,1 |
| Massive facial CT | 4,0 |
| Rx skull | 7,9 |
| Nasal bone x-ray | 4,9 |
| Cervical column x-ray | 15,8 |
| ***specialist visits required*** | (min) |
| visit neurosurgery | 23,0 |
| eye examination | 17,5 |
| maxillo facial visit | 2,3 |
| pediatric surgery visit | 14,0 |
| ENT visit | 15,7 |

*data are reported as median (iqr)*

***Table*** correlation with request for CT
***6.a Univariate logistic models results***

| | *OR* | *95 % CI* | *p value* |
|---|---|---|---|
| *Sex, M* | 1.37 | 0.80 – 2.33 | 0.254 |
| *Age (years)* | 1.33 | 1.26 – 1.41 | < 0.001 |
| *Age ≥ 2 years* | 5.86 | 2.51 – 13.68 | <0.001 |
| *Triage Code (baselevel Triage Code IV)* | | | |
| *Triage Code III* | 3.21 | 0.73 – 14.17 | 0.124 |
| *Triage Code II* | 19.75 | 10.94 – 35.63 | < 0.001 |
| *Triage Code I* | 56.81 | 19.06 – 169.29 | < 0.001 |
| *Waiting time* | 1.00 | 0.99 – 1.00 | 0.598 |
| *LOS* | 1.00 | 1.00-1.01 | <0.001 |
| *Time doc to exames* | 1.00 | 0.99 – 1.01 | 0.929 |
| *Process time* | 1.01 | 1.00-1.01 | <0.001 |
| | | | |

***Table 6b***
***Multivariate logistic models results***

| *Model a)* | *OR* | *95 % CI* | *p value* |
|---|---|---|---|
| *Age (years)* | 1.32 | 1.23 – 1.42 | <0.001 |
| *Triage Code (baselevel Triage Code IV)* | | | |
| *Triage Code III* | 3.86 | 0.81 – 18.48 | 0.091 |
| *Triage Code II* | 15.66 | 8.17 – 30.02 | <0.001 |
| *Triage Code I* | 55.63 | 16.14 – 191.71 | <0.001 |

| *Model b)* | | | |
|---|---|---|---|
| *Age ≥ 2 years* | 4.73 | 1.96 – 11.39 | 0.001 |
| *Triage Code (baselevel Triage Code IV)* | | | |
| *Triage Code III* | 3.18 | 0.71 – 14.24 | 0.1330 |
| *Triage Code II* | 18.14 | 9.95 – 33.05 | <0.001 |
| *Triage Code I* | 47.83 | 15.59 – 146.77 | <0.001 |

No, authors do not have interests to disclose

## 185 Pott's Puffy Puzzle: Unraveling a Cluster of Pediatric Cases

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Objectives: Pott's Puffy Tumor (PPT) is a rare diagnosis that describes a frontal sinus abscess, along with frontal osteomyelitis, which occurs most commonly in children and adolescents. Early recognition of PPTs is critical for preventing serious sequelae of the disease. Though increasing in the last decade, the incidence of PPTs remains relatively low. However, this case series describes five consecutive patients with PPT who presented within one year to a single pediatric emergency department at Jacobi Medical Center in Bronx, NY. By studying a series of cases of PPTs, commonalities including epidemiology, microbial cause, and hospital course will be identified. Based on information gathered, recommendations will be made on how to identify this rare disease promptly when patients present.

Methods: This case series uses information gathered from chart review of patient electronic records to evaluate the diagnosis and clinical course of five patients with PPTs during the one-year period of April 1st, 2022 through March 31st, 2023. Data parameters collected include demographics, clinical presentation, exam findings, imaging, immunization status, labs, culture results, medical and surgical interventions, and outcomes. The cases were evaluated independently and then compared to identify trends or similarities.

Results: The patients ranged from 6-17 years old (ages 6, 9, 9, 11, 17). The primary symptoms on presentation included headache, eyelid swelling and fever. Imaging modalities included CT with contrast and MRI. In three of the five patients, presenting CRP was greater than 200. Three of the patients had intracranial abscesses or empyemas. Two had non-occlusive filling defects of the superior sagittal sinus. Four of the patients required surgical drainage, while one was treated with antibiotics alone. All patients were ultimately discharged with no neurologic deficits.

Conclusions: In this case series, we described the clinical course of 5 patients with PPT between April 2022-March 2023. Five admissions of PPT in one year is extremely unusual considering the rarity of the diagnosis. The Jacobi pediatric emergency department sees around 32,000 patients yearly, which would make PPTs 1:6400 within the patient population during that year. In comparison, there have been only around 200 reported pediatric cases in the last 20 years in the United States. While it is often assumed that younger patients cannot develop PPT as their frontal sinuses are not pneumatized, three of our patients were nine years old or younger. Due to the rapid onset and deterioration of patients with PPTs, it is important to be able to recognize the signs and symptoms early to establish prompt treatment. The disease can spread intracranially, so it is important to obtain neuroimaging in addition to sinus and facial imaging.

No, authors do not have interests to disclose

## 186 Prescribing Patterns of Epinephrine Upon Discharge for Anaphylaxis Patients: A Comparison Between Adult and Pediatric Patients

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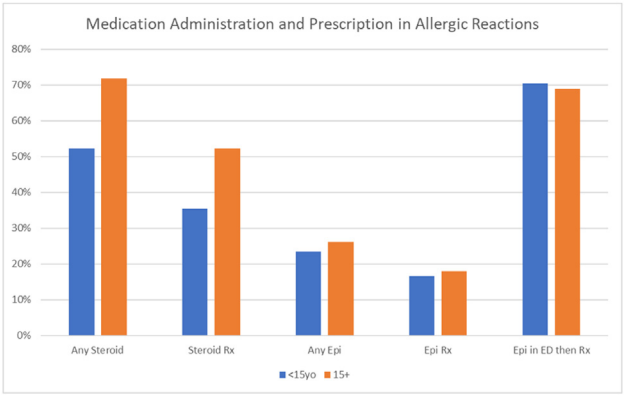
Background: Anaphylaxis is a severe and often life-threatening allergic reaction that requires emergent medical attention. In particular, time-sensitive administration of epinephrine is crucial for managing acute anaphylaxis in order to prevent and treat airway obstruction and shock. The lifetime prevalence of anaphylaxis is 0.05-2% in the US and up to 3% in Europe. Allergy-related complaints account for 1% of all emergency department (ED) visits with increasing rates reported for infants and toddlers in recent years. Most cases of anaphylaxis of all ages improve in the ED and patients are discharged. It is important to investigate how many of these patients are receiving prescriptions for epinephrine upon discharge to treat future anaphylactic reactions. To date, no extensive studies have been conducted to observe this across a large portion of our population in multiple centers, across different levels of socioeconomic status to answer this question.

Objectives: The aim of this study is to determine how many presumed anaphylaxis patients receive prescriptions for epinephrine and if a significant difference exists between adult and pediatric patients. We will also observe prescribing patterns for steroids on discharge. By examining prescribing patterns for anaphylaxis patients across the United States, this study aims to contribute to our understanding of anaphylaxis management and patient safety.

Methods: The National Hospital Ambulatory Medical Care - Emergency Department (NHAMCS-ED) dataset was queried from 2016-2019. Visits with an allergic diagnosis, as determined by the International Classification of Disease, Version 10, were selected. This included the following diagnoses: 'Anaphylactic reaction due to food,' 'Other adverse food reactions, not elsewhere classified,' 'Anaphylactic shock, unspecified,' 'Angioneurotic edema,' 'Other and unspecified allergy.' Visits were excluded if the patient was admitted. Medications administered and prescribed were collated, and steroid and epinephrine ED administration and prescription were coded. Visits were stratified into whether the patient was under 15 years of age (pediatric) versus 15 and over (adult).

Results: The study period represents 4,094,000 visits. Of those, 3.5% were excluded for admission. Of the remaining, 25% were under 15 years of age. Of all patients, 67% received any steroid, 45% received a steroid prescription, 25% received any epinephrine and 18% received a prescription. 69% of adults and 70% of pediatrics received a prescription for epinephrine after having received epinephrine in the ED. Five percent of patients received no medication. Figure 1 shows the breakdown of medications by age group.

Conclusions: Our study found that of all presumed anaphylaxis patients, approximately 70% of these patients received a prescription for epinephrine upon discharge with no significant difference between adult and pediatric patients. This suggests that almost one third of all ED patients discharged with anaphylaxis may not have access to a time critical life-saving medication at home. It is worth noting that 5% of patients received no medication at all, indicating a potential need. These findings highlight the need for increased awareness and education about the importance of prompt treatment for allergic reactions.




No, authors do not have interests to disclose

## 187 Awareness of California Medicaid Expansion for Undocumented Adults Over 50

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Objectives: In May 2022, California expanded access to full-scope Medi-Cal (Medicaid in California) to all income-eligible individuals over the age of 50, regardless of immigration status. Additional expansion to include income-eligible undocumented individuals of all ages is slated for January 1, 2024. In contrast to restricted scope Medi-Cal, which only provides access to emergency care, full-scope Medi-Cal provides free or low-cost primary and preventative care, including vision and dental. Community awareness of Medi-Cal expansion is a critical step in ensuring that this legislative change is translated into a meaningful increase in access. We sought to characterize awareness of California's Medi-Cal expansion among patients presenting to the emergency department (ED).

Methods: We conducted a cross-sectional survey of a convenience sample of adult ED patients, in both English and Spanish, from April to May 2023 at a safety-net ED in Los Angeles County. Measures included demographic information, documentation, and insurance status. The primary outcome consisted of awareness of the Medi-Cal expansion. Secondary outcomes included awareness of Medi-Cal expansion by documentation status and reported enrollment in full-scope Medi-Cal as a result of the Medi-Cal expansion.

Results: Of the 52 patients enrolled, 50% were female, 77% identified as Latinx, 13% were White (non-Latinx), 4% Black (non-Latinx), and 4% Asian; the median age was 50 (IQR 40 – 61). The primary language of 52% of participants was Spanish and 44% self-identified as undocumented. In the past 12 months, 42% received most of their healthcare from a doctor's office or health center and 40% received most of their care from the ED. Sixty percent (31/52) of participants were unaware of the recent Medi-Cal expansion.

Seventeen percent (9/52) reported a member of their household became eligible and 21% (11/52) knew others (e.g. neighbors, friends, or coworker) who became newly eligible. Of the 73% (38/52) participants who reported having health insurance, 76% (29/38) have Medi-Cal. Of all Medi-Cal beneficiaries, 72% (21/29) have full-scope Medi-Cal and 14% (4/29) have restricted scope Medi-Cal. Out of the 31% (16/52) of participants who had restricted scope Medi-Cal in the past 12 months and who were over 50 years of age, making them potentially newly eligible for full-scope Medi-Cal, 29% recalled receiving a notice in the mail informing them of their eligibility for full-scope Medi-Cal and 14% actually received full-scope Medi-Cal due to the expansion.

Conclusions: A majority of participants were unaware of the recent Medi-Cal expansion that grants access to undocumented, income-eligible adults over 50 and few potentially eligible undocumented adults report transitioning to full-scope Medi-Cal as a result of the expansion. Widespread outreach is necessary to ensure newly eligible undocumented individuals gain meaningful access to care, in accordance with the intent of the expansion.

No, authors do not have interests to disclose

## 188 A Qualitative Investigation of Black Patient Perspectives on Racism and Emergency Care

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Objectives: Many disparities between Black and White individuals have been observed across a range of outcomes tied to structural, institutional, and individual racism, including in health care spaces. While many studies have observed racial disparities in the care Black patients receive, less is known about Black patient perspectives on emergency department (ED) care, racism, and patient-centered methods to dismantle structural racism. This study aimed to explore the qualitative perspectives and experiences of Black patients related to race, racism, and care following an ED visit.

Methods: This qualitative study included 25 semi-structured interviews of Black patients discharged from an academic, urban ED. Interviews were conducted and transcribed by the study team. Interviews were coded and analyzed by the Mixed Methods Research Lab MMRL using NVivo, a qualitative analysis software. Two research coordinators coded transcripts and developed a codebook that incorporated emergent themes from the interviews.

Results: All 25 participants were Black patients discharged from the ED. Most (24/25) reported that race negatively impacted their care. Three broad conceptual areas were identified which included: 1) Race, racism, and health care; 2) Clinical care; and 3) Strategies for improvement. Within these broad areas, the first two include specific themes. Eight themes within "race, racism, and health care" were identified using directed content analysis: (1) Medical racism, (2) Dismissiveness, (3) Expectations of care, (4) Medical mistrust, (5) Health literacy, (6) Previous experience with health system, (7) Post experience impact, and (8) Perceived discrimination. Five themes within "ED clinical care" were identified using the same methods. These included: (1) Discharge plan, (2) Experience sentiment, (3) Waiting room perceptions, (4) Medication treatment, and (5) Pain management. Finally, a separate patient generated theme of recommendations for improvement was also identified.

Conclusions: Black patient perspectives on ED care and racism in medicine highlight the persistent disparities in care and trust. Patients described system level mistrust, skepticism, and dismissiveness. Patients also highlight racism from entry to discharge during and ED visit. These perspectives highlight the invasiveness of racism in clinical care and offer insights to explore patient-centered methods of improving anti-racist cultures in the ED and broadly in medicine.

Dr. Agarwal has previously received research funding from PCORI, AHRQ, and the FDA. Dr. Agarwal's work is currently supported by the Emergency Medicine Foundation, NIMH, and NIMHD.

## 189 Does Medicaid Cover Out-of-State Abortion? A Mystery Shopper Survey of State Medicaid Agencies

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Objective: Following the *Dobbs* supreme court decision, many states enacted laws restricting access to abortion care. Thus, some pregnant people have turned to seeking abortion care out-of-state (OOS). Two thirds of patients who use abortion services are low-income; Medicaid is the second most common payment method for abortions. The Hyde Amendment specifies federal Medicaid funds can be used for abortion care in the case of life-threatening medical emergency, rape, or incest. However, it is unclear to what degree states adhere to federal policy and what requirements must be met for coverage as most state plans do not specify coverage policies for OOS services. This study examines state-level Medicaid coverage policies for OOS abortion care.

Methods: Between August and December 2022, three trained female callers surveyed 50 state Medicaid agencies and the District of Columbia using a mystery shopper design. Using standardized case scenario scripts, callers queried whether out-of-state abortion would be covered generally, in medical emergencies, and in cases of rape. Callers also queried how agencies defined medical emergency and specific requirements for coverage when agencies indicated coverage existed. Callers spoke with the first available staff member designated to answer benefits questions. At least three call attempts were made before agencies were deemed to be unreachable.

Results: Forty states provided information on out-of-state coverage for abortion due to medical emergency; 32 (80%) agencies stated abortion would be covered for a medical emergency, 4 (10%) stated it would not, and 4 (10%) did not know. Of the 32 states endorsing coverage for medical emergency, 20 (63%) defined medical emergency as life endangerment. Forty-four states provided information on abortion coverage for rape; 15 (34%) agencies stated that OOS abortion sought for rape would be covered, 27 (61%) stated it would not, and 2 (5%) did not know. Of the 15 states endorsing coverage for rape, 10 (67%) were unable to provide information on requirements for coverage. Among those that were, the most commonly cited requirements for coverage were: out-of-state provider registration with beneficiary's home Medicaid, prior authorization, and Medicaid committee approval.

Conclusion: We found substantial state-variability and notable gaps in Medicaid coverage for out-of-state abortion services that would otherwise meet Hyde criteria, with 4 states indicating abortion would not be covered for a medical emergency and 27 states indicating abortion would not be covered for rape.

No, authors do not have interests to disclose

## 190 Health Disparities in Emergency Department Administration of Buprenorphine for Treatment of Opioid Use Disorder

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Objectives: Buprenorphine use in the emergency department contributes to decreased frequency of opioid overdose, reduced emergency room visits, and decreased associated health care costs. However, racial and ethnic disparities in buprenorphine prescription contribute to fewer prescriptions of buprenorphine for Black and Hispanic patients when compared to White patients. The objectives of our study were to 1) examine whether buprenorphine administration in an urban emergency department varies by patient demographics including race and ethnicity; and 2) examine other structural determinants of health to expand upon why these differences may exist.

Methods: This is a retrospective analysis of electronic health records from patients who presented to the emergency room at Henry Ford Hospital between January 1, 2021, and December 31, 2021. Included patients were 18 years of age or older and screened positive for opioid use disorder (OUD) in the emergency room at Henry Ford Hospital. Area deprivation index (ADI) was determined based on patients' documented street addresses to serve as a proxy for measuring income, education, employment, and housing quality. Univariate and multivariate analyses were conducted using SAS 9.4. Statistical significance was set at $p<0.05$. The institutional IRB approved this study.

Results: There were 1082 patients included in our final analysis. Patients had a mean age of 48.1 years and were largely male (n=721, 66.8%). The majority of patients were Black (n=682, 63.0%), had Medicaid insurance (n=667, 61.6%), and were from the most disadvantaged ADI group (n=624, 62.7%). Patients that received buprenorphine had on average longer length of stay (LOS) with a mean of 844.2 minutes (p=0.016). Patients who identified as Black or Other Race were less likely to receive buprenorphine, and patients who identified as White were more likely to receive buprenorphine (p=0.021). After adjusting for age, LOS, sex, insurance type, and ADI, Black patients were less likely to receive buprenorphine as compared to White patients (p=0.0237). There were no significant differences found when comparing ADI among those who received buprenorphine. There were no differences among demographics for patients receiving buprenorphine for first-time induction compared to those receiving a maintenance dose.

Conclusions: Our study demonstrates that the majority of patients at risk of opioid use disorder in our hospital sample were patients who were Black, male, had Medicaid insurance, and were from the most disadvantaged communities. However, White patients were still more likely to receive buprenorphine in our ED for treatment of OUD after controlling for other structural determinants of health. Limitations include the inherent inability of electronic medical records to accurately document a patient's identified race and ethnicity. Future studies should include prospective analyses that better capture the very complex relationships of unconscious bias in medicine and structural determinants of health. Furthermore, we can utilize multifaceted education and training for ED providers and advocate for systemic changes at the hospital and policy level. Equitable administration of buprenorphine in the ED can contribute to decreased health disparities in the treatment of OUD.

No, authors do not have interests to disclose

## 191 Accessibility of Emergency Physicians to the Medicare Population

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Objectives: This project analyzes the change in Medicare-serving emergency physicians in the US by region and type of community (urban v. rural) from 2012 to 2020. This will identify trends and variations in emergency healthcare accessibility for populations and communities nationwide. This is relevant to patients and emergency physicians due to the recent workforce projections estimating a surplus of 7,845 emergency mediicne physicians by 2030.

Methods: The number of emergency medicine physicians submitting claims to Medicare was extracted from the CMS Physician and Other Supplier Public Use File Database. The number of Medicare enrollees by region was obtained from the Kaiser Family Foundation. This was used to determine the number of emergency medicine physicians per 100,000 enrollees in every region. National- and regional-level changes per capita values were then analyzed using compound annual growth rates (CAGRs). Additional urban-rural analysis was performed. Physicians were labeled as rural providers if they were in zip codes with a total population of 2,500 or less. Compound annual growth rates were calculated for the number of absolute providers in these distinctions.

Results: The number of Medicare-serving emergency medicine physicians per 100K Medicare enrollees increased in every region and community type. Some regions increased this figure at a higher rate than others. The regions with the most growth are the Northeast and Midwest with a CAGR of 3.23% and 2.46%, respectively. The regions with more modest growth are the South and the West with a CAGR of 1.88% and 0.11% respectively. It was also found that rural communities had a faster increase of Medicare-serving emergency medicine physicians per 100K Medicare enrollees (5.44%) than urban communities (2.02%).

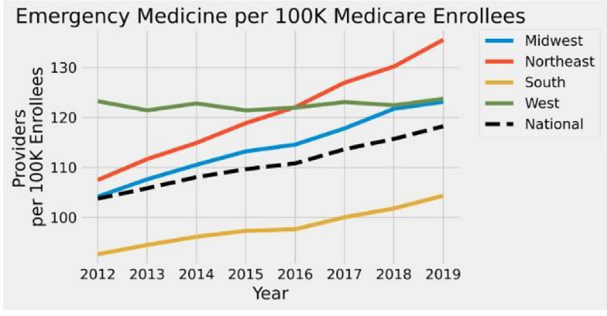
Conclusions: The change per 100K Medicare patients of Medicare-serving emergency physicians exhibits growth in all regions and community types, although there is significant variation between regions and between urban and rural ED physicians. These variations are likely due to community and labor factors that may have potential implications for accessibility of emergency healthcare for Medicare patients across the United States. This is relevant to the field of emergency medicine in particular due to the projection of the oversupply of physicians. Organizations such as ACEP are working to form policies to balance this trend and this data can help inform how such policies may relate to regional factors.

ER Physicians per 100K

| Region | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | CAGR (%) |
|---|---|---|---|---|---|---|---|---|---|
| Midwest | 106.6 | 109.6 | 112.2 | 113.7 | 116.8 | 120.6 | 121.9 | 126.4 | 2.46 |
| Northeast | 111.7 | 114.9 | 118.9 | 122.0 | 126.9 | 130.2 | 135.5 | 139.5 | 3.23 |
| South | 94.5 | 96.1 | 97.3 | 97.6 | 100.0 | 101.8 | 104.3 | 107.6 | 1.88 |
| West | 123.0 | 124.2 | 122.7 | 123.2 | 124.3 | 123.7 | 125.1 | 124.0 | 0.11 |

Number of rural ER physicians vs urban ER physicians

| Year | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | CAGR |
|---|---|---|---|---|---|---|---|---|---|
| Rural | 1089 | 1145 | 1190 | 1278 | 1388 | 1467 | 1532 | 1578 | 5.44% |
| Urban | 36315 | 37290 | 38210 | 39157 | 40165 | 40795 | 41534 | 41784 | 2.02% |




No, authors do not have interests to disclose

## 192 Initiating Care for Low Back Pain in the Veterans Health Administration: Where Does It Start? And Where Does It Go?

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Objectives: Low back pain (LBP) is highly prevalent among Veterans and one of the most common reasons they seek medical care. Where Veterans choose to initiate care for LBP varies, with the emergency department (ED) representing one access (entry) point. Our objective was to describe the prevalence of Veterans who initiate Veterans Health Administration (VHA) care for LBP through the ED or urgent care clinics compared to primary care or other VHA clinics and examine how this starting point impacts the location of the next LBP encounter.

Methods: VHA electronic health records were used to identify Veterans with an initial visit for LBP, defined as a visit with an ICD-10 LBP-related code after a 365-day period without such a visit, between October 1, 2015, to September 30, 2016. Primary and secondary clinic stop codes were used to identify the initial entry point and stratify the entry clinic into ED/urgent care, primary care, and all other service lines grouped into "other". The location of the first subsequent visit within 365 days with an ICD-10 code for LBP, if any, was similarly identified. We identified demographic and clinical characteristics of Veterans whose first subsequent LBP visit was in ED/urgent care and used logistic regression to assess the impact of entry point on location of first subsequent LBP visit location, controlling for relevant covariables.

Results: We identified 55,612 Veterans receiving an initial visit for LBP. Of those, 44,956 (80.8%) were initially seen in primary care, 4,652 (8.4%) in ED/urgent care, and 6,004 (10.8%) in other clinics. There were 44,175 (79.4%) Veterans with any subsequent LBP visit, and these visits were most commonly in primary care (49.4%), followed by other clinics (46.9%), and ED/urgent care and (3.7%).The odds of the first subsequent LBP visit occurring in the ED/urgent care was greater for Veterans initially seen in ED/urgent care compared to primary care or other clinics (OR = 8.2, 95% CI [9.3, 7.2]; OR = 8.4, 95% CI [10.7, 6.5], respectively). Of the 4,652 Veterans initially seen in ED/urgent care, 785 (16.9%) had their first subsequent visit in ED/urgent care. Sex of record, race, presence of co-occurring neck pain, depression, anxiety, post-traumatic stress, or traumatic brain injury, marital status, and diagnosis of alcohol or substance use disorder did not impact the odds of returning to the ED/urgent care; pain intensity, the presence of a LBP-related serious diagnosis, and opioid treatment increased the odds of returning to the ED/urgent care.

Conclusions: In VHA facilities, 1 in 12 initial LBP visits occur in ED/urgent care. After the initial visit, 1 in 33 subsequent visits occur in ED/urgent care. Interestingly, initiating care in ED/urgent care increases the odds that the next LBP encounter occur will also occur in ED/urgent care by a factor of 8. Factors associated with ED returns after discharge from an index ED visit within VHA contribute to the published literature in non-VHA settings.

Implications: Future research is needed to explore patient and system factors contributing to first subsequent LBP care occurring in ED/urgent care after their initial LBP visit.

No, authors do not have interests to disclose

## 193 Improving Physicians' Ability to Perform the Sexual Assault Forensic Exam (SAFE) in the Emergency Department

Ragazzo G, Moran T, Rupp J, Hudak L/Emory University School of Medicine, Department of Emergency Medicine, Atlanta, Georgia, US

Objectives: Each year sexual violence accounts for approximately 73,000 emergency department visits nationwide. Emergency department providers are often responsible for performing forensic examinations as part of caring for these patients. However, lack of forensic training can lead to anxiety regarding the examination and caring for victims of sexual violence across both academic and private groups. It can also lead to errors in evidence handling procedures, laboratory testing orders, and medication orders during patient care. This quality improvement study explores the effect of a 4-hour didactic and patient simulation training session on physicians' knowledge and comfort performing a sexual assault forensic exam (SAFE).

Methods: Using a case-based format, training included taking a patient from presentation in triage through their ED stay and follow-up process. The session included a 1 hour in-person didactic session followed by a standardized patient experience in the simulation center using the state crime lab's forensic kit. Residents were observed performing the full sexual assault kit by nurses and faculty members trained in the SAFE and given feedback on their history and examination performance. The residents were given a short pre/post survey to assess their knowledge about the exam and comfort with exam components. Twenty first-year emergency medicine residents participated in the training session. Knowledge-based questions were evaluated using McNemar's test. Comfort-based questions, which were rated on a 1-5 Likert scale, were evaluated using a fixed-effects ordinal logistic regression.

Results: At baseline, 0 (0%) of residents knew the correct set of laboratory orders. At post-test, this increased to 10 (45.5%; p = .004). Twelve (57.1%) of residents knew the correct evidence handling procedure at baseline. This increased, though not significantly, to 17 (81%; p = .23) at post-test. Results regarding self-reported confidence are reported in Table 1. For all items, the majority of residents responded with 1, 2, or 3 on the 5-point Likert at baseline. At post-test, the majority of residents responded with 4 or 5 for all items. All odds ratios were significant (ps < .003).

Conclusions: Our 4-hour didactic session and patient simulation training improved physicians' knowledge and comfort in performing a SAFE, which likely improves the medical care of victims of sexual violence who present to the emergency department. Given the prevalence of sexual violence in our society and the relative scarcity of training that exists, further efforts should explore the implementation of such training in academic and private groups to improve care for this vulnerable patient population.

Table 1. Self-reported confidence in performing a SAFE before and after training

| Item | Pre-Test N (%) | Post-Test N (%) | OR (95% CI) |
|---|---|---|---|
| **Forensic-Focused History Documentation** | | | 27.4 (8.4; 89.0) |
| 1 | 7 (33.3) | 0 (0) | |
| 2 | 10 (47.6) | 1 (4.8) | |
| 3 | 3 (14.3) | 3 (14.3) | |
| 4 | 0 (0) | 8 (38.1) | |
| 5 | 1 (4.8) | 9 (42.9) | |
| **Collection of Samples/Kits** | | | 62.6 (15.4; 254.4) |
| 1 | 13 (61.9) | 1 (4.8) | |
| 2 | 8 (38.1) | 0 (0) | |
| 3 | 0 (0) | 2 (9.5) | |
| 4 | 0 (0) | 10 (47.6) | |
| 5 | 0 (0) | 8 (38.1) | |
| **Lab Orders** | | | 8.1 (2.3; 29.2) |
| 1 | 2 (9.5) | 0 (0) | |
| 2 | 5 (23.8) | 1 (4.8) | |
| 3 | 10 (47.6) | 5 (23.8) | |
| 4 | 4 (19) | 9 (42.9) | |
| 5 | 0 (0) | 6 (28.6) | |
| **Medication Orders** | | | 13.4 (4.9; 36.7) |
| 1 | 2 (9.5) | 0 (0) | |
| 2 | 8 (38.1) | 1 (4.8) | |
| 3 | 8 (38.1) | 2 (9.5) | |
| 4 | 2 (9.5) | 8 (38.1) | |
| 5 | 1 (4.8) | 10 (47.6) | |
| **Chain of Custody** | | | 62.2 (18.1; 213.5) |
| 1 | 12 (57.1) | 0 (0) | |
| 2 | 8 (38.1) | 0 (0) | |
| 3 | 0 (0) | 5 (23.8) | |
| 4 | 1 (4.8) | 8 (38.1) | |
| 5 | 0 (0) | 8 (38.1) | |
| **Able to Elicit Details** | | | 6.4 (2.0; 20.5) |
| 1 | 6 (28.6) | 4 (19) | |
| 2 | 7 (33.3) | 0 (0) | |
| 3 | 7 (33.3) | 3 (14.3) | |
| 4 | 1 (4.8) | 6 (28.6) | |
| 5 | 0 (0) | 8 (38.1) | |

No, authors do not have interests to disclose

## 194 Development of a Mastery Learning Checklist for Pregnancy Disclosure and Options Counseling in the Emergency Department

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Objectives: More than 2.77 million pregnant patients present to emergency departments (EDs) in the US annually. Standard emergency medicine training does not routinely include pregnancy options counseling: the discussion of whether a newly

diagnosed pregnancy is desired, whether a patient intends to continue the pregnancy, and options for termination. Pregnancy options counseling can address many of the known reproductive healthcare disparities and inequities in emergency and obstetric care. Mastery learning is a rigorous form of competency-based education in which learners engage in standardized deliberate practice in a simulated environment with individualized, expert feedback until they meet or exceed a minimum passing standard (MPS) on a checklist assessment. The objective of this study was to develop a mastery learning checklist for pregnancy disclosure and options counseling in the ED and determine the MPS for independent performance of emergency physicians.

Methods: The mastery checklist was adapted from an existing pregnancy disclosure and options counseling objective structured clinical evaluation (OSCE) for medical students. The checklist underwent systematic revision via two rounds of a modified Delphi technique with ten experts in medical education and complex family planning from 4 institutions. The checklist wording and structure was tested during a pilot simulated encounter. A second panel of 15 experts established the minimum passing standard using the Mastery Angoff Method via a modified Delphi approach. Both the checklist revision and standard setting was completed via serial online surveys.

Results: The first group of experts developed the pregnancy disclosure and options counseling checklist that included 17 distinct actions. The actions are grouped into 5 categories: delivery of test results, response to the patient's reaction, counseling the patient, making a plan, and overall performance. The second group of experts set a minimum passing standard requiring 85% of checklist items (at least 15/17) be correctly completed to demonstrate competency.

Conclusions: We rigorously developed a mastery learning checklist using expert consensus for pregnancy disclosure and options counseling in the emergency department. Next steps include piloting the checklist with emergency physicians in standardized patient encounters and collecting validity evidence including interobserver reliability. As this checklist was developed for states without abortion restrictions, further adaptation may be required to make the checklist applicable to states with abortion restrictions. Ultimately, this checklist will serve as an assessment instrument for a curriculum designed to teach pregnancy disclosure and options counseling to emergency physicians.

**Mastery Learning Checklist for Pregnancy Disclosure and Options Counseling in the Emergency Department**

**Part 1: Pregnancy Disclosure and Response to Reaction**

Delivery of Test Results

1) Addressed privacy/support: Asked patient if they would like anyone to step away or be part of the conversation
2) Provided a warning shot (e.g. I have a result that may be unexpected…)
3) Delivered the pregnancy test neutrally (showed neither excitement nor disappointment) and unambiguously "results show that you are pregnant" OR "your test result indicates you are pregnant." If only the word "positive was used to convey the result, **check NO**.

Response to Patient's Reaction

4) Allowed silence for the patient to process their emotional reaction to the test result.
5) Delivered a statement that attends to the emotional reaction of the patient (acknowledge, validate, normalize, explore, or support)
6) Asked about readiness to talk about next steps

**Part 2: Confirmation of IUP at 6 Weeks and Options Counseling**

Counseling

7) Explained results of the ultrasound and reported gestational age
8) Explored initial plans with patient/determined whether the patient is open to discussing options
9) Discussed continuation of pregnancy as an option
10) Discussed abortion as an option
11) Discussed adoption as an option
12) Explored patient's initial thoughts about options

Making a Plan

13) Discussed gestational limits for abortion services (if the patient expresses interest in abortion)
14) Provided resources based on the patient's preferences (can say I will get you more resources about abortion, etc.)

Overall

15) Did not introduce personal opinions/views into the discussion
16) Did not use these terms/phrases: "baby," "giving up for adoption," "you don't want to be pregnant."
17) Used inclusive language (e.g. "pregnant people" or "those in this situation" instead of "women")

No, authors do not have interests to disclose

## 195 The Red Eye: A Diagnostic Tool to Assist the Emergency Physician

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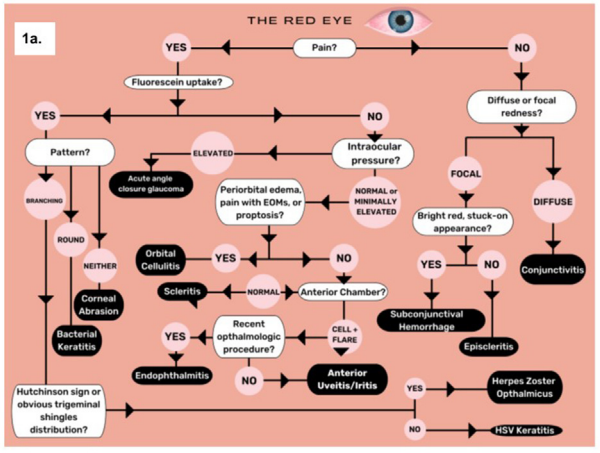
Objectives: Ophthalmologic eye complaints are common in the emergency department, representing approximately 2 million visits per year. Even so, emergency doctors report feeling ill-equipped to diagnose and work-up eye complaints. We propose a clinical tool for diagnosing the acute red eye based on history, fluorescein staining, ocular pressures, and slit lamp exam. This tool supports the assessment of the ocular vital signs, which include extraocular movements, visual acuity, and eye pressures. Common emergent and non-emergent diagnoses are covered in this diagnostic tool. This tool aids the ED physician in determining the need for emergent ophthalmology consultation versus outpatient management and provides a starting point for treatments.

Methods: Iterations of categorizations of eye complaints were conducted until a simple algorithm emerged. Consideration of common emergency-based physical exam and diagnostic maneuvers were considered. Of note, while visual loss is not included in this algorithm as it can be a component of many diagnoses of red eye syndromes, it is of utmost diagnostic importance and warrants further evaluation by an appropriate consultant. Additionally, this diagnostic tool is not meant to be exhaustive and covers the following diagnoses: herpes zoster ophthalmicus, HSV keratitis, bacterial keratitis, corneal abrasion, acute angle closure glaucoma, orbital cellulitis, scleritis, endophthalmitis, iritis/uveitis, conjunctivitis, episcleritis, and subconjunctival hemorrhage. The form is available via Google Forms at the following URL: *https://forms.gle/ezpEv15HyNsfgUD76*

Results: Currently, we present a google form that can be easily used while evaluating a patient with an acute red eye and determining possible treatments. This tool is presented as an algorithmic survey, with questions and branch points detailed in Figure 1. Further evaluation of the diagnostic utility, ease of use, and external validation is warranted. At this time, the tool can be utilized as a starting point for diagnosis and must not replace the ED physician's thorough eye examination, clinical gestalt, or discussion with consultants as needed.

Conclusions: We believe this tool will assist many physicians in discussions with ophthalmology colleagues and develop confidence in the assessment of the acute red eye. Additionally, the ease of development of this tool represents an opportunity for resident physicians or physicians in training to consider developing similar learning aids and diagnostic tools.

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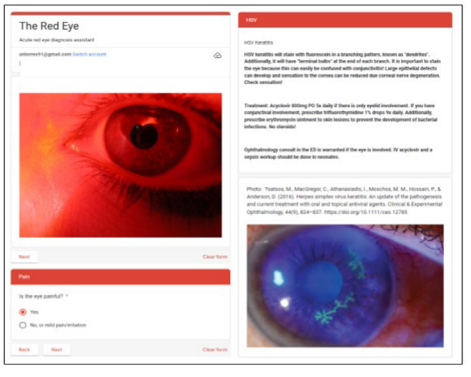


**Fig 1a.** The complete algorithm used for the "Red Eye" diagnosis tool. **Fig 1b.** An example of the types of questions asked, all with simple, dichotomous or trichotomous answer choices. Theresulting diagnosis includes a descriptive example of the pathology or a physical exam finding.

No, authors do not have interests to disclose

## 196 A Novel Simulation Model for EZ IO Emergency Craniostomy for Dural Drainage

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Objectives: First reported in 2018, the EZ IO intraosseous needle has been used to temporize an extradural hematoma by Emergency Physicians when neurosurgery is not

available locally and requires medical evacuation to a higher level of care. However, this delay may result in brain death in the setting of an expanding epidural or subdural hematoma is not expeditiously drained. There was a subsequent case report of a complete neurological recovery of a 17-year-old female. after an MVA associated epidural hematoma was temporized by EZ IO drainage in 2022. While there has been cadaver report on the technical aspects of this technique, there is no simulation training model or aid available on the market. In this study we designed, built and tested a simulation model for emergency craniotomy for dural drainage. Our specific aim was to test the learner perceived sense of confidence to perform the procedure, realism, effectiveness and overall satisfaction of the model.

Methods: This was an educational intervention study consisting of 25 subjects who were all emergency medicine residents in training. All subjects underwent a brief educational module filled by small groups hands on simulation training with the novel simulation model. Both temporal and parietal fluid collections were drained during this simulation (vid 1). At the conclusion of the session subjects were asked to evaluate their confidence, the models realism, and overall level of satisfaction. This model build used an older model lateral airway head that was repurposed for this project. The latex skin was removed from the underlying artificial skull. The full was split in half using a reciprocating saw (cast cutter). The empty model cranium was then packed with a ziplock bag full of artificial blood and large sponge inserted to simulate brain tissue and provide pressure. The full was then approximated with a rubber band and the latex skin reapplied (vid 2).

Results: 25 subjects completed the educational intervention with 100% post module survey participation. Prior to the intervention, 80% of subjects rated their confidence to perform this procedure as 1 or 2; whereas after 87% rated their confidence a 4 or 5. 80% rated the realism of the model as a 4 or 5. 93% of subjects felt the model accurately emulated the technical aspects of the procedure. 100% of the subjects rated their overall satisfaction with the model as a 4 or 5.

Conclusions: This model appears to be effective in emulating the technical aspects of performing an EZ IO intraosseous craniostomy for temporization of an extra dural hematoma with a high degree of learner satisfaction. While much more real world research is required before this procedure becomes widely disseminated, we believe this novel model to be a simple, cheap and effective simulation tool.

No, authors do not have interests to disclose

## 197 Residents Teaching Residents Resuscitation in a Pediatric Emergency Department: An In Situ Model

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Objectives: Psychological safety is mandatory for satisfactory learning. However, creating an environment that fosters confidence and exchange of ideas can be challenging. Often residents feel pressured and worried about their performance with faculty teaching. We used residents as facilitators to teach resuscitations in the emergency department (ED) to determine whether it creates a safe space and improves their psychological safety. In addition, we assessed the impact of residents' teaching on their performance during in-situ simulation sessions, how residents perceived teaching at a resident level compared to a faculty level, and how comfortable they were with resident teaching.

Methods: Setting: Pediatric ED of an inner-city hospital with an annual visit of 40,000 patients. Participants: pediatric and emergency medicine residents. Time frame: 4 months (December 2022 - March 2023). We conducted in situ simulations facilitated by senior residents lasting 30 - 45 minutes using the Emergency Medicine Resident Simulation Curriculum for Pediatrics (EM ReSCu Peds) simulation scenarios. We utilized four clinical scenarios (Status Asthmaticus, Anaphylaxis, Neonatal Delivery, and Foreign Body Aspiration). Participants were inquired about their comfort and performance post-simulation using a structured questionnaire on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). In addition, these learning sessions were recorded, and the study team assessed their performance with the faculty using a structured checklist.

Results: A total of thirty residents participated in the several simulation scenarios. Among the thirty residents, twenty-eight (93%) agreed and strongly agreed to be at ease and relaxed during the simulation. Twenty-four residents (80%) were satisfied with their patient management during the simulation without nervousness or difficulty communicating their medical opinions to other co-residents. Nineteen residents (63%) performed better and incorporated their knowledge during the academic session without fear of being wrong or judged. Seventeen residents (57%) would prefer not to have faculty present, while five residents (16%) disagreed with not having faculty present during the simulation.

Conclusions: Residents felt relaxed and more comfortable while performing in the simulation sessions facilitated by the senior residents. Therefore, knowledge-intensive work environments such as residency training programs should create and boost psychological safety by adopting senior residents; teaching "coresidents" resuscitations through clinical simulations to achieve excellent performance. However, this resident's teaching model requires further exploration and validation and whether lack of faculty involvement limits their educational experience.

No, authors do not have interests to disclose

## EMF 198 The Impact of Stress and Distraction on Bag Valve Mask Performance

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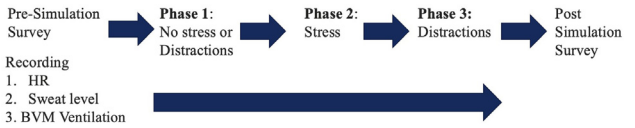
Objectives: Stress and distractions are intrinsic to the emergency department (ED). These factors can invoke a physiologic response, potentially impacting the performance of a lifesaving skill like bag valve mask (BVM) ventilations. The aim of this study is to use a simulation scenario to evaluate the effect of stress and distractions on emergency medicine (EM) residents' performance of BVM ventilations. Our hypothesis was that increased stress levels would result in increased ventilations, whereas increased distraction would result in disengagement to the task at hand thereby resulting in decreased ventilations.

Methods: Institutional review board approval was obtained to recruit four EM residents from an academic emergency medicine residency. All residents were familiar with the American Heart Association (AHA) standards for BVM ventilation or 10-12 ventilations per minute with each one delivered over 1 second. A Gaumard Trauma Hal manikin was used to record the number of ventilations delivered. A wrist worn wearable device (Empatica E4) was used to record the residents' physiological data (i.e., heart rate and sweat levels). The data collected was analyzed for trends and percent deviation from base line. These results were then compared to our hypotheses and the subject's survey responses regarding perceived stress and level of distraction. Prior to the scenario starting the residents were informed that they would be responsible for providing BVM ventilations to an unresponsive patient. The scenario (Figure 1) had three phases: (1) baseline phase (no stress or distractions); (2) stress phase (increased number of alerts/alarms); (3) distraction phase (multiple disruptions caused by confederates in the scenario). A post scenario survey was sent to the residents asking which phase they felt was most stressful and impacted their BVM performance the most.

Results: All 4 residents responded that phase 3 was the most stressful and impactful on their ability to perform BVM ventilations. The average number of ventilations provided during phase 1=12.1, phase 2=21.4, and phase 3=11.4 (Figure 2). Sweat recorded by the wearable progressively increased over the duration of the scenario from baseline through alerts/alarms, and distraction phases. >90% of heart rate values in alerts/alarm phases were 50% greater than the baseline heart rate recorded in the initial baseline state.

Conclusions: The sweat levels and heart rate increasing through the scenario indicate that the residents were experiencing significant physiologic stress. This increase in stress may have contributed to the observed performance decrements (i.e., deviations from AHA guidelines and expectations). These decrements presented in different ways depending on whether the residents were exposed to stress or distraction. Stress provided by alerts/alarms could have contributed to a heightened emotional state causing an increase in the ventilation rate delivered, whereas the confederates induced distraction leading to a lack of engagement resulting in a lower ventilation rate. Future research should identify which percentage deviation from physiological baselines indicate a provider may be at-risk for performance decrement and provide assistance or adaptive aiding to ensure peak performance during patient care.




Yes, authors have interests to disclose

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Grant Support

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## 199 Do Hospitals Get Emergency Medical Services Patient Care Reports?

Shanley J, Marcero J, Swor R/Corewell Health East - William Beaumont University Hospital, Royal Oak, Michigan, US

Objectives: EMS Patient Care Reports (PCRs) are an important component of the EMS system, patient care, and a foundational element of EMS quality improvement (QI). In many cases, PCR documentation provides handoffs between care providers, and may serve as the only objective context for patient presentation. This is especially evident when patients have altered mental status, are unreliable historians, or their caretakers are not immediately available for interview. Little data exists regarding the frequency and timeliness of PCR provision to emergency departments (ED). Our objective is to describe the frequency of missing PCRs following EMS transport and the timing of their receipt by EDs within a regional health care system.

Methods: We performed a retrospective study of EMS PCRs for patients transported to a single health system from 1/1/21 – 7/1/22. This healthcare system includes eight acute care hospitals in Southeast Michigan, which received 541,486 ED visits during that timeframe. EMS Agencies who transported <100 patients were excluded. PCRs are transmitted by fax to ED or e-fax to Non-EPIC® server and manually uploaded into the system's EMR. We stratified agencies by whether they provided primary 911 response or interfacility transport. PCR receipt and time of EPIC upload were obtained from EPIC Crystal Report® query. Our primary outcome was frequency of PCR receipt by EDs (in aggregate and by agency). Our secondary outcome was interval from EMS ED arrival to EMR upload. We dichotomized that interval as greater or less than 120 minutes of arrival. We provide descriptive statistics reporting proportion of receipt of PCR (mean, range) by hospital and agency.

Results: There were 106,496 patients transported by 62 agencies, with 87.3% being primarily 911 responding agencies. Overall, receipt of PCRs varied substantially by hospital – 54.2% (13.5% - 80.1%) (Table 1). Of those submitted, 30.7% (2.4% - 63.4%) were uploaded within 120 minutes of ED arrival. PCR submission rate also varied substantially by agency, 45.8% (2.5% - 96.8%). Interfacility EMS services were far less likely to submit a PCR after ED transport (35.9% vs. 56.9%).

Conclusions: Completed PCR's are frequently missing after EMS transport to ED's within this large hospital system, and infrequently available for review in a timely manner. Interfacility transport agencies are less likely to provide PCRs compared to 911 responders. Although hospital manual upload of PCRs may impact time of their receipt, this does not explain the overall rate of missing PCRs. Further work is needed to identify obstacles to PCR delivery and assure their availability for ED care of EMS patients.

Variation in PCR Receipt by Hospital

| Hospital | ED EMS Volume/year | % receipt PCR | % Scan< 120 min |
|---|---|---|---|
| 1 | >10,000 | 66.7% | 52.4% |
| 2 | 5000-10000 | 50.0% | 27.6% |
| 3 | >10,000 | 13.5% | 4.2% |
| 4 | 5000-10000 | 31.3% | 5.3% |
| 5 | >10,000 | 35.6% | 2.4% |
| 6 | 5000-10000 | 30.8% | 0.5% |
| 7 | >10,000 | 81.0% | 63.4% |
| 8 | >10,000 | 77.1% | 47.9% |

No, authors do not have interests to disclose

## 200 Access Granted: Investigating the Outcomes of Emergency Medical Services-Placed Peripheral Intravenous Catheters in Pre-Hospital Care

Shanley J, Mielke N, Swor R, Bahl A/Corewell Health East - William Beaumont University Hospital, Royal Oak, Michigan, US

Objectives: In the pre-hospital setting, EMS (emergency medical services) providers are responsible for the difficult task of obtaining peripheral intravenous catheter (PIVC) access while transporting patients to definitive care. Given the high complexity, high severity of illness, and the likelihood of hospital admission in this fragile population, establishing reliable and functional vascular access is critical to provide therapeutics in a timely manner. EMS-initiated access is often utilized for field treatment, emergency department (ED), and inpatient care. EMS personnel's insertion-related choices substantially impact patient outcomes and complications related to vascular access. Currently, there is limited evidence describing the outcomes of EMS-placed PIVCs. It is also unclear if EMS practices adhere to best practice recommendations for PIVC insertions. Our objective is to describe characteristics and outcomes associated with EMS-placed PIVCs. Additionally, we aim to compare current practices to best practice recommendations.

Methods: This study was a multicenter observational investigation conducted at four sites ranging from small/midsize community centers to a large academic tertiary care center evaluating outcomes associated with EMS-placed PIVCs. Data were retrieved from the electronic medical record and included using a standardized vascular access flowsheet started and completed by nursing in the ED or inpatient wards. We measured dwell time, the time from PIVC placement to completion of therapy or PIVC removal. Eligible subjects included adults presenting to the ED via EMS transport who had an EMS-placed PIVC. The primary endpoint was PIVC failure. Additionally, compliance with best practice insertion methods was explored.

Results: From 1/1/21 to 3/25/23, 21,170 patients had an EMS-placed PIVC. The median age was 69 (IQR 53, 81), with 51.2% being female. Most patients were admitted to the hospital (64.9%), with 43.3% of those admitted requiring ICU or step-down level care during their hospitalization. EMS-placed PIVCs failed before completion of therapy in 56.4% of admitted patients and 16.7% of ED patients. PIVCs placed in admitted patients had a median dwell time of 51.93 hours (IQR 27.53, 90.53). The most common causes of PIVC failure included leaking (47.1%), infiltration (38.3%), and occlusion (14.6%). Regarding insertion practices, EMS PIVCs were most commonly placed in the antecubital fossa (49.5%), followed by the forearm (20.8%). Insertions in the hand/wrist comprised 6.9% of placements. For device selection, 20-gauge catheters were the most commonly used in 63.5% of cases, with 18-gauge catheters in 24.5%.

Conclusions: This large-scale investigation overviews the landscape of EMS-inserted PIVCs. As the majority of PIVCs fail before completion of therapy, this represents a potential area of focus for pre-hospital care. Harmonizing current practice and patient's clinical needs with best practice standards, addressing anatomic site and catheter size, may reduce failure rates in this cohort. Further research on EMS PIVCs is needed to optimize the provision of this common but poorly understood component of EMS care.

Yes, authors have interests to disclose

Disclosure: B. Braun Medical, Becton-Dickinson, Teleflex, Adhezion, Medline Industries, 3M, Moderna, and Access Vascular.

Grant Support

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Disclosure: B. Braun Medical, Teleflex, Lineus Medical, and Interad Medical.

Consultant/Advisor

B. Braun Medical, Teleflex, Lineus Medical, and Interad Medical.

# 201 Difference of Dispatcher-Assisted Cardiopulmonary Resuscitation in Private Homes Versus Public Locations Among Patients Following Out-of-Hospital Cardiac Arrest

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Objective: Dispatcher-assisted cardiopulmonary resuscitation (DACPR) is an effective intervention for improving survival rates for out-of-hospital cardiac arrest (OHCA) patients. However, the execution of DACPR may be influenced by the locations of the cardiac arrest. This study aims to compare the implementation of DACPR in private homes and public places.

Methods: We conducted a retrospective cohort study using adult OHCA patients who underwent DACPR attempts in private homes or public places in Taichung City, Taiwan between January 1, 2021, and December 31, 2022. The exclusion criteria were cases that occurred in medical facilities, pediatric patients, bystander-initiated CPR, those of traumatic origin, etc. The records of DACPR indicators of enrolled OHCA patients were analyzed. The studied exposure was the location of OHCA in private homes versus public places. Variables such as age, sex, occurrence time, and calling method were collected for adjustment. The primary outcome was the proportion of chest compressions. Secondary outcomes were the proportion of OHCA recognition, call-to-chest compression time, call-to-OHCA recognition time, and reasons for failed DACPR.

Results: A total of 2715 OHCA patients were analyzed, with 2386 OHCA patients in private homes (57.8% male) and 329 in public places (79% male). The proportion of chest compressions was significantly higher in private homes compared to public places (65.3% vs. 36.7%, $p < 0.01$), with an adjusted odd ratio of 3.16 (95%CI: 2.38-4.22). Compared to patient in the public places, those in private homes had a higher proportion of OHCA recognition (71% vs. 44%, $p < 0.01$), shorter call-to- OHCA recognition time (66 vs. 98 sec, $p < 0.01$), shorter call-to-chest compression time (158 vs. 175 sec, $p = 0.049$), and longer duration of CPR instruction (73 v.s. 56 sec, $p < 0.01$).

The reasons for failed DACPR differed between private homes and public places. These included a higher proportion of patients under DNR status (25.6% vs. 4.5%, $p = 0.008$), a higher proportion of bystanders trained in CPR (9.8% vs. 4.7%, $p = 0.027$), a higher proportion of bystanders facing emotional/psychological obstacles (33.9% vs. 11.4%, $p = 0.048$), and a lower probability of the caller reporting the patient's consciousness or normal breathing (20.9% vs. 59.1%, $p = 0.002$).

Conclusions: Our study revealed differences in the implementation of DACPR between private homes and public places. DACPR was more successfully performed in private homes, although adequate emotional support to bystanders may further promote DACPR. For OHCA patients in public places, despite the higher chance of shockable rhythm and bystander defibrillation, efforts to facilitate successful DACPR have the potential to improve patient survival. The DACPR instruction protocol may be modified according to these findings for different locations.

Table 1.
The effectiveness of implementing DACPR in private home versus public place

| Variable | Private Home %(n)/median(IQR) N = 2386 | Public place %(n)/median(IQR) N = 329 | p-value |
|---|---|---|---|
| OHCA recognized | | | |
| Time to OHCA recognition (Sec.) | 69 (34-120) | 88 (50-154) | <0.01[a] |
| OHCA Recognized rate | 83% (1980) | 58.7% (193) | <0.01[b] |
| Chest Compression | | | |
| Duration of CPR instruction(Sec.) | 73 (44-114) | 56 (32-89) | <0.01[a] |
| Time to Chest Compressant(Sec.) | 158 (117-214) | 175 (126-237) | 0.049[a] |
| Chest Compression rate | 65.3% (1577) | 36.7% (121) | <0.01[b] |
| Compression' Recognized rate | 79.6% | 63.0% | <0.01[b] |
| Stop CPR | | | |
| Time to stop CPR(Sec.) | 536(432-663) | 546(418-718) | 0.750[a] |
| CPR persist time(Sec.) | 363(250-489) | 354(219-547) | 0.959[a] |

a: Mann-Whitney U test
b: Chi-square test

Table 2.
Reasons failed to instruct or start chest compression during DACPR.

| Variable | Private Home %(n)/median(IQR) N = 254 | Public place %(n)/median(IQR) N = 44 | p-value |
|---|---|---|---|
| Line factor | | | |
| Caller's line problem | 5.5%(14) | 4.5%(2) | 0.793[a] |
| Dispatcher's line problem | 2.0% (5) | 0% (0) | 0.704[a] |
| Off-site caller and failed transfer to on-site helper | 2.0% (5) | 0% (0) | 0.348[a] |
| Environment factor | | | |
| Environment or distance barrier | 10.6% (27) | 11.4% (5) | 0.885[a] |
| Caller and patient's factor | | | |
| Language barrier | 2.0% (5) | 0% (0) | 0.348[a] |
| Emotional or psychological obstacles | 33.9% (86) | 11.4% (5) | 0.049[a] |
| Patient's physical or environment factor | 8.7% (17) | 0.8% (3) | 0.970[a] |
| Caller's physical factor | 7.9% (20) | 2.3% (1) | 0.180[a] |
| Patient under DNR or abandoned first aid | 25.6% (65) | 4.5% (2) | 0.008[a] |
| Bystander trained in CPR | 9.8% (25) | 4.7% (12) | 0.027[a] |
| Instruction factor | | | |
| Ambulance arrives prior chest compression | 4.7% (12) | 0% (0) | 0.141[a] |
| Caller reports consciousness or breathing in patient | 20.9% (53) | 59.1% (26) | 0.002[a] |
| Dispatcher failed to identify abnormal breathing or consciousness in patient | 8.3% (21) | 20.5% (9) | 0.110[a] |

a: Chi-square test
* Multiple factors may contribute to failure to chest compression, and were coded accordingly

No, authors do not have interests to disclose

# 202 Feasibility of Transesophageal Echocardiography in Out-of-Hospital Cardiac Arrest: A Single Center Pilot Study

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Background: Out of hospital cardiac arrest (OHCA) is a devastating and unfortunately frequent pathology with undesirable outcomes in the majority of patients. Patient outcomes have been evaluated previously with respect to patient demographics (eg age, socioeconomic status, race, and comorbidities), intervention (eg medication, AED), modality of arrest (shockable vs non-shockable, traumatic vs atraumatic), and EMS management. Several studies have shown that the use of transthoracic echocardiography in cardiac arrest can improve the accuracy of diagnosis, identify reversible causes, and increase the likelihood of successful resuscitation. We aim to identify the feasibility and interpretation of transesophageal echocardiography (TEE) in OHCA performed by prehospital providers.

Objectives: Our primary objective is to describe the feasibility of point-of-care TEE in the prehospital setting. Secondarily, we plan to identify the accuracy of prehospital clinicians in evaluating prehospital TEE images.

Methods: After focused education, EMS physicians attempted 13 prehospital TEE scans in patients suffering OHCA from July 2022-May 2023. After aggregation and de-identification, scans were interpreted separately by EMS physicians and the department of Cardiology at a single institution using an online questionnaire with embedded still images and video clips.

Individual patient encounters were assessed by:

1. Identification the left ventricle on still image captured.
2. The presence of organized, disorganized, or no cardiac activity.
3. Assigning an image grading score based on the ACEP ultrasound image grading scale. After collection of image and video assessments, analysis was performed.

Results: Of the 13 patients in whom TEE was deployed, a total of 10 videos were successfully obtained (77%). In three patients where the TEE was attempted, challenges with the app interface prevented deployment of the TEE. Of the 10 patients in whom videos were successfully obtained, patients had a median age of 50 years old (IQR [41-70]) with a M:F ratio of 9:1. An inter-rater reliability was identified as Fleiss' kappa of 0.965 with respect to identification of cardiac structures, specifically the left ventricle among still images obtained from the TEE scans. Inter-rater reliability of the presence of organized, disorganized, or no cardiac activity was 0.65. Image quality of the videos was found to have an average score of 3.96, however Fleiss' kappa for inter-rater reliability among image grading was found to be 0.15.

Conclusions: Prehospital TEE is a feasible and practical modality in the management of OHCA and is similarly interpretable between EMS physicians and cardiologists. Further research is needed to determine its efficacy and application in the prehospital setting.

No, authors do not have interests to disclose

## 203 Longer Emergency Department Length of Stay Prior to Transfer Is Associated With Lower Mortality in Rural Sepsis Patients

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Objectives: Treatment of sepsis is time sensitive, and previous studies have shown that early intervention improves outcomes. One factor affecting the arc of care in rural sepsis patients is the time spent in the rural emergency department (ED) and the subsequent transport to definitive care. The objective of this study was to test the hypotheses that longer transport times during interhospital transfer are associated with worse clinical outcomes.

Methods: A cohort of 181 adult (age $\geq$ 18y) rural sepsis patients transferred between hospitals were identified in the TELEmedicine as a Virtual Intervention for Sepsis Care in Emergency Departments (TELEVISED) propensity-matched cohort study. Data were collected on the time spent between initial triage and disposition at the rural facility (ED length-of-stay), time from disposition to arrival at the final hospital (transport duration), and overall time from initial triage to arrival at the final hospital (total transfer time). Univariate regression (linear for hospital-free days; logistic for adherence and mortality) to measure the association between exposure and outcomes, with time exposures included as continuous variables, was completed. The primary outcome was 28-day hospital free days, and secondary outcomes were of Surviving Sepsis Campaign (SSC) bundle adherence and in-hospital mortality. Covariates screened were age, sex, ethnicity, race, Sequential Organ Failure Assessment (SOFA) score, and source of infection, but all were balanced across groups.

Results: There was no significant association between 28-day hospital free days and ED length-of-stay prior to transfer ($\beta$=-0.03 hospital-free-days per hour delay, 95% CI [-0.11] to 0.05), transport duration ($\beta$=0.02, 95% CI [-0.17] to 0.21), or total transfer time ($\beta$=-0.18, 95% CI [-0.09] to 0.05). There was also no association between complete SSC bundle adherence and ED length-of-stay prior to transfer (OR 1.13 per hour delay, 95% CI 0.74 to 1.71), transport duration (OR 0.89, 95% CI 0.43 to 1.93), or total transfer time (OR 1.06, 95% CI 0.79 to 1.52). In-hospital mortality was 0.5% lower for each 1-hour increase in rural ED length-of-stay (OR 0.74, 95% CI 0.58 to 0.94) and 0.4% lower for each 1-hour increase in total transfer time (OR 0.79, 95% CI 0.62 to 0.94). However, there was no association between in-hospital mortality and transport duration (OR 0.83, 95% CI 0.43 to 1.61).

Conclusions: Longer ED length-of-stay prior to transfer was associated with lower mortality in rural sepsis patients. At this point, it is not clear whether this finding was a result of increased pre-transfer interventions or whether patients with more urgent conditions were transferred earlier. Future work will seek to better understand how early ED-based interventions can improve sepsis outcomes in transferred patients.

No, authors do not have interests to disclose

## 204 Assessing the Management of Cardiac Arrest Patients in the Interfacility Transfer Setting

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Background: There is great variation in out-of-hospital cardiac arrest (OHCA) outcomes amongst different regions, as well as different emergency medical service (EMS) departments. In the state of Maine, the care delivered by different EMS departments varies, as there are many small community departments with limited resources. Moreover, due to the geographic nature of Maine, there are many rural hospitals that initiate treatment, with many interfacility transfers (IFT). However, all agencies fall under the Maine EMS governing body, and only have a basic requirement for OHCA. Yet, there is a non-standardized IFT orders that ED physicians give to EMS providers which may lead to wide variation in hemodynamic, temperature, and ventilation management during transport. Altogether, this suggests there is an opportunity to improve outcomes in OHCA patients by delivering a standardized curriculum to all EMS agencies, focused on IFT care of patients with OHCA that have achieved return of spontaneous circulation (ROSC).

Objective: The objective of this study is to assess physician orders during IFT for OHCA patients across the MaineHealth hospital system.

Methods: This was a retrospective study, with data collection from 1/1/2019 to 12/31/2021. Data were collected through MaineHealth's electronic medical record (EMR) via a query of Epic (Epic Systems Corp.; Verona, WI), as well as a data query of the state of Maine EMS database. These data sets were combined to gather both accurate hospital and pre hospital information. Only OHCA encounters requiring an IFT to a larger hospital for definitive post cardiac arrest care were included. Age, sex, emergency medical service (EMS) agency, post IFT vital signs, comorbidities, initial rhythm, initial temperature at receiving facility, TTM initiation prior to IFT and other descriptive variables were collected. Fisher's exact test, Welch two sample T-Tests, and odds ratios (OR) were used to analyze the variables.

Results: Out of 122 patient encounters that were matched from the Maine EMS data base to the MaineHealth's data base, 93 (76.2%) met inclusion criteria. There was no statistical difference in comorbidities and variation in vital signs or initial rhythm between EMS agencies. Of these encounters, 35.5% (33/93) had physician order forms identified and scanned into the EMR. None of the physician order forms that were identified contained vital sign parameters for the patients IFT. Amongst the different EMS agencies, there was a statistically significant difference between run sheets scanned into the EMR by LifeFlight of Maine compared to other EMS agencies (p-value = 0.001).

Conclusions: Only 35.5% of encounters had physician order forms present, and of these order forms, none had included vital sign parameters. Patients who have suffered an OHCA are in a vulnerable state, requiring intensive post ROSC care. This care involves vital sign parameters to avoid hyperthermia, hypotension, and hypoxia. LifeFlight of Maine did have a higher chance of recording the run sheet in the EMR, however these forms did not include vital sign parameters. We suspect the lack of standardized physician orders for the IFT of OHCA patients contributes to this disparity of vital sign parameters, and our future work involves implementing a plan to address this deficit.

No, authors do not have interests to disclose

## 205 Heart Rates of Patients Presenting to Hospital Triage in Rural Uganda: A Cross-Sectional Analysis

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Objectives: Vital signs are a key component of medical care in every setting. Multiple demographic, physiologic, and societal factors have been shown to contribute to significant differences between resting heart rates within populations. The goal of this study was to assess the heart rate of adult patients presenting to hospital triage in order to develop evidence-based protocols within this rural, East African hospital system. Our hypothesis was that patients in this Ugandan community would have a higher average heart rate when compared to standardized values derived from Western data.

Methods: This is a retrospective, cross-sectional analysis of 1,079 patients presenting to hospital triage during daytime hours. Patient heart rates were calculated using a 30-second six-lead EKG (Kardia Mobile). A statistical analysis using standard t-test and linear regression was then performed to determine the differences in heart rate based on patient demographics.

Results: For our total population, the average heart rate was 86 bpm ($\pm$16). Heart rates ranged from 38 bpm to 158 bpm, and 39% of patients had heart rates greater than 90 bpm. Females had a statistically significantly higher heart rate than males with an average rate of 88 bpm ($\pm$15) compared to 82 bpm ($\pm$16) ($p < 0.05$). There was no significant difference between the average heart rates of patients presenting for routine care, 87 bpm ($\pm$15), compared to patients presenting with a new concern, 85 bpm ($\pm$16).

Conclusions: Our study population in Masindi, Uganda had a notably higher average heart rate of 86 bpm when compared to the average heart rate of 71 bpm derived from the United States National Health Statistics Report. Currently, the accepted clinical reference range for normal heart rate is 60 – 100 bpm, and academic discussions using data derived from Western populations propose lowering this heart rate reference range to 50 – 90 bpm. However, our study population had substantially higher average heart rates than these accepted Western reference ranges and should be considered when creating protocols and clinical guidelines in rural, East African settings.

No, authors do not have interests to disclose

## 206 High Sensitivity Troponin Is Frequently Elevated After Carbon Monoxide Exposure

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Background: Cardiotoxicity from carbon monoxide (CO) exposure is well-described. For CO neurotoxicity, there are several standardized approaches for

assessment and recommendations for hyperbaric oxygen therapy (HBO). However, CO cardiotoxicity does not have similar standardized approaches for assessment or treatment. Indications for troponin measurement and prognostic value of troponin in the setting of CO exposure are not well-described nor uniform. This study seeks to evaluate the correlation of HS-cTn with carboxyhemoglobin (COHb) levels to determine if any patterns of elevated HS-cTn after CO exposure exists. Particularly we seek to determine if there is association or correlation of elevated HS-cTn with elevated carboxyhemoglobin (COHb) levels and secondarily evaluate for other clinical findings associated with elevated HS-cTn.

Methods: Cases of CO toxicity reported to our poison center in one winter period were reviewed. All cases of confirmed CO exposure with COHb>5% were included. Of these, all patients with measurement HS-cTn were included. Statistical analysis to assess association or correlation between COHb and Hs-cTn were: Pearson correlation, Spearman correlation, Kendall correlation, linear regression, and Chi-squared testing using categorical groups of COHb>25%.

Results: Of 55 patients with positive COHb levels, (range 4.8-54%, mean 25.28%), 17 had HS-cTn measured, and all had detectable concentrations (range 1.4-8806 ng/L, mean 1073.5 ng/L). Fourteen patients with elevated HS-cTn had ECGs available for review, and all were normal. Notably, only two patients had chest pain, and the other 15 had HS-cTn measurement without specific concern for cardiac injury. The highest risk patient was 68 years old with cardiac risk factors of CABG, CVA, and diabetes mellitis but his HS-cTn was negative. 70.5% (n=12/17) of all HS-cTn were elevated (range 12.45-8808.6 ng/dL, mean 1519.13 ng/dL). Pearson correlation (-.284, p=.269), Spearman correlation (-.272, p=.29), Kendall correlation (tau= -.176, p=.343) linear regression (p=.269), and Chi-squared analysis using categorical grouping of COHb>25% found no clear link between higher COHb and higher HS-cTn.

Conclusions: HS-cTn is frequently elevated after CO exposure. In this series, 31% (n=17/55) of patients had HS-cTn measured after CO exposure, and 70% (n=12/17) were elevated. Of those positive, 8.3% (n=1/12) had syncope and 8.3% (n=1/12) had chest pain. Screening HS-cTn- measurement without chest pain or other indications for troponin measurement was positive in 67% (n=10/15). Cardiac injury is an understandable and predictable result of CO toxicity. In this series, routine screening of HS-cTn was frequently positive in patients with no specific cardiac symptoms. Of patients with chest pain, one had elevated HS-cTn and one did not.

Statistical analysis by multiple methods failed to find correlation between elevated HS-cTn with elevated COHb. This study demonstrates that HS-cTn is frequently elevated in patients with CO exposure, but finds no association between higher HS-cTn and higher COHb levels. Investigation is warranted to better understand the relevance, value, and utility of screening HS-cTn measurement in patients with CO exposure. Based on this preliminary data, we advise against routine measurement of HS-cTn in the absence of specific risk for cardiac injury, including ECG changes, history of cardiac disease, or chest pain.

No, authors do not have interests to disclose

## 207 Evaluation of EHR-Integrated Clinical Pathway Implementation of High Sensitivity Troponin Upon Emergency Department Disposition Rates

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Background and Objectives: High-sensitivity troponin (hsTnT) assays are increasingly being adopted in the ED setting, but little is understood about the impact on downstream testing and hospitalization. Our objective was to examine the effects of a concurrent transition to a hsTnT assay, and adoption of an EHR-integrated clinical pathway, on ED patient outcomes and utilization of testing.

Methods: We conducted a pre-post observational study of 7 EDs in a large northeast health system that transitioned from 4$^{th}$-generation troponin to hsTnT. In addition, there was a concurrent adoption of an associated EHR-integrated clinical pathway (together referred to as "the intervention"). We collected data from 6 months prior and 12 months following the transition, with a 1-week washout period. Adult patients were included if they had a chief complaint suggestive of ACS. Primary outcomes included odds of troponin testing, ED discharge disposition, and chest pain observation disposition. We also examined changes in rates of subsequent cardiac testing (echocardiograms, stress tests, cardiac catheterization, and cardiology consults) among patients who had troponin testing. Logistic regression was performed adjusting for age, gender, language, Charleson comorbidity index, and baseline trend.

Results: 189,677 total ED visits were included with 68,301 (36.0%) in the post-intervention period. The intervention was associated with lower odds of troponin testing (OR 0.78; 95% CI 0.76 to 0.82) and lower odds of being placed in chest pain observation (OR 0.81; 95% CI 0.66 to 0.99), with no difference in odds of discharge from the ED (OR 1.00; 95% CI 0.96 to 1.05).

Use of the EHR-based clinical pathway during an encounter was associated with lower rates of ED discharge (OR 0.83; 95% CI 0.79 to 0.88) and higher odds of chest pain observation (OR 6.45; 95% CI 5.51 to 7.53). The intervention was associated with increased odds of downstream echocardiograms (OR 1.22; 95% CI 1.13 to 1.32), cardiology consults (OR 1.07; 95% CI 1.00 to 1.15), and cardiac catheterization (OR 1.36; 95% CI 1.19 to 1.55), with no difference in rates of stress testing (OR 1.13; 95% CI 1.31 to 1.23). The yield of troponin testing increased post-implementation with increased diagnosis of acute myocardial infarction (OR 1.16 95% CI 1.00, 1.36).

Conclusions: While the transition to hsTnT did not result in more ED discharges, it was associated with decreased troponin testing, and increased downstream testing, while capturing more acute myocardial infarctions. Health systems transitioning to hsTnT should be cognizant of operational pressures this testing while capturing more acute pathology. Future work should examine the association between hsTnT testing and healthcare costs, morbidity, and mortality.

No, authors do not have interests to disclose

## 208 Diagnostic Performance of Cardiac Stress Testing Following Exclusion of Acute Myocardial Infarction With a 0/1-Hour, High-Sensitivity Cardiac Troponin Protocol

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Background: Rapid exclusion of acute myocardial infarction (AMI) is critical for patients presenting to emergency departments (EDs) with chest pain or other anginal equivalents. High-sensitivity cardiac troponin (hs-cTn) protocols have been widely adopted in the United States for this purpose. These protocols allow for early identification and exclusion of patients with AMI using a 0 and 1-hour hs-cTn measurement. However, little is known about the use of cardiac stress testing in patients who ruled-out for AMI within 1 hour with very low hs-cTn values. This study analyzed the diagnostic performance of cardiac stress tests in this population.

Methods: We performed a secondary analysis of the RACE-IT trial, a stepped-wedge cluster randomized trial performed across 9 EDs in a large metropolitan health system from July 2020 through March 2021. The eligibility criteria for the trial mirrored the real-world use of hs-cTn testing, including both patients complaining of chest pain and/or other anginal equivalents. All adults with a hs-cTnI and electrocardiogram (ECG) completed in the ED were enrolled, while patients with ST- segment elevation AMI, trauma, or pregnancy were excluded. In the interventional arm of the trial, AMI was excluded if hs-cTnI was <4 ng/L at presentation or =4 ng/L at presentation with a 1-hour value < 8 ng/L. The trial followed all patients through 30 days to assess for AMI or death and captured all cardiac testing. We compared stress testing results to invasive coronary imaging with or without revascularization.

Results: 10,444 study patients (43.61%) ruled out for AMI in the ED within 1 hour and were included in this analysis. There were 320 (3.0%) patients who had a stress test within 30 days, with few ischemic findings (25, 0.24%) or revascularization procedures (5, 0.05%). The positive predictive value of stress testing in this population to identify the need for revascularization was 10.1% (95% CI 2.8% - 29.4%). Table 1 displays the proportion of ischemic stress tests and overall test performance in this population. The rate of 30-day death or AMI was low (17, 0.20%) among those discharged from the ED or placed in observation (n=8,553).

Conclusions: Our study highlights the infrequent use and low diagnostic yield of stress testing in patients who have been ruled out for AMI within 1 hour using an accelerated hs-cTn protocol in the ED.

**Table 1.** Stress Testing Results for 10,444 Patients Who Ruled Out for Myocardial Infarction (MI) Within 1-Hour and Overall Test Performance for Revascularization

| Type of Stress Test | Ischemic Findings | Frequency (%) |
|---|---|---|
| Exercise | No | 8 (0.08%) |
| | Yes | 1 (0.01%) |
| Echocardiography | No | 76 (0.73%) |
| | Yes | 1 (0.01%) |
| Nuclear | No | 211 (2.02%) |
| | Yes | 23 (0.22%) |
| **Test Characteristics for Overall Stress Testing (95% CI)** | | |
| Sensitivity – 60.0% (17.0 – 92.7%) | | |
| Specificity – 92.2% (88.5 – 94.7%) | | |
| Positive Predictive Value – 10.7% (2.8 – 29.4%) | | |
| Negative Predictive Value – 99.3% (97.3 – 99.9%) | | |

Yes, authors have interests to disclose
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EMF

## 209 Uninsured Patients Diagnosed With ST-Elevation Myocardial Infarction Present to Lower Volume and Lower Quality Percutaneous Coronary Intervention Facilities

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Objectives: Nearly 250,000 patients with ST-Elevation Myocardial Infarctions (STEMI) present to US EDs annually. Percutaneous coronary intervention (PCI) is the preferred reperfusion strategy, and timely PCI is essential to reduce morbidity and mortality. Patients without insurance have up to 60% higher odds of interfacility transfer for STEMI. However, it is unknown where uninsured patients initially seek care and whether they are more likely to present to facilities without PCI necessitating transfer. We sought to examine whether insurance status was associated with the types of facilities patients presented to, specifically PCI capabilities and secondarily quality of care for acute myocardial infarction (AMI).

Methods: We conducted a retrospective cohort study using the California Department of Healthcare Access and Information (HCAI) database. We identified adult patients with STEMI initially presenting to EDs by diagnostic code (International Classification of Diseases version 9 or 10) from 2010-2019. We used multivariable logistic regression to examine whether insurance status was associated with presentation to facilities with PCI capabilities (defined as ≥36 PCIs annually). Facility volume was grouped into low (<36), medium (36-60), or high (>60). Next, we used facility quality measures from HCAI including quartile of rankings for both risk-adjusted AMI facility mortality and PCI performance risk-adjusted mortality to examine the quality of care provided by facilities. Patient, facility, and situational factors were included as covariates.

Results: There were 135,358 eligible patients included who presented to US EDs with STEMI. Uninsured patients were less likely to present to facilities with PCI capabilities (adjusted odds ratio [aOR]= 0.64, 95%CI 0.60-0.67). Sensitivity analysis showed that uninsured patients were more likely to present to low PCI volume facilities (aOR=1.57, 95%CI 1.48-1.67), and less likely to present to medium (aOR= 0.81, 95%CI 0.76-0.86) or high (aOR=0.75, 95%CI 0.70-0.80) PCI volume facilities.

Uninsured patients were less likely to present to the highest quality facilities (i.e. lowest risk-adjusted mortality) for facility AMI mortality (aOR 0.51, 95%CI 0.42-0.62) and PCI risk-adjusted mortality (aOR 0.64, 95%CI 0.56-0.73). Uninsured patients had higher odds of presenting to the lowest quality facilities for PCI (aOR= 1.06, 95%CI 0.85-1.32) but lower odds of presenting to the lowest quality facilities for AMI (aOR= 0.65, 95%CI 0.58-0.74).

Conclusions: Uninsured patients with STEMI had significantly higher odds of presenting to facilities without PCI capabilities. When uninsured patients did present to facilities with PCI capabilities, these facilities were of lower quality suggesting potential disparities in accessing high-quality, time-sensitive treatment for uninsured individuals with STEMI. Future research should examine the generalizability to states without the robust regionalization of STEMI care that California has and why these disparities exist.

No, authors do not have interests to disclose

## 210 Electronic Health Record-Integrated Clinical Pathway and Transition to High Sensitivity Troponin to Promote Standardization of Attending Physician Chest Pain Care

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Background and Objectives: Standardization of physician practice can improve care quality and safety but is often challenging for healthcare leaders to implement. In November 2021, seven professional organizations released a joint clinical practice guideline for chest pain evaluation and advocated for the use of high-sensitivity troponin (hsTnT) and clinical pathways. We aimed to determine if physician practice around chest pain changed.

Methods: In February 2022, we transitioned from a fourth-generation troponin assay to a hsTnT assay with computer-automated reflex testing and introduced an associated EHR-integrated standardized clinical pathway (together referred to as "the intervention" at 7 EDs in a large northeast health system). The EHR-integrated pathway was developed as a collaboration between Emergency Medicine and Cardiovascular Medicine. We conducted a 6-month pre- and 12-month post-intervention retrospective analysis of the effect of the intervention ED physician practice variation. Patients were included for analysis if they were aged 18 or older and had ED chief complaints potentially suggestive of an acute coronary syndrome (ACS). ED attending physicians were included if they cared for at least 50 patients meeting inclusion criteria. Primary outcomes included odds of troponin testing, ED discharge disposition, and chest pain observation disposition. Physicians were grouped in low, average and high category for each metric based on one standard deviation from the mean. Secondary outcomes included rates of delayed ACS diagnosis, defined as the proportion of patients with a troponin sent who were discharged from the ED and received a diagnosis of ACS in the following 30 days. Groups were compared using linear regression adjusting for years since medical school graduation; MI rates were compared by chi-square statistic.

Results: A total of 189,677 ED visits were included [68,301 (36.0%) in the post-intervention period] and 147 (69.7%) EM attending physicians were included for analysis. Physicians with relatively high pre-intervention discharge rates decreased their discharge rate by 1.3% ($p<0.0001$; 95% CI -1.4% to -1.1%) relative to their peers. Physicians with relatively low pre-intervention discharge rates increased their discharge rates by 4.0% ($p<0.0001$; 95% CI 3.9% to 4.2%) relative to their peers. Physicians with relatively high pre-intervention chest pain observation rates decreased their observation rate by 5.6% ($p<0.0001$; 95% CI -5.7% to -5.6%) relative to their peers. Physicians with relatively low pre-intervention chest pain observation rates increased their observation rates by 1.4% ($p<0.0001$; 95% CI 1.3% to 1.4%) relative to their peers. There was no significant change in the rate of delayed ACS diagnosis.

Conclusions: After introduction of a hsTnT assay and an associated care pathway in accordance with joint society guidelines, physician variation regarding ED disposition of patients receiving troponin testing decreased, with pre-intervention

outliers approaching the department mean in the post-intervention period. Clinical pathways have a role in implementing new processes and standardization of care. Future work should examine the association between reduced physician practice variation and patient outcomes and resource utilization.

No, authors do not have interests to disclose

## 211 Gender Differences in Empiric Treatment in US Emergency Departments for Chlamydia and Gonorrhea: A Systematic Review and Meta-analysis

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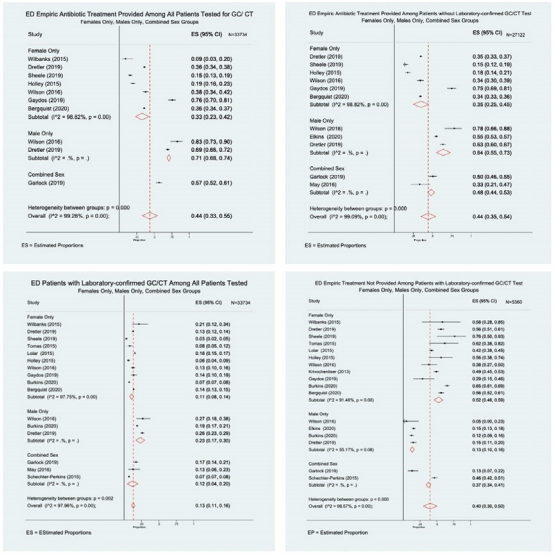
Objective: In US emergency departments (EDs), antibiotic treatment for gonorrhea (GC) and chlamydia (CT) typically is empiric because test results usually are not available during the ED visit. Because males more often than females have and report symptoms from and show signs of an infection from GC or CT, females might be less likely than males to receive GC and CT empiric antibiotic treatment in the ED. In this investigation, we investigated gender differences in ED empiric antibiotic treatment of GC and CT as compared to subsequent laboratory-confirmed test results for these infections.

Methods: We conducted a systematic review and meta-analysis of US ED studies that reported GC and CT testing and empiric antibiotic treatment. We searched seven databases (Medline, Cochrane, Embrace, Scopus, Web of Science, CINAHL, and PsychInfo) for relevant studies from 1/2010 to 2/2021. Study selection, quality assessment, and data extraction were performed by two reviewers, and disagreement was resolved by a third. JBI Research Institute critical appraisal tools were used to assess study quality. The principal data point extracted was empiric testing proportions by gender according to laboratory-confirmed test results. For studies did not provide gender-specific results, data were classified in a "combined sex" category. We conducted a random-effects meta-analysis to calculate pooled estimates of GC/CT empiric treatment. The study was pre-registered (Prospero #241429), followed PRISMA reporting guidelines, and used STATA 16.0 for meta-analytic calculations.

Results: Of 1644 deduplicated articles considered, 16 met inclusion criteria, and represented 33,734 ED patients, primarily from the Midwestern US. Across these 16 studies, GC/CT test positivity was 13% (95%CI, 11%-16%); 11% (95% CI, 8%-14%) for females, and 23% (95%CI, 17%-30%) for males. GC/CT ED empiric antibiotic treatment among those tested was 44% (95%CI, 33%-55%); 33% (95%CI, 23%-42%) for females, 71% (95%CI, 68%-74%) for males. Among those without a laboratory-confirmed GC/CT infection, ED empiric treatment was 44% (95%CI, 33%-54%); 35% (95%CI, 25%-45%) for females, 64% (95%CI, 55%-73%) for males. Among those with a laboratory-confirmed GC/CT infection, no empiric antibiotic treatment was provided for 40% (95%CI, 30%-50%); 52% (95%CI, 46%-59%) for females, 13% (95%CI, 10%-16%) for males.

Conclusion: ED empiric antibiotic treatment for GC/CT is often discrepant with final laboratory test results. Females were two-fold less likely than males to receive ED empiric antibiotic treatment. Among those with a laboratory-confirmed infection, females were four-fold more likely than males to have not been provided ED empiric antibiotics. These results indicate gender disparities in GC/CT ED empiric antibiotic treatment and the critical need for accurate rapid GC/CT point-of-care testing.

Antibiotic Treatment Rates and Prevalence of Gonorrhea/ Chlamydia in Emergency Departments from 2010-2021, displayed by laboratory-confirmation status and gender




No, authors do not have interests to disclose

## 212 Emergency Department Opt-out HIV Screening Programs Influence Overall System-wide HIV Screening Increases Within a Southern Community Health System

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Objectives: The new epicenter of the United States HIV epidemic is the South. In 2019, a large Southern Community Health System instituted an HIV Opt-out screening program within two of seven emergency departments (EDs) within the system. Multiple published studies tout the success of ED-based HIV screening programs but primarily focus on large academic centers in the Northeast, and West. None have reported on any system-wide changes in overall HIV screening that accompany the ED-based screening program implementation. The objective of this project is to report on system-wide increased HIV screening that coincided with the institution of two ED-based Opt-out HIV screening programs. We include three years of data from 2019 the year of implementation of these programs through 2022 and describe increases and percentages of screening from the ED, outpatient, and inpatient settings.

Methods: This IRB-approved retrospective cohort study reports on overall HIV screening from Jan. 1, 2019, through Dec. 31, 2022, within a large southern community health system, including seven hospitals covering the Upstate region of South Carolina. This project was supported by both SC Department of Health and Environmental Control and the Frontline of Communities in the U.S. program (Gilead Sciences). All HIV screening was performed using a fourth-generation Ab/Ag serum test (Abbott) with reflex RNA confirmation (Quest Labs). This program, utilizing several full-time linkage-to-care coordinators, receives system-wide HIV screening results to support timely follow-up. The overall number of HIV screens were subdivided across the screening site (eg, ED, Outpatient (not including the ED), and Inpatient). All de-identified results were collected from our EHR (Epic).

Results: Over three years, overall HIV screening within the entire health system increased from 521, to 19856, then 27509, and 36097, respectively. ED-based screening increased from 476, to 8063, to 9778, and 6540 respectively. Outpatient screening increased from just 24, to 8159, to 13327, and 16615 respectively. Inpatient screening increased from 21, to 3634, to 4404, and 3201 respectively. Overall, system-wide HIV screening increased 97% from 2019-2020 and another ~23% increase year after year thereafter. ED-based HIV screening comprised 91% of total HIV screening in 2019 but decreased to only 18% of the total in 2022. Conversely, outpatient screening increased from only 4.6% of total HIV screening in 2019 to 63% in 2022.

Conclusions: This report highlights the rapid and substantial increases in HIV screening across the entire health system after the implementation of ED-based opt-out screening programs. Generalized Opt-out HIV screening, following CDC guidelines, was instituted for all adult (>18 yrs) ED patients within only two of seven EDs. Despite this, there was a substantial coincidental increase in system-wide HIV screening. This may be due to several factors including 1) diaspora of education (eg, email updates and lectures at resident conferences) for EM providers including (30) EM resident physicians and rotating resident physicians from Internal medicine, Family medicine, Psychiatry, and Orthopedic surgery and all rotating medical students on this program and 2) the linkage to care facilitated by our coordinators. This data highlights how ED-based programs and a small number (3) of linkage coordinators can influence overall HIV screening within a large community health system.

No, authors do not have interests to disclose

## 213 Trichomonas Vaginalis Infection in Male Emergency Department Patients

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Objectives: *Trichomonas Vaginalis* (TV) is one of the most common sexually transmitted infections (STI) in the world. Although male patients may be asymptomatic, TV infection also causes urethral discharge and dysuria similar to other STIs such as *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (GC).

Although TV infection is fairly widespread, prevalence data is very limited. There is therefore a significant public health issue for both men and women alike. Data in women has been well documented, however male infection rates are largely unknown, especially in the emergency department (ED) setting and STI clinic rates vary widely from 6.6% to 21% in male patients. Rates of TV infection in male ED patients has been investigated previously by Territo et al., however data was collected more than 10 years ago and is specific to Western New York.

While emergency physicians commonly treat CT and GC prophylactically for patients presenting with symptoms concerning for STIs, TV treatment is not commonly prescribed. We seek to determine the rates of Trichomonas infection among patients presenting to various EDs, and compare the incidence of infection in different socioeconomic communities.

Methods: We performed a retrospective chart analysis of ED patients who were tested for TV, CT, and GC during their routine care. Patients in six EDs throughout the Las Vegas metropolitan area in Nevada were included who presented during the one-year period preceding March, 2023.

Hospitals were compared based on socioeconomic factors using their zip code with results from the U.S. Census Bureau.

Results: Three hundred forty-six patients met the inclusion criteria consisting of exactly 173 (50%) males and 173 (50%) females. 5.8% of males and 15.0% of females tested positive for TV, however there existed a large discordance between hospitals in low and high poverty areas. Patients presenting to hospitals in areas of lower socioeconomic status (>20% persons below the poverty line) had rates of TV, CT and GC of 8.2%, 22.4%, and 27.1% in males and 21.2%, 8.2%, and 8.2% in females, respectively. Areas of higher socioeconomic status (<15% persons below the poverty line) had rates of TV, CT and GC of 3.4%, 8.0%, and 10.2% in males and 9.1%, 8.0%, and 3.4% in females, respectively.

Conclusions: Trichomoniasis is a common STI in the ED. Infection rates, especially in male patients, have been insufficiently researched and shown to be a significant etiology for ED presentation. TV is the most common STI in women presenting to all EDs but also a significant source of discomfort and suffering in male patients. As many patients presenting to the ED for STI treatment may not follow-up elsewhere, this encounter may be the best option to treat TV. Although local infection rates will likely vary, prophylactic treatment for Trichomoniasis appears to be an appropriate treatment option for female as well as male patients in the ED, especially in areas of lower socioeconomic status.

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| Socioeconomic Status | TV | CT | GC | TV | CT | GC |
| Low | 8.2% | 22.4% | 27.1% | 21.2% | 8.2% | 8.2% |
| High | 3.4% | 8.0% | 10.2% | 9.1% | 8.0% | 3.4% |
| Total | 5.8% | 15.0% | 18.5% | 15.0% | 8.1% | 5.8% |

No, authors do not have interests to disclose

## 214 Effect of an Emergency Department Waiting Room Outreach Intervention on Rates of COVID Vaccination

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Objective: The SARS-CoV-2 (COVID-19) pandemic created a public health crisis, leading to over 1 million deaths in the United States. Vaccinations against COVID-19 are effective in preventing severe disease and associated complications. The Emergency Department (ED) is a primary source of medical care for many patients, especially vulnerable populations such as low socioeconomic status, racial/ethnic minorities, or those experiencing homelessness. It is known that many patients view healthcare providers as trusted sources of information about COVID vaccines and that patients would accept COVID vaccination as part of their ED care. Prior studies with influenza, hepatitis A and other diseases have shown that EDs can effectively implement vaccination programs without affecting efficiency. In our ED, we began offering COVID vaccines in June 2021. In addition to nurse-led triage, we implemented an outreach initiative for patients in the ED waiting room. The purpose of this study was to determine if waiting room outreach by trained personnel affected patient willingness to be vaccinated and rates of subsequent vaccination in the ED.

Methods: We conducted a retrospective analysis of a COVID vaccination outreach initiative at our single large urban ED during the Delta variant surge in summer 2021. The vaccination initiative consisted of undergraduate research assistants who screened patients in the ED waiting room for vaccine eligibility and discussed patient questions and concerns about vaccination. Patients interviewed by research assistants were compared to the rest of the ED waiting room population during the time period of one month before to one month after the outreach program.

Results: There were 19,559 ED visits during the study period. Most patients (60.5%) identified as Hispanic and most patients were primarily English speaking (58.9%), with Spanish being the second most common language (35.2%). 4.3% of patients stated that they were homeless. Nurses screened 60% of patients for COVID vaccine eligibility.

During the study period, 1242 patients were screened by research assistants with 1234 responses. Of these, 1168 (94.7%) were matched to ED records and 46.5% of these patients were screened by both a nurse and research assistant. Of those screened by a research assistant, 22% were found to be eligible for a covid vaccine. One third (33.7%) of eligible patients screened by research assistants agreed to be vaccinated in the ED during that visit, with 62.8% of these patients subsequently being vaccinated.

Being screened by an ED nurse at triage increased the odds of getting vaccinated by 2.23 (95% CI: 1.81 – 2.75) and being interviewed by an outreach research assistant increased the odds by 1.91 (95% CI: 1.50 – 2.45). Additionally, patients who were homeless were nearly two times more likely to agree to vaccination. Race/ethnicity and primary language were not significantly associated with differences in vaccination willingness.

Conclusions: Screening and outreach to patients in an ED waiting room doubled the odds of these patients receiving COVID vaccination in the ED. Additionally, patients experiencing homelessness were more likely to accept vaccination in the ED. This study suggests that ED waiting room outreach is effective for increasing vaccination willingness and may inform future ED vaccine implementation efforts.

No, authors do not have interests to disclose

## 215 Reasons for Delay in Primary COVID-19 Vaccine Series in Underserved Emergency Department Patients

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Objectives: COVID-19 vaccine refusal and delay in vaccine uptake significantly impacted the rollout of COVID-19 vaccines in the United States. Low uptake disproportionately underserved populations, including racial minorities and individuals of low socioeconomic status. Individuals in these demographic groups often lack access to primary care services and receive medical care primarily through the emergency department (ED). Previous studies have shown that intention to delay vaccination is both more common and more likely to be modifiable than vaccine refusal, with the majority of those who intended to delay vaccination ultimately receiving their primary COVID-19 vaccine series. We sought to determine specific reasons for primary vaccine series delay in ED populations, and

factors that ultimately influenced those who had delayed vaccination to become vaccinated.

Methods: Using a convenience survey sampling method, we enrolled alert, non-critically ill patients at five safety-net hospital EDs in four cities who had received at least one COVID-19 vaccine. We assessed the timing of primary vaccine series to determine the prevalence of vaccine delay in this population, as well as reasons for vaccine delay and factors that ultimately convinced individuals to become vaccinated. To assess differences in likelihood of vaccine delay among demographic groups, we calculated odds ratios with 95% confidence intervals (CIs).

Results: Of 401 participants, 186 (45.3%) were women, 221 (56.2%) were non-White, 81 (19.7%) lacked primary care, 58 (14.1%) primarily spoke Spanish, and 5 (1.2%) were uninsured. Approximately a third, 124 (30.9%; 95% confidence interval 26.6-35.6%), reported that they had delayed receiving their primary COVID-19 vaccine series by >1 month. Those who had delayed vaccination were more likely to be non-white ($x2=11.9$, $df=4$, $p<.05$), and more likely to identify as Republicans ($x2=13.5$, $df=4$, $p<.05$). The most common reasons for vaccine delay were concerns about side effects and safety of the vaccine, and feeling more information was needed about the vaccine. Among those who were ultimately vaccinated for COVID-19, the most common factors that influenced their decision were being mandated to do so for work (15%), being persuaded by a family member or friend (13%), and learning more about the vaccine (12%).

Conclusions: Among this medically vulnerable population, a significant proportion chose to delay COVID-19 vaccination, with concerns about side effects and lack of information being the most cited reasons for delay. Vaccine mandates, social pressure, and access to more information being the most cited reasons for ultimately accepting vaccination. Efforts to increase vaccination should focus on strategies targeting social and community networks to address the factors most likely to influence the decision to vaccinate.

No, authors do not have interests to disclose

## 216 Alteration of Informed Consent in the Emergency Department Has a Significant Impact on Ability to Effectively Evaluate Novel Diagnostics for Severe Infection

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Objectives: There are significant barriers to obtaining informed consent (IC) in research for acutely-ill patients at risk for bacteremia upon arrival in the emergency department (ED). This leads to 1) inability to enroll (or delayed enrollment) due to acuity, and 2) enrollment of cohorts less representative of the true target population. We compared metrics of enrollment effectiveness and cohort characteristics between patients enrolled under two methods of informed consent: Alteration of IC vs Standard IC.

Methods: We conducted a prospective observation blood sample acquisition study in 3 academic EDs, enrolling adult patients at risk for bacteremia (planned clinical blood culture and clinical provider considering treatment with intravenous antibiotics), part of an ongoing investigation sponsored by Day Zero Diagnostics. During phase 1 (18 months), we utilized Standard IC of patients or legally authorized representatives (LARs); during phase 2 (6 months), we utilized an Alteration of IC in accordance with 45 Code of Federal Regulations Part 46, allowing the research sample to be drawn prior to consent, and concordant with the initial clinical draw; informed consent was obtained within 24 hours. We compared metrics of enrollment success and clinical attributes between cohorts using basic comparative statistics.

Results: We approached 501 and consented 353 patients during the 24-month study period. Consent rate increased from 53.5% (159 of 297) to 95.1% (194 of 204) with Alteration of IC (see Table). Only 6 patients in the latter cohort declined participation after sample draw, and for 4 a LAR could not be contacted for consent. Median weekly enrollment rate per site increased from 1.0 to 3.7. Inability to obtain sample in the Standard IC cohort was primarily due to difficulty with research-specific blood draw. Median time from triage to research draw decreased from 125 to 40 min; most importantly, sample concordance with initial clinical draw increased from 37.1% to 100%. Differences in cohort characteristics included older age and increases in non-white participants, altered mental status, vasopressor initiation in ED, and number of distinct pathogens isolated.

Conclusions: Implementation of Alteration of Informed Consent increased enrollment rates in patients at risk for bacteremia, enabled 100% acquisition of research samples concurrent with clinical diagnostics, and enriched for a diverse and ill population. Alteration of Informed Consent is an important mechanism to enable efficient development and validation of novel diagnostics for severe infections.

| ENROLLMENT | Standard Informed Consent (18 months) | Alteration of Informed Consent (6 months) | p-value |
|---|---|---|---|
| **Approached**, n | 297 | 204 | |
| **Consented**, n (%) | 159 (53.5%) | 194 (95.1%) | <0.001 |
| **Median weekly enrollment rate** | 1.0 | 3.7 | <0.001 |
| **Research sample obtained**, n (%) | 140 (88.1%) | 204 (100%) | <0.001 |
| **Collection time**, median (IQR), min | 125 (82.5-215.0) | 40 (20.0-80.0) | <0.001 |
| **Concordant sample**, n (%) | 52 (37.1%) | 204 (100%) | <0.001 |
| **COHORT CHARACTERISTICS** | | | |
| **Age**, median (IQR), yrs | 65.0 (54.0 – 72.3) | 72.0 (58.0 – 79.8) | <0.001 |
| **Non-white race**, n (%) | 18 (11.3%) | 47 (24.2%) | 0.01 |
| **Altered mental status**, n(%) | 22 (16.1%) | 53 (28.3%) | 0.01 |
| **Blood culture positive**, n (%) | 29 (20.7%) | 47 (24.2%) | 0.52 |
| **Vasopressor in ED**, n (%) | 15 (10.7%) | 37 (19.7%) | 0.04 |
| **Number of distinct pathogens** | 14 | 31 | - |

Yes, authors have interests to disclose
Disclosure: Day Zero Diagnostics
Scientific Study/Trial Day Zero Diagnostics

EMF

## 217 The Impact of Health Insurance on Catastrophic and Impoverishing Health Expenses for Patients Seeking Emergency Care in Kumasi, Ghana

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Objective: The World Health Organization recognizes that emergency care (EC) is an essential component of universal health coverage (UHC). A key indicator for tracking a nation's progress towards UHC is financial risk protection. In 2003, Ghana implemented a National Health Insurance Scheme (NHIS), however it is unknown the degree to which it reduces financial risk for patients seeking emergency care. This study aimed to determine the effect of the NHIS on the financial burden faced by emergency care patients in Ghana.

Methods: We conducted a cross-sectional survey among 329 adults seeking EC at Ghana's national accident and emergency center in Kumasi. Patients were chosen by systematic sampling between May and July 2022. Out-of-pocket (OOP) EC and household expenses data were collected. A catastrophic health expense (CHE) was defined as total OOP payments of more than 10% of a household's annual expenses or more than 40% of a household's annual non-food expenses. An impoverishing health expense (IHE) was defined as total OOP payments that pushed a household below the World Bank's extreme poverty threshold of $2.15/person/day.

Results: Of the 329 respondents, 46% were insured. Triage acuity and median household income were similar in both groups. Uninsured patients were younger, more likely to be male, and more likely to be unemployed ($p<0.05$). There was no statistically significant difference in the rate of CHE between uninsured and insured patients at the 10% threshold [59.9% vs 53.3%, $p = 0.23$] or at the 40% threshold [32.8%% vs 27.0%, $p = 0.25$]. Uninsured patients were more likely to meet the extreme poverty threshold prior to the ED visit (81.9%) compared to insured patients (71.7%) ($p<0.05$). Due to this unexpectedly large proportion of already impoverished patients, the study was underpowered to detect differences in IHE.

Conclusions: This is the first study to evaluate the impact of insurance on financial risk protection for EC patients in Ghana. Although EC is included in the NHIS, coverage is lacking, as less than half of patients seeking EC in our sample were enrolled in the program. Importantly, we found that an overwhelming majority of patients met the extreme poverty threshold prior to incurring additional OOP expenses, and the most impoverished patients were significantly less likely to have insurance. Furthermore, this study did not demonstrate superior financial protection for insured patients relative to uninsured patients seeking EC. To ensure adequate financial protection for Ghana's patients seeking EC, improvements to the national insurance scheme are needed that address the services covered, the population covered, and reduce cost-sharing to increase the quality of the financial protection provided.

No, authors do not have interests to disclose

## 218 Understanding and Improving the Emergency Department Referral System in the Ashanti Region of Ghana

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Objectives: The Ghana Health Service (GHS) provides healthcare via a tiered hospital system that utilizes a structured referral system to extend services from the large cities to the smaller villages. The Komfo Anokye Teaching Hospital (KATH) houses Ghana's National Accident and Emergency Center (AEC) and receives many referrals daily mainly from the northern 2/3rds of the country. Providing definitive care requires coordinated, timely referral between facilities, to ensure that patients receive accurate diagnostic testing, evaluation from a specialist, and treatment at the appropriate care center. Challenges to this include challenges with transportation, communication gaps between facilities, and limited capacity at the tertiary institutions. Inefficiencies of the referral system can cause delays in transfer of care, unnecessary costs, and errors and omissions in the referral process, ultimately contributing to increased morbidity and mortality. Our goal was to survey the efficacy, user satisfaction, and shortcomings of the current referral system in the Ashanti Region.

Methods: We conducted a cross-sectional observational study to evaluate physician satisfaction and interpretation of referral forms received at KATH AEC. 50 referral forms to the KATH AEC were collected, de-identified, and safely stored. A panel of 6 Emergency Medicine specialist physicians with from varying years of expertise levels each individually reviewed the same 50 referral forms and filled out a Qualtrics survey. The survey elicited the provider's thoughts on the form's completeness of information and the satisfaction of the GHS-required standardized variables. An interrater comparison was conducted to assess the reliability of the current form.

Results: Three hundred total reviews were elicited from 6 physicians reviewing the 50 referral forms from health centers, district, municipal, or regional hospitals in the Ashanti region. Health facilities not using the official referral form issued by the GHS were excluded. 31.3 % (94) of surveys indicated an unclear reason for referral, and 50% (151) had insufficient information to determine the need for a referral. 82% (53) instances contained incomplete patient demographics data. 31% (92) cases did not clearly state which unit of the hospital the patient was being referred to, and 37% (111) cases stated an inappropriate unit for the referral. For 71% (212) of the survey results, the referral diagnosis was not clearly stated. 36% (108) were extremely dissatisfactory and 28% (85) were dissatisfactory in documenting physical exam findings in relation to the presenting complaint. For follow-up, only 24% (73) of the surveys contained contact information for the initial health care provider.

Conclusions: The current GHS referral form used in the Ashanti region presents gaps in completeness and consistency leading to discrepancies in interpretation and provider dissatisfaction. Generalizability of our current results is limited, as the study is observational. We can not extend our conclusions to other departments, institutions, or regions as well. Further research on the perspectives of referring facilities will be needed to improve communication between facilities and improve patient outcomes.

No, authors do not have interests to disclose

## 219 Emergency Triage Assessment and Treatment: Post-Covid Implementation of a Pediatric Emergency Care Curriculum in Belize

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Objectives: Early recognition and stabilization of acutely ill and injured infants and children improves outcomes; however, many healthcare workers (HCWs) in hospitals worldwide are ill-equipped to do so, and as a result, severely ill children often experience significant delay in potentially life-saving treatment. The World Health Organization (WHO)'s Emergency Triage Assessment and Treatment (ETAT) is a 2-day, evidenced-based course that teaches pediatric assessment, triage and initial management to HCWs in resource-limited settings and includes a 1-hour basic introductory module for support staff. ETAT- based training triage systems paired with training of HCWs have improved pediatric outcomes worldwide. Belize, with an under 5 mortality rate of 1.1%, trained 387 HCWs in ETAT from 2016-2020. After a pause during the Covid pandemic, training resumed in 2022 utilizing a staged regional model of training-of-trainers (ToT). This study aims to assess the quality of this novel staged ToT model.

Methods: In coordination with the Karl Heusner Memorial Hospital Authority (KHMHA) and Belize Ministry of Health and Wellness (MOHW), staged ToTs were held in May 2022 and March 2023 creating two regional ETAT facilitator teams. Demographic data of trainees and pre- and post-course knowledge was collected. Demographic data was analyzed utilizing descriptive statistics. Pre- and post-course knowledge assessments were analyzed using the Wilcoxon Signed-Rank Test. Associations between baseline knowledge, clinical experience and prior emergency training were analyzed utilizing the Kruskal-Wallis Test.

Results: The ToTs produced 29 facilitators: 17 physicians, 11 nurses and 1 administrator. The facilitators taught 11 ETAT courses, training 144 HCWs in the full ETAT course and 136 support staff in the introductory ETAT module over 11 months. The full ETAT course participants were nurses (57%) and physicians (43%). Clinical experience varied from less than one year (22%) to greater than 15 years (20%). Ninety percent of participants had completed at least one prior training in Basic Emergency Care, Basic Life Support, or Advanced Cardiovascular Life Support. Most participants (87%) successfully completed the full ETAT course. There was a significant improvement in knowledge after training (n=144, mean pre 68 vs. post 82 mean difference 14.1 95% CI 12.2-16.1, $p< 0.0001$, Z value -9.551) with no significant difference in post-test scores between facilitator teams (mean post 82 vs 83, $p=0.69$). While physicians had higher baseline knowledge than nurses (mean 73 vs 65, $chi2(1)=12.9$, $p<0.001$), there was similar improvement in knowledge between physicians and nurses (mean difference 13.7 vs 14.4, $chi2(1)=0.1$, $p= 0.74$). There was no significant association with baseline knowledge and clinical experience or prior training.

Conclusions: The regional ToT model allowed for a rapid and effective method to implement ETAT trainings in a staged manner. As courses are ongoing and expanding to other regions, future studies will include assessment of long-term knowledge retention, sustainability, and clinical translation of knowledge to improve pediatric emergency care utilizing pediatric triage and key clinical indicators.

No, authors do not have interests to disclose

## 220 External Validation and Comparison of NIRUDAK Models and WHO Algorithm for Assessing Dehydration in Patients With Acute Diarrhea

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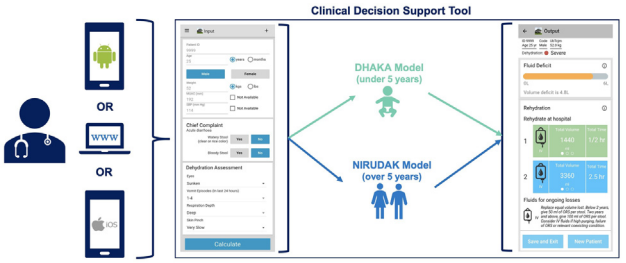
Objectives: Despite significant progress in reducing early childhood deaths from acute diarrhea, morbidity and mortality remains high among older children and adults with 5.7 billion cases and 1.1 million deaths globally in 2019. Rehydration remains the most important treatment for acute diarrhea in all populations, with intravenous fluids recommended for patients with severe dehydration and oral rehydration solution for those with mild to moderate (some) dehydration. While several clinical diagnostic models exist for assessing dehydration in young children, no validated tools exist for older children and adults. Recently, two clinical diagnostic models (the full and simplified NIRUDAK models) were derived and incorporated into a mobile health (mHealth) Clinical Decision Support Tool (CDST). In addition, a paper-based score was developed based on the simplified NIRUDAK model, which does not require a smartphone. The aim of this study is to externally validate both the mHealth CDST and paper-based NIRUDAK score in a new population of patients and compare their accuracy and reliability to the current World Health Organization (WHO) algorithm (originally developed for use in young children).

Methods: A prospective cohort study was conducted in patients over 5 years presenting with acute diarrhea in Dhaka, Bangladesh. Two nurses independently assessed patients on arrival using the NIRUDAK models and WHO algorithm. Patients were weighed and then rehydrated with repeat weights obtained every four hours until they reached a stable weight to determine their percent weight change with rehydration, the criterion standard for dehydration severity. Dehydration was classified as none (<3%), some (3-9%), or severe (>9%). Model discrimination for the diagnosis of dehydration category was assessed using the ordinal c-index (ORC), while accuracy for predicting overall volume deficit was assessed using root mean squared error (RMSE). Reliability was assessed by comparing the model prediction from each nurse's assessment using the Intraclass Correlation Coefficient (ICC). Each measure was compared to the WHO algorithm.

Results: From January to December 2022, 1601 patients were enrolled, of which 1580 (99%) had complete data for analysis. Of these, 659 (41.7%) were male with a mean age of 28.0 (IQR:21.0-39.0) years. 120 (7.5%) had severe dehydration by the criterion standard. The ORC for the mHealth CDST (0.74; 95%CI 0.71-0.77) and paper-based score (0.75; 95%CI 0.71-0.78) were both significantly better than the WHO algorithm (0.64; 95%CI 0.61-0.67). The RMSE for the CDST (6.43%) was also significantly better than the WHO algorithm (8.52%). Finally, the ICC for the CDST (0.98; 95%CI 0.97-0.98) and the paper-based score (0.95; 95%CI 0.94-0.95) were significantly better than the WHO guidelines (0.56; 95% CI 0.52-0.60).

Conclusions: This study has externally validated the very first mHealth CDST and paper-based clinical score for determining dehydration severity in older children and adults with acute diarrhea, which can be used to guide fluid resuscitation. Overall, both NIRUDAK models externally validated well with significantly better accuracy and reliability than the WHO algorithm. Use of these novel tools could improve care for acute diarrhea in both high and low resource settings worldwide, as well as during outbreaks of cholera and other diarrheal diseases where rapid and accurate triage and resuscitation of patients remains critical.




No, authors do not have interests to disclose

## 221 Basic Emergency Care: Post-Covid Implementation Utilizing Regional Teams

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Objectives: Strengthening healthcare capacity is a strategic priority for Belize, who in 2019 launched a nationwide campaign to train essential healthcare workers (HCWs) in the foundational tenets of emergency care through the World Health Organization and International Committee of the Red Cross' Basic Emergency Care (BEC) course, utilizing a regional training of trainers (ToT) model. After a pause during the covid pandemic, in 2022 the Southern Health Region (SHR) of Belize was prioritized to resume regional BEC training due to the traditionally under-resourced healthcare system and long distance to higher level of care hospitals. This study aims to assess the efficacy of the staged ToT model.

Methods: In coordination with the Belize Ministry of Health and Wellness, a ToT was held in August 2022 creating BEC facilitator teams that led courses in the region. The BEC mobile application (BEC app), developed by University of California San Francisco, was also utilized to supplement in-person training. Demographic data of trainees, pre-, post- and 6-month post-course knowledge and pre- and post-confidence levels (Likert scale 1-5) were collected.

Participants were also surveyed on the potential utility of BEC and barriers to BEC implementation. Demographic and survey data was analyzed utilizing descriptive statistics. Pre- and post-course knowledge and confidence was analyzed using the Wilcoxon Signed-Rank Test. Associations between confidence level, clinical role, clinical experience, BEC app use and knowledge were analyzed utilizing the Kruskal-Wallis Test.

Results: The SHR ToT produced 13 new BEC facilitators: 5 physicians and 8 nurses, adding to the existing 5 master facilitators in the SHR. The facilitators taught 3 BEC courses. A total of 46 HCWs were trained, 31 nurses (67%) and 15 physicians (33%). Most (91%) reported limited experience with critically ill patients (< 5 per day). There was a significant association between higher baseline knowledge and higher pre-course confidence (chi2(4)=10.9, p=0.03), but not with clinical role or greater experience. Nearly all (98%) successfully completed the BEC course. There was a significant improvement in knowledge (mean pre 77 vs. post 90, p<0.0001, z-factor -5.632, n=44) and confidence (mean pre 3.2 vs. post 4.0, p<0.0001, z-factor -4.331, n=44) after the course.

Knowledge gains persisted 6 months post-course (mean 92, p=0.0001, z-factor -3.568, n=24). Approximately half (54%) of the participants utilized the BEC app; most (96%) found it helpful for the training but there was no significant difference in post-course knowledge between BEC app groups. Survey data showed consensus (100%) agreement that BEC would be beneficial for clinical practice, but most (54%) reported they did not have all the tools to be successful in implementation. The most commonly cited tools needed were essential equipment and medications (61%), additional staffing (11%) and more practice with skills (11%). Two of the three major emergency healthcare facilities for the region achieved a majority of HCWs trained in BEC in 9 months (72% and 83% respectively).

Conclusions: The staged regional model is an effective method of BEC training. In preparation for BEC implementation, facilitators should ensure the appropriate clinical resources will be available. Future studies will include continued assessment of long-term knowledge retention and clinical translation of knowledge to improve emergency care.

No, authors do not have interests to disclose

## 222 Comparison of Serious Illness Communication and Self-Reported Practice Patterns of Code Status Conversation Between Japanese and American Clinicians Using a Multicenter Scenario-Based Survey

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Objectives: When discussing a prognosis and eliciting goals of care and directives, crisis communication is essential. However, little is known about how these conversations differ between Japanese and American emergency clinicians (ECs). Our goal is to identify their self-reported practice patterns of code status conversations.

Methods: This study involved a multicenter scenario-based survey to investigate the differences in crisis communication between Japan and the United States. Thidathit et al. conducted a survey in the United States in 2022, and we used their results for the United States. We selected five teaching hospitals in Japan's Kanto region (Tokyo, Chiba, and Kanagawa). More than 300 beds were available at each hospital. We included emergency physicians (EPs) and others (nurse practitioners or physician assistants) with at least 3 years of experience in the emergency department (ED). Participants who did not complete the questionnaire were excluded. The study team at Brigham and Women's Hospital/Harvard Medical School drafted the survey items after reviewing the literature and leveraging clinical expertise in emergency medicine and palliative care. The questionnaire was divided into two sections and contained 18 questions. The survey began with a typical case describing a seriously ill patient who required emergent, shared decision-making in the ED, followed by the survey items. Participants were asked procedure-based questions (six items, for example, "Would your father want to be on a breathing machine?") as well as value-based questions (12 items, for example, "What is important to your father if time is short?"). All questions were scored on a 5-point Likert scale (1 = very unlikely to ask, 5 = very likely to ask). We asked participants about their demographics (occupational role and clinical experience after graduating from professional school), their experience training in palliative care or communication skills for end-of- life care, their estimated number of code status conversations per month, and prior training in palliative care in the second part of the questionnaire.

Results: Overall, 81 Japanese ECs (58 EPs and 23 others) and 161 American ECs (82 EPs and 79 others) submitted questionnaires. Clinical experience varied greatly (Japanese: 32.1% with 0−5 years, 14.8% with 21+ years; American: 30.4% with 0−5 years, 13% with 21+ years, $p = 0.04$), and Japanese ECs reported less experience training in palliative care or communication skills (Japanese: Never = 60.5%; American: Never = 16.8%, $p < 0.01$). Statistically significant differences were observed between the two groups in two procedure-based questions and six patients' values-based questions, and all significantly different questions' answers of "very likely" or "somewhat likely" were higher among Japanese ECs than among US ECs (e.g., "Explain the probability of survival from intubation and critical care": Japanese 84.0%, American 76.0%, $p < 0.01$; "Ask 'what could your father do on his good days in the past one month?'": Japanese 80.3%, American 31.0%, $p < 0.01$).

Conclusions: From vignette-based research, there were significant differences in procedure-based questions and patients' values-based questions between Japanese and American ECs.

Table 1. Physician characteristics and knowledge

| Variables | Japanese clinicians ($n$ = 81) | The United States clinicians ($n$ = 161) | p value |
|---|---|---|---|
| **Role** | | | <0.01 |
| Physician, No. (%) | 68 (71.6) | 82 (50.9) | |
| Physician assistant or Nurse practitioner, No. (%) | 23 (28.4) | 79 (49.0) | |
| **Year in practicing clinical medicine** | | | 0.04 |
| 0-5 years, No. (%) | 26 (32.1) | 49 (30.4) | |
| 6-10 years, No. (%) | 14 (17.3) | 49 (30.4) | |
| 11-15 years, No. (%) | 20 (24.7) | 19 (7.5) | |
| 16-20 years, No. (%) | 9 (11.1) | 23 (14.3) | |
| 21+ years, No. (%) | 12 (14.8) | 21 (13.0) | |
| **Frequency of verbally determining code status while providing clinical care** | | | <0.05 |
| < once every 2 months, No. (%) | 29 (35.8) | 53 (32.9) | |
| 1 time every 1-2 month, No. (%) | 15 (18.5) | 45 (28.0) | |
| 1- 2 times every month, No. (%) | 13 (16.1) | 37 (23.0) | |
| >2 times per month, No. (%) | 24 (29.6) | 26 (16.1) | |
| **Prior training in palliative care or communication skills for end-of-life care** | | | <0.01 |
| Never, No. (%) | 49 (60.5) | 27 (16.8) | |
| Prior training, No. (%) | 32 (39.5) | 134 (83.2) | |

Table 2: The results of procedure-based components of code status conversations between Japanese and the United States emergency clinician.

| | Japanese emergency clinicians ($n$ = 84) | The United States emergency clinicians ($n$ = 161) | p value |
|---|---|---|---|
| **Ask "would your father want to be on a breathing machine"** | | | 0.08 |
| Very likely, No. (%) | 59 (72.8) | 100 (62.1) | |
| Somewhat likely, No. (%) | 13 (16.1) | 49 (30.4) | |
| Neutral, No. (%) | 3 (3.7) | 6 (3.7) | |
| Somewhat unlikely, No. (%) | 4 (5.0) | 2 (1.2) | |
| Very unlikely No. (%) | 2 (2.5) | 4 (2.5) | |
| **Ask "would your father want us to restart his hart if it stops?"** | | | 0.37 |
| Very likely, No. (%) | 56 (69.1) | 101 (62.7) | |
| Somewhat likely, No. (%) | 13 (16.5) | 41 (25.4) | |
| Neutral, No. (%) | 4 (4.9) | 7 (4.3) | |
| Somewhat unlikely, No. (%) | 6 (7.4) | 6 (3.7) | |
| Very unlikely No. (%) | 2 (2.5) | 6 (3.7) | |
| **Ask about the patient's preference for central line placement.** | | | <0.01 |
| Very likely, No. (%) | 27 (33.3) | 35 (21.7) | |
| Somewhat likely, No. (%) | 11 (13.6) | 57 (35.4) | |
| Neutral, No. (%) | 20 (24.7) | 30 (18.6) | |
| Somewhat unlikely, No. (%) | 18 (22.2) | 28 (17.4) | |
| Very unlikely No. (%) | 5 (6.2) | 11 (6.8) | |
| **Ask about the patient's preference for vasopressors.** | | | 0.09 |
| Very likely, No. (%) | 30 (37.0) | 34 (21.1) | |
| Somewhat likely, No. (%) | 17 (21.0) | 49 (30.4) | |
| Neutral, No. (%) | 16 (20.0) | 31 (19.3) | |
| Somewhat unlikely, No. (%) | 13 (21.0) | 31 (19.3) | |
| Very unlikely No. (%) | 5 (6.2) | 16 (10.0) | |
| **Explain the probability of survival from intubation and critical care** | | | <0.01 |
| Very likely, No. (%) | 54 (66.7) | 64 (40.0) | |
| Somewhat likely, No. (%) | 14 (17.3) | 58 (36.0) | |
| Neutral, No. (%) | 5 (6.2) | 26 (16.1) | |
| Somewhat unlikely, No. (%) | 7 (8.6) | 11 (6.8) | |
| Very unlikely No. (%) | 1 (1.2) | 2 (1.2) | |
| **Ask "would your father want everything done?"** | | | 0.40 |
| Very likely, No. (%) | 31 (38.3) | 54 (33.5) | |
| Somewhat likely, No. (%) | 21 (25.9) | 32 (19.9) | |
| Neutral, No. (%) | 10 (12.4) | 23 (14.3) | |
| Somewhat unlikely, No. (%) | 13 (16.1) | 28 (17.4) | |
| Very unlikely No. (%) | 6 (7.4) | 24 (14.9) | |

Table 3: The results of patients' value - based components of code status conversations between Japanese and the United States emergency clinician.

| | Japanese emergency clinicians ($n$ = 84) | The United States emergency clinicians ($n$ = 161) | p value |
|---|---|---|---|
| **Ask "what is your understanding of your father's illness?"** | | | <0.01 |
| Very unlikely, No. (%) | 73 (90.1) | 81 (50.3) | |
| Somewhat unlikely, No. (%) | 5 (6.2) | 59 (36.6) | |
| Neutral, No. (%) | 1 (1.2) | 13 (8.1) | |
| Somewhat likely, No. (%) | 1 (1.2) | 7 (4.3) | |
| Very likely No. (%) | 1 (1.2) | 1 (0.1) | |
| **Ask "what could your father do on his good days in the past one month?"** | | | <0.01 |
| Very likely, No. (%) | 29 (35.8) | 18 (11.2) | |
| Somewhat likely, No. (%) | 28 (34.6) | 31 (19.3) | |
| Neutral, No. (%) | 9 (11.1) | 40 (24.8) | |
| Somewhat unlikely, No. (%) | 12 (14.8) | 47 (29.2) | |
| Very unlikely No. (%) | 3 (3.7) | 25 (15.5) | |
| **Ask "what would your father say would be the most important him if time were to be short?** | | | <0.01 |
| Very likely, No. (%) | 45 (55.6) | 16 (9.9) | |
| Somewhat likely, No. (%) | 20 (24.7) | 34 (21.1) | |
| Neutral, No. (%) | 7 (8.6) | 39 (24.2) | |
| Somewhat unlikely, No. (%) | 8 (9.9) | 44 (27.3) | |
| Very unlikely No. (%) | 1 (1.2) | 28 (17.4) | |
| **Ask "how much more would your father say he would be willing to go through for the possibility of more time?"** | | | <0.01 |
| Very likely, No. (%) | 18 (22.2) | 16 (9.9) | |
| Somewhat likely, No. (%) | 23 (28.4) | 27 (16.8) | |
| Neutral, No. (%) | 17 (21.0) | 40 (24.8) | |
| Somewhat unlikely, No. (%) | 15 (18.5) | 49 (30.4) | |
| Very unlikely No. (%) | 8 (9.9) | 29 (18.0) | |
| **Explore the patient's minimum quality of life that he would conder living.** | | | |
| Very likely, No. (%) | 35 (43.2) | 26 (16.1) | |
| Somewhat likely, No. (%) | 22 (27.2) | 41 (25.5) | |
| Neutral, No. (%) | 11 (13.6) | 37 (23.0) | |
| Somewhat unlikely, No. (%) | 11 (13.6) | 46 (28.6) | |
| Very unlikely No. (%) | 2 (2.5) | 11 (6.8) | |
| **In the past year when you have faced similar clinical situations where immediate shared-decision making is necessary, how often did you provide a recommendation to the patient or surrogate whether or not to intubate** | | | <0.01 |
| Always, No. (%) | 27 (33.3) | 2 (1.2) | |
| Very frequently, No. (%) | 25 (30.9) | 36 (22.4) | |
| Sometimes, No. (%) | 15 (18.5) | 58 (36.0) | |
| Very infrequently y, No. (%) | 7(30.9) | 49 (30.4) | |
| Never No. (%) | 7 (8.6) | 16 (9.9) | |
| **In the past year when you have faced similar clinical situations where immediate shared-decision making is necessary, how often did you attempt to contact the patient's primary outpatient clinician?** | | | <0.01 |
| Always, No. (%) | 18 (22.2) | 5 (3.1) | |
| Very frequently, No. (%) | 32 (39.5) | 30 (18.6) | |
| Sometimes, No. (%) | 16 (19.8) | 52 (32.3) | |
| Very infrequently y, No. (%) | 11 (13.6) | 45 (28.0) | |
| Never No. (%) | 4 (4.9) | 29 (18.0) | |

No, authors do not have interests to disclose

## 223 Usage and Clinical Impact of Point-of-Care Ultrasound Applications Among Emergency Medicine Residents and Early-Career Residency Graduates

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Objectives: Point-of-care ultrasound (POCUS) has become a key diagnostic tool in emergency medicine (EM) and is a required component of EM residency training per ACGME. However, it is unclear which POCUS applications are most useful to practicing EM physicians. We sought to assess the usage and clinical impact of key POCUS applications among EM residents and recent residency graduates.

Methods: A survey developed by EM and emergency ultrasound (EUS) faculty was distributed electronically to all current residents and graduates (within the past six years) of an urban 4-year EM residency program with an annual volume of 120,000 visits/year. Confidence in POCUS skills was assessed using a 100-point scale. Frequency of use and perceived impact of core POCUS applications (as identified by

ACEP guidelines) were assessed both via a 10-point Likert scale and by ordinal ranking. Survey data were collected using REDCap. Student's T-test was used for comparisons. The study was approved by the Cook County Health IRB.

Results: One hundred sixty-four emergency physicians were invited to participate, and 85 responded (52%). 47% were current residents and 53% were graduates. 48% of residents were in their PGY-3 or PGY-4 year. All graduates were in clinical practice, 47% for 2 years or less, and 78% worked primarily in the community setting. Although 100% of graduates reported having an US machine available, all identified at least one barrier to POCUS utilization including time constraints (64%), having radiology- performed US available 24 hours a day (47%) and absence of billing for POCUS scans (31%). Mean confidence in POCUS skills was higher among graduates as compared to current residents (59 v. 67, $p<0.05$). Residents reported using POCUS more often (4.9 v. 3.8, $p<0.05$) and found it more impactful than graduates (6.2 v. 5.2, $p<0.05$). The cardiac application was ranked highest in terms of frequency of use and impact in clinical decisionmaking among all respondents. Both groups also ranked ultrasound-guided peripheral intravenous access (USG-PIV) and biliary applications highly in terms of frequency of use. Regarding impact on clinical decisionmaking, graduates ranked USG-PIV and pregnancy highly while current residents ranked biliary, airway, ocular, and renal applications highly. When asked which POCUS applications should receive extra focus during residency, graduates most frequently identified cardiac and procedural guidance applications.

Conclusions: Residents reported greater frequency of POCUS use, possibly due to graduation requirements, and higher POCUS impact, which may reflect confirmation bias. The cardiac application was identified among both groups as the most frequently performed and most impactful on clinical decision-making. Graduates most frequently identified cardiac and procedural guidance applications as areas of focus for extra training during residency. These findings may be valuable in the refinement of EM POCUS residency curricula.

No, authors do not have interests to disclose

## 224 Point-of-Care Ultrasound Quality Assurance Data From Fellow-Performed Scans in a Pediatric Emergency Department: A Descriptive Study

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Objectives: The Children's Hospital of Michigan (CHM) Pediatric EM (PEM) fellowship began an organized point-of-care ultrasound (POCUS) curriculum in January of 2015, which was expanded in January 2019 to cover more clinical scans. Concurrent with this expansion was implementation of a quality assurance (QA) process using QPath (a picture archiving and communications system), in which US faculty review scans for accuracy and provide feedback. Our goal was to determine whether agreement on exam interpretation between US faculty (reference standard) and PEM fellow interpretation varied by fellowship year or exam type, for the 3 most performed exams in our emergency department: focused assessment for sonography in trauma (FAST), cardiac, and skin/soft tissue.

Methods: This study was performed at CHM, a level 1 trauma center with 4 PEM fellows per year. We conducted a retrospective review of all the PEM fellow POCUS scans captured in Qpath between January 1, 2019 and June 30, 2022.

Raw proportion agreement by fellowship year between fellows and QA faculty was assessed with Fisher's exact test. Negative binomial (NB) random effects regression modeling was used to account for longitudinal measurement of individual PEM fellow performance across 3 years. The outcome was the count of agreement with expert overread. Fixed effects were exam type and fellowship year; an offset equal to the total number of exams performed by each fellow over 3 years was included. To assess between- and within-user variability across time, a random intercept and slope were included for each fellow. Fixed effects coefficients are interpreted as relative risks (RR).

Results: There were 2016 exams (909 FAST, 836 cardiac, 271 skin) done by 24 fellows. Raw proportion agreement by fellowship year was high for all exams (FAST: yr1:93, yr2:94, 93%; cardiac: 93, 89, 96%; skin: 98, 98, 97%), but none of these differences were statistically significant. From the NB model, there was no statistically significant effect of year on the population mean count of agreement. The RR of agreement for cardiac vs FAST was 1.8 ($p=0.02$), 1.9 for cardiac vs skin ($p=0.01$), and 1.1 for FAST vs skin ($p=0.9$). For the random intercept, the standard deviation (SD), a measure of variability between-fellows in year 1 was 2.1 while the SD of the random slope (a measure of between-fellow variability over time) was 1.04. The correlation between random intercepts and slopes was -0.91.

Conclusions: We found that PEM fellows generally interpret these exam types correctly, with little variation from start to end of fellowship. In the mixed model, fellowship year did not influence likelihood of correct interpretation but there was variation across exam type, with best agreement with expert overread seen for cardiac exams. There was substantial variation between fellows in year 1 and in progress through fellowship. The between-fellow variation had a greater effect on likelihood of correct interpretation than did training year or exam type. The high negative correlation between intercepts and slopes suggests that there is more progress during training for those who begin with more basic skills. However, whether PEM fellows graduate uniformly with adequate skills remains unknown, and further study across more exam types is needed to confirm our findings.

No, authors do not have interests to disclose

## 225 Learning Curve Cumulative Summation in Emergency Medicine Residents Performing Ocular Ultrasound

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Objectives: Ocular ultrasounds are a common use of point-of-care ultrasound for a prevalent ED complaint. Current guidelines require trainees to acquire 25 proctored ultrasound scans before being deemed competent; however, this number has not been substantiated for ocular ultrasound. The purpose of this study is to determine the number of scans required to reach competency in ocular ultrasound. Prior studies have utilized cumulative summation to evaluate for competency in ultrasound trainees.

Methods: We reviewed ocular ultrasound scans from 21 first-year residents in an academic urban emergency department. All residents received didactic training on how to perform an ocular ultrasound during a one-month ultrasound rotation. Each eye qualified as an individual scan. Three fellowship-trained ultrasonographers reviewed the scans to evaluate both the image quality and the trainee's accuracy of interpretation. Image quality was graded on a five-point scale based on quality of image. A score of three or above was considered competent. Interpretation competency was based on accuracy of diagnosis regardless of image acquisition. The cumulative sum method was used with an accuracy of 85% or above for combined image acquisition and interpretation of ocular ultrasounds to determine the average number of scans to reach clinical competency.

Results: Using the cumulative sum method with 85% accuracy, 14 scans are needed to reach competency. The median number of scans per resident was 23 (range 16-54). Out of the 21 residents with more than 14 scans, 15 reached image acquisition competency and 15 reached interpretation competency, with 10 residents achieving competency in both areas.

Conclusions: Based on these results, residents should complete at least 14 scans to demonstrate competency in the ocular ultrasound. Image acquisition competency was reached more often than interpretation competency, suggesting that greater emphasis should be placed on didactic teaching during the training process.

No, authors do not have interests to disclose

## 226 Is Handheld Point-of-Care Ultrasound "Good Enough" in a Busy Academic Emergency Department?

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Objective: Our objective was to characterize the real-world diagnostic performance of handheld point-of-care ultrasound (HH-POCUS) in the emergency department (ED).

Methods: A natural experiment occurred in our ED, an academic Level 1 trauma center, such that only a handheld POCUS system (Butterfly iQ$^{TM}$, Butterfly Network, Inc.) attached to an Apple iPad$^{TM}$ was available for ED POCUS studies for a period of one year, instead of our usual cart-based systems. We performed a retrospective observational study of patients who underwent cardiac, thoracic, renal, biliary, or lower extremity venous HH-POCUS in the ED from 11/2021-11/2022. Performance characteristics of HH-POCUS compared to radiology imaging within two days or cardiology-performed echocardiography within two weeks were calculated, and descriptive analyses of image quality and patient demographics were performed.

Results: A total of 381 HH-POCUS studies were performed during the study period, with an average patient age of 53.7 years (±21.6) and BMI of 29.9 (±7.5). Image quality ratings varied significantly by study type ($p=.001$), with cardiac image quality significantly lower than lung ($p=.002$). 77.6% of studies were signed by an emergency ultrasound fellowship-trained physician, and 50.7% (193/381) of studies had consultative imaging available for comparison. Overall, HH-POCUS was 86.4% ([95%CI] 77.0-92.5) sensitive and 79.0% ([95%CI] 69.8-86.1) specific for categorization of consultative imaging as abnormal versus normal.

HH-POCUS identified 86.5% (32/37, [95%CI] 70.4-94.9) of prespecified emergent diagnoses including acute cholecystitis, severely reduced left ventricular ejection fraction (LVEF), pericardial effusion, cardiac tamponade, moderate or larger pleural effusion, pneumothorax, moderate or larger hydronephrosis, and deep vein thrombosis. For less emergent diagnoses including cholelithiasis, reduced LVEF, small pleural effusion, or mild hydronephrosis, POCUS correctly identified 84.3% (43/51, [95%CI] 70.9-92.5) as abnormal. The performance for selected diagnoses are shown in Table 1.

Conclusions: Handheld POCUS in the ED had good specificity but poor sensitivity for pericardial effusion, right ventricle (RV) dilation, pleural effusion, and hydronephrosis, with moderate pooled sensitivity for prespecified clinically significant diagnoses. Our findings suggest that HH-POCUS can identify several emergent and non-emergent conditions in the ED, but is likely inadequate to rule out many conditions.

| Study Type (n[1]) | Finding | Identified/ Positives | Sensitivity | Specificity |
|---|---|---|---|---|
| Biliary (n=23) | Acute cholecystitis or cholelithiasis | 4/4 | 100 (39.6-100) | 83.3 (57.7-95.6) |
| Cardiac (n=61) (LVEF n=52; Effusion n=60; RV n=46) | Reduced LVEF | 18/21 | 85.7 (62.6-96.2) | 71.0 (51.8-85.1) |
| | LVEF category | 16/22 | 72.7 (49.6-88.4) | 56.7 (37.7-74.0) |
| | Pericardial effusion | 11/17 | 64.7 (38.6-84.7) | 95.3 (82.9-99.2) |
| | Dilated RV | 3/9 | 33.3 (9.0-69.1) | 94.6 (80.5-99.1) |
| | Cardiac tamponade | 1/1 | - | - |
| DVT (n=11) | DVT present | 3/3 | 100 (31.0-100) | 100 (59.8-100) |
| Lung (n=56) | Alveolar interstitial syndrome | 8/11 | 72.7 (39.3-92.7) | 62.2 (46.5-75.8) |
| | Pleural effusion | 15/24 | 62.5 (40.8-80.4) | 90.6 (73.8-97.5) |
| | Pneumothorax | 0/1 | - | - |
| Renal (n=42) | Hydronephrosis | 14/19 | 73.7 (48.6-89.9) | 87.0 (65.3-96.6) |

**Table 1.** The performance characteristics of hand-held point-of-care ultrasound in the emergency department compared to consultative imaging. (1) Studies with consultative imaging available for comparison.

No, authors do not have interests to disclose

## 227 Point-of-Care Ultrasound Use by Advanced Practice Providers in an Urban, Academic Emergency Department

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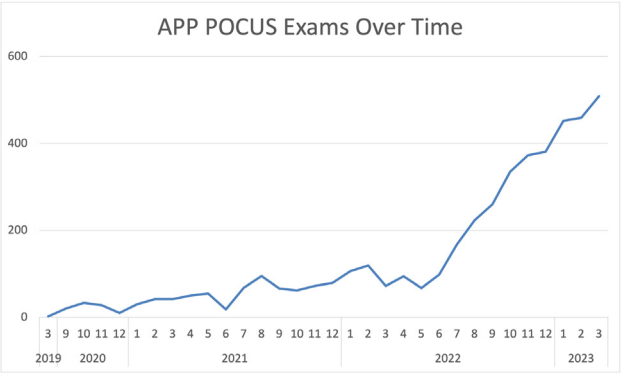
Objectives: Point-of-care ultrasound (POCUS) is performed and interpreted by a clinician primarily caring for a patient. POCUS is ubiquitous in the Emergency Department (ED), where it is used commonly by Emergency Physicians (EPs). Advanced Practice Providers (APPs) are non-physician providers with advanced training degrees, such as Physician Assistants and Nurse Practitioners, who provide care in the ED as part of an EP-led care team. APP training does not uniformly provide POCUS education, and little data exists describing POCUS use by APPs in the ED. In our ED, APPs practice under close, real time, onsite supervision by attending EPs, primarily in a lower-acuity "fast track" zone. Our group provides structured POCUS education to these APPs. Our ED also hosts a four-year Emergency Medicine residency program. We sought to examine and describe overall use of POCUS by APPs in our ED, and compare the quality of APP-performed POCUS to that of resident physicians.

Methods: In September 2020, our ED implemented a cloud-based middleware software for POCUS archiving and quality assurance (QA) review, which records a unique POCUS exam for each patient. A single exam may have multiple POCUS applications (eg, a patient receiving concurrent transabdominal pelvic and renal POCUS). Since July 2022, each unique exam is QA reviewed by a member of the Emergency Ultrasound team, and results are recorded using ACEP Emergency Ultrasound Standard Reporting Guidelines: an image quality score (1-5, 5 being best), diagnostic accuracy given the saved images, and whether the exam demonstrates proficiency for credentialing purposes. APP- and resident-performed POCUS exams were identified by querying the middleware.

Data abstracted included exam date, provider name, and POCUS applications used. Exams with complete QA results were identified. Summary statistics of APP POCUS use were generated, and QA results of APP-performed POCUS were compared to that of residents.

Results: A total of 2016 APP-performed exams with 2240 total applications were identified. The most frequently performed applications were transabdominal pelvis (702, 30.9%), soft tissue (423, 18.6%), and biliary (266, 11.7%). Other frequently performed applications included renal, focused assessment for sonography in trauma (FAST), and focused echocardiography. A total of 820 APP-performed exams and 623 resident-performed exams with complete QA results were identified. Median image quality for APP-performed exams was 4 (interquartile range 4-5) compared to 5 (4-5) for resident-performed exams, significant by Mann-Whitney U testing ($p<0.01$). A total of 771 (94.0%) APP-performed exams were proficient for credentialing purposes, compared to 607 (97.4%) of resident exams, significant by chi-square testing ($p<0.01$).

Conclusions: APPs can perform and interpret a high volume and varying applications of POCUS exams. We observed statistically, but not clinically significant lower image quality and rates of proficiency for APP-performed exams, highlighting the importance of close, real-time, onsite supervision as part of an EP-led care team. Further study is needed to compare overall POCUS use by APPs to that of attending and resident physicians, validate the generalizability of these findings, and to examine the potential for misdiagnosis and related safety events.




Yes, authors have interests to disclose
Disclosure: Butterfly Network Inc.
Consultant/Advisor Butterfly Network Inc.

## 228 Pediatric Point-of-Care Ultrasound Training in United States Emergency Medicine Residencies: Is Current Training Adequate?

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Objectives: The American College of Emergency Physicians (ACEP) Ultrasound (US) guidelines recommend a benchmark of 150-300 exams (25-50 per core modality) during emergency medicine (EM) residency. The original document has limited mention of point-of-care ultrasound (POCUS) in pediatrics and the ACEP US compendium didn't have a dedicated pediatric section until the most recent edition. The primary goals of this survey were to assess EM resident's perception of training, confidence, and use of pediatric-specific POCUS during residency. A secondary objective was to identify any perceived barriers to pediatric POCUS.

Methods: This was a web-based descriptive survey (Qualtrics) emailed to 276 accredited EM residency programs and posted on 2 EM community websites. The 31-question survey assessed program demographics, POCUS training specifics, clinical confidence in POCUS (rated yes/no) and opinions on the state of pediatric POCUS training. Scanning modalities were categorized as adult- or pediatric-specific, or generalizable. Pediatric-specific scanning techniques included pyloric stenosis, appendicitis, intussusception, and hips. Results are presented as percentages or means where applicable.

Results: 116 residents completed the survey and were primarily from urban areas (79%), academic centers (67%), and equally distributed by PGY (37%, EM-1, 32% EM-2 and 30% senior EM 3-4). 68% of programs had >3 US-trained faculty, whereas only 11% had >3 US-fellowship trained pediatricians. Most residents (84%) completed >100 POCUS exams yet 59% had performed <10 exams on pediatric patients. Mean overall clinical confidence (0-100) in adult POCUS (76.6) was double compared to pediatric POCUS (35.6). Of the 4 pediatric-specific exams, resident confidence varied between 5-44% compared to 62-78% for generalizable/adult-specific studies. 71% of residents reported hands-on training in pediatric POCUS is necessary. The greatest barriers to learning pediatric POCUS were lack of trained faculty (66%) followed by the culture of the department not prioritizing pediatric POCUS (50%).

Conclusions: This study demonstrates wide disparity in EM resident POCUS training, clinical use, and confidence which are significantly higher for adult vs

pediatric applications. Most residents report that pediatric POCUS training necessary. Addressing the barriers to learning and using pediatric POCUS should be considered to augment EM residency training.

No, authors do not have interests to disclose

## 229 A Comparison of Intraosseous Pressure Transfusion Strategies in a High Bone Density In Vivo Swine Model of Hemorrhagic Shock

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Objectives: Massive hemorrhage secondary to traumatic injury remains a leading cause of preventable death and early rapid infusion of whole blood reduces mortality. Intraosseous (IO) infusion, the driving of fluid directly into the bone, is lifesaving for damage control resuscitation when intravenous access is not immediately obtainable. Beyond hemorrhage, IO has great utility in civilian emergency care for infusion of fluids and pharmaceuticals to treat critically ill patients. Crucially, IO infusion is a balancing act, requiring sufficient flow rates to preserve life while avoiding excessive pressures that cause complications (hemolysis, periosteal hemorrhage, pulmonary fat embolism, osteonecrosis). Current military trauma guidelines recommend pressure bag for IO infusion, but prior cadaveric studies have shown that pressure bag confers unacceptably low flow rates. Further, it was unclear which commercially available pressurized IO infusion device delivers the highest flow at the lowest pressures. To fill this important gap, we assessed four IO infusion strategies in an *in vivo* swine model of hemorrhagic shock with bone densities similar to the 20-40-year-old adult human patient population.

Methods: *Sus scrofa* swine (N=39) were each randomly assigned to one of four pressurized IO infusion devices: pressure bag (PB, n=10), push-pull with 60cc syringe (PP. n=10), handpump (HP, n=11), or LifeFlow® rapid infuser (LF, n=8). Approximately 20% of estimated blood volume was removed, followed by a 30-minute stabilization period. A 45mm, 15-gauge IO needle was drilled into a proximal humerus with an EZ IO Power Driver and IO catheter placement was confirmed by aspiration and flush. Previously drawn blood was then autologously infused via the randomly assigned IO infusion device as flow rates and in-line pressures were recorded. Following a 60-minute observation period, necropsy for bone, lung, and heart histology were completed. Primary outcomes were flow rates (mL/min), mean and peak infusion pressures (mmHg), plasma free hemoglobin (PFHb, mg/dl), and histology, contrasted by device group using ANOVA at $p<.05$.

Results: Flow rates for LF (223±23) were significantly higher than HP (91±13), PP (76±9), and PB (32±5, each $p<.00001$). Mean pressures for LF (1039±160) were significantly higher than PP (488±41), HP (425±31), and PB (196±18, each $p<.00001$). Peak pressures were significantly higher for LF (2286±323) and PP (2105±268) than for HP (1325±100) and PB (568±56, each $p<.01$). PFHb significantly rose from baseline (2.6±0.2) following infusion (4.7±0.7; $p<.0001$) but remained below the 50mg/dl safety threshold for all swine and did not significantly differ between devices. There was no evidence of pressure-induced histological damage (pulmonary or coronary fat emboli, periosteal hemorrhage, disruption of the trabecular meshwork) in any swine.

Conclusions: LF conferred the highest flow rates, but at the cost of highest pressures. HP conferred 19% higher flow rates than PP at 1/3 lower peak pressures. Crucially, LF, HP, and PP flow rates were markedly superior to PB, which has important implications for both future resuscitation guideline recommendations and the use of pressurized IO infusion devices in treating critically ill and injured patients.

No, authors do not have interests to disclose

## 230 Abdominal Aortic Aneurysm Rupture and Predictors of Death

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Objectives: The outcome of a ruptured abdominal aortic aneurysm (AAA) without any interventions is close to uniformly fatal. The Society for Vascular Surgery suggests a door to intervention time of less than 90 minutes in the patient with a ruptured AAA. Factors on admission that have been associated with poor outcomes for ruptured AAAs include hypotension, renal insufficiency, severe anemia, advanced age, and cardiac arrest. Patients who are particularly high risk for open abdominal aortic aneurysm repair may be candidates for endovascular repair which may decrease mortality. The purpose of the study was to evaluate the patient's systolic blood pressure and serum bicarbonate as predictors of mortality for ruptured AAAs.

Methods: This retrospective study was performed utilizing the United States Collaborative Network of 55 academic medical centers/healthcare organizations in the TriNetX database. There were 11,698 patients with ruptured abdominal aortic aneurysms identified. Patients were stratified based on systolic blood pressure (SBP) and bicarbonate levels, with mortality assessed within the 90 days after presentation for the ruptured AAA. Rounded cutoffs of the bicarbonate ranges (< 10, 10.01- 15; 15.01-20, > 20.01) were chosen for interpretative purposes.

Results: After exclusion of patients who presented more than 20 years ago, there were 10,735 patients with ruptured AAA who presented between November 30, 2002, and November 30, 2022, in the database. Overall, 90-day mortality in this cohort was 20%. Patients who presented with a ruptured AAA with a SBP < 90 had a 45.9% mortality. Those who presented with a SBP < 80 had a 51% mortality. In addition, if the SBP < 90 and the bicarbonate < 10 the mortality was 89.4%, (SBP < 90) with bicarbonate 10-15 a 66% mortality, (SBP < 90) with bicarbonate 15–20 reported a 49.9% mortality, (SBP < 90) and with bicarbonate > 20 a 39% mortality.

Conclusions: Early recognition and intervention is critical to survival in patients with ruptured abdominal aortic aneurysms. Metabolic acidosis is an important marker of the severity of hemorrhage in these patients. In this large cohort study of ruptured abdominal aortic aneurysms, mortality increases significantly with hypotension and metabolic acidosis, represented by lower bicarbonate levels. Abnormalities in the serum bicarbonate may be seen before severe changes in the vital signs in the hemorrhaging patient. Early recognition of metabolic acidosis may lead to earlier life-saving interventions in these patients with ruptured abdominal aortic aneurysms.

No, authors do not have interests to disclose

## 231 The Role of End-Tidal Carbon Dioxide and Cerebral Oxygen Saturation to Predict Return of Spontaneous Circulation Among Patients With Out-of-Hospital Cardiac Arrest Patients

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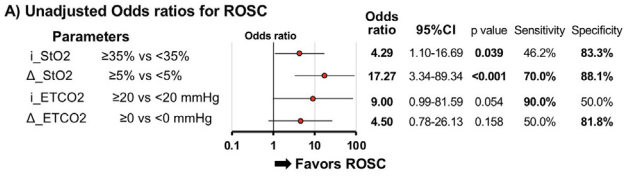
Objectives: Both capnometry and near-infrared spectroscopy have been used to measure end-tidal CO2 (ETCO2) and cerebral oxygen saturation (StO2) as tools to predict return of spontaneous circulation (ROSC) in patients with out-of-hospital cardiac arrest (OHCA). However, it remains unclear which parameter is more closely associated with the achievement of ROSC. Thus, the effect of StO2 and ETCO2 on ROSC in patients with OHCA was evaluated.

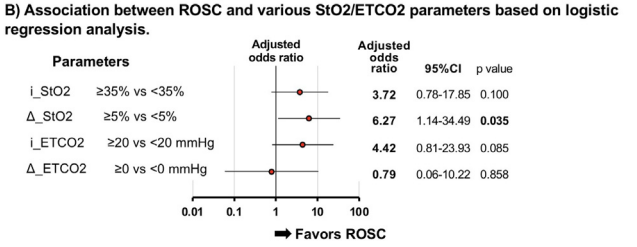
Methods: This is a single-center, retrospective, observational study conducted at a Japanese teaching hospital. Patients aged 18 years or older with OHCA who were transferred to our emergency department between August 2019 and April 2020 were screened for enrollment. ETCO2 and StO2 were assessed at baseline (initial_ETCO2/initial_StO2) and at the end of the measurement (final_ETCO2/final_StO2). End of measurement was determined when patients achieved ROSC or when resuscitation was terminated. Differences in ETCO2/StO2 between baseline and end values were defined as Δ_ETCO2 and Δ_StO2, respectively. In a certain number of patients, StO2 values were obtained at specific time points (i.e., 4, 8, and 16 min from the initiation) during the cardiopulmonary resuscitation (CPR), and the differences between initial_StO2 and the StO2 at 4, 8, and 16 min (d_StO2) were also evaluated. We compared the values of each parameter of StO2 and ETCO2 in achieving ROSC in OHCA patients and evaluated the effect of the interaction between these parameters on ROSC using discriminant analysis.

Results: A total of 55 OHCA patients were enrolled in this study out of 359 OHCA patients transferred to our emergency department, and ROSC was achieved in 13 patients. In the ROSC group, initial_StO2 and initial_ETCO2 tended to be higher, and Δ_StO2 but not Δ_ETCO2, was greater than in the non-ROSC group. The cutoff values for StO2 (initial_StO2 and Δ_StO2) and ETCO2 (initial_ETCO2 and Δ_ETCO2) as predictors of ROSC were calculated using the ROC analysis. Therefore, we adopted 35%, 5%, 20 mmHg and 0 mmHg as cutoff values for initial_StO2, Δ_StO2, initial_ETCO2, and Δ_ETCO2, respectively, and the patient population was dichotomized based on these cutoff values. Achievement of ROSC was more frequent in patients with initial_StO2≥35% (odds ratio (OR)=4.29[1.10-16.69]) and with Δ_StO2≥5% (OR=17.27[3.34-89.34]). The patients with paired data of initial_ETCO2 and Δ_StO2 were dichotomized based on the presence/absence of ROSC with discriminant analysis and a clear discrimination was found (OR=46.00

[4.03-525.15]). When the serial change in StO2 at 4, 8 or 16 minutes of the observation period was used for analysis instead of Δ_StO2, the combination of these parameters gave higher sensitivity and specificity for discrimination.

Conclusions: The suitability of StO2 and ETCO2 as potential markers of ROSC is under investigation. In particular, Δ_StO2 was hypothesized to play a critical role in the achievement of ROSC. Although the combined use of Δ_StO2 and initial ETCO2 values appears promising, the inclusion of data obtained during the early phase of the CPR procedure may provide more favorable results for the prognosis of ROSC.




No, authors do not have interests to disclose

## 233 Sex Disparity Between Patients Receiving Lung Protective Ventilation in the Emergency Department

Gilman S, Johnson S, Lesser M, Sison C, Rolston D, Barnaby D/Northwell, New Hyde Park, New York, US

Objectives: Studies have demonstrated lung-protective ventilation (LPV) with tidal volumes (TV) ≤8 mL/kg predicted body weight (PBW) improve outcomes in acute respiratory distress syndrome (ARDS); and LPV may improve outcomes in all ventilated patients. Several studies have demonstrated high percentages of ED patients receive >8 mL/kg PBW TV. Pilot data from our institution demonstrated a difference in provision of LPV in the ED between men and women. The primary aim of our study was to assess if women are less likely to receive LPV and if this can just be explained by differences in height. Secondarily we sought to assess other factors that may affect the use of LPV in the ED, and whether the use of LPV was associated with longer ventilator free days or lower hospital mortality.

Methods: This was a retrospective, observational study of all adult patients (≥18 years old) who received mechanical ventilation in 13 EDs of a large healthcare system from January 2021 to December 2022. We excluded patients who expired prior to inpatient admission. We used multivariable logistic regression analysis to examine the association between sex and lung protective ventilation (tidal volumes less than 8 mL/Kg PBW), adjusted for related covariates selected a priori, at the time of ED to ICU transfer.

Results: 2,262 adult patients were mechanically ventilated during the study period. 1,819 patients (77%) received LPV, 333 (14.1%) >8-9 mL/kg, 138 (5.8%) >9-10 mL/kg, and 72 (3%) >10 mL/kg. Height was not documented during their ED stay in 643 (27.2%) of patients but was retrieved from the inpatient record. Median ventilator free days was not significantly different between the LPV group 3 days (IQR 0-8) in t and the >8 mL/kg group 2 days (IQR 0-7) in the. We found that male sex (OR 1.5 [1.1-1.9]), height (OR1.2 [1.2-1.2]), and receiving care in a tertiary hospital (OR 1.5 [1.2-2.0]) were associated with increased odds of receiving lung protective ventilation. Having a documented height in the ED, day vs. night shift, and ED length of stay were not associated with LPV. There was no association with in- hospital mortality or ventilator free days when patients received LPV in the ED, although the study was not powered to evaluate these outcomes.

Conclusions: We confirmed the existence of sex disparity in the use of LPV that was not entirely accounted for by differences in height. Tertiary care hospitals were associatedwith higher odds of LPV use. There were no differences in ventilator free days or in-hospital mortality when LPV was initiated in the ED. Targeting interventionsdirected at female sex, and community hospitals may help to improve the use of lung protective ventilation in the ED.

Yes, authors have interests to disclose
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## 234 Identification of Diagnostic Errors in the Emergency Department Using Data-Driven Strategies

Khalili M, Patel S, Huschka T, Parker S, Cabrera D, Pasupathy K, Singh H, Mahajan P, Bellolio F, Enayati M/Mayo Clinic, Rochester, Minnesota, US

Objectives: Diagnostic errors, defined as missed, wrong, or delayed diagnoses, are a source of patient safety concerns that can lead to patient harm or death. To improve the quality of care, it is crucial to identify common diagnostic errors, characterize contributing factors, and develop strategies to mitigate errors. This work aims to facilitate the identification of prevalent diagnostic errors and contributing factors in the Emergency Department (ED).

Methods: Observational cohort of consecutive ED visits (2017-2019). We used a validated trigger-based query procedure to identify potential error-positive ED patients. We focused on 3 Triggers (T): T1 as unscheduled ED return visit resulting in admission within 10 days from the index visit; T2 for care escalation from the inpatient unit to the ICU within 24 hours from ED admission; and T3 to identify deaths in the ED or within 24 hours of admission. Diagnostic test accuracy with positive predictive values (PPVs) were calculated for each trigger.

Results: Electronic health records of trigger-positive patients (478 cases, including 238 T1, 157 T2, and 83 T3) were reviewed by an emergency physician to confirm the presence/absence of diagnostic errors. The review was conducted using the revised Safer Dx Instrument, a standardized instrument for identifying diagnostic errors.

Thirty-one cases were identified as error-positive, including T1 (41.9%), T2 (48.3%), and T3 (9.8%). PPVs were as follows: PPV_T1 = 5.5%; PPV_T2 = 9.5%; PPV_T3 = 3.6%. The most prevalent diagnoses among the error-positive cases included *infectious disease* (64.5%) and *cardiovascular disease* (12.9%). Within Infectious disease cases, sepsis had the highest prevalence of diagnostic error (40% of 20 infection cases). The most prevalent chief complaints for error cases (i.e., the primary patient-reported problems) and their respective breakdowns (i.e., "isolated": single problem; "non-isolated": multiple problems) were *shortness of breath* (22.6%, 16.1% isolated & 6.5% non-isolated), *fever* (12.9%, 9.7% isolated & 3.2% non-isolated), *vomiting* (9.7%,3.2% isolated & 6.5% non-isolated), and *abdominal pain* (6.5% non-isolated). P-values were not significant for the isolated vs non-isolated comparisons.

Conclusions: Effective strategies are required to identify ED diagnostic errors to improve patient safety. The use of a trigger-based query protocol contributed to the identification of ED diagnostic errors. Infectious and cardiovascular disease were the most prevalent sources of ED diagnostic errors. Patients presenting with isolated chief complaints were as likely as those with combined chief complaints to have diagnostic errors highlighting the difficulty for the clinician when approaching the workup based on chief complaint only. Suspicion of sepsis is important among those with infectious complaints, as sepsis diagnosis was among the most common missed diagnoses in error-positive cases. A trigger-based approach in its current format resulted in low PPVs. To enhance the PPV, we suggest refining trigger definitions with a disease-specific approach and including information about common chief complaints. Extracted information from these cases can provide directions for future modeling of diagnostic errors and development of clinical decision support tools to enhance the quality of diagnosis.

No, authors do not have interests to disclose

## 235 Assessment of a Cellular Host Response Test Against Field Standards for Diagnosing Sepsis-3 and Risk Stratifying Subjects in the Emergency Department

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Background: Most cases of sepsis present to the emergency department (ED), where they are masked among a much larger undifferentiated population of those with

signs or suspicion of infection. A highly sensitive rapid diagnostic with clinically actionable performance is needed to aid ED clinicians in their risk assessment of this large population. To date there are a variety of biomarkers and clinical scoring systems used for the prediction and risk stratification of Sepsis. In this study, we evaluated the performance of a recently FDA-cleared rapid sepsis diagnostic, IntelliSep Test, alongside five other biomarkers and clinical scores to predict sepsis (per Sepsis-3) and risk stratify subjects with signs or suspicion of infection.

Methods: The IntelliSep test quantifies immune activation by measuring the biophysical properties of leukocytes from a whole blood sample in <10 minutes. The test provides a single score, the IntelliSep Index (ISI) ranging 0.1-10.0, stratified into 3 interpretation bands based on increasing probability of sepsis: Band 1, Band 2, Band 3.

Adult patients presenting to the ED with signs or suspicion of infection were prospectively enrolled at multiple US sites (Feb. 2016 – Oct. 2021). The assay was performed on EDTA-anticoagulated blood within 5 hours of draw, and patients were followed by retrospective chart review for outcome information. Sepsis disease status was determined through retrospective physician adjudication. This study included subset of subjects with a procalcitonin (PCT) measured at the same time as the ISI. We compared the diagnostic performance of the ISI to PCT, lactate, and values computed for SOFA, Q-SOFA, and APACHE-II. For lactate and APACHE II, subjects for whom a lab value was not collected per standard of care, the value was considered normal.

Results: Nine hundred eighty-eight subjects with a sepsis prevalence of 23% were included in the study. When comparing performance characteristics in predicting sepsis (Table 1), the ISI outperformed other measures in sensitivity (86.5; 81.4 – 90.7, 95% CI). Importantly, among those identified by each marker as low risk, the ISI achieved 0.0% sepsis mortality and the lowest rate of positive blood cultures (3.7%) (Table 2). Comparable specificity was observed for Lactate, PCT, ISI, and qSOFA (Table 1).

Conclusions: The ISI, a quantitative measure of immune activation, compared favorably to other biomarkers and clinical scores as an aid in the rapid assessment of sepsis risk for patients presenting to the ED with signs or suspicion of infection.

**Table 1.** Summary of receiver operating characteristic curve performance in predicting Sepsis for different biomarkers and clinical scores.

| | Marker Cutoff(s) | ISI Band 1, Band 3 | PCT 0.5, 2 | Lactate 2, 4 | SOFA 2 | APACHE - II 11 | q-SOFA 2 |
|---|---|---|---|---|---|---|---|
| AUC | Mean | 0.82 | 0.80 | 0.72 | 0.71 | 0.69 | 0.66 |
| | 95% CI | (0.79, 0.85) | (0.77, 0.84) | (0.68, 0.76) | (0.68, 0.75) | (0.65, 0.73) | (0.62, 0.7) |
| Sensitivity | Mean | 86.5 | 64.8 | 52.6 | 82.2 | 81.3 | 31.3 |
| | 95% CI | (81.4, 90.7) | (58.2, 70.9) | (45.9, 59.2) | (76.6, 86.9) | (75.2, 85.7) | (25.4, 37.7) |
| Specificity | Mean | 85.6 | 93.0 | 93.8 | 49.0 | 48.2 | 89.3 |
| | 95% CI | (80.0, 89.5) | (88.4, 95.6) | (89.5, 96.3) | (42.1, 55.4) | (41.2, 54.5) | (84.4, 92.8) |

**Table 2.** Comparison of outcomes of those deemed low-risk by each marker.

| Marker Low- Risk Cutoff | ISI Band 1 | PCT 0.5 | Lactate 2 | SOFA 2 | APACHE - II 11 | q-SOFA 2 |
|---|---|---|---|---|---|---|
| Number of Subjects in Low-Risk Group | 485 | 697 | 715 | 413 | 409 | 835 |
| Sepsis Mortality in Low-Risk Group | 0 (0.0%) | 4 (0.6%) | 3 (0.4%) | 1 (0.2%) | 0 (0.0%) | 12 (1.4%) |
| Positive Blood Culture in Low-Risk Group | 18 (3.7%) | 38 (5.4%) | 61 (8.5%) | 31 (7.5%) | 21 (5.1%) | 85 (10.2%) |

Yes, authors have interests to disclose
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## 236 Financial Sustainability to Increase Level 5 Billing

To J, Singh M, Restivo A, Ahmed O, Sperling J, D'Amore J, Meguerdichian M, Trottier D/
Jacobi Medical Center, Bronx, New York, US

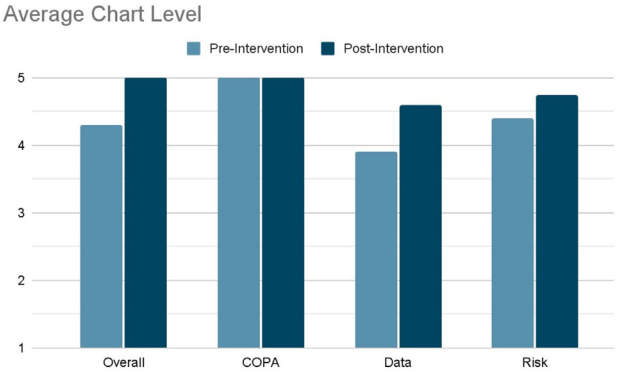
Background: Emergency Medicine (EM) documentation practices were updated on January 1, 2023, the first time in 21 years. The American Medical Association (AMA) and American College of Emergency Physicians (ACEP) released guidelines to help provide instructions on the new standards, which are now based solely on Medical Decision Making (MDM) criteria, the subcomponents which include Number and Complexity of Problems Addressed (COPA), Amount and/or Complexity of Data to be Reviewed and Analyzed (DATA), and Risk of Complications and/or Morbidity or Mortality of Patient Management (RISK). Despite this, there remains widespread confusion amongst faculty members and a lack of training across residencies has only perpetuated the issue.

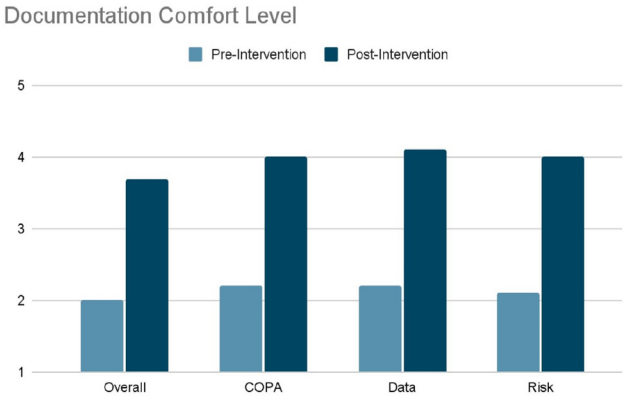
Objectives: We created a simulation-based educational intervention for EM physicians to review the coding criteria, improve documentation quality and increase the incidence of level 5 billing.

Methods: The pilot study occurred at Jacobi Medical Center (JMC) in Bronx, NY, an academic emergency department (ED) with a 4-year EM residency program, starting from March 2023 to present day. A pre-intervention survey was given to residents and attendings to assess their level of understanding and comfort on the new documentation changes. Participants were given a simulated case involving the management of a high-risk chest pain patient and were required to write an MDM note. Post-simulation, they received a 25 minute didactic session to address each coding level requirement, along with tips and personalized feedback. They were asked to re-write their MDM and given a post-intervention survey to reassess their level of understanding and comfort. Each note was reviewed and given a level of coding, per AMA guidelines, with guidance from Phycare (JMC billing company.) The primary outcome measure was a quantitative change in the level of billing. So far, 3 attendings and 21 residents participated.

Results: The average chart level and COPA, DATA, and RISK levels increased from 4.3, 5, 3.9, and 4.4 (pre-intervention) to 5, 5, 4.6, and 4.75 (post-intervention), respectively. On a scale from 1 to 5 (with 1 being very uncomfortable and 5 being very comfortable), the average comfort level of overall documentation and the subcomponents of COPA, DATA, and RISK increased from 2, 2.2, 2.2, and 2.1 (pre-intervention) to 3.7, 4.0, 4.1, and 4.0 (post-intervention), respectively. All participants admitted their simulated patient.

Conclusion: Simple interventions can result in improved clinical documentation and generation of higher billing codes. To determine return on investment, once all staff have participated in the project, we will check with Phycare to see whether there has been an increase in level 5 charting within our emergency department. Because the simulation involved a high-risk chest pain patient that all participants admitted, our next steps include simulating a lower acuity patient to evaluate level 5 billing for treat and release patients.




No, authors do not have interests to disclose

## 237 Effect of an ED-ICU on Emergency Department Billing and Coding

Sherman M, Kan V, Reznek M/UMass Chan Medical School; UMass Memorial Health Care, Worcester, Massachusetts, US

Objectives: In recent years, increasing patient acuity and boarding in emergency departments (EDs) has prompted operational innovations, including different ED–based intensive care unit (ED-ICU) models. As ED volume and acuity rise, these models seek to address the increasing demand for immediate critical care services in the ED. Data regarding the financial outcomes and the viability of these units remains an area of investigation. In 2019, the study site opened the "NEXT Pod," a 9-Bed ED-ICU integrated into the ED. The goal of the study is to examine the impact of the ED-ICU on ED professional services coding and billing.

Methods: We conducted a quasi-experimental study at an urban, academic medical center with approximately 90,000 annual ED encounters at which a 9-Bed ED-ICU was integrated into the Adult ED in July 2019. We examined billing data 8 months before and 8 months after the implementation of ED-ICU (11/2018-3/2020). This ED- ICU was created by repurposing a smaller 9-bed unit of the ED with no physical space change. The unit was staffed by 1 attending EM physician and 1 senior EM resident, and a minimum of 3 nurses (generally, patient-to-nurse ratios were ~5:1 in other areas of the ED). No formal billing or educational program was implemented for the ED-ICU. However, the department did continue with regular reviews of billing code distributions at staff meetings (this was unchanged during the study period). We abstracted current procedural terminology (CPT) codes (99281, 99282, 99283, 99284, 99285) and critical care CPT codes (99291, 99292) billed. The percentage of critical and non-critical care CPT codes billed and total professional revenue before and after implementation were compared. Statistical analysis was performed using Student's t-test.

Results: There was a total of 39,052 ED visits pre compared to 38,094 post. In the pre-period, 6.6% and 0.5% of all CPT codes billed were 99291 and 99292, respectively. In the post-period, 9.4% and 1.2% of all CPT codes billed were 99291 and 99292, respectively. The implementation of ED-ICU resulted in a 2.8% (95% CI: 2.4-3.2) net increase of 99291 billed (42.4%) and a net increase of 0.6% (95% CI: 0.5-0.8) of 99292 billed (140%). Compared to the pre-period, the percentage of 99282 (9.4% vs. 7.3%, $p<0.001$) and 99283 (16.3 vs. 11.4, $p<0.001$) were statistically significantly lower, and the percentage of 99285 (31.1% vs. 34.0%, $p<0.001$) was higher in the post-period. No changes were seen in the percentage of 99281 and 99284 billed. The implementation resulted in an average increase of $41.4/visit (95% CI: 37.2-45.5) in all ED visits. This translates to an increase of $1,186,372 in charges ($15,883,554 vs. $17,069,926) and a $330,985 increase in payments ($5,438,228 vs. $5,769,213) during the 16-month study period.

Conclusion: This study demonstrated a statistically significant association between the implementation of an ED-ICU and an increase in critical care billing, a trend towards higher acuity EM coding, and an increase in total charges and payments across the ED. Whether this reflected more resources dedicated to critical care or more time and attention for documentation practices across the ED, not just the ED-ICU unit, remains unclear. The development of the ED-ICU model is an ongoing area of potential operational and quality improvement in EM. Our preliminary data reveals promising potential for the fiscal viability of the ED-ICU model.

No, authors do not have interests to disclose

## 238 Use of a Rapid Bedside Semi-Quantitative Test to Detect COVID-19 Immunoglobulin Levels in Vaccinated Immunocompetent Adult Patients

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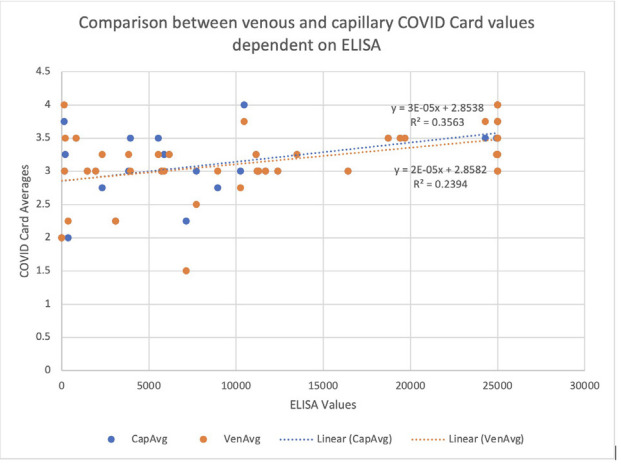
Objectives: The immune response to COVID-19 infection or immunization can be determined by measuring the level of immunoglobulins specific to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) using enzyme-linked immunosorbent assay (ELISA). ELISA is an expensive laboratory testing method requiring trained personnel in addition to having a turnaround time of 1-2 days. In comparison, the COVID Card, a rapid semi-quantitative testing method that utilizes fingerprick blood and yields a hemagglutination pattern, can be done at the bedside in just minutes and at a fraction of the cost. This study aimed to determine the effectiveness of COVID Card testing in predicting the level of antibodies compared to that of ELISA.

Methods: A total of 50 immunocompetent adult patients, vaccinated with the primary series, who presented to the ED reasons other than infection were enrolled in this study and analyzed. They underwent both ELISA and COVID Card testing. COVID Card testing was done using both capillary and venous blood. Additional information, such as vaccination dates, number of boosters, co-morbidities, as well as any history of COVID-19 infection were collected. COVID card testing results were interpreted independently by two reviewers.

Results: The average age was 53.00 ± 15.75 years with female predominance (60.0%). The vast majority of patients had at least one comorbidity (98.0%), the most common of which was hypertension (57.1%). Most patients had received at least one vaccine, and more than half (58.0%) reported having previously contracted COVID-19. The median time since the most recent reported COVID-19 infection was 8 (IQR, 2.5 – 13) months. The median COVID Card result was 3.25 (IQR, 3.0- 3.5). The median ELISA result was 12050.5 (IQR, 5151.5-25000) U/mL. There was no significant difference between the evaluation of the COVID Card results performed by the two reviewers ($p = 0.29$) and between capillary and venous COVID card testing ($p = 0.12$). Linear regression analysis between COVID card testing and dependent ELISA variables revealed an $R^2 = 0.36$ (capillary) and $R^2 = 0.24$ (venous).

Conclusions: This study found that COVID card testing was not very effective in predicting the antibody levels compared to that of ELISA. Despite these results, COVID card testing can be potentially used as a qualitative test for antibodies to COVID-19. A positive result would not guarantee immunity; however, a negative result ensures lack of humoral immunity. Further studies are needed to determine the effectiveness of COVID card testing in other populations, such as immunocompromised patients, who require more boosters to mount a measurable immune response.




Yes, authors have interests to disclose
Disclosure: Eldon Biologicals
Other
Eldon Biologicals

## 239 How Does a Novel Irrigation Device Compare to Standard Irrigation Techniques

Rosenberg M, Skinner L, Gilson L, Papa L/Orlando Health, Orlando, Florida, US

Objectives: Wound irrigation is the most important step in the wound treatment process. This is the only step that has been proven to decrease infection rate. However, the current best practice for producing pressurized irrigation for wounds is time and resource-intensive, requiring many pieces of equipment and repeated syringe refilling. As a result, many physicians turn to less effective methods which can lead to inadequate pressure and fluid delivery. This study sought to compare the use of the "Irrigator", a novel wound irrigation device, against standard irrigation methods (saline-filled syringes or bottles). The novel device is a pre-filled wound irrigation device that contains 150 mL of sterile saline, making it suitable for lacerations up to 3 cm long. It is pressurized and discharges saline at 8-12 psi when the trigger is depressed. This allows for proper wound debridement without tissue damage. The ergonomic design allows for single-handed use, and it has a built-in splash guard. The device is pre-packaged, no need to connect to external pressure or power sources, and is disposable.

Methods: The study was a two-arm, unblinded, randomized, controlled trial that enrolled 59 emergency department patients with simple lacerations that required closure. The study primarily sought to determine whether the use of the novel device reduced total length of time for irrigation supply setup, wound irrigation, and laceration repair.

Secondarily, the study sought to determine whether the patients who had their wounds irrigated with the novel device had similar or better wound outcomes in comparison to patients who had their wounds irrigated per standard of care; determine whether the use of the novel device reduced total patient length of stay in the emergency department; and determine whether clinicians were more satisfied with irrigating using the novel device, or with standard of care irrigation methods.

Patients were randomized to the control (irrigation per standard of care) or exploratory (novel irrigation device) group, and 5 processes were timed to determine their duration: physician arrival to patient room to end of wound irrigation; laceration repair; irrigation supply retrieval to supply setup end; emergency department length of stay; and wound irrigation. At the end of the visit, the clinician would be surveyed as to their satisfaction of the irrigation method used. After two weeks, patients were contacted to determine how their laceration healed and if there were any complications, infection, need for antibiotics, or unplanned visits to the emergency department.

Results: The study found that the use of the novel device significantly reduced clinician time spent on irrigation supply setup by 54.6% compared to the control group, and significantly reduced wound irrigation time by 45.9%. Additionally, clinicians significantly reported higher satisfaction irrigating with the novel device compared to the control. No statistically significant difference between groups was found concerning laceration repair time, wound outcomes, or overall emergency department length of stay.

Conclusions: This study demonstrated that the novel device saved time and materials in the emergency department without sacrificing quality of wound care and infection prevention. With quality and throughput as such important issues in our emergency departments this device could play a very important role.

Yes, authors have interests to disclose

Disclosure: Orlando Health

Employee

Orlando Health

## 240 Documentation and Compliance With Emergency Department Restraint Best Practices

Hoffman S, Raio C, Decena E, Tomkin T, Gaeta L, DeVoe D, Klein L/Good Samaritan University Hospital, West Islip, New York, US

Background: Physical restraint use for acute behavioral disturbance in the emergency department (ED) is commonplace but carries potential risk to patients as well. Given this risk, clear process, policy, and documentation compliance is essential. In this study, we report on the utilization of physical restraints in the ED and describe physician documentation practices during these events. This data has potential important implications on the safety of both the patients and the surrounding ED staff.

Methods: This is a retrospective single center study of patients that required physical restraints in the ED during a 24-month period. All patients requiring physical restraints are recorded in a log by ED security personnel, which is how patients were identified for inclusion. We reviewed each chart to describe demographics, safety and adverse events, as well as documentation compliance practices. We define documentation compliance referring to the standardized Joint Commission criteria for electronic ordering and components of written documentation for physical restraints.

Results: During the study period, we identified 196 patients that required the use of physical restraints while being cared for by emergency physicians. The mean age was 37, and 130 (66%) were male. The etiology of the behavioral disturbance was alcohol intoxication in 57 (29%), drug intoxication in 54 (28%), and psychiatric disease in 108 (55%). Medication was given for agitation in 191 (97%) encounters. The duration of restraint use was a median of 116 minutes (IQR 57-301). There were 9 patients that required intubation during their ED encounter all of which were due to refractory agitation or respiratory failure from intoxication, and were not considered restraint related. No patients suffered from cardiac arrest. There were no instances of documented physical restraint-associated injury. In regards to documentation compliance, a correct electronic order was placed in the EMR in 183 (94%) instances. An initial physician note was written in 177 (90%) charts, and an initial nursing note was written in 124 (63%) charts. The physician note included all required components in 153 charts (78%).

Conclusions: Physical restraint use occurs in the emergency setting in certain scenarios of acute behavioral disturbance. This presents a high risk period for the patient. We report no significant adverse events associated with restraint use and no restraint related injuries. We do however report a significant lack of compliance with electronic medical record ordering and documentation compliance, highlighting potential from improvement in care.

No, authors do not have interests to disclose

## 241 Characteristics Associated With Receiving a CT Among Individuals Meeting Criteria for a Non-Contrast Head CT in the Emergency Department

Hudepohl N, Gormley M, Chen S, Ozaki Y, Rochester A/Prisma Health, Greenville, South Carolina, US

Objectives: In 2008 the American College of Emergency Physicians (ACEP) released a clinical policy detailing recommendations for neuroimaging in adult patients with mild traumatic brain injury in the acute setting, yet few studies have reported clinical factors associated with compliance to these recommendations. The objective of this study was to determine compliance with performing a noncontrast head CT on individuals following mild trauma, and identify characteristics associated with receiving a CT among individuals who met criteria for a noncontrast head CT.

Methods: This IRB-approved retrospective cohort study assessed patients ($\geq$16 years) from January 1, 2021 to December 31, 2021, who presented to the emergency department (ED) at a large academic level 1 trauma center with a chief complaint of headache, motor vehicle crash, fall or trauma. Required a CT was defined as any individuals meeting ACEP Level A or B recommendations for receiving a non-contrast head CT (criteria considered included headache, vomiting, age >60 years, intoxication, deficit in short term memory, loss of consciousness, post- injury above clavicle traumatic amnesia, ejection from vehicle, pedestrian struck, or basilar skull fracture). A simple random sample of 500 individuals was selected from the eligible population to undergo independent chart review by two investigators.

Descriptive statistics were utilized to calculate the proportion of individuals who required a CT and the prevalence of receiving a CT. Unadjusted and adjusted logistic regression were used to identify characteristics associated with receiving a CT among individuals who required a CT.

Results: Of the 500 individuals in the simple randomized sample, 12 (2.4%) left against medical advice and were not evaluated, leaving a total of 488. Of these, 259 (53.1%) met recommendations for receiving a non-contrast head CT in the ED, 188 (72.6%) received a CT. Adjusted logistic regression showed Emergency Severity Index (ESI), Glasgow Coma Score (GCS) $\leq$ 14, and blood alcohol level were significantly associated with receiving a CT. Individuals with an ESI of emergent or immediate had nearly triple the odds of receiving a CT compared to those who were urgent/less urgent (OR=2.87, 95%CI=1.60-5.17). Individuals with GCS $\leq$ 14 were 5.4 times more likely to receive a CT compared to those with GCS of 15 (OR=5.38, 95%CI=2.12-13.67). Individuals with a blood alcohol level greater than 50 mg/dL were 5.3 times more likely to receive a CT compared to those whose blood alcohol level less than 50mg/dL (OR=5.29, 95%CI=1.50-18.71).

Conclusions: Only about three of every four individuals requiring a CT received a CT following mild trauma. Imaging utilization was associated with abnormal GCS, alcohol intoxication, and acuity of patient presentation. A better understanding of the clinical variables most associated with receiving a non-contrast head CT will guide feedback on imaging utilization. Imaging utilization stratified with variables associated with imaging completion would be one means of more timely feedback on appropriate imaging utilization and variation in clinical practice.

No, authors do not have interests to disclose

## 242 Leveraging Big Data in American College of Emergency Physicians Emergency Medicine Data Institute Registry to Find the Rate of Co-testing for HIV When Already Testing for Gonorrhea and Chlamydia

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Background: The Centers for Disease Control and Prevention (CDC) and US Preventive Services Task Force (USPSTF) guidelines recommend screening for human immunodeficiency virus (HIV) in patients aged 15 to 65 years, but especially for those at increased risk. Patients screened in the emergency department (ED) for gonorrhea (GC) and/or chlamydia represent an easily identified high-risk population that should also be co-tested for HIV unless known to be HIV positive. A current HIV co-testing rate of 4% when already testing for GC/chlamydia, identified in Nationwide Emergency Department Sample (NEDS), demonstrates a significant gap in co-testing. Our aim was to assess compliance with CDC and USPSTF guidelines for HIV testing in a large national sample of EDs, American College of Emergency Physicians' (ACEP)

Emergency Medicine Data Institute (EMDI) registry, by utilizing a novel process measuring the rate of HIV co-testing with GC/Chlamydia to evaluate compliance.

Methods: We examined encounter-level laboratory results data within the ACEP EMDI registry for calendar year 2021 to create estimates of ED care by querying tests for Gonorrhea (GC), chlamydia, and HIV testing. The data query was based on encounters and not individual patients. Two encounters by the same patient were counted as two encounters. We generated two value sets for GC/Chlamydia tests and HIV tests using the discrete Logical Observation Identifiers, Names and Codes (LONIC) standard. Unique encounter counts were then obtained by filtering laboratory results data using the two value sets separately and sequentially. We limited the study population to 2021 encounters from EDs which have laboratory results data within CEDR.

Result: We identified 40,960 encounters in which gonorrhea and chlamydia testing was performed and 23,595 encounters in which HIV testing was performed. Co-testing, both GC/chlamydia and HIV tests, was performed in 1,721 cases at a rate of 4.2% (Table 1).

Conclusions: Using ACEP's registry, a representative national ED visits data set, we found that despite CDC and USPSTF recommendations for HIV screening in high-risk patients like those undergoing STI evaluation, only a small proportion of patients are being tested. An HIV co-testing rate of 4.2% is similar to the 4% rate found in NEDS. We propose a process measure, co-testing of HIV when already testing for gonorrhea and chlamydia, to help benchmark ED HIV testing.

**Table 1.**

| Category | Unique Encounters |
|---|---|
| All encounters | 8,941,040 |
| GC/Chlamydia tests | 40,960 |
| HIV tests | 23,595 |
| Co-testing | 1,721 |

No, authors do not have interests to disclose

## 243 A Pilot Study to Measure Noise Levels for Mitigation in the Emergency Department

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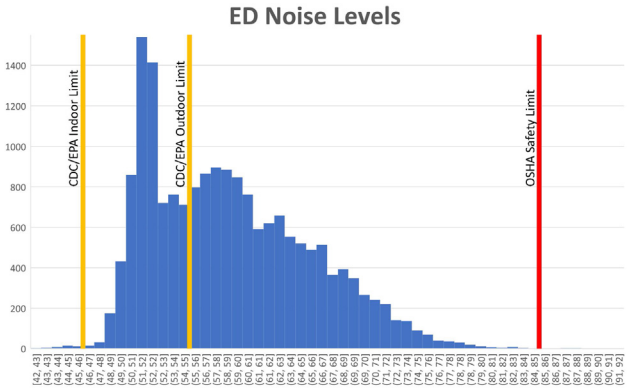
Objectives: The ED is a high-stress environment that can be further exacerbated by excessive noise levels. High noise levels can lead to negative health effects on healthcare workers, such as stress and burnout, and can negatively affect patient experience, leading to poor experiences, lower satisfaction, and increased risk of adverse events. We present pilot data from a study to measure the noise levels in the emergency department of our Level-1 Trauma Center. We aim to ultimately evaluate the impact of noise and mitigation efforts on the experience of the healthcare environment by staff and patients.

Methods: We began this work with a walking noise survey of our department, noting areas of particular interest. We then used a series of monitors (ennoLogic ES528L) to continuously measure noise levels at 5 second intervals around the busiest area of the ED over several 24-hour periods. We then analyzed the data for maximum and minimum noise levels, averages, and time durations above the accepted Centers for Disease Control/ Environmental Protection Agency (CDC/EPA) and Occupational Safety and Health Administration (OSHA) thresholds for general and workplace environments, respectively.

Results: We found that, within our samples, sound levels in our ED were consistently high, with average sound levels of 58 decibels across multiple areas, exceeding the CDC/EPA recommended limits for both the indoor noise (45 decibels) and the outdoor noise (55 decibels) levels, which represent the noise limits below which conversation and work can comfortably be maintained. Minimum noise levels over the days sampled were between 41.7 and 47.8 decibels. Noise levels exceeded 55 decibels for between 66.6% and 69.3% of the days sampled. We also found that noise levels exceeded OSHA safety limits of 85 decibels at least once each day in each area, although for very limited periods of time (1 minute or less).

Conclusions: High noise levels may negatively impact stress, attention, and satisfaction among patients and employees. This pilot work will further guide research and quality improvement efforts around assessing the impacts of noise in the ED and mitigating it with tools like acoustic ceiling tiles, sound- absorbing materials, and education programs to raise awareness and staff responses to the impact of noise on patients and health care personnel.




No, authors do not have interests to disclose

## 244 Using Community TeleParamedicine to Perform In-Home Fall-Risk Reduction After a Sentinel Emergency Department Encounter

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Background: Falls are the leading cause of fatal and nonfatal injuries in adults over 65 years of age, accounting for over 3 million emergency department (ED) visits annually. ED- initiated fall risk interventions demonstrate decreased ED utilization and hospitalizations. However, the vast majority of post-fall ED patients do not undergo any fall risk evaluation nor any fall prevention follow-up instructions.

Objectives: We leveraged an existing community teleparamedicine (CTP) program to perform at-home fall risk assessments and develop risk mitigation plans in geriatric patients discharged from the ED. Our primary aim was to determine feasibility with secondary goals of estimating potential reductions in avoidable healthcare utilization, facilitating follow-up, and improving patient-reported quality of life measures.

Methods: Geriatric patients were screened during index ED visits utilizing the CDC STEADI questionnaire. Patients identified as at risk for falls and agreeing to CTP participation were referred for a home visit within 72-hours of ED discharge. During the visit, providers used a modified STEADI evaluation including home hazards assessment, timed get-up and go test (TUG), medication reconciliation, mini mental status exam (MMSE), and psychosocial evaluation. Based on identified modifiable risk factors, providers developed an individualized fall-risk mitigation plan. A repeat CTP visit two weeks later evaluated implementation of this plan.

Finally, patients were called 30 days post index ED visit to assess perceptions of the program, interval events, as well as any ongoing needs.

Results: Between November 2022 and April 20 2023, 144 out of 450 (32%) approached patients were eligible for the study and all agreed to CTP intervention: 92 were referred to CTP while 52 were admitted to the hospital from the ED after enrollment. Of these, 53 have received their initial visit, 40 their follow-up visit, and 11 patients declined any CTP visit scheduling. Mean time from discharge to initial visit is 10.1 days (STD 9.1) and from initial to follow-up visit is 19.1 days (STD 5.0).

All patients except for one received a STEADI evaluation during their CTP visit. Of the 49 initial visits most patients had identified prolonged TUG tests (68.6%) and home hazards (43.1%). Almost one-quarter (21.6%) had a MMSE less than 24 as well as 21.4% with medication changes. 19.6% of patients were referred to physical therapy, 13.7% for home services, and 19.6% to an outpatient physician.

On two-week follow-up visits there were two new fall events. 46 patients have received a 30-day follow-up call with five (10.9%) falls without seeking care and 3 (6.5) fall related ED visits since the initial CTP intervention. There was no change in patients' STEADI score or Falls Efficacy Scale at 30-day follow-up compared to baseline surveys.

Conclusions: Our results suggest ED screening and post-ED discharge in-home fall risk evaluation and mitigation using Community TeleParamedicine is feasible, acceptable, and can identify areas of fall risk reduction in the home where most falls take place. Specifically, home hazards and gait instability were common and in addition

to immediate home modifications, many patients were referred to physical therapy or received additional home services and/or assistive devices. Additional medical needs include medication reassessment and further evaluation for cognitive decline. Future randomized trials will evaluate clinical and patient-reported outcomes.

No, authors do not have interests to disclose

## 245 Patterns of Chemical Restraint Use for Emergency Department Patients With Acute Mental Health Distress

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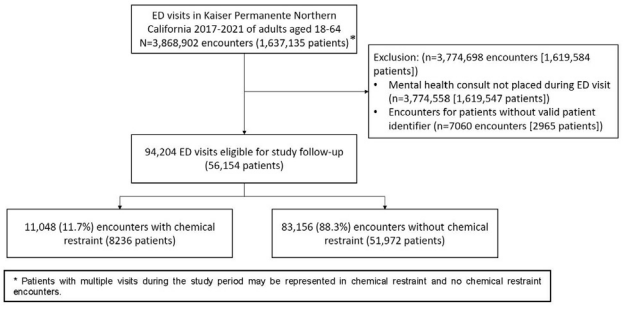
Objectives: Recent literature describes racial disparities in use of physical restraints among emergency department (ED) patients. Granular data on the more commonly applied chemical restraints and potentially serious adverse outcomes are not well characterized. We sought to describe patient characteristics and adverse outcomes associated with receiving nonconsensual chemical restraint in the ED.

Methods: We conducted a retrospective study of adult patients aged 18-64 years who presented to one of 21 Kaiser Permanente Northern California (KPNC) EDs in 2017-2021 and for whom a mental health consultation was initiated. Chemical restraint was defined as an initial intramuscular dose of sedating and/or antipsychotic medications given in the ED. We defined our composite adverse outcome as supplemental oxygen administration above baseline use, intubation, or cardiac dysrhythmia during the ED stay, and ICU admission. We conducted generalized estimating equation (GEE) analysis with a logit-link function to estimate adjusted odds ratios (aOR) and 95% confidence interval (CI) to assess characteristics associated with receipt of chemical restraint. If an adverse outcome occurred during a visit, we described visit characteristics (eg, length of stay, concomitant physical restraint).

Results: A total of 94,204 ED visits (56,154 patients) met the cohort selection criteria, 11,048 (11.7%) received nonconsensual chemical restraint, and 3,544 (3.8%) experienced an adverse outcome. Median patient age was 34 years (IQR 25 to 48), and 46,948 (49.8%) visits were for male patients. Characteristics associated with a higher adjusted odds of chemical restraint included Black race (aOR 1.38, 95% CI 1.27-1.50) compared to white race and Medicaid/Medicare (aOR 1.38, 95% CI 1.29-1.48) compared to Kaiser Permanente (KP), commercial insurance. Higher adjusted odds of chemical restraint were also associated with concomitant physical restraint (aOR 33.05, 95% CI 30.28-36.08), EMS or law enforcement arrival (aOR 1.51, 95% CI 1.43-1.60) compared to self-arrival, and involuntary mental health hold placement (aOR 1.66, 95% CI 1.56-1.77). Patients' age, sex, and need for interpreter services were not associated with nonconsensual chemical restraint. Of the 3,544 ED visits with an adverse outcome, median length of stay was 16.1 hours (IQR 8.5 to 25.8), 413 (11.7%) involved concomitant physical restraint, and 2,031 (57.3%) had involuntary mental health hold placement.

Conclusions: We observed higher odds of nonconsensual chemical restraint use among patients arriving via EMS or law enforcement, those who had concomitant physical restraint use or involuntary mental health hold placement, as well as Black and Medicaid/Medicare insured patients. Adverse outcomes were infrequent. Further work is needed to understand how factors including comorbid mental health conditions and unmeasured confounders (system, provider, and patient characteristics) may impact the use of nonconsensual chemical restraint.

**Figure 1. Flow diagram of total encounters with and without chemical restraints**




No, authors do not have interests to disclose

## 246 Utility of Emergency Department Diagnostic Testing in Medical Clearance of the Psychiatric Patient

Lovett S, Patel P, Lew G, Rech M/Loyola University Medical Center- Trinity Health; Loyola Stritch School of Medicine, Chicago, Illinois, US

Objectives: Mental health complaints comprise 8% of patient visits to the Emergency Department (ED), with visits increasing since the COVID-19 pandemic. Inpatient psychiatric facilities require an assessment of medical stability prior to accepting a psychiatric admission, often creating delays in patient transfer from the ED. This study aimed to evaluate the utility of laboratory and radiologic testing both after clinical evaluation by the ED provider, and as requested by the accepting facility prior to transfer for inpatient psychiatric admission.

Methods: This is a retrospective review of patients who presented to either an urban academic tertiary care center ED or an associated community hospital ED from January 2018 to January 2019 for medical clearance prior to transfer to a primary psychiatric facility. We evaluated standard tests that are required by majority of facilities (e.g complete blood count (CBC), basic metabolic panel (BMP), serum ethanol level (ETOH), urine drug screen, and urine pregnancy in females of childbearing age) as well as additional requests for testing by the receiving facility. The primary outcome was to determine if additional requested labs or radiologic testing by the accepting psych facility resulted in any change in patient disposition. Secondary outcomes include what proportion of our inpatient psychiatric admission transfers have abnormal results, and the clinical relevance and impact of the abnormal results on patient management and ultimate disposition.

Results: Eight hundred twenty-two patient ED encounters with mental health related complaints and possibility of inpatient transfer for psychiatric admission were reviewed. 614 patients (74.7%) had all standard medical clearance labs required by many facilities ordered immediately by the ED provider. Psychiatric facilities requested additional testing in 68 (8.3%) of patients. The most requested additional testing included computed tomography (CT) of the head, EKG, and serum troponin levels. None of requested additional testing changed patient management or final disposition from the ED. In initial work-up based on clinical exam by the ED provider, a CT head was ordered in 87 (10.5%) patients, an EKG in 297 (36.1%) patients, and a troponin in 83 (10%) of patients. 51 patients (6.2%) had some minor change in management due to abnormal laboratory or radiographic findings (potassium repletion, antibiotics initiated, or intravenous fluids given for example). However, disposition decision was changed in only 1 (0.1%) patient that was found to have a subdural hematoma on head CT and was admitted to the intensive care unit.

Conclusions: Medical clearance is a necessary component of evaluation for patients prior to psychiatric admission. While clinical evaluation by an ED provider may trigger warranted laboratory or radiologic testing, requested testing after ED evaluation from the psych facility did not lead to medical admission or changes in management in our study population.

No, authors do not have interests to disclose

## 247 Acute Healthcare Utilization Among Schizophrenia or Related Conditions and Bipolar Disorder Before and After COVID-19

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Objectives: Mental health resources continue to be a challenge in most communities and emergency departments (EDs) often care for patients with acute mental health issues. The COVID-19 pandemic led to changes in ED utilization patterns in many populations and potentially exacerbated mental health issues. The purpose of this study was to assess trends in ED utilization of patients with schizophrenia or related condition and bipolar disorder over a four-year period in California.

Methods: This was a multicenter retrospective study to identify trends of ED utilization among patients 18 years or older with schizophrenia or related schizo-affective conditions (SCH) and bipolar disorder (BPD) from 2018-2021 using non-public data from the Department of Health Care Access and Information (HCAI) ED and inpatient discharge databases. Data were from all licensed, non-federal, acute care hospitals in California. Patients were identified by primary diagnosis (SCH included ICD-10 codes F20 – F29; BPD included ICD10 codes F31.X). Overall utilization and admission rates are reported per 100,000 ED visits per year and differences and associated 95% confidence intervals are reported.

Results: ED visits increased from 11.8 million in 2018 to 12.0 million in 2019, but decreased to 10.2 million in 2020 and 10.9 million in 2021. The rate of ED visits per 100,000 ED visits among SCH and BPD remained relatively constant from 2018 to 2019 (894.8 to 874.9 per 100,000 ED visits; decrease of 19.9 ±4.5 visits) and increased dramatically from 2019 to 2020 (1001.9 per 100,000 ED visits in 2020; increase of 127 ±10.1 visits). This was due a larger decrease in non-SCH and BPD visits. There was a slight decrease from 2020 to 2021 (1001.9 to 938.4 per 100,000 ED visits; decrease of 63.5 ±7.8 visits) due to an increase in overall ED visits, but the increase in SCH and BPD was minimal, from 102,103 to 102,220 ED visits. The proportion of admission among SCH and BPD patients remained between 46.1% and 46.9% over the four-year period.

Conclusions: The rates of visits were prior to COVID-19 but went up after the pandemic began. This was likely due to the fact that the rest of the ED visits went down for other medical issues during pandemic, which indicates that these patients continued to go to the ED for care, pandemic or not. For admissions, these data suggest that patients with these types of mental health conditions will continue to require inpatient care.

Yes, authors have interests to disclose

Disclosure: BioXcel Therapeutics

Consultant/Advisor BioXcel Therapeutics

## 248 Assessing Emergency Department Clinician Confidence in Identifying Alcohol Use Disorder and Prescribing Medically Assisted Treatment

Winters M, Lembo B, Weick R, McCarthy D, Ogedegbe C, Nierenberg R, Kleven J, Perotte R, Hewitt K/Hackensack University Medical Center, Hackensack, New Jersey, US

Background: A systematic review article from 2019, demonstrated that there is a paucity of published research regarding initiation of naltrexone in the ED for AUD, and as a result, there is a significant gap in provider knowledge. The COMBINE study revealed that the use of medications like naltrexone in combination with screening and brief intervention can have clinically significant outcomes, highlighting that delivery of effective treatment can occur in health-care settings where specialized addiction treatment is not available. Naltrexone is one of three FDA approved medications for AUD, and has robust evidence demonstrating a number needed-to-treat of 9 for decreasing moderate to heavy drinking days in persons with AUD. Previous studies have described rates of screening and brief intervention in the primary care setting, however to our knowledge no studies have been published describing the confidence and barriers for emergency physicians in identifying AUD and prescribing MAT. This study addresses a unique opportunity for provider-linked educational intervention as well as identification, and increased awareness for linkage to the appropriate treatment services for many patients with AUD as the ED may be their only point of contact within the healthcare system.

Objectives: The goal of this study is to assess the confidence physicians have in identifying alcohol use disorder (AUD) and prescribing naltrexone for medically assisted treatment (MAT) upon discharge from the emergency department (ED). The study uses a survey tool and structured interviews to determine what possible barriers exist, and employs an educational module to address those barriers; secondary objective is to determine whether we can address, mitigate or eliminate possible impediments to physicians treating patients with AUD utilizing this model.

Methods: We will be utilizing a quasi-experimental study design implementing a pre-test survey, an educational intervention (learning module) and a post-test survey. The anonymous surveys will contain pertinent questions surrounding existing knowledge of AUD, use of MAT, and what possible barriers to patient identification and prescribing exist. Study subjects include ED attending and resident physicians practicing across10 hospitals within our Hackensack Meridian Health network. We will augment and inform the survey instrument with initial structured focus group interviews designed to assess possible physician barriers.

Results/Conclusions: This is an ongoing study that has not completed participant recruitment at the time of submission. Preliminary results should be obtained by October 2023. This study received funding from the New Jersey Healthcare Foundation, in February 2023.

No, authors do not have interests to disclose

## 249 WITHDRAWN

## 250 Impact of Housing Status on an EMS-Led Leave-Behind Naloxone Program: A Retrospective Analysis

Enayati D, Burner E, Pickering T, Abramson T/Los Angeles County + USC Medical Center, Los Angeles, California, US

Objectives: Persons experiencing homelessness (PEH) are at increased risk for opioid-related morbidity and mortality. Naloxone is essential in preventing deaths among PEH with substance use disorders; however, PEH have reduced access to opioid use disorder treatments, including naloxone, compared with housed individuals. A leave behind naloxone program allows Emergency Medical Services (EMS) providers to distribute naloxone kits to patients of all housing statuses and their support systems. While homelessness is associated with higher rates of EMS administered naloxone as a treatment for opioid overdose, the influence of housing status on the distribution of leave-behind naloxone is unknown. This study aims to identify if housing status is associated with distribution of leav- behind naloxone by EMS providers.

Methods: This was a retrospective database analysis of Long Beach Fire Department (LBFD) electronic patient care reports from 8/1/21 to 12/31/22. Patients were included if EMS had administered naloxone for treatment of opioid overdose. Patients were excluded if they had experienced cardiac arrest, respiratory arrest requiring advanced airway, or death. The primary outcome was the distribution of leave-behind naloxone. Secondary outcomes included transport status, age, gender, Glasgow Coma Scale (GCS), respiratory depression (respiratory rate $<12$ breaths per minute), time of day, and EMS administered naloxone dosage. Descriptive statistics were generated and logistic regression models were constructed to examine the association of homelessness with receiving leave-behind naloxone, adjusting for declining transport to hospital, age, and sex.

Results: 1,013 incidents met inclusion criteria. 80 incidents were excluded. Final sample size was 933. The mean age was 44 (SD 17), 71.3% were male, and 25.5% were documented as experiencing homelessness Of these incidents, 71 resulted in distribution of leave-behind naloxone. In unadjusted models, homelessness was not associated with receiving leave-behind naloxone. After adjusting for transportation, age, and sex, PEH were 0.55 times as likely to receive leave-behind naloxone compared to those who were not experiencing homelessness (CI 0.26-1.13, $p=0.11$). Leave-behind naloxone was statistically significantly associated with being younger ($p=0.012$), male ($p=0.030$), higher initial GCS ($p=0.013$), declining transport AMA ($p<0.001$), and higher EMS-administered naloxone dose ($p<0.001$).

Conclusions: EMS leave-behind naloxone distribution is significantly associated with younger age, male sex, and refusing hospital transport. There may be an association between homelessness and leave-behind naloxone; larger sample sizes are needed to further explore this potential association. By expanding access to naloxone among PEH, EMS led leave behind naloxone programs may help prevent deaths among those who are most at risk of opioid-related mortality.

No, authors do not have interests to disclose

## 251 Comparing the Efficacy of Video-Stylet and Pentax AWS® in Simulated Cadavers With Ludwig's Angina: A Cross-over Randomized Controlled Trial

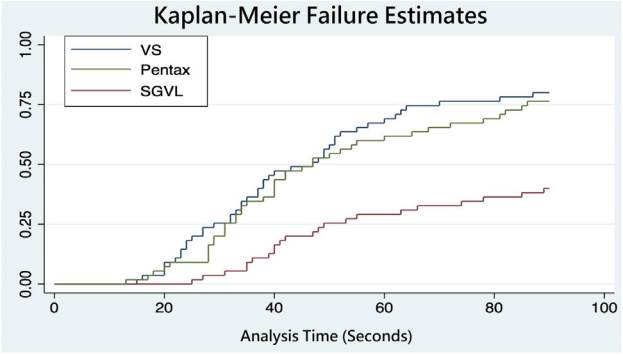
Lee C-W, Yung-Cheng/Dalin Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Chiayi, Taiwan

Objectives: Ludwig's angina (LA) is a life-threatening infection that can affect the floor of the mouth and neck, potentially causing serious airway obstruction. In such cases, rescue airway management and oxygenation can be challenging due to swelling of the mouth floor, trismus, and limited mouth opening. The aim of this study was to assess the efficacy of Trachway video-stylet (VS) and Pentax compared to the standard geometric video-laryngoscope (SGVL) in simulated cadavers with Ludwig's angina.

Methods: Three fresh frozen cadavers were prepared with varying degrees of difficulty to simulate the airway conditions of patients with LA, including mouth floor swelling, restricted mouth opening, and trismus. Fifty-five postgraduate doctors participated in the study and received training in airway management using SGVL, VS (Trachway), and high-angled channeled blade (Pentax-AWS S-200) devices. Participants were randomly assigned to intubate simulated cadavers using the three devices in a random order, and intubation times and success rates were recorded. Participants also rated the difficulty of intubation using a visual analogue scale (VAS) score.

Results: The success rates for intubation within 90 seconds were 40.0% for SGVL, 81.8% for VS, and 76.4% for Pentax. VS and Pentax had significantly higher success rates than SGVL, with hazard ratios of 3.42 and 2.70, and 95% confidence intervals (CI) of 2.04-5.73 and 1.61-4.55, $p<0.001$, respectively. The odds ratios of successful intubation for VS and Pentax were 8.10 and 6.33, respectively, with a 95% CI of 3.69-17.78 and 2.39-16.72, $p<0.001$, compared to SGVL. The VAS score was significantly correlated with intubation success rate and time.

Conclusions: In cases of LA, the use of VS and Pentax AWS® is preferable over SGVL. These findings suggest that using VS and Pentax can improve intubation success rates and reduce intubation time in patients with LA.




No, authors do not have interests to disclose

## 252 Effect of Real-Time Carbon Dioxide Sensing Stylet-Assisted Endotracheal Intubation: A Case-Crossover Manikin Simulation Study

Kim Y, Joo YH, Kim KH, Hong KJ, Kang HJ, Moon BH, Lee HJ, Song KJ/Seoul National University Hospital, Seoul, Seoul, KR

Objectives: Endotracheal intubation is a very important skill in emergency medicine. Safe and rapid endotracheal intubation is essential for a good prognosis in patients requiring airway management. We have demonstrated the effectiveness of real-time carbon dioxide (CO2) sensing stylet in porcine experiment. The aim of the study is to evaluate the effect of the real-time CO2 sensing stylet on first attempt success rate of manikin simulation in three different situations.

Methods: A case-crossover manikin simulation experiment was conducted with forty subjects including paramedics, EMTs, and students who voluntarily participated. Forty subjects are randomly assigned and divided into two groups of twenty subjects each. One group performed experiments using a real-time CO2 sensing stylet follow by conventional intubation using direct laryngoscopy with a washout period of at least 5 days. Another group performed conventional intubation first and used a real-time CO2 sensing stylet after a washout period. Experiments were conducted under three different situations. The first was normal tracheal intubation (normal), the second was neck immobility (immobilization), and the third was situation on chest compression during CPR (CPR). The primary outcome was first attempt success rate, and the secondary outcome was total procedure time. The McNemar test was used to compare the first attempt success rate, and a linear mixed effect model was used to compare the total procedure time.

Results: Twenty subjects were assigned to the real-time CO2 sensing stylet first group and the conventional intubation using laryngoscope first group. There were no significant differences between each group for baseline characteristics. Compared to the conventional intubation using laryngoscope, the first attempt success rate showed a higher (normal: 100.0% vs. 82.5%; p-value = 0.01, immobilization: 97.5% vs. 80.0%; p-value = 0.04, CPR: 100.0% vs. 95.0%; p-value = 0.49) in the real- time CO2 sensing stylet group. The total procedure time observed a shorter (median [IQR], normal: 23.5 (19.2-28.4) vs. 31.6 (22.2-59.7); p-value <.001, immobilization: 24.4 (20.4-30.8) vs. 28.6 (22.6-56.9); p-value = 0.003, CPR: 23.1 (19.6-31.4) vs. 25.1 (18.6-32.4); p-value = 0.37) in the intervention group.

Conclusions: In manikin simulation, there is a significant difference in the first attempt success rate and total procedure time between real-time CO2 sensing stylet group and conventional intubation using direct laryngoscope group. Further investigation should be considered to improve endotracheal intubation success rate using novel device in real world.

No, authors do not have interests to disclose

## 253 AIRWAY-XR: Augmented Instruction to Refine Wayfinding and Yielding Skills in Emergency Medicine Residents for Intubation Using Mixed Reality Technology

Bhavsar N, Sriram S, Coleman D, Sulcov A, Fortenko A, Lame M, Greenwald P, George J, Sigaras A/New York Presbyterian Cornell Emergency Medicine, New York, NY, US

Objectives: The ability to maintain a patient airway is critical in emergency situations. Training in intubation and airway management is essential for Emergency Medicine (EM). Traditional approaches to airway education include textbooks, didactics, assisted practice on airway trainers, and direct patient contact. Mixed reality (MR) technology provides an opportunity to enhance the learning experience by allowing an immersive, interactive, and engaging training environment. The objective of this study is to establish the feasibility of an MR airway education module that we plan to compare to a more traditional airway teaching in a later non-inferiority trial.

Methods: We collected preliminary data at the Protected Airway Collaborative (PAC). PAC is an advanced airway course that uses an innovative learning delivery system to bridge the digital/physical divide to deliver complex concepts, skills, and procedure training. Users were asked to operate the Microsoft HoloLens 2, a HIPAA compliant MR device, capable of audio and video communication and 2D/3D digital content placement onto the real world. Users were coached to intubate mannikins complete with upper airway anatomy and two inflatable lungs with an esophagus connected to an inflatable balloon mimicking the stomach. During intubation, the user's field of view (FOV) was annotated with images and highlights identifying key structures while observing how the user intubated. Microsoft Teams was utilized as the platform for video sharing during sessions. We utilized pre- and post-test surveys to assess prior experience with the technology and the overall user experience.

Results: During PAC, we collected pre- and post-survey data from our users including Emergency Medicine Attendings, Residents, APP (Advanced Practice Provider) Residents. 12 users filled in a pre-survey survey, and 9 users completed a post-survey. When asked to rate their computer skills on scale of "Poor" – "Excellent," 8 % said "Fair," 17% said "Good," 58% stated "Very Good," and 17 % stated "Excellent." When asked about prior experience with AR/VR/MR prior to the session, 58% said "Yes," while 42% said "No". On the post-survey, when asked to rate their overall experience from on a scale of "Poor" – "Excellent", 33% said, "Very Good," while 67% said "Excellent." When asked "How easy was it to get comfortable with the HoloLens as a coaching tool?" on a scale of "Very Easy" – "Very Hard," 11% said "Normal," 22% said "Easy" while 67% said "Very Easy."

Conclusions: The study at this time is limited given the small census and exclusively testing group A. We understand this is a preliminary dataset but from the positive engagement from learners at PAC, future enrollment will include a clinical trial

of MR as an educational and telemedicine tool. We plan to enroll 21 of our new EM interns into two groups, group A with HoloLens 2, and group B with current traditional didactics. We will have two aims in mind: 1) assessment of a telemedicine remote training scenario with a PAC instructor coaching an EM intern remotely and 2) assessment of effective intubation with complex airway scenarios and simulations when using MR. If HoloLens is non-inferior to traditional didactics, this presents us with a unique opportunity to establish an innovative class for intubations with scalable, reproducible, and easily deployed technology, and without limitations of current methodologies regarding staffing, location, timing or availability.

Figure 1 – Side by Side view of an EM resident and a remote instructor during an intubation session in Mixed Reality during PAC

No, authors do not have interests to disclose

## 254 Brazilian Airway Registry COoperation: The First 1,000 Emergency Intubations of the BARCO Study

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Objectives: There is an information vacuum about how airway management is performed in severely ill patients in the Emergency Department (ED) in Brazil. Our initiative to address this gap is the Brazilian Airway Registry COoperation (BARCO) that will collect data on endotracheal intubations (ETI) performed across Brazilian EDs. Here we present the first 1,000 reported intubations.

Methods: This is an observational prospective cohort study of intubations performed in 11 EDs across several regions of Brazil launched in March 2022. We collected data about each procedure immediately afterwards in a standardized REDCap survey filled by an observer who participated in the procedure. We excluded centers with a compliance rate < 90% per month. The study endpoints were first pass success (FPS) rates and major adverse peri-intubation (MAPI) events (severe hypoxemia ($SpO_2$<80%), new hemodynamic instability and cardiac arrest) occurring within 30 minutes after tracheal intubation. We calculated risk ratios (RR) with 95% confidence intervals (CI).

Results: We report the first 996 ETI in our registry. Bag-valve masks (51.3%) and non-rebreather masks (31.9%) were the most common methods of pre-oxygenation. Providers used apneic oxygenation in 23.2% of cases. Rapid sequence intubation was used in 82.9% of all intubations and drugs such as etomidate (56%), ketamine (30%), succinylcholine (58.1%), and rocuronium (32.8%) were commonly administered. In contrast to the North American literature, fentanyl was used in 24.3% of the intubations. Videolaryngoscope (VL) was used in 20.9%, and 36.5% of all intubations were performed with bougies. Capnography was available in 31% of the intubations. The first operator was a PGY-1 at 44.3%. Overall FPS rate was 78.4%. The highest FPS rate of 87.2% was achieved in an emergency medicine training center. In contrast, the lowest FPS rate of 63.9% was observed in an ED that used neuromuscular blockers sparingly (11% of cases). The use of VL during the first attempt was associated with higher FPS rates (RR 1.11; CI 1.03 – 1.19). There was post-intubation hemodynamic instability in 19.3% of cases, severe hypoxemia in 11.2% of cases, and cardiac arrest in 3% of cases. In general, centers with emergency medicine programs were associated with a lower risk of MAPI events (RR 0.75; CI 0.62 – 0.92). Additionally, first attempts by emergency physicians had a higher chance of success (RR 1.10; CI 1.03 – 1.17) and lower chances of severe hypoxemia (RR 0.59; CI 0.40 - 0.87) compared to non-emergency physicians.

Conclusions: BARCO is the first initiative of its kind in South America. The FPS rates in Brazil are similar to those reported in international centers. Best practices, like Rapid Sequence Intubation, are commonly used for endotracheal intubation in most of our EDs. The use of VL may lead to better FPS rates; however, it is only available in a minority of the centers. There are probably multiple factors that explain the reduction of MAPI events in ED with training programs, but it shows the importance of developing the specialty of emergency medicine throughout our country.

No, authors do not have interests to disclose

## 255 Clinical Outcomes Following Uniform Compared to Non-Uniform Dosing of Rapid Sequence Intubation Medications in the Emergency Department

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Objectives: Rapid sequence intubation (RSI) involves near-simultaneous administration of a sedative and neuromuscular blocking agent. These medications are typically dosed by weight, but some clinicians employ uniform dosing where most adult patients receive the same predetermined dose for RSI. We sought to compare first attempt success and complications between weight-based dosing and uniform dosing.

Methods: We analyzed data from the National Emergency Airway Registry (NEAR) from January 2016 to December 2018 (the most recent available version), which comprises intubation data from 25 emergency departments. We included adult (≥14 years) patients who underwent orotracheal intubation facilitated by a sedative (ketamine or etomidate) and a neuromuscular blocking agent (succinylcholine or rocuronium). We defined uniform dosing as receiving both the most common dose of etomidate or ketamine and the most common dose of succinylcholine or rocuronium for a given site. All other doses were considered non-uniform. The primary outcome was first-attempt success. Secondary outcomes included hypotension and hypoxemia. We tabulated the proportion of patients who received the recommended dose and those who were underdosed or overdosed according to weight for each group. Propensity score analysis was used to compare outcomes between groups.

Results: We identified 14,036 patients, including 5,699 who received a uniform dosing strategy and 8,337 who did not. Within the uniform dosing group 92% received etomidate and 54 % received rocuronium. The median dose of etomidate was 0.3 mg/kg (IQR: 0.2-0.3 mg/kg) and the median dose of ketamine was 1.3 mg/kg (IQR: 1.1-1.4 mg/kg). The median dose of rocuronium was 1.25 mg/kg (IQR: 1.1-1.4 mg/kg) and the median dose of succinylcholine was 1.8 mg/kg (IQR: 1.4-2.5 mg/kg). Underdosing of the neuromuscular blocking agent occurred in 23% of cases while overdosing occurred in 40% of cases. Within the non-uniform dosing group 85% received etomidate and 53% received rocuronium. The median dose of etomidate was 0.3 mg/kg (IQR: 0.3-0.4 mg/kg) and the median dose of ketamine was 1.4 mg/kg (IQR: 1.0-2.0 mg/kg). The median dose of rocuronium was 1.1 mg/kg (IQR: 1.0-1.3 mg/kg) and the median dose of succinylcholine was 1.5 mg/kg (IQR: 1.3-1.8 mg/kg). Underdosing of the neuromuscular blocking agent occurred in 32% of cases while overdosing occurred in 18% of cases. The uniform and the non-uniform dose cohorts showed similar rates of first-pass success 91% and 88% respectively with a propensity-score adjusted difference of 1.3% (95% CI: 0.0% to 2.6%). Hypotension occurred in 3% of cases within the uniform dosing group and 5% of cases within the non-uniform dosing group with a propensity-score adjusted difference of -0.8% (95% CI: -1.5% to -0.1%). Hypoxemia occurred in 8% of cases within the uniform dosing group and in 9% of cases within the non- uniform dosing cohort with a propensity-score adjusted difference of -1.2% (95% CI: -3.2% to 0.7%).

Conclusions: In this large registry analysis, providing uniform dosing, compared to non-uniform dosing, was associated with similar incidence of first-pass success and complications. Further prospective study of dosing strategies for RSI medications is warranted, as fixed doses may preserve physician cognitive bandwidth during emergency care.

No, authors do not have interests to disclose

## 256 Emergency Physicians Initiate Proper Lung Protective Ventilation Tidal Volumes Three-quarters of the Time After Emergency Department Rapid Sequence Intubation

Madsen W, Villegas D, Buena C, Weyers B, Miller J, Bihrer S, Slattery D/Kirk Kerkorian School of Medicine at UNLV, Las Vegas, Nevada, US

Objectives: Lung protective ventilation (LPV) strategies based on ideal body weight (IBW) are well established. High tidal volumes ($V_T$) have been strongly linked

to ventilator induced lung injury, however, there is also data that suggests $V_T$ below 6-8 mL/kg may also be harmful. The benefits of LPV go beyond preventing lung injury; it has been shown to decrease mortality rates, hospital length of stay, and costs. A recent study showed that only 58.4% of patients who were intubated in an emergency department (ED) had $V_T$ consistent with LPV. Our objective is to determine the proportion of adult patients undergoing rapid sequence intubation (RSI) in the ED who have IBW-appropriate initial $V_T$ settings and to determine if patient sex influences $V_T$ settings.

Methods: Setting: Academic (PGY 1-3), county ED, and level I trauma center. Design: Structured, retrospective chart review. Inclusion criteria: Adult (age >17) patients who underwent RSI in the ED. Exclusion criteria: patients intubated by EMS, any patient who suffered peri-intubation cardiac arrest, pregnant patients, patients in police custody, or cases with missing data. Two trained and monitored abstractors, blinded to the study purpose, used a standardized data collection tool/dictionary to extract demographics and initial ventilator setting data. Initial ventilator settings and patient's height in inches were recorded from the electronic medical record. The following calculations for IBW were used: Male IBW = 50 kg + 2.3 kg × (height (in) – 60) and Female IBW = 45.5 kg + 2.3 kg × (height (in) – 60). Interrater reliability was measured. The primary outcome was the proportion of patients with appropriate initial ventilator settings defined as those within the recommended 6-8 ml per kg (using IBW) $V_T$. The secondary outcome was the difference in proportions of appropriate $V_T$ between male and female patients. We report proportions and 95% confidence intervals as appropriate and compare male and female $V_T$ settings using chi square.

Results: 212 patients comprised the final cohort during the study period. The median (IQR) age was 60.0 (48.3-71.0) years, and 39.6% were female. Primary outcome: 157/212 = 74.1 % (95% CI = 67.8, 79.5) had IBW appropriate initial ventilator settings. Secondary outcome: There was no difference in the proportion with appropriate ventilator settings between male and female subjects; however, when out of range, male patients were below 6-8 ml/kg range 96.9 % of the time, and females were above proper range, 78.3 % of the time (see table). Limitations: single center, inherent limitations of retrospective data, and ordering clinician not documented.

Conclusions: In our center, initial ventilator settings are within optimal LPV range 74% of the time. There was no difference in the proportions with optimal LPV settings based on gender; however, in general females were over-ventilated and males were under-ventilated. We hope these results are helpful for those working to improve safe ventilation practices in their ED.

**Table-Secondary Outcomes**

| | N | N In Range | % in Range | 95% CI | N out of range | N too high | % too high | 95%CI | N too low | % too low | 95%CI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | 128 | 96 | 75 | (66.8, 81.7) | 32 | 1 | 3.1 | (<0.01, 17.1) | 31 | 96.9 | (82.9, 99.9) |
| Female | 84 | 61 | 72.6 | (62.2, 81.1) | 23 | 18 | 78.3 | (57.7, 90.8) | 5 | 21.7 | (9.2, 42.3) |

No, authors do not have interests to disclose

## 257 Tele-Ophthalmology Has Low Acceptance and Use in the Emergency Department for Non-Traumatic Injuries

Haskins P, Redlener M, Vargas-Torres C, Bonadio W, Legome E/Mount Sinai Morningside and West Hospitals, New York, NY, US

Objectives: Emergency department (ED) patients may require ophthalmologic consultation to evaluate for vision threatening disease or injury. Tele-ophthalmology offers a potential opportunity to allow ocular visualization from outside the ED and may improve timeliness of consultation treatment and disposition decisions.

Our eight ED health system implemented a tele-ophthalmology program to decrease the need for in-person ED ophthalmology consultation and improve the timeliness of consultation. The ED and ophthalmology attending staff had a brief training on the basics of the process and machine prior to implementation with follow-up updates. The initial ED exam included basic ophthalmoscopy (without dilation), visual acuity, and evaluation of extraocular muscles and surrounding areas. Based on specific complaints, other common parts of the exam may have included the slit lamp examination, fluorescein staining, tonometry, and imaging. Once the consult was initiated, the process included a discussion by the ED provider (generally a resident physician, physician assistant, or attending physician) followed by the use of a bi-directional tele-ophthalmology machine that allowed for an evaluation of the anterior aspect of the eye and periocular area or one of several other options including follow up alone, ED in-person evaluation, OR, admission or transfer.

Methods: Using a standardized template data abstraction form, consecutive ophthalmology consults (n=183) for 5 months, (5/21-9/21) from two system sites with the same faculty were reviewed. Six records were unavailable for review. Several possible scenarios may occur after consultation order. On initial review, they were stratified into consultation by phone alone (+/- chart review/photograph uploads to the electronic chart) or telehealth. Both branch points were followed by several potential options (eg, admission, in person visit, operating room, outpatient follow-up, transfer).

Results: One hundred eighty-three patients had a consultation placed during the time frame; 177 records were available for review. Nine (5%) proceeded to tele-ophthalmology consultation. Eight of the TE consults (89%) were for traumatic injuries. All were discharged. One patient had a non-traumatic complaint and was transferred to a site with in-house ophthalmology. Of those who had verbal consultation without proceeding to tele-ophthalmology (n=168), 67 (40%) were given outpatient follow-up directly, 2 (15%) were transferred for ophthalmology admission or operating room and 76 (45%) had an ED in-person visit, with 8 of those requiring a procedure in the ED.

Conclusions: While effective when used, tele-ophthalmology had a relatively low acceptance rate by ophthalmology consultants. Trauma examinations were the main use and they generally allowed for discharge home. While not directly explored, the lack of ability to visualize the posterior portion of the eye as well as ophthalmologist comfort was likely the main reason for reluctance to use. Improving use would require both options to visualize the posterior chamber of the eye as well as understanding and addressing ophthalmologists' reluctance to use.

No, authors do not have interests to disclose

## 258 Emergency Department in Home: A Novel Approach to Delivering Acute Care to Patients in Home

McGrath M, Estrella D, Patsiogiannis V, Zambrano J, Dvorkis Y, Ekstrom T/Medically Home Group, Boston, Massachusetts, US

Objectives: Describe the delivery of emergency department in home (EDiH) care to patients in their homes as a substitute for emergency department (ED) care. Describe use of in-home health service utilization, rates of transfer to a brick-and-mortar ED, and patient status 7-days post EDiH encounter.

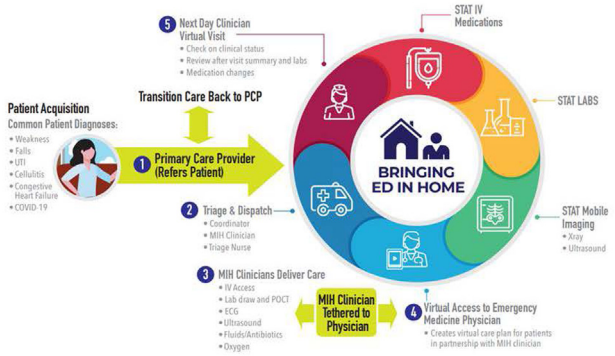
Methods: Design: EDiH rapidly delivers acute episodic care to patients at home. The intervention operates in three phases: patient intake, care delivery, and care transition. Eligible patients are triaged by experienced ED nurses and cared for by in-home mobile integrated health (MIH) clinicians within two hours of referral with medical direction from a virtual emergency medicine (EM) physician. Patients receive acute care at home including labs, imaging, and medications. Setting: A patient's residence in Massachusetts, whose care is managed by Atrius Health, an ambulatory healthcare delivery system. Type of participants: Adult patients who required evaluation for their acute symptoms.

Results: EDiH delivered acute episodic care to 3,666 patients from January 1, 2021, through December 31, 2022. Patient average age was 79 years old; 68% of patients were female and 29% male. Patient race/ethnicity include 77.6% white, 7.3% Black or African American, 1.9% Asian, 1.6% Hispanic or Latino, and 0.2% American Indian or Alaska Native. Chief complaints include dizziness, fever, shortness of breath, Covid-19, urinary tract infections and falls.

After the EDiH encounter 3,056 of 3,666 (83.4%) of patients remained at home; 610 (16.6%) were escalated to a hospital ED; 510 (83.6%) of patients that were escalated to an ED, were admitted to the hospital. Of 3,056 patients who remained at home, 380 (12.4%) patients had an ED visit within 7-days of their EDiH visit; of the 380 patients who had an ED visit within 7-days, 325 (85.5%) were admitted to a hospital.

Conclusions: EDiH is a feasible and safe program that delivers ED-level care to adults with acute symptoms, as an alternative to traditional facility ED care. This innovative model has the potential to reduce crowding in hospital EDs, reduce facility utilization, and improve patient experiences in acute care.

**Figure 1.** The Emergency Department in Home Operating Model




Yes, authors have interests to disclose
Disclosure: Medically Home Group
Employee
Medically Home Group
Disclosure: Atrius Health
Employee Atrius Health

## 259 Estimating the Rate of Telehealth-Able Emergency Department Visits: A Look at National Data

Tune N, Zachrison K, Pines J, Zheng H, Hayden E/Massachusetts General Hospital, Boston, Massachusetts, US

Objectives: In the wake of the COVID-19 pandemic, emergency department (ED) crowding has accelerated. Moving some emergency care to telehealth could reduce crowding. We sought to identify the proportion of in-person ED encounters that could potentially be conducted by telehealth using national ED data. We term this "telehealth-able."

Methods: This was a retrospective observational study using data from the 2019 National Hospital Ambulatory Medical Care Survey (NHAMCS). The 2019 NHAMCS data included 19,481 ED encounters from 269 Emergency Service Areas of the hospitals surveyed. These ED encounters were weighted to estimate a representative sample of annual visits to US EDs. Any ED visits for patients over the age of 4 years were included in the study. We used two approaches to identify potentially telehealth-able ED visits: 1) a stepwise elimination of encounters based on ED visit characteristics (disposition, procedures, medication administration) and 2) patient-described reason for visit (RFV), stratified by age. In each approach, we estimated what proportion of ED visits could potentially be conducted via telehealth. In the second approach, we also added a "Video Plus" estimate considering a hypothetical visit with availability of a subset of outpatient diagnostic testing.

Results: The 2019 NHAMCS dataset represented 150.6 million ED visits. Using Visit Characteristics, 17% of annual in-person ED visits were categorized as telehealth-able for patients over the age of 4 years. Using Reason For Visits instead of Visit Characteristics, the proportion categorized as telehealth-able varied by patient age. In aggregate, 12% were estimated to be telehealth-able with Video Only and 27% for Video Plus. Younger patients were more likely to be rated as telehealth-able, with the proportion of telehealth-able visits decreasing with age, excluding those patients under 4 years.

Conclusions: Using two distinct methods of analysis, we found that between 12 and 27% of annual ED visits may be appropriate for EM-based telehealth, depending on patient age and availability of outpatient testing. Increased use of telehealth in emergency care delivery may be a key strategy to address current capacity challenges.

No, authors do not have interests to disclose

## 260 Creating an Open Source Resident/Student Telehealth Collection

Miller J, Wang L, Hayden E, Fabiano A, Chandra S, Whitehead D, Kolkin A, Dickens J, Hou P, Nash C, Tomovic M/University of Connecticut, Hartford, Connecticut, US

Objectives: Amidst the post-pandemic creation of educational telehealth resources and the publication of Association of American Medical Colleges (AAMC) Telehealth Competencies, we recognized that medical education did not have a structured, accessible collection for trainees. After an extensive search of published telehealth education content, it was noted that a few programs and schools had individualized institutional academic improvement plans for incorporating telemedicine, but there weren't any generalizable, open access resource platforms for telehealth education materials. To address this resource gap, we sought to create a workforce capable of delivering high-quality telehealth care by building a structured collection of resources for undergraduate and graduate medical education.

Methods: To address this need in medical education we created a working group of medical students, Emergency Medicine (EM) faculty members and residents to build an open-source telehealth collection. The working group chose to focus on materials appropriate for resident-level education in general, not specific to EM. We identified open source, educational materials across a variety of MedEd platforms including peer reviewed articles, websites, video/audio segments, seminars, national organization position statements, and categorized them by the designated AAMC Telehealth Competency domains (Patient Safety and Appropriate Use, Access and Equity, Communication, Data collection and Assessment, Technology, Ethical Practices and Legal Requirements). We assessed each resource using the Revised Medical Education Translational Resources Impact and Quality (rMETRIQ) scoring system to determine level of quality and prioritize inclusion in the final collection.

Results: Hundreds of resources were evaluated by the working group and 199 were selected for initial rMETRIQ scoring. Resources were excluded if deemed to be duplicates, not useful for learners, or unable to be accessed without subscriptions. Using inter-rater congruence we compared two scores (faculty and trainee) of each resource. We defined congruent scores as rMETRIQ score +/-1. Scoring is ongoing at this time and near completion. Preliminary data suggests congruence amongst the scores across multiple AAMC Competency Domains. Identifying these resources proved challenging and time-intensive due to the publication of these resources across many platforms without a unifying system of organization. This yearlong working group created a collection of open source telehealth resources that can be used by institutions across the country for resident and medical student education.

Conclusions: As telehealth adoption in medicine has skyrocketed over the past few years, medical education has not kept up with the educational needs of future physicians entering into the workforce. Since current telehealth resources are siloed and poorly organized, creating a comprehensive, structured, ready-made collection for medical education is beneficial as telehealth continues to expand and the need for training future providers increases.

Yes, authors have interests to disclose
Disclosure: iDoc TeleHealth Solutions (https://idocvms.com)
Stockholder
iDoc TeleHealth Solutions (https://idocvms.com)
Disclosure: Takeoff Health
Stockholder Takeoff Health
Disclosure: Previous Consultant for Borealis Ventures
Consultant/Advisor
Previous Consultant for Borealis Ventures

## 261 Predictive Modeling: Telehealth Calls Are an Indicator of Emergency Department COVID-19 Surges

Slovis B, Ji X, Chang AM, Kairys J, Hollander J/Thomas Jefferson University, Philadelphia, PA, US

Objectives: The COVID-19 pandemic is one of the deadliest in history with multiple waves of infections leading to emergency department surges. During the pandemic, there was increased use of telemedicine services. Our hospital system had an established on-demand telemedicine program (JeffConnect) that had performed over 100,000 synchronous audio-video visits prior to 2020 and were able to leverage and scale this service to meet the needs of the pandemic. The capability to precisely predict increased volumes in the emergency department could allow for preparation for the negative consequences of overcrowding. The objective of this study was to determine if patient self-initiated telemedicine call volumes could be applied in generating a predictive model of Emergency Department surges during the COVID-19 pandemic.

Methods: This IRB-approved retrospective cohort study examined patients who self-initiated on-demand telehealth care in Philadelphia, PA using JeffConnect between January 1, 2020 and June 30, 2022 and compared telehealth use rates to emergency department arrivals. We included all patients who had Synchronous audio-video on-demand telehealth visits or emergency department visits during the study period. We

performed an autocorrelation assessment between on-demand telehealth visits and emergency department visits to determine time intervals and features for regression modeling. We created a multivariate linear regression model based on a curated time series with time intervals ranging from 2 to 7 days lead time, to predict future emergency department visits. We used 80% of the data set for training, and 20% as test data.

Results: There were 42,429 on-demand telehealth calls during our study period, of which 43.6% were COVID-19 related. There were 540,686 emergency department visits of which 3.9% were diagnosed with COVID-19. Our predictive model demonstrated that COVID-19 related telehealth calls 3 days ($p=0.011$) and 2 days ($p=0.026$) prior were predictive of emergency department encounters ($R^2 = 0.85$, $p<0.001$). Emergency department visits with 1 day, 1 week, 2 weeks and 3 weeks lead time were also highly predictive of emergency department visits ($p<0.001$ for all).

Conclusions: This study demonstrates that frequency of telehealth calls related to COVID-19 were an accurate predictor of emergency department encounters 2-3 days later, though overall emergency department visits were also highly predictive of higher future visit rates. This implies that while upward trending emergency department encounter should be considered as a barometer for future surges, COVID-19 related telehealth visits are also highly predictive. Limitations of this study include: 1) this was a single health system in the region covered by the telemedicine providers, and may not be externally valid, 2) We did not match the two encounter types nor severity of illness at the patient level so are unable confirm direct links between patients calling telehealth and then going to the emergency department. Our study demonstrates that telehealth calls related to COVID-19 are highly predictive of emergency department encounters within 2-3 days. This brief but critical window could allow for enough time to modify emergency department staffing and supplies to meet the needs of future COVID-19 waves. Future research could examine the relationship between telemedicine calls as a predictor of other causes of emergency department surges.

No, authors do not have interests to disclose

## 262 Impact of the COVID-19 Pandemic and Research Publications in Emergency Medicine

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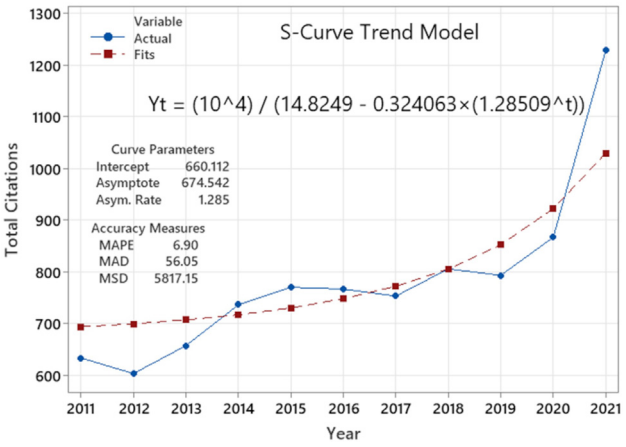
Objectives: The COVID-19 pandemic instigated a significant transformation in the domain of scientific journals, the role they play in sharing acute information, and the attention they receive from the public. As a result, there was a significant increase in publications and citations per publication during the COVID-19 pandemic. Our aim was to determine how emergency medicine (EM) journals and their influence may have adapted to this time. We hypothesized that publications from the field of EM would increase their impact.

Methods: We utilized the SCImago Journal and Country Rank resource to investigate the trend of EM publications' impact from 2011 to 2021, the most recent year on file. Our primary outcome was the trend of total citations. The annual number of total citations by a journal was measured as the total number of citations of that journal for documents published in the prior 3 years. Our secondary outcome was the trend of citations per publication over the study period. The citations per publication were measured as an average of citations per document in the two years prior. For example, the citations per document for Journal X in the year 2020 is an average of the citations per document received in 2020 for documents published in 2018 and 2019. Time series analysis was used to estimate the trend by utilizing the best fit curve, judging from each curve's measure of accuracy.

Results: We analyzed the top 16 EM journals as ranked with SCImago's journal rank indicator. The average total citations across the top 16 EM journals indicated an upward trend over the pandemic, especially in 2021. The best fit model was an S-curve with a numerator of 10,000(Figure 1). Similarly, the average total citations per publication of the top 16 EM journals continued to increase over time, achieving its highest level in 2021. We observed that *The Annals of Emergency Medicine* also reflected these trends, best fit by quadratic models. Although there were yearly declines in total citations from 2018 through 2020, there were steep rises in total citations and citations per publications in 2021.

Conclusions: Citation activity across top EM journals, and specifically *Annals of Emergency Medicine,* underwent a dramatic increase during the COVID-19 pandemic. While there had been a steady trend of increases in both total citations and citations per document in EM journals since 2011, the spike during the COVID- 19 pandemic was unprecedented. The time series models indicated an explosive growth of citations in the year 2021. These trends suggest that the impact and relevance of EM has grown significantly since the onset of COVID-19. It will be interesting to see if the trend continues and is something we hope to investigate in the future.




No, authors do not have interests to disclose

## 263 Trauma Activations From Electric Scooter, E-bike, and Moped Use Before and During the COVID-19 Pandemic

Sanky C, Ren J, Meshel A, Chou R, Youssef D, Sackey J, O'Halloran R, Meyers C/Icahn School of Medicine at Mount Sinai, New York, NY, US

Background: Motorized personal vehicles, including electric scooters, e-bikes, and mopeds, have become increasingly prevalent in the United States. At the beginning of the COVID-19 pandemic, use of such vehicles expanded rapidly, especially with avoidance of public transportation modes, quarantine protocols, and travel restrictions.

Objectives: This study sought to characterize the frequency and patterns of injury among patients presenting to a New York City emergency department/trauma center who utilized personal motorized transportation devices. We hypothesized that the more widespread use of these vehicles led to both higher rates of injury and specific patterns of traumatic injury.

Methods: This retrospective, nonconcurrent cohort study included adult patients presenting to a single trauma center in New York City after using a motorized scooter, e-bike, or moped between 3/1/2019 and 9/1/2021. Participants were separated into two cohorts: before COVID-19 (3/1/2019-2/29/2020) and during COVID- 19 (3/1/2020-2/25/2021). Demographic and patient characteristics, injury patterns, length of stay, and hospital courses were characterized and compared.

Results: During the COVID-19 pandemic, more patients using motorized scooters, e-bikes, and mopeds presented with traumatic injuries (92 to 148). Compared to the period before the pandemic, these patients more frequently required full trauma team activations, have a longer length of ICU stay, have Medicaid insurance, present on weekends, and have operations within 48 hours as the result of multisystem injuries (all statistically significant with $p<0.05$). For patients presenting with concomitant alcohol use, their serum ethanol levels were higher during the COVID-19 pandemic than those presenting in the period before (215.4 vs. 133.7, $p<0.01$).

Conclusions: Consistent with prior research on personal motorized transportation devices, this study demonstrates a pattern of multisystem injuries with use of such devices following the start of the COVID-19 pandemic. Future research should investigate the impact of harm reduction strategies such as correlation with bike lane and street redesign campaigns, helmets, and training for use of personal motorized transportation devices.

No, authors do not have interests to disclose

## 264 Baseline Measures of Resident and Faculty Confidence Perceptions on Leading Level 1 Traumas Prior to Implementation of a Novel Training Program

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Objectives: Trauma continues to be one of the largest causes of mortality worldwide, and Emergency Medicine (EM) physicians should have the skills and confidence to lead trauma teams, particularly in rural areas or standalone facilities in order to reduce the gap in quality of care and facilitate better patient outcomes. We developed a novel training program to facilitate EM resident confidence and competency to lead level 1 traumas. The program includes a Standardized Direct Observation Tool (SDOT) that provides longitudinal, specific and actionable feedback on key metrics during trauma resuscitations. We assessed EM resident's self-efficacy, perceived knowledge and skills, and attitudes towards faculty feedback prior to implementation in order to provide focus to training efforts and permit evaluation of the new program.

Methods: A cross-sectional survey of EM residents (PGY 2 and 3) provided baseline measurements of their confidence, perceptions, and attitudes towards their trauma training. These items were scaled according to a 4-point Likert-type scale (strongly disagree, disagree, agree, strongly agree). Faculty were also surveyed on these same characteristics related to the residents (e.g., I am confident residents can lead Level 1 traumas). Descriptive statistics illustrate the number and percent endorsement of each item on the survey, and Fisher's exact test assessed differences between the resident and faculty responses on like items. An $\alpha = 0.05$ was the threshold for statistical significance.

Results: Twenty-one EM residents (87.5%) and 14 faculty (77.7%) completed the pre-implementation survey. Almost half (47.6%) of the residents disagreed or strongly disagreed that they are confident to lead level 1 traumas. The majority agreed they have the knowledge (66.7%) but disagreed they have the skills (57.1%). Notably, 42.8% of residents disagreed or strongly disagreed that feedback received from faculty was actionable and specific, while 57.1% disagreed or strongly disagreed that feedback was consistent. Faculty, similar to residents, were asked about their confidence in EM residents to lead level 1 traumas ($p = 0.407$), and there were no statistically significant differences in resident and faculty belief that post-trauma feedback is actionable and specific ($p = 0.203$, 0.316, respectively). However, residents and faculty responses were significantly different when asked about the consistency of the feedback ($p = 0.022$). Faculty responded with more favorable attitudes towards consistency than residents (78.6% vs. 29.4% agreed or strongly agreed, respectively).

Conclusions: The development of confidence to lead a level 1 trauma is critical among EM residents who may serve as the sole physician in an emergency department. There is considerable variability in the levels of confidence in which residents lead trauma resuscitations. The results of this pre-implementation survey will allow us to provide focused trauma training and the design of the SDOT in order to develop the confidence and skills needed to run a level 1 trauma, and the appropriate faculty training to better educate and deliver consistent, actionable feedback to residents.

No, authors do not have interests to disclose

## 265 Trauma Education Practices in Emergency Medicine Residencies: A Survey of Program Directors

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Objectives: Emergency physicians must have the skills and confidence to lead trauma teams in rural settings that may lack trauma or surgery specialists. Anecdotally, few emergency medicine (EM) residency programs have formal systems to evaluate resident readiness to lead traumas; they are assumed competent at time of graduation. However, program structure and the coexistence of surgery or anesthesia residency programs can limit repetition and hands-on training. This study aimed to describe current practices among EM residencies to elucidate gaps in training and evaluation for trauma team lead competency.

Methods: Program directors on the Council of Residency Directors in Emergency Medicine listserv completed a survey about their program practices specific to the division of invasive procedures and trauma leads, standards of competency assessments, and confidence in their emergency medicine resident physicians' leading trauma resuscitations. We distributed the survey via listserv to 260 program directors in April 2023. Analyses included calculation of the number with percent endorsement of each item, as well as the Fisher's exact test to assess differences in endorsement across trauma level ($\alpha = 0.05$ defined *a priori*).

Results: A total of 57 program directors responded to the survey (21.9% response rate). Of these respondents, 44 were from Level I trauma centers, 9 were Level II, and 4 were Level III. Significantly more Level II and III centers send residents to other sites for trauma experience compared to Level I ($p = 0.000$). The majority of EM directors noted their residents participate in airway management (100.0%), thoracostomy (87.5%), EFAST (96.4%), central venous access (83.9%), and trauma team lead (78.6%) when managing traumas. Thoracotomy participation was notably lower (39.2%) with a statistically significant difference in endorsement between Level I (25.6%) and Level II and III (88.9% and 75.0%, respectively; $p = 0.000$). The majority of programs share procedures with more than 50% stating that EM manages the airway and share invasive procedures by side or day (even/odd) with surgery residents. However, only 66.7% share team lead; 19.3% said EM takes the lead on all traumas and 15.8% said surgery takes the lead on all traumas. This was not significantly different across trauma levels. Lastly, program directors noted that simulations (81.8%), didactics (72.7%), and year in training (74.6%) are used to assess competency. Fewer reported using standardized direct observational tools (SDOT) (24.5%). Notably, 75.4% of program directors endorsed they are very confident in their graduating residents' ability to manage trauma independently and few (8.8%) reported trauma experience as being identified as a deficiency with the Residency Review Committee or by resident feedback.

Conclusions: Trauma training and confirmation of competency is critical among EM residents who may serve as the sole physician in an emergency department. There is currently considerable variability in which residents lead trauma resuscitations. To assess competency, most programs use evidence-based evaluation methods though few employ the SDOT. SDOTs are useful in procedural training and may be beneficial in more cognitively based tasks such as trauma resuscitation. Future research should explore the use of SDOTs for training and evaluations in EM programs.

No, authors do not have interests to disclose

## 266 Micro-Transit Injuries Admitted to an Urban Trauma Center: A Trauma Registry Review

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Objectives: Micro-transit (bike, scooter and board) injuries are a major public health concern associated with significant physical, emotional, and economic consequences. With the proliferation of the newer motorized versions (e-bike, e-scooter, e-board), there is limited research on the epidemiology of injuries related to their use. The aim of this study was to evaluate the epidemiology of micro-transit injuries resulting in admission to the hospital.

Methods: A retrospective study design was utilized to describe the characteristics of patients with micro-transit injuries admitted to an urban, community hospital's regional trauma center between 1/1/2021 and 12/31/2022. Information was collected from the trauma registry using pre-defined data collection forms, including patient demographics, injury characteristics, mechanism of injury, location of injury, severity of injury (ISS), and outcome. Descriptive statistics are reported. Chi- square and Student's T test were used to estimate associations (95% confidence intervals (CI)). The study received approval from our institutional review board.

Results: A total of 147 patients with micro-transit injuries were included in the study. The majority of patients were male (71.4%) and the mean age was 40.6 years (range 5-84). The most common mechanism of injury was a collision with a motor vehicle (64.6%), followed by falls (26.5%). The most frequently injured body regions were the extremities (59.9%), head and neck (26.5%) and chest (17.7%). The most common injuries were fractures (65.6%), followed by soft tissue injuries (21.3%) and traumatic brain injuries (13.1%). The mean length of hospital stay was 4.2 days and the median ISS was 5, with 7 patients having an ISS score of $> 15$. A total of 68 patients (46.3%) required admission to the intensive care unit, 9 (6.1%) went directly to the OR and 1 patient died as a result of their injuries. Motorized micro-transit vehicle riders accounted for 24.5% of the admissions (32 e-scooter, 2 e-boards and 2 e-bikes). Pedal bikes accounted for most of the non-motorized presentations 98 (88%), followed by 10 scooter and 3 skateboard. 50.3% of riders were helmeted. There was no statistical difference between riders of electric versus manual vehicles (52% vs 44%, 95% CI: 0.44-1.66). The median ISS was significantly higher in the e-transit group, 7.5 vs 5.0 (t-stat – 2.73, 95% CI: 0.69-4.3, p=0.007).

Conclusions: This study begins to fill an important gap in the literature on micro-transit injuries. Orthopedic and head injuries predominate. Patients presenting using e-

transit vehicles had a higher ISS. The study was limited by the reliance on retrospectively derived data from a regional trauma registry of admitted patients only. A prospective study of all patients presenting to the ED to gather more detailed risk factors, patient characteristics, patterns of injury and the severity of micro-transit injuries is in order.

No, authors do not have interests to disclose

## 267 Identifying Occult Shock in Young Trauma Patients Using Logistic Regression Analysis of the 2020 National Trauma Data Bank

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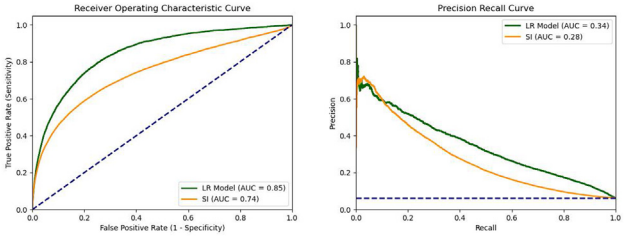
Objectives: Young healthy trauma patients have a high reserve capacity to compensate for life threatening hemorrhagic shock and may present to the ED with seemingly innocuous vitals. Identifying patients at risk of decompensation allows for early mobilization of ED resources and can potentially reduce in-hospital morbidity and mortality. The shock index (SI) was developed to identify patients in occult shock using the systolic blood pressure and pulse rate. This tool, however, ignores several other important patient variables that may indicate impending decompensation. Our objective was to use the 2020 National Trauma Data Bank (NTDB) to build a logistic regression (LR) supervised machine learning model and compare its performance to the shock index.

Methods: A retrospective study was performed using the 2020 NTDB that includes a total of 1,135,018 patients presenting to any of the 780 participating US trauma centers during the 2020 calendar year. The database was queried for demographic data, initial ED vitals, GCS, trauma type and whether a blood transfusion was done in all patients aged 16-44 with initial systolic blood pressure greater than 90 mmHg. The database did not provide a lactate level, so blood transfusion within 4 hours was used as a surrogate for shock. SI was calculated as pulse rate divided by systolic blood pressure for each patient. Initial ED systolic blood pressure, pulse rate, respiratory rate, GCS and trauma type were included as variables for the LR machine learning algorithm. The dataset was split 75%/25% into the training or testing set respectively. Receiver operating characteristic (ROC) curves and Precision Recall (PR) curves were calculated for the SI and LR model. The optimal threshold for the sensitivity and specificity were determined to be at the maximum Youden's J Statistic. Analysis and graphing was done using the Anaconda python distribution.

Results: 244,062 patients were included in the study. There were 181,273 male patients and 62,789 female patients. There was a total of 187,191 blunt injuries and 50,920 penetrating injuries. 6.4% of the patients received a blood transfusion. The LR model outperformed the SI in predicting the occurrence of a blood transfusion in both the ROC area under the curve (AUC) and PR AUC. The ROC AUC for the LR model is 0.85 versus 0.74 for the SI. Similarly, the PR AUC for the LR model is 0.34 vs 0.275 for the SI. At the optimal threshold (0.441 for the LR model, 0.826 for the SI), the LR has a higher sensitivity (79% vs 59%) but a slightly reduced specificity (75% vs 80%) to the SI.

Conclusions: The logistic regression machine learning algorithm has superior performance in detecting occult shock in young patients compared to the shock index in this retrospective study. Unfortunately, the NTDB did not include lactate, MAP, or diastolic blood pressure which limited the analysis. While the LR model does not directly measure shock, it does predict the clinically relevant outcome of blood transfusion in young trauma patients. Further studies need to be conducted to prospectively validate the LR model and determine whether its clinical application will improve trauma outcomes.




No, authors do not have interests to disclose

## 268 Epidemiology of Urban Micro-Transit Injuries

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Objectives: Motorized micro-transit vehicles (e-bikes, e-scooters & e-boards) have become increasingly popular; reports of injuries associated with their usage are also rising. The aim of this study was to describe the patterns, characteristics, and severity of motorized micro-transit (MMTV) related injuries among patients treated in the emergency department (ED) and to compare these to manual non-motorized bicycle (CMTV) related injuries.

Methods: This is a prospective observational study conducted at a regional trauma center. Patients of all ages presenting to an urban, community ED between 11.1.2022 and 4.30.2023 were enrolled in an IRB-approved MicroTransit Registry. A specific case report form was used to identify the vehicle type (MMTV or CMTV), safety behavior (use of a helmet/safety gear), and circumstances of the event (e.g., driver/passenger or pedestrian, recreation/business). Additional information about patient demographics, injury characteristics and disposition were documented. Descriptive statistics are reported. Chi-square, Fisher's exact, and logistic regression models were used to estimate associations (95% confidence intervals (CI)).

Results: One-hundred and one patients were entered into the registry (93 drivers, 2 passengers and 5 pedestrians) during that period. The mean age was 35 (range: 13, 64), 83% men, 46% white, and 32% non-Hispanic. Eighty-four percent (84%) of patients arrived by ambulance, 74% of events were a result of collision with another vehicle, 17% required Level 1 Trauma activation and 24% required injury-related admission. Seventy-two of the injured were MMTV drivers (31, Mopeds, 22 eBikes, 16 eScooters, 2 eScooters with seat), 50% wore helmets, 10% were riding rentals and 29% used the vehicle for business (food delivery). Isolated lower extremity injuries accounted for 49% of the pathology, 29 patients (31%) had isolated head injury (3 requiring intervention), and the remaining 20% were multi- trauma. After controlling for age, mechanism, helmet use, location of injury there was no significant difference in injuries requiring hospitalization for MMTV incidents compared to CMTV (OR 1.18, 95% CI 0.3 to 4.5). Of note, all 3 patients with traumatic brain injuries were MMTV users without helmets.

Conclusions: There are limited data describing epidemiology micro-transit injury patterns. Our early data suggest that motorized micro-transit vehicle injuries are not more severe than those sustained during manual bicycle riding. We are continuing to enroll and expect to have data that will allow us to explore more granular patient demographics (zip codes and insurance status), the impact of mechanism of injury (collision vs non-collision), types of micro-transit, safety behavior, and associated substance use on injury patterns and outcomes.

No, authors do not have interests to disclose

## 269 Inhaled Glucocorticoids for Acute Pharyngitis: A Randomized Clinical Trial

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Objectives: The primary objective of this randomized control trial was to compare the efficacy of a single dose of nebulized dexamethasone and budesonide to a placebo in improving sore throat among patients with acute pharyngitis at 24 hours. The secondary objective was to assess the efficacy at 48 hours, the incidence of hospital admission, and the rate of re-attendance to ED.

Methods: Patients were randomly assigned to receive a single dose of nebulized dexamethasone, budesonide, or placebo. The patients were evaluated 24 and 48 hours after treatment for improvement of sore throat. The analysis plan included descriptive statistics using means and proportions. The treatment arms were compared using chi-square for the primary outcome. The trial is registered at the Clinicaltrial.com NCT04027322.

Results: A total of 163 patients with acute pharyngitis were enrolled in this study. The results showed that there was no significant difference between nebulized dexamethasone, budesonide, and placebo in terms of improving sore throat at 24 and 48 hours; RR= 2.22 (95%CI 0.81-5.1) and 1.05 (95% CI 0.90 to 1.22) respectively. There is no significant difference between the study arms in the rate of re-attendance to the emergency department, hospital admission, or absence from work at seven days of follow-up. In terms of safety, all three treatments were well tolerated, with no significant adverse events reported.

Conclusions: In conclusion, this study found no evidence that a single dose of nebulized dexamethasone or budesonide is more effective than a placebo in improving sore throat among patients with acute pharyngitis. Further research is needed to

determine the optimal dose and duration of treatment with these ICSs in the treatment of acute pharyngitis.

No, authors do not have interests to disclose

## 270 Appropriate Emergency Severity Index Assignment and Timely Pain Management for Emergency Department Patients With Vaso-occlusive Crisis

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Objectives: Emergency department (ED) care is crucial for patients with sickle cell disease (SCD) with acute pain from a vaso-occlusive crisis (VOC). Due to the severity of pain and the need to assess for other life-threatening etiologies, the Emergency Severity Index (ESI) requires designation of a high acuity (ESI level of 1 or 2) for patients with VOC. There are no emergency medicine policy guidelines for pain management of VOC, however multidisciplinary guidelines by the American Society of Hematology and the American Pain Society advise treatment with parenteral analgesics within 60 minutes of ED arrival. The primary goals of our study were to assess how frequently ED patients presenting for VOC management: 1) received an ESI level of 1 or 2; and 2) received recommended pain management within 60 minutes of ED arrival.

Methods: A multicenter retrospective cohort study of ED visits from 11/8/2017 – 10/17/2021 of patients $\geq$ 18 years old presenting to 11 EDs for treatment of VOC were identified through ICD-10 diagnosis codes. The primary outcome was treatment with parenteral opioids, ketamine, or ketorolac within 60 minutes of ED arrival and triage ESI level. Factors associated with failure to receive recommended pain management within 60 minutes of ED arrival or failure to receive an ESI triage level of 1 or 2 were identified using multivariable logistic generalized estimating equations (GEEs) and are reported as odds ratios (ORs) with 95% confidence intervals.

Results: A total of 581 visits from 87 distinct adult patients were identified. The median number of repeat visits from a single patient was 2, with an interquartile range (IQR) of 1 – 4.5. The median patient age was 28 years (IQR 23 - 47), 50.3% were male, 94.7 % were Black or African American, and 94.5% were non- Hispanic. There were 277 (47.7%, 95% CI: 43.6-51.8%) patients treated with parenteral opioids, ketamine or ketorolac within 60 minutes of ED arrival. Seventy-four (12.8%, 95% CI: 10.2-15.8%) patients were triaged at ESI level 1 or 2, 78.7% at ESI of 3, and 5.7% ESI level 4. After accounting for patient age, sex, race, and ethnicity, patients who did not receive an ESI level 1 or 2 were 51% less likely to be treated with parenteral opioids, ketamine or ketorolac within 60 minutes of ED arrival (OR = 0.49, 95% CI: 0.27 – 0.87, p = .015). Younger patients were less likely to receive an ESI level of 1 or 2 (per 5 years: OR = 0.74, 95% CI: 0.66 – 0.84, p < .001).

Conclusions: We found that only 48% of patients with VOC received recommended pain management within 60 minutes of ED arrival, and only 13% were assigned an ESI level of 1 or 2. Patients who did not receive an ESI level of 1 or 2 were 51% less likely to receive recommended pain management within 60 minutes of ED arrival. Efforts to improve care for patients with VOC must include addressing appropriate triage ESI designation and timely pain management.

No, authors do not have interests to disclose

## 271 Acupuncture Treatment in the Emergency Department Reduces Pain and Revisits

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Objectives: Pain is one of the most common conditions for an emergency department (ED) visit. Using acupuncture for treatment of pain in the ED is not standard practice in the U.S. In July 2021 our ED implemented acupuncture as an alternative analgesia treatment strategy for patients with acute or intractable chronic pain (ED-ALT program). Our objective is to report patient outcomes and ED staff perception of acupuncture treatment as an alternative treatment for pain.

Methods: This is a retrospective cohort analysis in an urban academic ED (annual census 130,000). Adult patients with intractable acute or chronic pain of any origin that was not improved with standard ED pain treatments were offered acupuncture treatment. We excluded patients that required medical or surgical treatment for their pain, did not speak English or Spanish, or had missing data or incomplete 3-month follow-up. Acupuncture treatment was performed by staff members of our institution's pain service who are board-certified specialists in acupuncture. We calculated descriptive statistics for demographics, pain medicines used pre- and during the ED visit, and 3-month follow-up data.

Results: Between 7/1/2021 and 6/30/2022, 247 patients were referred for acupuncture by the ED and 158 met our study inclusion criteria. Among patients in the study, 60% were female, race/ethnicity was 58% African American/Black, 29% Latinx, 5% Asian, 5% White (non-Hispanic), 3% Other, and mean age was 52 years (SD 14; range 21 to 94). Thirty percent received their initial acupuncture treatment in the ED, and all were referred for additional treatment in the acupuncture clinic. Mean pain score at ED presentation was 7.96 (SD 2.11) and mean final ED pain score after acupuncture treatment was 3.88 (SD 2.13). Prior to acupuncture, non- opioid analgesia was administered in the ED in 79% cases and an opioid was administered in 11%. Only 3.8% of patients received an opioid prescription at time of discharge. Over the next 30 days, only 5% had a repeat ED visit for pain. At clinic follow up, 98.5% were "highly likely" or "likely" to recommend acupuncture for pain relief to a friend. Most ED staff (65%) perceived that acupuncture availability reduced their opioid prescriptions to patients with pain, and 35% perceived that acupuncture treatment in the ED reduced the admission rate to the hospital for pain.

Conclusions: The use of acupuncture decreased ED pain scores and nearly all patients were satisfied with acupuncture treatment during their 3-month follow-up. ED staff perceived a reduction in opioid prescriptions and admission rates. Since acupuncture was offered as an alternative analgesia strategy for all intractable painful conditions in this first year, our next steps will define optimal ED indications for acupuncture treatment and examine the actual reduction in opioid prescriptions and hospital admissions.

No, authors do not have interests to disclose

## 272 Evaluation of an Emergency Department-Based Over-the-Counter Analgesic Medication Starter Pack Initiative and Subsequent 30-Day Revisits

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Objectives: The PAMI ED-ALT Over-The-Counter (OTC) Starter Pack Initiative was implemented in the emergency department (ED) of an urban, academic safety- net institution beginning April 2021 as part of an ED-wide alternatives to opioids program. The goal of the initiative is to increase use of OTC non-opioid options by providing four OTC analgesic medications (acetaminophen, diclofenac 1% gel, ibuprofen, and lidocaine 4% patch), which are dispensed in the ED, free-of-charge to patients with pain who are experiencing financial and healthcare access barriers. This study compared 30-day all-cause ED revisit rates in PAMI OTC-Starter Pack program participants before and after program assistance.

Methods: This was an IRB-approved chart review of ED visits made by OTC Starter Pack program participants from January 1 - October 31, 2021. Demographics, number of ED visits in the prior 12 months, ICD10 codes, medications, acuity, Charlson Comorbidity Index scores, ED disposition, and pain scores were collected for all ED visits. Index visits (January 1- September 30, 2021) were defined as the first visit with a disposition of discharge and revisit as any subsequent visit within 30 days of the index visit. A fixed effects analysis with multivariable logistic regressions was conducted comparing all-cause ED revisits in program participants *prior* to program assistance ("usual care visits") to their revisit rates *after* program assistance ("OTC-assisted visits"). A fixed effects analysis was chosen to mitigate bias from unobserved time-invariant participant characteristics that were not included as variables in the analysis. Participant-specific fixed effects, number of ED visits in the prior 12 months, Charlson Comorbidity index (0, 1-2, 3-4, 5+), acuity levels (1-5), and triage pain score were included in the analysis. Analyses were performed in Stata version 15.

Results: There were 334 unique program participants (149 with usual care and OTC-assisted visits; 185 with an OTC-assisted visit only) with 1004 ED index visits (483 usual care; 521 OTC-assisted visits) during the study period. The mean age of the 334 program participants was 43.98 (SD 15.21). The majority were African American (241, 72%), male (172, 51%), and presented with musculoskeletal pain (206, 62%); 4% received an opioid prescription and 58% received an alternative prescription at their index visit. The mean 30-day revisit rate for the 334 program participants was 28%. Among the 149 participants with both usual care visits and OTC-assisted visits within the study period, the 30-day revisit rate was lower after program assistance (34%) compared to their revisit rate following a usual care visit (52%). OTC- Starter Pack program assistance was associated with a 66% reduction in the odds of revisiting

the ED within 30 days (OR 0.34, 95% CI 0.17, 0.65) (p<0.01). The Agency for Healthcare Research and Quality estimates the average ED visit cost for a low-income metropolitan area to be about $500 per visit. The average cost of an OTC-Starter pack item per visit was $2.90 and per patient was $5.19.

Conclusions: The PAMI ED-ALT OTC-Starter Pack Program reduced 30-day revisit rates among patients with financial or healthcare access barriers. Additionally, the program demonstrated cost savings.

No, authors do not have interests to disclose

## 273 Opioid Prescribing to Medicare Beneficiaries by American Board of Emergency Medicine-Certified Physicians and Other Physicians Practicing Emergency Medicine

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Objectives: Over the past decade, the impact of prescribing patterns of physicians have been a focus of interventions to reduce the negative impacts and public health burden associated with the opioid epidemic. Opioid prescribing patterns in emergency department settings might provide important insights into practice variation, particulary among physicians with different training or board certification status. We hypothesized that there are significant differences between American Board of Emergency Medicine (ABEM)-certified physicians compared to other physicians with a designated National Provider Identifier (NPI) emergency medicine taxonomy.

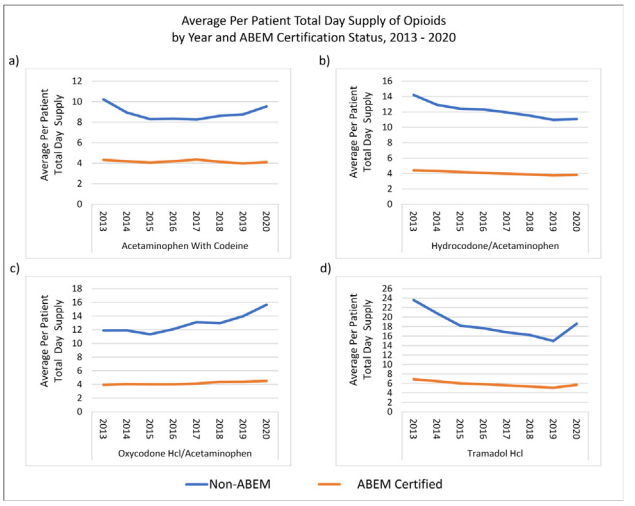
Methods: IRB-approved, retrospective, cross-sectional analysis of the Medicare Part-D Prescriber Drug Files dataset. Study participants included Medicare enrolled physicians with a NPI taxonomy of Emergency Medicine (EM), who prescribed opioids to 11+ Medicare beneficiaries per year, during the calendar years 2013 to 2020. Physicians with an active or prior ABEM certification during any of the calendar years were compared to those without ABEM certification.

The primary outcome was the per patient averages for opioid prescriptions by physicians, measured in total day supply, for the 4 most prescribed opioid prescriptions in the Medicare dataset: acetaminophen with codeine, hydrocodone/acetaminophen, oxycodone hcl/acetaminophen, and tramadol HCL. The outcomes were adjusted by calendar year, as nationally, opioid totals have been observed to decrease over this time. We used standard methods for zero-truncated count data with sufficient total counts: a generalized linear model with Poisson distribution, log-link, and individual clustering to calculate the adjusted differences between our prescribing groups of interest.

Results: The number of ABEM-certified and non-ABEM physicians prescribing opioids to Medicare beneficiaries in emergency department settings decreased over time. In 2013, 21,750 ABEM and 9,396 non-ABEM physicians prescribed opioids to 11+ Medicare beneficiaries compared to in 2020, only 14,661 ABEM and 5,364 non-ABEM. Most non-ABEM physicians specialized in EM (non-ABEM certified) (64%), family medicine (20%), or internal medicine (7%).

Non-ABEM physicians prescribed an average total day supply (tds) of 12.4 (95% CI: 11.8, 12.9) hydrocodone/acetaminophen per Medicare beneficiaries compared to the 4.1 tds (95% CI: 4.0, 4.2) supplied by ABEM certified physicians. We estimated similar differences for oxycodone hcl/acetaminophen: non-ABEM 12.4 tds (95% CI: 11.4,13.4) and ABEM 4.1 tds (95% CI: 3.9,4.3); and for tramadol hcl: non-ABEM 18.3 tds (95% CI: 17.4,19.2) and ABEM 5.9 tds (95% CI: 5.7,6.1). For acetaminophen with codeine, the difference was less: non-ABEM 8.7 tds (95% CI 7.9,9.5) and ABEM 4.2 total day supply (95% CI: 4.0,4.4). (see Figure). All tds averages were adjusted for the effects of the calendar years.

Conclusions: There are pronounced differences between ABEM-certified physicians and non-ABEM certified physicians in the quantities of opioids prescribed to Medicare Part-D beneficiaries. ABEM-certified physicians prescribed 2 to 3 times less opioids compared to non-ABEM certified physicians, as measured as per Medicare beneficiary day supply within a calendar year. These results and future research might provide insights into how board certification might be a proxy for implementation of evidence-based principles into practice.




Yes, authors have interests to disclose
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## 274 Patient Utilization and Feedback After a Novel Pain Coach Educator and Integrative Pain Management Toolkit Session in an Urban Academic Emergency Department

Hendry P, Sheikh S, Montague M, Lott M, Velasquez E, Menze N, Curtis M, Perl K, Bartow V, Crisp A/University of Florida College of Medicine – Jacksonville, Jacksonville, Florida, US

Objectives: Pain is the most common presenting complaint in the emergency department (ED). Patients discharged from the ED usually do not receive adequate education or instruction on nonpharmacologic, integrative pain management options. A novel ED pain coach educator program providing customized education sessions and integrative pain management toolkits to patients with pain was developed and implemented in an urban safety-net, not-for-profit hospital system. A one-month follow-up phone survey was conducted to assess patient toolkit utilization, adherence, and value.

Methods: The program and survey were registered with the affiliated university's Quality Improvement Project Registry. The pain coach educator program began January 2021 and one-month follow-up survey November 2021. Patients > 14 years with pain and capacity to participate in coaching sessions were eligible for the program. Program participants were contacted by a research coordinator to complete the survey one-month after ED session. The survey included questions on toolkit item home utilization and adherence, perceived value of the program, and qualitative feedback. Data from participants completing the survey were collected over 16 months and analyzed. Descriptive statistics were performed on demographics, area deprivation index (ADI), pain type, education and toolkit items provided, and follow-up survey data.

Results: Educators provided 581 pain coach sessions during the study period and 125 (21.5%) patients completed the one-month survey (5 patients did not recall the session and were excluded from analysis). The average age of participants was 48.8 years (*SD*=16.0). The majority identified as female (65.6%), Black (68.8%), and Non-Hispanic/Latino (99.2%). Overall, patients had a high level of socioeconomic disadvantage (mean ADI national percentile 80.9 [*SD*=17.6], range 42-100). Pain was reported as acute (64%), acute on chronic (23.2%), and chronic (12.8%), with patients

often having multiple pain diagnoses. During the customized sessions, patients were most frequently educated on hot/cold therapy (97%), 4 flat tires multimodal analogy with stress ball (90%), aromatherapy (84%), pain journal with guided questions (83%), pain neuroscience (72%), and breathing techniques (70%). Toolkits most commonly included hot/cold therapy (98%), stress ball (98%), pain journal (94%), and aromatherapy inhaler (93%). Toolkit items were used at least once in the past 30 days by 116 (92.8%) patients. Most patients reported using items daily (35.3%) or weekly (47.4%). The most common items used at home included aromatherapy (66.4%), hot/cold therapy (54.3%), stress ball (50.0%), and virtual reality (18.1%). Most respondents (87.1%) reported the session as very helpful or helpful on a 5-point Likert scale ($M$=4.53, $SD$=0.74); and 94% would recommend the program to others. Qualitative statements indicated program satisfaction and improved quality of life.

Conclusions: Most patients felt the program was very helpful or helpful, leading to improved quality of life in some. Additionally, most reported consistent home use of integrative toolkit items. Future plans include analysis of qualitative statements and assessment of program outcomes such as readmission and ED recidivism, decrease opioid use, and cost-effectiveness.

No, authors do not have interests to disclose

## 275 Factors Associated With Conversion to Procedural Sedation After Intra-articular Lidocaine Administration for Emergency Department Anterior Shoulder Dislocation Reduction

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Objectives: Emergency physicians frequently treat anterior shoulder dislocations. Procedural sedation can aid shoulder reductions; however, it is time and resource intensive and exposes patients to potential harms. Recent evidence has suggested that using intra-articular lidocaine (IAL) instead of procedural sedation with intravenous medications may decrease emergency department (ED) length of stay and likelihood of adverse events. Little is known about which patients are likely to fail IAL facilitated shoulder reductions and subsequently require procedural sedation. Multiple reduction attempts have been previously shown to increase risk of neurovascular injury. The goal of this study was to identify factors associated with unsuccessful IAL facilitated reductions as well as identifying if conversion to procedural sedation is associated with adverse events and differences in ED length of stay.

Methods: This was a retrospective observational cohort study of adult patients presenting to an urban academic ED from 2013-2021 with an isolated acute anterior shoulder dislocation reduced in the ED. Review of provider documentation was used to determine which patients underwent IAL and if they subsequently received procedural sedation. Patient age, sex, body mass index, history of substance use disorder, prior shoulder dislocations or surgery, and ultrasound guidance during IAL were obtained through electronic medical record review. Univariate analysis using chi-squared and Wilcoxon rank sum tests as well as stepwise and gestalt based logistic regression models were used to identify significant risk factors for failure of IAL. Patients undergoing successful IAL were compared to those who failed IAL and required sedation for the secondary outcomes of number of reduction attempts, incidence of respiratory depression (respiratory rate $< 12$), any episode of hypotension (mean arterial pressure $< 65$ mmHg), ED LOS (hours) and total oral morphine equivalents (OME) of narcotics administered during the encounter. Analyses were performed using R Statistical Software (v.4.2.2; R Core Team 2022).

Results: In total, 182 patients were identified who underwent IAL, among whom 49 (26.9%) required unplanned procedural sedation. Patients requiring unplanned procedural sedation were older (52.4 vs 42.5 years) and age was the only significant risk factor for failed IAL in univariate ($p < 0.001$) and multivariate analyses. When controlling for sex and history of substance use disorder, patients had 1.2 (95% CI 1.0, 1.5) fold increase in odds of requiring procedural sedation for every 10-year increase in age. Patients requiring unplanned procedural sedation had more reduction attempts (2.19 vs 1.09, $p < 0.01$), greater rates of respiratory depression (22.4% vs 3.0%, $p < 0.01$) and hypotension (10.2% vs 1.5%, $p = 0.02$), ED length of stay (7.20 hours vs 4.11 hours, $p < 0.01$) and OME of narcotics received (11.3 mg vs 7.08 mg, $p < 0.01$).

Conclusions: Unplanned procedural sedation after IAL is associated with increased number of reduction attempts, adverse events, ED length of stay, and narcotic doses received. Among patient factors, only older age was found to be associated with IAL failure. Further prospective studies of predictors of IAL failure are warranted.

No, authors do not have interests to disclose

## 276 Inhaled Nitrous Oxide for Shoulder Dislocation Reduction in the Emergency Department: A Retrospective Case Series

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Background: Inhaled nitrous oxide (INO) is becoming a more useful option for analgesia and sedation in the Emergency Department (ED). The efficacy, safety and tolerability of INO may provide an alternative to procedural sedation, particularly when conducting orthopedic procedures such as shoulder dislocation reductions.

Objectives: To describe characteristics and outcomes of patients who were administered INO for shoulder dislocation reductions.

Methods: Data was collected via chart review of patients who presented to the ED between January 1, 2019 and January 1, 2022. Inclusion criteria was documentation of a shoulder dislocation reduction procedure and an order for INO administration in the chart. Exclusions were subjects who had a contraindication to INO or declined its utilization. The primary endpoint was successful procedural completion with use of INO as monotherapy.

Results: Of 138 eligible patients, 90.6% of shoulder reductions required INO only. Only 9.4% required escalation to procedural sedation for successful reduction. Twenty-eight (20%) subjects did not have any documented medication administered prior to reduction with INO. Three of these 28 (11%) subjects who did not receive any medication prior to INO required procedural sedation.

Conclusions: Our retrospective case review indicates that INO may serve as an effective, safe and reliable option for analgesia for shoulder dislocation reduction in the ED. These findings should prompt further investigation of INO utilization for additional procedures in the ED.

No, authors do not have interests to disclose

## 277 Reducing the Number of Physical Assaults on Emergency Medicine Residents by Agitated Patients Through Implementation of a BETA Guideline-Based Initiative

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Objectives: The number of physical assaults by patients on emergency department (ED) staff are on the rise despite many efforts to train ED personnel. In 2017, in response to the growing violence in the ED, our residency leadership and hospital administration created a multitude of initiatives primarily based on BETA (Best Practices in the Evaluation and Treatment of Agitation) to reduce ED violence which included risk assessment at triage, de-escalation, self-defense training, annual lectures and small group simulation, an agitation order set, and police support to assist with de-escalation and physical restraint if needed. Simulation training for managing agitated patients was not included in the resident curriculum over the last two years primarily due to COVID-19.

Methods: We conducted a cross-sectional survey of our emergency medicine (EM) residents (PGY 1-3) to determine the incidence of physical assaults by agitated patients and related issues at our level 1 trauma center and county hospital that has over 220,000 ED patients visits a year. This REDCAP survey was performed at the following intervals: 1) pre-initiative survey of cumulative physical assaults, 2) one year after implementation of initiatives for the preceding academic year only, and 3) cumulative physical assaults of all current EM residents, five years post implementation of these initiatives.

Results: The survey response rates for the three surveys were 76% (50/66), 80% (53/66) and 71% (49/69) respectively. The physical assault rates were as follows: pre-implementation 28% (14/50), one year after implementation 11.3% (6/53) for the preceding academic year only, and post-implementation cumulative assaults during residency, five years later 22% (15/69). The 2 independent samples proportions test comparing the number of physical assaults *before* and one year *after* these initiatives were implemented was significant, p=0.032. In the five-year post implementation survey, 28.6% (14/49) had never seen a health care professional assaulted by a patient in the ED. The most common staffing factors related to the physical assault were a delay in patient management (57.6%, 19/33) and lack of information about the patient such as violence risk factors (51.5%, 17/33). Crowding in the ED was the most common environmental factor related to the assault (73.5%, 25/34). The three most common underlying patient conditions related to the assault were intoxication, psychiatric disorder, or organic brain syndrome/dementia which were present in all but

one case (2.6%, 1/39). Of the 49 respondents, most felt safe most of the time (n = 28) or all of the time (n = 13) in the ED (83.7%, 41/49) and were somewhat satisfied (n = 22) or very satisfied (n = 24) with police support to assist with de-escalation or physical restraint of agitated patients (93.9%, 46/49).

Conclusions: Despite implementation of several initiatives to improve the management of agitation and reduce physical assaults in the ED, physical assaults on EM residents working in a busy ED continues to exist although improving. The significant reduction in physical assaults one year after implementation was not demonstrated in our five-year survey but most likely multifactorial and may be explained by the one-year duration of data for the second survey, reduction in simulation training, COVID-19 and other factors that could not be controlled such as increased patient volumes. Most EM residents feel safe in the ED.

No, authors do not have interests to disclose

## 278 Pain Control Guidance Reduces Opioid Disparities But Not Prescriber Flexibility

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Objectives: Given documented disparities in analgesia by age, gender, language, and race across settings, it is crucial to understand whether a tightened prescribing environment affects all patients equitably. We sought to compare disparities in opioid prescribing before and after a Quality Improvement (QI) intervention offering standardized guidance on pain control after common procedures.

Methods: We examined all adult inpatient appendectomies, cholecystectomies, and colectomies at an academic tertiary care center from January 2016-April 2021. Patients with complicated surgical courses were excluded. A yearlong QI initiative to improve multimodal pain control began in January 2018 with dissemination of standard post-procedural analgesic recommendations and monthly publication of opioid prescribing.

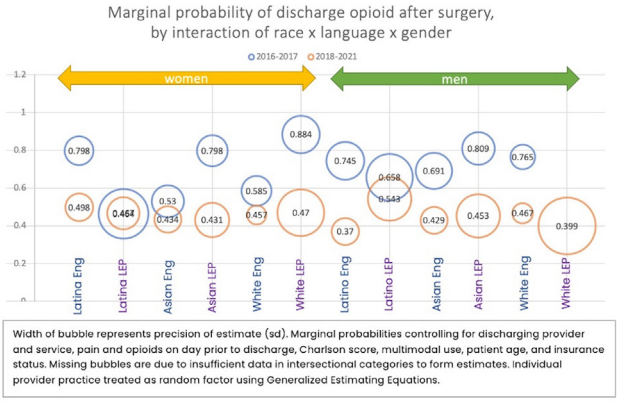
The primary outcome was receipt of a discharge opioid prescription, and the secondary outcome was the discharge daily Oral Morphine Equivalent (OME) dose. We extracted and validated provider factors (service and role: resident, attending, or advanced practice professional), pain-related factors (day prior to discharge average pain score and OME requirement) and patient factors (age-adjusted Charlson score, multimodal agents, gender, age, race, limited English proficiency [LEP] and insurance status) from the electronic health record.

In a repeated measures analysis, correlation of prescribing practices for an individual provider was treated as a random factor. Generalized Estimating Equations were used to model prescription and Mixed Effects to model log-transformed opioid dose. Marginal estimates of the probability of opioid prescription were used to assess interaction effects of patient race, language, and gender.

Results: Of 3,097 included discharges, 1,833 occurred before and 1,264 after the QI initiative began. The cohorts were similar in terms of self-identified gender, race, and English proficiency as well as age. Opioids were prescribed after 83% of procedures before and 45% after the intervention. The median discharge dose was the same (45 OMEs) with no change in prescribers' dose variability (within-provider correlation, 0.28). Pain-related factors significantly predicted prescribing before and after intervention.

Though odds of opioid at discharge were not related to age, gender, race, insurance or language status after standardization, there had previously been significant interaction effects (Fig 1). Holding language and race constant, for example, English-proficient White men had been more likely than women to receive an opioid at discharge for the same procedures (OR 2.87, CI 1.33-6.18). Neither outcome showed interaction effects after QI.

Conclusions: Significant disparities in prescribing by intersections of race, language, and gender were no longer present after standardization efforts. Individual prescriber dose and variability did not change, suggesting that providers had equal flexibility in meeting analgesic needs. The novel analysis of qualitative three-way interaction, with the influence of gender on opioid prescribing varying by race and language status, suggests complex mechanisms affecting pain control assessments. Evidence-based recommendations eliminated opioid disparities without preventing adjustment based on pain severity, with clear relevance for post-procedural emergency department care.




No, authors do not have interests to disclose

## 279 A Quality Improvement Project Is Associated With Increased Prescribing of Laxatives With Opioid Analgesics to Patients Discharged From the Emergency Department

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Objectives: A department quality improvement project was undertaken with the goal of increasing prescriptions for laxatives to patients being discharged from the Emergency Department (ED) with a new prescription for an opioid analgesic. Opioid-induced constipation (OIC) is a very common and problematic side effect of opioid analgesic use. It can lead to increased health care costs and ED utilization. Laxatives are recommended first-line therapy. Prior to this project, the baseline rate of co-prescribing of laxatives with opioids was low, less than 15%.

Methods: ED residents initiated a quality improvement project to increase prescribing of laxatives with opioids in a local medical service area (MSA) of a large, integrated health care system. All data was obtained from the electronic health record (Epic) via SQL query of the associated relational database (Oracle).

Retrospective data was collected for the one-year period prior to implementation of the project (January-December 2021) and then analyzed monthly through the one- year project time period (January-December 2022). Data elements included total number of ED visits, number of adult patients (age 18 and older) discharged from the ED with a new prescription for an opioid analgesic, and the number of patients receiving an opioid who also received a prescription for a laxative. Independent t- tests were performed to identify differences in monthly averages between the two time periods.

Project interventions included initial education and promotion including presentations at department meetings, emails, and flyers posted in the ED. Monthly performance updates, consisting of overall department metrics and recognition of individual top performers, were given at meetings, and distributed by email to all department physicians.

Results: In the twelve months prior to initiation of the QI project, averaged monthly, 7.8% of ED patients received a new prescription for an opioid analgesic. Of these patients, 12.9% also received a prescription for a laxative. During the project, 8.0% of patients received a new opioid prescription (p=0.13). During this time frame, the percentage also receiving a laxative prescription started at 12.7%, quickly increased to 22-28%, and then increased again during the second half of the project to 30-38%. Overall, during the project, a monthly average of 27.8% of patients receiving a new opioid prescription were also prescribed a laxative (p,0.0001). In the four months following project completion, co-prescription rates were maintained at 33-37% on a monthly basis. Overall opioid prescribing rates stayed stable throughout the study period.

Conclusions: A resident driven quality improvement project was associated with a sustained, significant increase in prescribing of laxatives to patients being discharged from the ED with a new prescription for an opioid analgesic. This has the potential to reduce rates of opioid induced constipation and associated morbidity and health care utilization; however, this effect was not directly studied.

No, authors do not have interests to disclose

## 280 Medicine Meets Engineering: Development of Discrete Naloxone Nasal Spray Devices to Increase Access

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Objectives: Opioid overdose deaths are rapidly increasing across the US, claiming 107,622 lives in 2021 as reported by the CDC. Naloxone, which can be delivered by a nasal spray, is the only FDA-approved reversal agent for an opioid overdose. While recent legislation hopes to increase access by making it available over the counter, there are still limitations surrounding the ability to always carry naloxone nasal sprays. Current devices are bulky, with a very unique and bulbous profile. These design limitations may prevent users from having naloxone at the time of need. Our objectives were to adapt the pressurized capsules currently in use, to fit into other designs that would be more inconspicuous and easily carried. By creating nasal sprays that can be hidden in plain sight, we hope to increase access and decrease stigma to facilitate more community availability of naloxone to hopefully save more lives.

Methods: Utilizing a unique collaboration of engineering students at a local university and emergency medicine physicians at a local health system, a program to design new nasal Narcan delivery devices was established. The program, part of a class for graduation within their engineering major, began design and construction with a brainstorming session. At this session, the collaborative group discussed the current devices in rough size/shape and discussed everyday objects that might be disguised to contain the nasal spray. Of the ideas from the first session and subsequent sessions, the team settled on several candidate devices including: 1) a pen, 2) vaping device, 3) a souvenir "soda bottle" keychain, and 4) a mini permanent marker keychain. A training and real nasal Narcan kit were delivered to the engineering students and dissected to allow exact measurements for adaptation of current technology. Commercial design software and a 3D printing machine (Solidworks) were then used to create prototype models.

Results: The four designs were successfully printed, and included: 1) a pen, 2) vaping device, 3) a souvenir "soda bottle" keychain, and 4) a mini permanent marker keychain. These designs were adapted to accommodate the size of the nasal spray pressurized capsule while retaining the look of these everyday objects.

Conclusions: This project has been successful in beginning to design Naloxone nasal spray devices that would look like everyday objects. These devices were created as part of an iterative design process between engineering students at a local university and emergency physicians. The initial designs were created, and the 3D-printed prototypes will now allow for patient and user focus-group evaluation and feedback. Future work related to this project will then pick two of the top device designs for further development including the assessment of drug delivery from these devices.

No, authors do not have interests to disclose

## 281 Human Trafficking: Screening and Linkage to Care

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Objectives: Human trafficking (HT) is a human rights violation affecting patients across the country and is correlated with a higher prevalence of health issues such as substance abuse and mental and reproductive health problems. ED-based screening has the potential to identify trafficked patients or those at risk for HT, which is the first step toward successful connection to supportive resources. The objective of this study was to perform targeted screening of patients at increased risk for HT and link patients who screened positive to appropriate local resources.

Methods: A non-experimental descriptive study was conducted at a large urban academic center to describe the number of patients who screened positive for HT risk and received relevant resources over a 5-month period. A validated, four-question screening tool for identifying trafficked patients in the ED was adopted for use in this study. The dichotomous questions gauge a person's risk for being trafficked where at least one affirmative response indicates HT risk. A list of local resources pertaining to HT was compiled through discussions with social work and community partners. A protocol for screening and linkage to care through the center's Early Intervention Program (EIP) was developed. EIP is a public health promotion program operating within the ED. This program already screens a convenient patient sample for infectious disease and substance abuse risk and collects information about other social determinants of health that may affect risk or access to care; HT screening questions were added to the existing questions. Additionally, ED providers may request that EIP screen any particular patient for HT. Per the study protocol, EIP health promotion advocates (HPAs) screen patients for HT using the four question tool and document responses in REDCap. If a patient screens positive, the HPAs refer patients to resources using the list that was developed. For all patients who screen positive, HPAs document whether resources were accepted.

Results: Out of 190 patients assessed, 31 (16%) screened positive. Of those, 17 (54.8%) patients accepted referrals to resources specific to trafficked persons, and 29 (93.5%) accepted referrals to other resources, including those providing assistance with housing, addiction, and food insecurity.

Conclusions: This study confirms that HT is a significant problem affecting patients presenting to the ED. Given the number who accepted resources, it is clear that many patients desire assistance and are open to interventions on their behalf. Ongoing research will be needed to determine which resources and interventions are most helpful. Based on our preliminary data, interventions targeting not only patient safety from a trafficking situation, but also the social vulnerabilities that may have led them to that situation, will be the most effective.

No, authors do not have interests to disclose

## 282 Waiting for Rock Bottom: Health Care Engagement Before and After Initiation of Medication-Assisted Treatment for Alcohol Use Disorder

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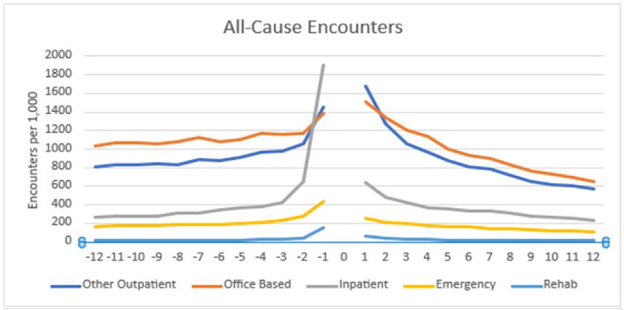
Objectives: Heavy alcohol use is a persistent and growing threat to public health, particularly with increased alcohol use nationwide since the COVID-19 pandemic. Medications to treat alcohol use disorder (AUD) have longstanding FDA approval and are effective at reducing binge drinking, heavy drinking days, and alcohol-related emergency (ED) visits. However, they are underutilized across treatment settings. This analysis examines initiation of medication assisted treatment (MAT) for alcohol use disorder and trajectories of healthcare utilization pre- and post-initiation to identify potential missed opportunities for AUD MAT initiation.

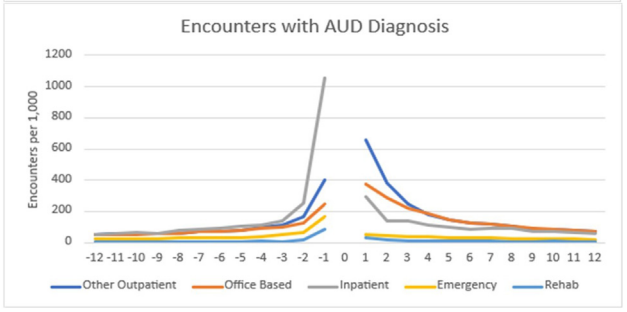
Methods: Using the Optum Clinformatics database of health care claims from 1/2017-12/2021, we examined all patients 18 years and older initiated on AUD MAT, defined as filling a prescription for oral naltrexone, acamprosate, or disulfiram, or an administration of intramuscular naltrexone with no prior receipt of AUD MAT in the preceding 12 months. We excluded patients who received naltrexone with only a diagnosis of opioid use disorder in the pre-period. We then examined AUD-related healthcare visits in the 12 months preceding and following AUD MAT initiation.

Results: We identified 30,454 unique patients, who were 54% female, 77% White 77%, 8% Black, 8% Hispanic, and 2% Asian. Most patients were middle-aged at the time of AUD MAT initiation (17% 30-39, 21% 40-49, 22% 50-59, 19% 60-69). About half (53%) had completed some college and 25% completed college or higher. Of the 30,454 patients, about half (15,492) maintained their health care coverage in the 12 months following MAT initiation. The vast majority (79.9%) of patients received a diagnosis of a behavioral health disorder in the 12 months prior to initiation of MAT; those comorbidities were largely unchanged in the year following diagnosis. There was an 8 percentage point increase in the rate of diagnosis codes for substance use disorders in remission.

There was a sharp increase in health care utilization prior to MAT initiation. About one-third of patients received prescriptions for withdrawal medications in the 12 months prior to MAT initiation. In the 9 to 12 months prior to initiation, patients had about 55 outpatient or office-based AUD-related visits per 1,000 patients, 59 inpatient stays, 24 ED visits, and 3 rehab encounters. In comparison, in the month preceding MAT initiation, those rates were 403 outpatient visits, 250 office-based visits, 1,053 inpatient stays, 166 ED visits, and 84 rehab encounters per 1,000 patients in our cohort. Rates of visits remained elevated in the months following initiation, but largely returned to pre-initiation levels by the end of the 12-month follow-up period.

Conclusions: In this large sample of insured patients who initiated AUD MAT, we noted marked increases in health care utilization prior to MAT initiation, including prescribing of withdrawal medications. Providers may be relying on severe signs of problematic alcohol use (such as hospitalizations for AUD) before initiating MAT.




No, authors do not have interests to disclose

## 283 A Pilot Study to Examine Resilience and Returns to the Emergency Department

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Objectives: While emergency department (ED) visit volumes have continued to increase in the United States, ED physicians have also noted changes not only in patient resources but also, anecdotally, in their worries and capacity for self-care. This trend may lead patients to seek care in the ED, particularly when they suffer the vagaries of illness. Indeed, patients with comorbidities, public insurance, extremes of age, as well as fear and uncertainty are known to be likely to present and return to the ED. We sought to assess whether there was an association between resilience and return visits to the ED for potential "bounce-back" conditions.

Methods: We conducted a prospective study of adult patients presenting to the ED of our Level-1 Trauma Center with one of six conditions associated with high frequency and high return rates. These potential "bounce-back" conditions were: abdominal pain, chest pain, dental pain, nausea and vomiting, headache, and joint or extremity pain. We screened patients using the Connor-Davidson Resilience Scale (CD-RISC), a 25-item 100-point scale previously validated in a variety of outpatient populations but never in the ED We intended to examine associations between resilience scores and all-cause returns to the ED in the following 6 months.

Results: We estimated 3200 patients would meet inclusion criteria annually and planned to enroll 800 for adequate power. However, we only enrolled 103 patients before the study was stopped due to the COVID-19 pandemic. No statements regarding a relationship between resilience scores and return rates can therefore be made, but we can characterize our convenience sample and their responses. Total resilience scores ranged from 35 to 100. Of 102 enrolled patients, 32 had known returns to our hospital's ED within 6 months. Unadjusted mean resilience scores were similar between those who did and did not return to the ED ( 74.3 vs. 75.1). Adjusting for race, ethnicity, gender, education, and employment status in logistic regression did not result in any statistically significant associations between total resilience score and ED bounce-back. Mean scores ranked highest to lowest for patients self-identifying their race as American Indian or Alaska Native (78), White (76.6), Black (74.1), Asian (73), Hispanic (65.1), and finally Other (56.4), as compared to previously measured averages for the general population (80.4), primary care patients (71.8), psychiatric outpatients (68.0), and patients with generalized anxiety disorder (62.4). Respondents' lowest average resilience scores were for items related to "Coping with stress strengthens," "Under pressure, focus and think clearly," "Think of self as strong person," "Make unpopular or difficult decisions," and "Can handle unpleasant feelings." Respondents' highest average resilience scores were for items related to "Able to adapt to change," "Best effort no matter what," "You can achieve your goals," "When things look hopeless, I don't give up," and "Pride in your achievements."

Conclusions: Ours is the first study to demonstrate the feasibility of administering the CD-RISC screener in the ED setting to assess patient resilience. Future research should examine associations between resilience and its constituent elements, as potentially measured by the CD-RISC screener or its 10- point version, and patterns of ED care seeking, disease presentation, and outcomes.

No, authors do not have interests to disclose

## 284 Nationwide Capabilities Assessment of Emergency Department Care of Patients With Opioid Use Disorder: 2022 to 2023

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Background: To enhance dissemination of resources to improve care of emergency department (ED) patients with opioid use disorder (OUD) and assess practices related to OUD care, we developed the American College of Emergency Physicians (ACEP) Emergency Medicine Quality Network (E-QUAL) Opioid Initiative, a virtual platform-based national learning collaborative. This program includes a low-burden, quality improvement project, webinars, and resources designed to support EDs with limited administrative and research infrastructure.

Objectives: To assess baseline ED OUD capabilities assessment from each ED enrolling in the 2022 and 2023 collaborative.

Methods: In the spring of 2022 and 2023, EDs indicated services provided including: provision of naloxone, warm transition to outpatient OUD treatment, clinical decision support tools for OUD treatment, departmental protocol for OUD treatment initiation with buprenorphine and presence of any ED clinician who prescribes buprenorphine for OUD. Descriptive statistics and Chi-Square tests are reported.

Results: Of the 227 EDs that completed the 2022 and 2023 capability assessment, 106 (46.7%) were rural and 44 (19.4%) were critical access hospitals. Annual visit volume was <20K in 125/227 (55.1%) EDs, 20-60K in 93/227 (41.0%), and >60K in 9/259 (4.0%) EDs. Naloxone provision to patients presenting with opioid overdose, either by prescription or dispensation, increased from 145/227 (63.9%) to 165/227 (72.7%) EDs between 2022 and 2023; p=0.044. Use of clinical decision support for OUD treatment was similar: 104/227 (45.8%) vs 115/227 (50.7%) EDs in 2022 vs 2023; p=0.302, as was warm transition of care: 24/227 (10.6%) to 35/227 (15.4%); p=0.125. The proportion of EDs with existing buprenorphine protocols was unchanged (21/227;9.3%) vs 22/227;9.7%); p=0.873, but the proportion of EDs with at least one clinician that prescribes buprenorphine increased from 43/227 (18.9%) to 61/227 (26.9%); p=0.044.

Conclusions: Among a nationwide sample of predominately small, with large percentage of rural EDs, most EDs report the provision of naloxone after opioid overdose, but only a small minority have protocols for the initiation of buprenorphine. Despite improvements in the proportion of EDs that provide naloxone and have clinicians that prescribe buprenorphine, opportunities improve the care of ED patients with OUD persist.

Yes, authors have interests to disclose
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Foundation for Opioid REsponse (FORE)

## 285 Trauma Evaluation and Outcomes of Incarcerated and Non-Incarcerated Patients

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Objectives: The United States has one of the world's highest rates of incarceration, with approximately two million incarcerated individuals in 2023. Incarcerated patients are a vulnerable population that experience high rates of acute and chronic health conditions including trauma. However, the literature regarding medical evaluation and care received by inmates at healthcare facilities is sparse. We sought to identify any differences in characteristics of incarcerated and non- incarcerated trauma patients, evaluation and disposition in the emergency department (ED), and admission patterns.

We hypothesized that incarcerated trauma patients would be younger, receive more thorough evaluations with longer lengths of ED stay, and have lower admission rates.

Methods: Our study was a single-center retrospective cohort study of incarcerated and non-incarcerated patients who presented to a level 1 trauma center in Houston, Texas. Incarcerated patients were from the local jail, state prison, or in police custody. The patient population was a sample of randomly selected trauma patients who arrived to the emergency department between Jan. 2010 and Dec. 2020. Minors, pregnant people, and transfers from other medical facilities were excluded. Patient demographics, injury patterns, imaging, disposition, and ED and hospital length of stay were analyzed by linear regression in SAS.

Results: This study included 532 patients (269 non-incarcerated, 263 incarcerated). 27% of patients were white; 38% were Black; and 27% were Hispanic. 79% of patients were male. Compared to non-incarcerated patients, incarcerated patients had lower acuity triaged visits ($p < 0.001$). Controlling for trauma acuity, incarcerated patients received more imaging even controlling for trauma acuity ($p=0.001$). Non-incarcerated patients had higher rates of surgeries ($p=0.001$).

Incarceration status was not associated with admission rates once controlling for trauma acuity. There was no statistical significance in ED or hospital length of stay.

Conclusions: Incarcerated patients are an important subset of trauma victims. In our single-center study, incarcerated patients had more lower acuity visits and received more imaging, suggesting more conservative evaluation. Further studies are needed to characterize the different mechanisms of trauma while incarcerated, disparities in evaluation and management, and potential mechanisms of intervention in this population.

No, authors do not have interests to disclose

## 286 Race and Ethnic Differences in Anxiety-Related Emergency Department Visit Trends

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Objectives: Mental health issues are becoming more prevalent in the general population causing people to seek care in overburdened emergency department (ED) settings. Public health research suggests disparities in access to preventative mental health care exists among minoritized racial and ethnic groups. We aim to investigate trends of emergency department visits in adults aged 25-64 in California from 2018-2021.

Methods: We used a multi-year retrospective cohort study design to investigate ED admission trends in adults aged 25-64 in California who presented with anxiety-related complaints using non-public data from the California Department of Health Care Access and Information (HCAI). ICD 10 codes F40-F48 were used to calculate incidence rates of ED visits in patients diagnosed with anxiety-related issues from 2018 and 2021. We also report rates for visits that lead to ED admission. Rates were calculated and reported per 100,000 ED visits and adjusted for age and sex.

Results: During the study period, we captured 2,199,096 ED visits among adult patients. Among adults aged 25-64, 61.7% were female, 35.5% identified as non-White and 7.0% were uninsured. Among older adults, 59.5% were female, 53.2% identified as non-White, and 6.1% were uninsured. Between 2018 and 2021, the rate of anxiety-related ED visits were 3,070 per 100,000 visits and 727 per 100,000 visits resulted in admissions among Hispanic/Latinos which accounted for 33.0% of this population. The rate of anxiety-related ED visits were 5,805 per 100,000 visits and 1,724 per 100,000 visits resulted in admissions among non-Hispanic (NH) Blacks. The rate of anxiety-related ED visits were 2,759 per 100,000 visits and 837 per 100,000 visits resulted in admissions among NH Asian/Pacific Islanders. The rate of anxiety-related ED visits were 6,579 per 100,000 visits and 4,398 per 100,000 visits resulted in admissions among NH Whites. Overall, females visited and were admitted for anxiety related complaints. The largest adjusted difference in anxiety-related ED visits was between NH Black men (4,241 per 100,000) and females (7,368 per 100,000). While only 5% of this population is NH American Indian/Alaskan native (AIAN), the rate of anxiety-related ED visits was 7,291 per 100,000 visits and 4,023 per 100,000 visits resulted in admissions.

Conclusions: NH Black adults in California held the highest incidence rate of anxiety-related ED visits and admissions where females hold the highest burden. NHAIAN have alarming rates of anxiety-related ED visits and admissions. Exploratory data suggests further research is needed to understand the determinants of this trend.

No, authors do not have interests to disclose

## 287 Epidemiology of Well-Appearing Febrile Infants (<60 days) Presenting to an Emergency Department During the COVID-19 Pandemic

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Objectives: The AAP recently updated clinical practice guidelines (2021) regarding the management of well-appearing febrile infants < 60 days, utilizing inflammatory markers, such as white blood cell count (WBC), absolute neutrophil count (ANC), C-reactive protein (CRP), and procalcitonin (PCT) to determine the likelihood of a serious bacterial infection (SBI). Unfortunately, these guidelines do not take into account the COVID-19 pandemic. The objective of our study was to describe the epidemiology of well-appearing febrile infants (< 60 days) presenting to an emergency department (ED) during the COVID-19 pandemic and to determine if inflammatory markers distinguished infants with SBI.

Methods: We conducted a retrospective analysis on well-appearing infants aged < 60 days presenting to our ED with a fever (> 100.4 degrees Fahrenheit) between March 2020 and September 2021. Premature infants (< 37 weeks gestation) and infants without an ED diagnostic work-up [blood, urine, respiratory viral panel (RVP); lumbar puncture at the physician's discretion] were excluded. Data abstracted included patient demographics, presenting symptoms, diagnostic results (WBC, ANC, CRP, PCT levels), and culture results (blood, urine, CSF, RVP). SBI was considered positive if a blood, urine, or CSF culture grew a non-contaminated bacterium. Data was stratified based on SBI, COVID-19 status, and RVP results.

Results: Analysis was performed on 89 patients, 63% (56/89) male, 60% (53/89) white, and a mean age of 26.2 days. The most common presenting symptoms included nasal congestion (42/89, 47%), decreased oral intake (41/89, 47%), cough (26/89, 29%), shortness of breath (15/89, 17%), and decreased urine output (13/89, 15%).

Of the 89 patients, 19 (21%) had a SBI [UTI (n=13), bacteremia (n=4), meningitis (n=2)] and 51 (57%) had a positive RVP [most common COVID-19 (n=30), rhinovirus/enterovirus (n=11), and RSV (n=4)]. A total of 3/30 (10%) infants with COVID-19 had a SBI, while 4/21 (19%) with (+) RVP and (-) COVID-19 had a SBI, and 12/38 (31%) with (-) RVP and (-) COVID-19 had a SBI (p=0.09).

Table 1 demonstrates mean WBC, ANC, CRP, and PCT levels stratified by *(1a)* SBI (+) vs. SBI (-) for all included patients, *(1b)* SBI (+) vs. SBI (-) for COVID-19 (+) patients, and *(1c)* SBI (+) vs. SBI (-) for COVID-19 (-) patients. In addition, there was a statistically significant difference in CRP levels in patients found to have a SBI, including when stratified by COVID-19 and RVP results.

Conclusions: Based on our data, there was no statistically significant difference in the rate of SBI when stratified by COVID-19 and RVP results. Furthermore, CRP distinguished the presence of a SBI when stratified by COVID-19 and RVP results. Our results are limited by our small sample size. Future clinical practice guidelines should take into account emerging viruses, such as COVID-19, to determine likelihood of SBI in well-appearing infants.

**Table 1**. Mean WBC, ANC, CRP, and PCT levels were stratified by (**1a**) SBI (+) vs. SBI (-) for all included patients, (**1b**) SBI (+) vs. SBI (-) for COVID-19 (+) patients, and (**1c**) SBI (+) vs. SBI (-) for COVID-19 (-) patients.

**1a**

| | SBI (+) (n=19) | SBI (-) (n=70) | P value |
|---|---|---|---|
| WBC ($x10^9$/L) | 11.95 | 11.23 | 0.46 |
| ANC (cells/$mm^3$) | 5258 | 4359 | 0.22 |
| CRP (mg/dL) | 4.75 | 1.06 | <.0001* |
| PCT (ng/mL) | 1.12 | 0.35 | 0.29 |

**1b**

| | COVID-19 (+)/SBI (+) (n=3) | COVID-19(+) /SBI (-) (n=27) | P value |
|---|---|---|---|
| WBC ($x10^9$/L) | 13.97 | 9.35 | 0.26 |
| ANC (cells/$mm^3$) | 5760 | 3764 | 0.33 |
| CRP (mg/dL) | 4.08 | 0.46 | 0.0040* |
| PCT (ng/mL) | 0.57 | 0.29 | 0.76 |

**1c**

| | COVID-19 (-)/SBI (+) (n=16) | COVID-19(-)/SBI (-) (n=43) | P value |
|---|---|---|---|
| WBC ($x10^9$/L) | 11.58 | 12.40 | 0.60 |
| ANC (cells/$mm^3$) | 5164 | 4742 | 0.70 |
| CRP (mg/dL) | 4.91 | 1.55 | 0.0022* |
| PCT (ng/mL) | 1.28 | 0.40 | 0.36 |

*Represents statistical significance

No, authors do not have interests to disclose

## 288 In-Situ Simulation Needs Assessment to Identify Areas of Opportunity in Pediatric Cardiac Arrest Management

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Objectives: Simulation has been identified as a tool to analyze and improve team dynamics, knowledge gaps, system processes, and environmental factors that impact patient safety and healthcare delivery. The purpose of this needs assessment was to use in-situ, multi-disciplinary simulation to identify latent safety threats (LSTs) and opportunities for improvement (OFIs) related to management of cardiac arrest in a pediatric emergency department.

Methods: In March and April 2023, two in-situ, multi-disciplinary simulations were conducted in the St. Louis Children's Hospital Emergency Department (ED). Simulation participants included individuals who would respond to pediatric cardiac arrests: physicians (pediatric resident physicians, pediatric emergency medicine (PEM) fellows), nurses, respiratory therapists, and paramedics. Two cardiac arrest scenarios were performed: one with ventricular fibrillation arrest requiring use of defibrillator, and one with pulseless electrical activity requiring intubation and epinephrine administration. The scenarios were observed by a simulation improvement team, including PEM physicians, an education nurse manager, and patient safety leadership. Following the simulation, the debrief focused on identification of knowledge gaps related to cardiac arrest management, equipment availability, team dynamics, and system processes. The LSTs and OFIs were scored using failure mode effect analysis (FMEA). Each item was scored, categorized, and prioritized to tailor educational objectives.

Results: 28 LSTs were identified: 20 high priority, and 8 medium priority (Median Risk Priority Number= 161). The greatest OFIs included need for standardized notification of code blues, laryngoscope blade availability, and adequate staff at bedside to prevent doing multiple roles simultaneously during a code. Other significant OFIs included medication availability, crisis resource management skills including role assignment and role clarity, closed-loop medication administration, and CPR skills, including ventilation-compression coordination and the need for a CPR coach.

Conclusions: Multiple high priority LSTs were identified during needs assessment simulations. These, in conjunction with chart review of cardiac arrests, provided the basis for the initiation of a longitudinal mock code simulation curriculum in the pediatric ED. We plan to assess the impact of these interventions with ongoing chart and video review of cardiac arrests in the ED.

No, authors do not have interests to disclose

## 289 Utilization of Sexual Assault Forensic Examiners in Emergency Department Child Maltreatment Evaluations

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Objectives: While sexual assault forensic examiners (SAFE) are now a routine part of sexual assault patient care, SAFE may also be an underutilized asset in the evaluation of child maltreatment cases. A standardized maltreatment screening process and protocol utilizing SAFE examiners may minimize bias, improve timely diagnosis, provide forensic documentation and standardize care. The purpose of the study is to describe patient characteristics and trends following implementation of a hospital-wide standardized child maltreatment protocol including forensic examiners.

Methods: Data from January 2017 through December 2022 were retrospectively collected and reviewed on all children under 18 years who had a child maltreatment evaluation following initiation of a standardized child maltreatment screening process and protocol incorporating SAFE forensic evaluations at an academic tertiary care level 1 trauma center. Data collected included patient demographics, mode of arrival, forensic examination, injuries present, use of weapons or strangulation during assault, involvement of law enforcement and child protective agencies, relationship of alleged perpetrator, disposition and follow-up.

Results: From January 2017 through December 2022 there were 764 child maltreatment evaluations completed with 763 (99.87%) evaluated by a trained SAFE examiner. There were 378 exams (49.48%) completed in children under 2 years of age, 281 (36.78%) in children 2 to 9 years of age and the remaining 105 (13.74%) in children 10 years and older. 452 patients (59.16%) were admitted, 291 (38.09%) were discharged and 9 (1.18%) were transferred. The number of cases increased since initiation of a standardized screening tool and protocol from 68 cases in 2017 to 158 cases in 2022, with peak of 167 cases in 2020.

Conclusions: The number of child maltreatment evaluations completed at our hospital has increased following implementation of a standardized screening and protocol. Approximately half of all child maltreatment cases were in children less than 2 years of age. SAFE providers can be successfully incorporated in the multidisciplinary evaluation of child maltreatment patients and can add invaluable education, forensic documentation, and standardization of practice in the care of this vulnerable population.

| | Total | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | p-value |
|---|---|---|---|---|---|---|---|---|
| | N=764 | N=68 | N=81 | N=136 | N=167 | N=154 | N=158 | |
| age_cat | | | | | | | | <0.001 |
| 0_2 | 378 (49.48%) | 40 (58.82%) | 45 (55.56%) | 74 (54.41%) | 100 (59.88%) | 36 (23.38%) | 83 (52.53%) | |
| 2_<10 | 281 (36.78%) | 17 (25.00%) | 32 (39.51%) | 46 (33.82%) | 50 (29.94%) | 84 (54.55%) | 52 (32.91%) | |
| 10_<15 | 67 (8.77%) | 6 (8.82%) | 2 (2.47%) | 10 (7.35%) | 7 (4.19%) | 24 (15.58%) | 18 (11.39%) | |
| 15_<18 | 38 (4.97%) | 5 (7.35%) | 2 (2.47%) | 6 (4.41%) | 10 (5.99%) | 10 (6.49%) | 5 (3.16%) | |
| patient's gender | | | | | | | | 0.86 |
| FEMALE | 354 (46.34%) | 30 (44.12%) | 39 (48.15%) | 63 (46.32%) | 72 (43.11%) | 79 (51.30%) | 71 (44.94%) | |
| MALE | 408 (53.40%) | 38 (55.88%) | 42 (51.85%) | 73 (53.68%) | 94 (56.29%) | 74 (48.05%) | 87 (55.06%) | |
| TRANS | 2 (0.26%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) | 1 (0.60%) | 1 (0.65%) | 0 (0.00%) | |
| patient's race | | | | | | | | 0.036 |
| ASIAN | 16 (2.09%) | 3 (4.41%) | 0 (0.00%) | 0 (0.00%) | 9 (5.39%) | 3 (1.95%) | 1 (0.63%) | |
| BLACK | 191 (25.00%) | 16 (23.53%) | 22 (27.16%) | 29 (21.32%) | 46 (27.54%) | 35 (22.73%) | 43 (27.22%) | |
| HISPANIC/LATINO | 35 (4.58%) | 3 (4.41%) | 7 (8.64%) | 6 (4.41%) | 5 (2.99%) | 6 (3.90%) | 8 (5.06%) | |
| MIXED | 65 (8.51%) | 4 (5.88%) | 7 (8.64%) | 10 (7.35%) | 15 (8.98%) | 16 (10.39%) | 13 (8.23%) | |
| OTHER | 41 (5.37%) | 0 (0.00%) | 1 (1.23%) | 6 (4.41%) | 13 (7.78%) | 8 (5.19%) | 13 (8.23%) | |
| WHITE | 416 (54.45%) | 42 (61.76%) | 44 (54.32%) | 85 (62.50%) | 79 (47.31%) | 86 (55.84%) | 80 (50.63%) | |

No, authors do not have interests to disclose

## 290 Predictors of Return of Spontaneous Circulation in Pediatric Out-of-Hospital Cardiac Arrest: A Single Out-of-Hospital Network Review

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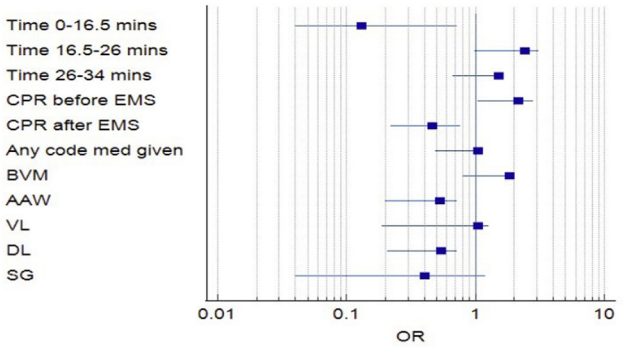
Background: Pediatric out-of-hospital cardiac arrest (OHCA) is a rare but catastrophic event. One primary goal of resuscitation in OHCA is the establishment of ROSC to allow for enhanced perfusion of end organs. We aim to identify predictors of return of spontaneous circulation (ROSC) in pediatric OHCA.

Objectives: Our primary objective is to describe epidemiological and clinical characteristics of pediatric patients suffering OHCA. Secondarily, we plan to identify predictors of patients with recovery of spontaneous circulation.

Methods: We conducted a retrospective cohort study of pediatric patients suffering OHCA from July 2016-July 2022. Unique EMR queries (CPR, cardiac arrest present) were used to identify cohort patients. Inclusion criteria were patients aged 0 to 18 years who presented with OHCA and received cardiopulmonary resuscitation (CPR) by prehospital providers. Exclusion criteria included patients over the age of 18 and patients in whom the cardiac arrest occurred as a result of a traumatic etiology. After the collection of patients presenting data, analysis was performed.

Results: One hundred sixty-nine patients were identified with a median age of 3 years old (IQR 0.35-14). The male to female ratio identified was 0.56. ROSC was achieved in 32% of patients. BVM, intubation, and supraglottic airways were utilized in 76%, 23%, and 1% of patients. CPR started prior to EMS arrival was present in 73 patients (44%). The use of epinephrine prior to ED arrival was found in 55 (33%) children. The median total time during EMS transport was 26 mins (IQR [16.5-34]). Univariate analysis of candidate predictors revealed statistically significant decrease in OR of ROSC in children where advanced airway was attempted (OR 0.53 [0.2,0.73]) and children who has a total prehospital time of less than 16.5 minutes (OR 0.13 [0.04,0.73]). CPR initiated prior to EMS arrival was associated with increased likelihood of ROSC (OR 2.15 [1.03,2.85]). Although not statistically significant, total ems time of 16.5-26 mins (OR 2.4 [0.99,3.13]), and use of BVM only (OR1.8 [0.8,2.1]), suggest increased likelihood of ROSC.

Conclusions: OHCA is a disastrous outcome associated with global impact on families. Identification of predictors which increase or decrease the likelihood of ROSC is imperative and future studies elucidating and guiding best practices are paramount. Further evaluation is needed to determine clinical predictors of ROSC in OHCA and the need for advanced treatment in these children.




No, authors do not have interests to disclose

## 291 Improving Emergency Department Postintubation Sedation in Pediatric Patients: A Quality Improvement Initiative

Wynia E, Bosnjak E, Mills K, Whiteley J, Wiltrakis S/Washington University in St. Louis School of Medicine, St. Louis, Missouri, US

Background: Rapid sequence intubation (RSI) and postintubation sedation (PIS) care are critical skills for emergency medicine clinicians. Postintubation sedation is vital for maintaining comfort and safety as the patient is exposed to continued noxious stimuli. Prior studies have shown children are half as likely to receive PIS compared to adults intubated in the emergency room (28% and 57% respectively).[1,2] This discrepancy in PIS care between pediatric and adult patients has been associated with the trend in Pediatric Emergency Medicine (PEM) to use long-acting neuromuscular blocking agents when performing RSI.[1,3] More attention and education is needed to close this gap and provide safe PIS care, and is the focus of this quality improvement (QI) initiative.

Objective: Increase the rate of postintubation sedation for children less than 18 years of age undergoing RSI in the pediatric emergency department (ED) from a baseline of 24% to 54% by June 1, 2024.

Methods: Population: Pediatric patients less than 18 years of age intubated in the ED at St. Louis Children's Hospital were included in this QI initiative. Patients who were intubated prior to arrival to the ED or who did not receive an induction paralytic with intubation were excluded. Baseline data was obtained from patients meeting inclusion criteria from January 1, 2020 to December 31, 2021.

Phases: The Pre-Intervention Phase was from January 1 to June 30, 2023. A Process Map (Figure 1) was created to determine critical operational steps in initiating PIS in the ED. A Key Driver Diagram (Figure 2) was developed to identify stakeholders and establish change ideas that that would directly impact the outcome measure. A PIS QI team was assembled which included PEM providers, pharmacy, nursing leadership, and pediatric intensive care unit (PICU) collaborators.

Baseline data collection and analysis also occurred during this phase. The Post-Intervention Phase will be from July 1, 2023 to June 1, 2024. Plan-Do-Study-Act cycles will occur with each intervention.

Interventions: PEM Provider educational sessions, PIS ED Guideline, EPIC orderset, integration of PIS into ED airway checklist

Measures: Proportion of patients who received postintubation sedation within 15 minutes after rapid sequence intubation in the ED. Balancing measures will include length of stay in the emergency department, hemodynamic instability, and unplanned extubation.

Results: A total of 130 patients were identified for the baseline data. The analysis of this baseline cohort is currently ongoing. Preliminary results show that approximately 24% of patients receive PIS after rapid sequence intubation in the ED (5/21). No patients received PIS within 15 minutes of induction sedative (0/5).

Conclusions: Postintubation sedation occurs infrequently within Pediatric Emergency Medicine. This QI project will help standardize PIS care in our pediatric emergency department in an effort to improve patient care and reduce safety events.

Figure 1: Process Map for Postintubation Sedation (PIS) in the Emergency Department at St. Louis Children's Hospital

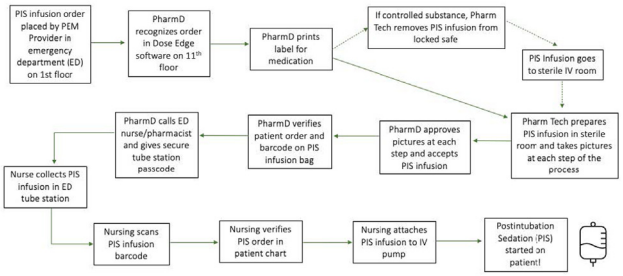
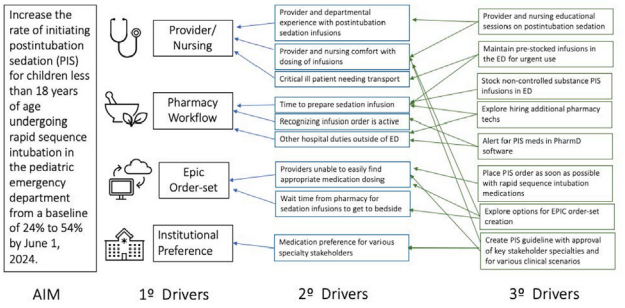



Figure 2: Postintubation Sedation (PIS) Quality Improvement Initiative Key Driver Diagram at St. Louis Children's Hospital




No, authors do not have interests to disclose

## 292 Expanding HIV Screening in a Pediatric Emergency Department on Chicago's South Side

Danzig R, Friedman E, Rosebush J, Schmitt J, Patel N, Stanford K/University of Chicago, Chicago, Illinois, US

Objectives: While the rate of new human immunodeficiency virus (HIV) infections in the United States (US) is declining, adolescents remain at significant risk. Youth ages 13-24 are the least likely of any age group to be aware of their HIV status, seek medical care, or have a suppressed viral load. While the Centers for Disease Control and Prevention (CDC) recommends routine, universal screening for youth ages 13 and above, this has not been widely put into practice in pediatrics. This project aims to increase screening for HIV among adolescents by applying a proven model used in the adult emergency department (ED) to the pediatric ED setting.

Methods: In July 2022, a large, urban pediatric ED implemented routine, opt-out HIV screening for patients ages 13 years and older for whom a complete blood count (CBC) or gonorrhea/chlamydia testing were ordered. Testing was prompted by two best practice advisories (BPAs) in the electronic medical record (EMR), which reminded physicians to order a 4th generation HIV-1,2 Ag/Ab assay when orders were signed, after offering the patient or guardian the opportunity to opt out. The BPA was accompanied by both physician and patient education about opt-out HIV screening. Data from the first eight months of the program, including demographics and testing trends, were collected and analyzed using descriptive statistics.

Results: Over eight months, there were 1099 BPA fires, representing 841 unique individuals. Of all fires, 91.2% occurred following an order for a CBC and the rest were prompted by orders for gonorrhea/chlamydia testing. After a BPA fired, HIV screening was ordered 34.6% of the time. Over the testing period, 618 HIV tests were performed. Of patients screened, 80.1% identified as African American/Black and 9.55% as Hispanic or Latino, and 378 (62.1%) identified as female, 228 (37.4%) as male, and 3 (0.5%) as non-binary. Screening assays were more frequently ordered in older adolescents, with almost half occurring in 17-year old (27.5%) and 16-year old (18.3%) youth. The total number of tests performed increased by 303% compared to the same eight-month period the year prior. The percent of reactive screens was 0.16% (1).

Conclusions: Routine, opt-out HIV screening in the pediatric ED is an effective strategy for increasing numbers of adolescents who are both screened and informed of

their HIV serostatus. The majority of screenings in our project were performed on older, female adolescents. Data is not available to ascertain the reasons some eligible patients were not tested, and this will be an important area for future study. This project demonstrates that the implementation of a routine HIV screening program utilizing an EMR prompt can dramatically increase screening rates among adolescents. Expanding this project and applying it in pediatric EDs has the potential for a major public health impact, reaching youth for early diagnosis and linkage to care.

No, authors do not have interests to disclose

## EMF 293 Interrater Agreement After Online Dissemination of Novel Lung Ultrasound Findings: Implications for Future Pandemics

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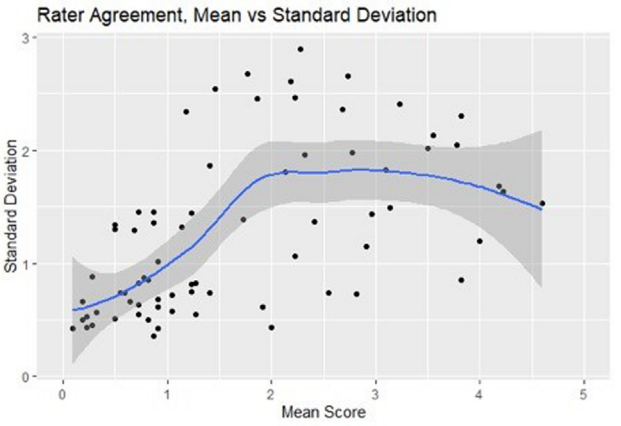
Objectives: During the COVID-19 pandemic health care workers (HCW) used online tools (social media, online publications) to propose that abnormal findings on lung point of care ultrasound (L-POCUS) carried diagnostic and prognostic implications. An important diagnostic characteristic of novel L-POCUS findings is interrater agreement of image interpretation because variability can threaten external validity. The purpose of our study was to assess HCWs' agreement of L-POCUS pathology after a focused online training that sought to mimic what would occur when attempting to disseminate and integrate novel L-POCUS findings.

Methods: We selected 25 total clips from 25 unique patients, targeting a mild to moderate illness severity population as part of a multi-institute cross sectional study of ambulatory patients at three large academic hospitals in New York, Missouri, and Arizona. Patients with respiratory complaints who tested positive for COVID-19 and maintained oxygen saturation ≥92% for two hours after emergency department presentation were eligible for inclusion. Emergency physicians with ultrasound (US) fellowship training performed L-POCUS on seven lung windows in each hemithorax using either a curvilinear or linear probe with "lung" settings. Clips were scored using a novel rubric categorizing pleural and parenchymal pathology. The components were then combined to yield a score on a scale of 0 to 6 with disease severity being higher with higher scores. Pleural findings were scored as either 0 (normal), 1 (blurring, indenting, or thickening of pleural line), or 2 (discontinuity of pleural line). Parenchymal findings were scored as either 0 (normal), 1 (1-3 B lines), 2 (>3 B lines), 3 (coalescing or "waterfall" B lines), or 6 (subpleural consolidation). When all 14 lung fields are included, the total score can range from 0-84. For this study, participants watched a 15-minute training video created by content experts and completed a 5-minute training quiz with direct feedback. Next, clips were compiled into an online survey using Qualtrics software and participants were asked to score them. We deliberately chose a prevalence of any pathology to represent 70% of clips by including 7 normal clips and 3 clips each for scores 1-6. The mean clip score was 2.5, while the mean total patient score was 16.7. Study participants were blinded to the clip score distribution. Participants received a $30 Amazon gift card upon completion of the online survey. We used Krippendorff's alpha to measure agreement.

Results: We recruited 22 volunteers: 9 (41%) residents, 8 (36%) attendings, and 5 (23%) US fellows or US faculty with fellowship experience. The calculated interrater reliability (IRR) for all raters was 0.40 (95% CI 0.31-0.49). Variability was lowest for normal to low disease severity clips (scores 0-1) and higher for moderate to severe disease scores (scores >1) as seen in Figure 1. When stratified by training level, IRR for residents was 0.48 (95% CI 0.39-0.57), 0.37 (95% CI 0.27-0.47) for attendings without an US fellowship, and 0.35 (95% CI 0.22-0.48) for US fellows and faculty with US fellowship training.

Conclusions: HCWs who complete online training have fair agreement on novel L-POCUS findings. Variability was lowest with low disease severity clips and higher with moderate to severe disease clips. Dissemination of novel US findings requires more than online resources to meet rapid adoption thresholds as measured by agreement.




Yes, authors have interests to disclose
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## 294 How Thick Is Too Thick? Diagnostic Utility of the Anterior Pleural Line Thickness on Point-of-Care Ultrasound in Identifying Patients With Pneumonia

Nelson M, Bielwa N, Stankard B, McCann M, Kim J, Devine A, Smilios C, Young E, Boateng K, Powers D, Ledasma K/North Shore University Hospital, Manhasset, New York, US

Objectives: Shortness of breath (SOB)is a common emergency department (ED) presentation with a broad diagnostic differential. Point-of-care ultrasound (POCUS) has been shown to be helpful in determining the etiology of SOB. Many prior studies have focused on the presence of B-lines, however, limited studies have evaluated the diagnostic utility of anterior pleural line thickness, using a phased array probe, for diagnosing pneumonia. The objective of this study was to determine whether anterior pleural line (PL) thickness, on phased array ultrasound, could be used to diagnose pneumonia in ED patients.

Methods: This was a retrospective study of all point- of- care lung ultrasounds (LUs) performed in an academic ED over a 16-month period. All LUs were reviewed by either an ultrasound fellow or fellowship- trained ultrasound faculty member. Patients were included if they had at least two bilateral anterior lung fields evaluated with a phased array ultrasound probe. The largest anterior PL thickness was recorded. Patients were excluded if they did not receive a computed tomography (CT) scan of the chest, which served as the gold standard for the diagnosis of pneumonia, within 24 hours of the LU. Chart review was performed on all enrolled patients. We determined the sensitivity and specificity of using PL thickness of >0.40cm vs. ≤0.40cm to diagnose pneumonia, compared with CT. A logistic regression model also estimated the odds of a diagnosis of pneumonia associated with a PL thickness of >0.40cm.

Results: A total of 216 patients were included in the analysis; 53 patients (24.5%) had a PL thickness >0.40cm on LU and 53 patients (24.5%) also had a diagnosis of pneumonia on CT. The sensitivity of pleural line thickness > 0.40cm in the diagnosis of pneumonia was 0.89 (95% CI:, 0.841, -0.94). The specificity was 0.66 (95% CI: 0.53, -0.79). The positive predictive value was 0.89 (95% CI: 0.84, -0.94). Compared to those with PL thickness≤0.40cm, patients with PL thickness T > 0.40cm had 15.67 times the odds of having a pneumonia diagnosis (95% CI: 7.40, 33.17).

Conclusions: The results of this study indicate that anterior pleural line thickness, measured using a phased array probe, can be used to identify patients with pneumonia with high sensitivity. In our study, patients with a PL thickness > 0.40cm had significantly higher odds of being diagnosed with pneumonia.

Yes, authors have interests to disclose
Disclosure: Phillips
Consultant/Advisor Phillips

## 295 Artificial Intelligence Model to Identify Pleural Line Abnormalities in Lung Ultrasound

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Objectives: Lung ultrasound (LUS) has emerged as an important tool to aid in the management of lower respiratory symptoms such as shortness of breath. An important sonographic feature in lung assessment is the appearance of thickened, fragmented, or irregular pleural lines (PL), the presence of which is linked to several pathologies including COVID-19, subpleural alveolar syndrome, or fibrosis. Here we present the development of an artificial intelligence (AI) model to standardize the identification of abnormal PL in LUS.

Methods:

*Study Design:* Single center, prospective, observational study approved by the Institutional Review Board.

*Data:* Adult patients (n=29) presenting with lower respiratory tract symptoms and suspected of having COVID-19 were enrolled in the study. Subjects aged 34 to 82 (38% female) underwent a 14-zone LUS protocol to collect video loops using a handheld ultrasound system (Philips, Lumify). Data were collected at up to four time points during the patient's stay in the hospital. Each subject contributed to data collected using two probes selected from a list of three probes (C5-2 curvilinear, S4-1 phased-array, and L12-4 linear). A total of 1007 LUS videos were available for this work.

*Image annotation:* Two expert annotators (Emergency Medicine fellowship-trained physicians) labelled each video for the presence or absence of PL abnormalities, with an adjudication process to resolve disagreement. Trained annotators labelled each frame of the videos with tight bounding boxes around the normal and abnormal PL segments.

*Algorithm:* A deep learning-based object detection model (YOLOv5) was trained to detect the presence of abnormal PL in each frame in the video loop. Detection confidence scores were aggregated across frames to determine a video-level binary prediction of PL abnormality. A five-fold cross-validation scheme was used to evaluate model performance. For each cross-validation fold, video loops were split into training, validation, and test data sets using a 60/20/20% split without patient-wise overlap.

Results: Figure 1 shows a representative LUS image with abnormal PL as classified by the AI model. The mean average precision for detection of abnormal PL was 0.69±0.05 (mean ± SD across five folds). The sensitivity, specificity and area-under-the-receiver-operating-characteristic curve for video-level classification of PL abnormality were 0.80±0.06, 0.77±0.12, and 0.85±0.05, respectively.

Conclusions: This work demonstrates that an AI-based model is feasible for detection and classification of abnormal PL in LUS videos. The model may enable evaluation of sonographic PL features by less-trained users and provide a framework for consistent assessment of patient lung condition over time.

Acknowledgments: Funding and technical support for this work is provided by the Biomedical Advanced Research and Development Authority (BARDA), under the Administration for Strategic Preparedness and Response (ASPR), within the U.S. Department of Health and Human Services (HHS), under ongoing USG Contract No. 75A50120C00097. For more information about BARDA, refer to https://www.medicalcountermeasures.gov/.

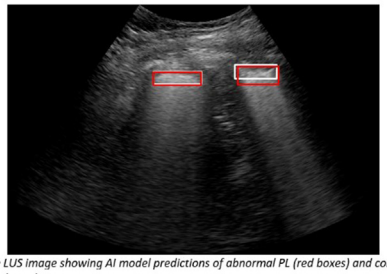

*Figure 1: Representative LUS image showing AI model predictions of abnormal PL (red boxes) and corresponding ground-truth annotations (white boxes).*

Yes, authors have interests to disclose
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Philips North America

## 296 Increased Number of B-Lines After 500cc Fluid Bolus Associated With Worse Outcomes

Nelson M, Cohen A, Jin A, Rolston D, Li T, Devine A, Smilios C, Rao V, Forrester J, Napolitano J/North Shore University Hospital, Manhasset, New York, USA

Objectives: Lung ultrasound (LUS) has become an invaluable tool in the ED to evaluate patients with dyspnea and help to determine fluid status in the critically ill. The purpose of this study was to determine whether a worsening LUS after receiving a small fluid challenge is associated with worse outcomes.

Methods: This was a prospective observational study of septic patients presenting to an academic emergency department. Patients were eligible for enrollment if they screened positive for sepsis. Each patient received an 8-zone lung ultrasound to evaluate for the presence of B lines. A zone was considered positive if greater than 3 B-lines were seen during a 6 second ultrasound clip. The sonographer reported how many of the 8 quadrants were positive for B lines. A repeat scan was performed after the patient received 500cc of intravenous fluid. Chart review was performed on all enrolled patients. Outcomes variables were whether the patient was admitted to the intensive care unit, had a rapid response called or experienced mortality within 24 hours of presentation.

Results: A total of 278 patients were enrolled in this study. 98 patients had an increased number of lung quadrants positive for B –lines. The logistic regression model of relative odds of ICU admission, rapid response or mortality within 24 hours associated with change in number of B-line lung quadrants showed a ratio of 1.74(1.06,285 95%CI) for patients with increased number of B lines after IVF administration compared to those with no change.

Conclusions: The results of this study show that septic ED patients with worsening LUS findings after a small volume of fluid had a higher likelihood of experiencing an adverse outcome within 24 hours of ED arrival, suggesting they may represent a sicker cohort.

Yes, authors have interests to disclose
Disclosure: Phillips
Consultant/Advisor Phillips
Disclosure: Flosonics
Consultant/Advisor Flosonics

## 297 Right Ventricular Assessment by Emergency Department Clinicians

Nelson M, Cohen A, Rao V, Powers D, Boetang K, Stankard B, Li T, Jin A, Forrester J, Smilios C/North Shore University Hospital, Manhasset, New York, USA

Objectives: Emergency clinicians routinely perform bedside focused echocardiography to evaluate for right ventricular dysfunction (RVD). Current teaching focuses on the assessment of RV size as an indicator of dysfunction. A divergence of the normal 2:3 RV:LV ratio is thought of as the gold standard in bedside diagnosis of RV strain. The objective of this study was to determine whether RV dilation in isolation is accurate in determining the presence of RV dysfunction.

Methods: This was a prospective, observational study of patients who received a bedside focused transthoracic echocardiogram (TTE) in an academic emergency department to evaluate for right ventricular enlargement. Patients were enrolled if they had a cardiology performed comprehensive echocardiogram ordered and performed within 24 hours. All patients had an emergency clinician-performed TTE to assess for RV dilation, which was defined as an RV being equal in size or larger than the left ventricle.

Results: A total of 193 patients were enrolled in this study. Amongst those 67 patients were diagnosed with right ventricular dysfunction. Of those diagnosed with RV dysfunction, 86.6% had a right ventricle that was equal to or greater in size that the

left ventricle. The overall accuracy of RV dilation for evaluating for RVD was 83.4%. 9 patients (13.4% of the total patients with RVD) with a right ventricle that was smaller than the left ventricle were found to have right ventricular dysfunction.

Conclusion: Emergency clinicians are often trained to evaluate for right ventricular dysfunction based on increased right ventricular size. In this study we found that although increased RV size was significantly associated with dysfunction, many patients without RV enlargement are still ultimately diagnosed with dysfunction. We may need further training to evaluate RV dysfunction as we continue to perform point-of-care ultrasound.

Yes, authors have interests to disclose

Disclosure: Phillips

Consultant/Advisor Phillips

## 298 Proficiency-Based Simulation Training: Will This Work for Resuscitative Transesophageal Echocardiography?

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Objectives: Resuscitative transesophageal echocardiography (rTEE) during cardiac arrest care in the emergency department (ED) is supported by several society guidelines. The American College of Emergency Physicians (ACEP) guidelines recommend a minimum of 10 proctored exams on live patients or simulator models to achieve rTEE proficiency. However, the optimal duration of training needed to achieve proficiency remains unknown, especially with a simulator-only training model. The purpose of this study was to determine the effectiveness of competency based rTEE training for emergency physicians (EPs).

Methods: This was a single center, observational study performed at an urban, academic level 1 trauma center. EPs participated in three 1-hour workshops involving simulator-enhanced hands-on training using a Heart Works Simulator. Participants performed 3 proctored rTEE exams during each of the first two workshops and 4 proctored exams during the last workshop. Each workshop included unique simulation scenarios. The workshops were, on average, spaced 1.2 weeks apart. At the conclusion of the second and third workshops, participants' skills were assessed using a checklist. The rTEE checklist, developed by expert consensus, included: naming views, describing probe manipulation, obtaining correct views, and interpreting the correct diagnosis. Competency was defined as successfully performing all 15 items on the checklist without assistance or feedback. In alignment with ACEP guidelines, EPs could only independently perform rTEE studies on real patients after achieving competency in 10 proctored simulated exams. Adequacy of post training rTEEs performed over 6 months is assessed by a rTEE expert.

Results: We enrolled 18 non-ultrasound fellowship trained EPs (72% (13/18) faculty and 28% (5/18) senior residents). At the end of the second workshop, 78% (14/18) achieved proficiency. The four participants who did not achieve competency failed in name recall of the views, but obtained all required views adequately and accurately interpreted the images. After 10 cases, all EPs achieved proficiency. Between October 2022 and April 2023, a total of 23 rTEE examinations were performed; 48% (11/23) were performed by the newly trained EPs. Ninety-one percent (10/11) of the rTEE exams were considered adequate based on the quality assessment checklist.

Conclusions: The majority of participants achieved full competency after only 6 proctored simulation exams. With this training protocol, non-ultrasound trained EPs were able to independently perform rTEE studies and acquire interpretable, clinically relevant images. Simulation-based rTEE training is highly effective amongst EPs, and future training protocols may achieve greater efficiency by implementing a proficiency-based approach.

No, authors do not have interests to disclose

## 299 Patient Factors That Influence Utilization of Emergency Department-Based Programs to Combat Opioid Use Disorder

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Objectives: Opioid overdose (OD) has been a leading cause of accidental death, and the emergency department (ED) is frequently the primary point of entry into the health care system for patients with opioid use disorder (OUD). Emergency medicine has been on the forefront of developing innovative programs to confront the opioid epidemic. In order to best implement ED-based programs, it is important to understand the factors that drive utilization. The purpose of this study was to determine the patient factors that influence the usage of these ED-based programs for patients with OUD.

Methods: This was a secondary analysis from a previously presented retrospective IRB-approved review of patients presenting to a large urban Midwestern ED at high risk for opioid OD from November 2017-December 2020 (n=1676) to determine outcomes of subsequent ODs. The ED-based OUD treatment program evaluated in this study includes three main interventions: 1) take-home naloxone, 2) ED-initiated MOUD and 3) an ED-based peer support and recovery program (ED-PSRP). The primary outcome of this study was utilization of each intervention. Patient demographics and social determinants were determined: Age, gender, race, ethnicity, insurance status, and area of Deprivation Index (ADI, a validated measure of socioeconomic distress, high index = higher deprivation). Prior history of OUD and number of prior ED visits (for OD and all visits) were identified. Statistical comparisons were made using binary logistic regression and Chi-squared analysis.

Results: Previous ED visits for OD were negatively associated with receiving MOUD (odds ratio 0.513, p=0.031) and the use of the ED-PSRP (Odds Ratio 0.69, p=0.026) but positively associated with receiving take-home naloxone (odds ratio 1.36, p=0.032). Transport to a facility was not associated with prior OD. The patient's age and race were not associated with differences in ED program usage. Male patients were more likely to be transported to a treatment facility (11% vs 7.4%, p=0.02). ADI was associated with increased take-home naloxone, but not associated with MOUD or ED-PSRP.

Conclusions: Patients factors such as demographics, social determinants, and prior opioid use history play an important role in the utilization of ED-based programs to for OUD. It is important to understand these factors to improve implementation of efficacy of ED programs to combat the opioid epidemic.

No, authors do not have interests to disclose

## 300 Prevalence of Fentanyl Co-Ingestion Among Emergency Department Patients With Opioid and Non-Opioid Drug Overdoses

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Objectives: The addition of illegally manufactured fentanyl to both the opioid and non-opioid illegal drug supply has been found to play a significant role in exacerbating the increase in overdose deaths noted in the United States. Fentanyl is present in many illegal opioids and is now increasingly found in non-opioid substances as well. Users are often unaware that the drugs they are ingesting contain fentanyl. An awareness of fentanyl in one's drugs may be protective against fatal overdose. Our objective was to determine the prevalence of fentanyl ingestion in emergency department patients presenting with overdoses of intended opioid and non-opioid substances.

Methods: We performed a prospective observational study of a convenience sample of patients presenting with overdose of illegal drugs to an urban, academic emergency department in New York City. Patients were surveyed about what drugs they had intended to ingest in the prior 24 hours and urine samples were tested for fentanyl metabolites. Results were analyzed according to whether the patient had been intending to ingest opioids, regardless of ingestion of non-opioid substances, versus ingestion of only non-opioid substances.

Results: We approached 188 patients after illegal drug overdose and enrolled 102 patients (54% acceptance; male 82%, average age 48) who overdosed on illegal drugs, with 53% (54/102) intending to ingest opioids (with or without non-opioids) and 47% (48/102) intending to ingest only non-opioid substances. Among those intending to ingest opioids, 91% (49/54) were positive for urine fentanyl metabolites, with 86% (19/22) who did not believe they were ingesting fentanyl screening positive for urine fentanyl metabolites. Among the 48 patients with intended non-opioid ingestions, 38% (18/48) were positive for urine fentanyl metabolites.

Conclusion: A majority of opioid overdoses and over one third of non-opioid overdoses involved fentanyl as a co-ingestant, even when individuals did not believe they were ingesting fentanyl. This knowledge can inform harm reduction approaches, such as the use of fentanyl test strips, for both opioid and non-opioid users.

No, authors do not have interests to disclose

# 301 Buprenorphine Induction in Emergency Department Patients Following Reversal of Non-Fatal Opioid Overdose With Naloxone

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Objectives: Emergency department (ED)-initiated buprenorphine reduces morbidity and mortality related to opioid use, but concern for risk of precipitated withdrawal following naloxone administration has been a barrier to buprenorphine initiation after nonfatal overdose. Here we examine the safety and tolerability of buprenorphine initiation following reversal of nonfatal overdose with naloxone.

Methods: We conducted a retrospective electronic health record review of patients 18 years or older that were treated with sublingual buprenorphine-naloxone in a large, urban, academic ED between March 1, 2020 and March 31, 2022. We reviewed cases of patients that were treated with buprenorphine after receiving naloxone, either in the pre-hospital or ED setting, and generated a matched cohort of patients that had not first received naloxone. Primary outcomes were (1) precipitated withdrawal using a validated definition and (2) other adverse events related to buprenorphine administration. Bivariate analyses (ie, fisher tests) were conducted to compare demographics, encounter characteristics, and outcomes between cases and controls.

Results: A total of 74 records were reviewed, with no statistical differences between cases (n=37) and controls (n=37) by demographics. Patients primarily identified as Black (89.2%), male (74.3%), and median age was 56.7 (IQR 12.8) years old. For cases only, 78.4% were administered naloxone pre-hospital, 5.4% in the ED, and 16.2% in both the pre-hospital and ED setting.

Table 1 shows no significant differences between cases and controls by primary or secondary outcomes. First dose of buprenorphine was higher in the control group (mean 5.8, SD 2.1) compared to cases (mean 4.8, SD 1.6) (p=0.01). Compared to controls, cases (13.5%) were less likely to be admitted to the hospital (vs. 40.5% for controls, p<0.01). Two of the five admissions for cases and one of the 15 admissions for controls were determined to be related to buprenorphine administration.

Conclusions: Buprenorphine induction following naloxone reversal of nonfatal opioid overdose led to no higher rate of precipitated withdrawal or other adverse outcomes related to buprenorphine administration when compared to induction of patients that did not receive naloxone.

**Table 1: Bivariate analysis by outcome between Cases and Controls**

| | Cases (n=37) | Controls (n=37) | Total | p-value |
|---|---|---|---|---|
| Precipitated Withdrawal | 2 (5.4%) | 4 (10.8%) | 6 (8.1%) | 0.67 |
| Other Adverse Events | 2 (5.4%) | 1 (2.7%) | 3 (4.1%) | 1.00 |
| Sedation | 1 (2.7%) | 1 (2.7%) | 2 (2.7%) | 1.00 |
| Hypoxia | 13 (35.1%) | 6 (16.2%) | 19 (25.7%) | 0.11 |
| Naloxone Rescue Administration After Bup Administration | 0 (0%) | 0 (0%) | 0 (0%) | 1.00 |
| Repeat ED Visit Within 7 Days of Discharge | 3 (8.1%) | 2 (5.4%) | 5 (6.8%) | 1.00 |
| Hospitalization Within 7 Days of Discharge | 0 (0%) | 2 (5.4%) | 2 (2.7%) | 0.49 |

No, authors do not have interests to disclose

# 302 Incidence of Buprenorphine-Precipitated Withdrawal in Emergency Department Patients With Opioid Use Disorder in Philadelphia

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Objectives: The incidence of precipitated withdrawal (PW) after induction with buprenorphine is unclear for individuals with opioid use disorder (OUD). Adverse outcomes from buprenorphine induction are associated with poor retention in OUD treatment for patients and may deter efforts to expand this evidence-based practice in emergency departments (EDs). Although evidence from patient surveys report high rates of PW, secondary analyses of an ED-based multicenter clinical trial estimated low incidence. The objective of this study was to estimate the incidence of PW in a real-world retrospective cohort of patients with OUD who presented to the ED.

Methods: We obtained electronic health record data for adult patients with OUD at three academic hospitals in Philadelphia between January 2020 and December 2021. We included patients who received an initial sublingual dose of buprenorphine greater than 2mg in the ED or soon after hospital admission from the ED. We included patients with a documented score of >8 on the Clinical Opiate Withdrawal Scale (COWS) prior to receiving buprenorphine. We excluded patients who lacked documentation of COWS after receiving buprenorphine. We defined PW as an increase in COWS >5 within two hours of the first dose of buprenorphine. We report PW incidence overall, by initial buprenorphine dose, by withdrawal severity, and for patients with urine drug testing (UDT) and fentanyl detected.

Results: Of 374 patients who received buprenorphine, 160 (43%) met inclusion criteria. Patients had mean age of 39 years; 51 (32%) patients were female, and 56 (35%) reported Black race. Overall, 22 (14%) patients met criteria for PW. The incidence of PW by initial dose was 2 of 29 patients (7%) for 2mg; 13 of 96 (14%) for 4mg; and 7 of 35 (20%) for 8mg or greater. Among patients with COWS between 8 and 12 prior to induction, 13 of 102 (13%) met criteria for PW, compared to 9 of 58 (16%) with COWS > 12. Among 89 patients fentanyl detected by urine drug screen, 17 (19%) met criteria for PW.

Conclusions: In this cohort of patients with OUD who presented to EDs in Philadelphia, the incidence of PW was more than ten-fold higher than that reported for patients enrolled in a recent clinical trial. PW was more common for higher initial doses of buprenorphine. Limitations of this study include small sample size as well as high rates of missing documentation of withdrawal scores. New approaches are needed to measure the incidence, anticipate, and manage symptoms due to PW to sustain access to this highly effective treatment for OUD in the ED.

No, authors do not have interests to disclose

# 303 Suboxone for Opioid Use Disorder: Reduction in Mortality and Increased Remission

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Objectives: The increased availability of Fentanyl has worsened opioid-related mortality in the United States. Smaller studies have suggested that opioid-agonists such as Suboxone have potential to reduce mortality related to overdose, as well as increase remission. Understanding the efficacy of opioid-agonists is important as the prevalence of opioid use disorder (OUD) increases. In this study, mortality and remission rates for OUD were evaluated to determine the efficacy of treatment with suboxone.

Methods: In this retrospective study, the US Collaborative Network database in TriNetX was used to evaluate de-identified medical records of approximately 90 million patients from 56 health care organizations (HCOs). Patients were selected from January 1st, 2017, to January 1st, 2022. Cohort 1 included patients with OUD who were started on suboxone (buprenorphine) within 1 year after diagnosis. Cohort 2 included patients with OUD who were never on suboxone. The outcomes tested were mortality and remission within a year of the indexed event, with and without propensity matching for age, sex, and race/ethnicity.

Results: Before propensity matching, a total of 215,243 patients with OUD were identified. After exclusions, patients with opioid use disorder showed 26% less deaths within 1 year of diagnosis when taking suboxone (N=62,730) compared to patients who were never on suboxone (N=151,351) (5.70% vs. 7.74%; RR 0.74; 95% CI

0.71-0.76; p<0.001). Remission rate was 1.6 times higher for patients with OUD when taking suboxone compared to patients not on suboxone (29.0% vs. 18.3%; RR 1.59; 95% CI 1.56-1.62; p<0.001). After propensity matching, the effect on mortality was less, but still statistically significant (RR 0.91; 95% CI 0.87- 0.95; p<001) and the remission rate was similar (29.0% vs 19.3%; RR 1.51; 95% CI 1.47-1.54; p<0.001).

Conclusions: Suboxone showed significantly reduced mortality and increased remission rates for patients with opioid use disorder and should be used as a primary treatment. Understanding treatment options like Suboxone can mitigate the impact of opioid use disorder.

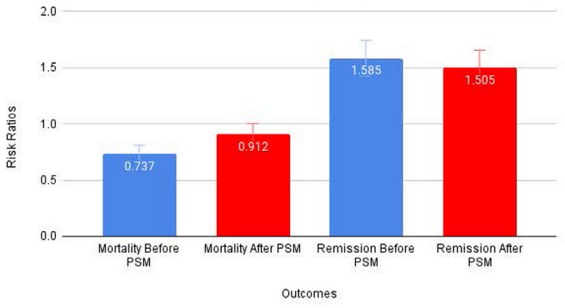
**Tables and Figures**

**Table 1: Outcomes before and after Propensity Score Matching**

| | Cohort 1 | Cohort 2 | RR (95% CI) | P-Value |
|---|---|---|---|---|
| **Mortality before PSM** | 5.7% | 7.7% | 0.737 (0.710-0.764) | P<0.0001 |
| **Mortality after PSM** | 5.7% | 6.3% | 0.912 (0.873-0.953) | P<0.0001 |
| **Remission before PSM** | 29.0% | 18.3% | 1.585 (1.553-1.617) | P<0.0001 |
| **Remission after PSM** | 29.0% | 19.3% | 1.505 (1.468-1.543) | P<0.0001 |

PSM, Propensity Score Matching; RR, Relative Risk; CI, Confidence Interval; P, P-Value

**Figure 1: Risk Ratios Before and After Propensity Score Matching (PSM)**




No, authors do not have interests to disclose

## 304 Randomized Controlled Trial of ANEB-001 as an Antidote for Acute Cannabinoid Intoxication in Healthy Adults

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Objectives: Emergency department visits due to acute cannabinoid intoxication (ACI) have increased exponentially as US states have liberalized cannabis policy. Serious clinical effects of ACI can include neuropsychiatric symptoms (e.g., panic attacks, psychosis), tachycardia, and hypotension, mediated through cannabinoid type 1 (CB1) receptor, primarily by the CB1 agonist delta-9-tetrahydrocannabinol (THC). We assessed the potential of CB1 antagonist ANEB-001 to reverse THC-induced effects in healthy subjects. Secondary objectives included safety, tolerability, and pharmacodynamics (PD) of ANEB-001.

Methods: This randomized, double-blind, placebo-controlled trial tested single oral doses of ANEB-001 in cannabis-experienced adults challenged with oral THC (NCT05282797). Part A: 10.5 mg THC with 50 mg or 100 mg ANEB-001, co-administered, or matching placebo (n=20/arm). Part B varied timing and dose of THC/ ANEB-001 in 6 cohorts (Table 1). THC and study drug were co-administered (cohorts 1 & 2) or delayed by 1 hour post THC (cohorts 3, 4, 5, & 6). ACI was assessed (pre-THC and at 1, 2, 3, 4, 5, and 8 h) via visual analogue scales (VAS) for feeling high & alertness, body sway, heart rate. Adverse events (AEs) were assessed over 24 h and at 7 – 14 d. Effects were compared to placebo within cohorts and for pooled THC doses, using a mixed model of covariance for repeated measures (ANCOVA), with treatment, time, treatment by time, and average baseline as covariates.

Results: Part A (60 subjects): Coadministration of THC + ANEB-001 (50 or 100 mg) produced a significant and sustained decrease in VAS feeling high (p<0.0001) and increase in alertness (p<0.01). Part B (74 subjects): for results see Table 1. ANEB-001 rapidly reversed THC effects and was safe and well tolerated with no serious or severe AEs. ANEB-001-related AEs were transient and mild, except for moderate nausea/vomiting in one patient each at the 21 and 30 mg THC doses. THC effects on most outcomes were blunted by a high-fat meal. Only five subjects enrolled in cohort 4 (40 mg THC 1 h before ANEB-001) due to poor THC tolerability.

Conclusions: When co-administered and in delayed dose strategies, single oral doses of ANEB-001 were well tolerated and rapidly reversed THC-induced ACI symptoms in healthy adults.

**Table 1. Effect of ANEB-001 dose and timing on THC-induced effects vs. placebo (Part B).**

| Cohort | 1 | 2 | 3 | 5 | Pooled 3+5 | 6 |
|---|---|---|---|---|---|---|
| Treatment | THC 21 mg + ANEB-001 (co-admin) 30 mg | THC 21 mg + ANEB-001 (co-admin) 10 mg | THC 21 mg + ANEB-001 (1 h delay) 10 mg | THC 30 mg + ANEB-001 (1 h delay) 10 mg | THC 21/30 mg + ANEB-001 10 mg | THC 30 mg + ANEB-001 (1 h delay) 10 mg (fed) |
| n, sex (active) | 2F/7M | 6F/1M | 6F/3M | 7F/3M | 13F/6M | 4F/6M |
| n, sex (PBO) | 3F/6M | | 3F/2M | 3F/2M | 6F/4M | 1F/4M |
| VAS Feeling High Difference log(mm) | -0.7856 p<0.0001 | -0.7072 P=0.0001 | -0.5545 p=0.0380 | -0.8581 p<0.0001 | -0.7028 p<0.0001 | -0.6057 P=0.0030 |
| Body Sway Difference (%) | -30.6% p=0.0023 | -29.3% p=0.0069 | -33.6% P=0.0406 | -34.8% p=0.0196 | -32.4% P=0.0014 | -19.5% p=0.2001 |
| VAS Alertness Difference (mm) | 10.8 p=0.0013 | 9.2 p=0.0047 | 4.4 p=0.4834 | 15.6 p=0.0042 | 11.3 P=0.0024 | 0.6 p=0.8679 |
| Heart Rate Difference (BPM) | -2.2 p=0.473 | -1.1 p=0.7264 | -10.3 p=0.0589 | -6.7 p=0.1119 | -8.1 P=0.0125 | -0.9 p=0.8722 |

Least squares means (range) p-value, ANEB-001 difference vs. placebo (p<0.05 considered statistically significant).

Yes, authors have interests to disclose
Disclosure: Anebulo
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Disclosure: Anebulo
Investigator Anebulo
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Investigator Anebulo
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Board Member/Officer/Trustee Anebulo
Disclosure: Anebulo
Board Member/Officer/Trustee Anebulo

## 305 The Association Between Frailty and Hospital Stays Among Geriatric Trauma Patients: A Retrospective Cohort Analysis

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Objectives: Frailty among older trauma patients is associated with increased morbidity and mortality. While frailty is a risk factor for fall injuries, it may also influence in-hospital care trajectory. We sought to determine the relationship between frailty status and in-hospital admission and length of hospital stay among adult trauma patients who underwent frailty screening.

Methods: Using a single institutional trauma database serving a culturally diverse population, we pooled data on 987 adults 65 years and older whose frailty index was assessed at their emergency department (ED) presentation. The predictor variable was frailty status, using the US Geriatric Advisory Panel's simple FRAIL scale, a five-item instrument that defines five domains of frailty – Fatigue, Resistance, Ambulation, Illnesses, and Loss of weight. Frailty status was measured as a three- level categorical variable (robust, pre-frail, and frail). The outcome measures were hospital admission and length of hospital stay. We controlled for age, sex, race/ethnicity, body mass index, Charlson Comorbidity Index, injury type, recurrent fall injury, and Glasgow Coma Scale score. We performed multivariable logistic regression to assess the odds and 95% confidence intervals (CI) of hospital admission and multivariable quantile regression to assess the median difference (MD) in the length of hospital stay across frailty status categories.

Results: The mean (SD) age of the study population was 81 (9.0) years, and the population was predominantly female (66%) and non-Hispanic White (64%). Twenty- six percent and 36% of the geriatric trauma patients who presented to the ED were categorized as frail and pre-frail, respectively. The predominant injury type was fall (94%) and half of the population was either overweight (32%) or obese (19%). Of those in the study population, 64% were admitted and the median length of hospital stay was two days. The mean (SD) age increased by frailty

classification: robust (77 (8.5) years), pre-frail (82 (8.7) years), and frail (85 (8.0) years) categories ($p<0.001$). Fall injuries accounted for 90%, 95%, and 98% of injury types in the robust, pre-frail, and frail categories ($p<0.001$). Across the spectrum from robust to pre-frail and frail categories, the proportion of hospital admission increased from 50% to 68% and 77% ($p<0.001$), respectively. Also, the median (Q1, Q3) length of stay increased from 1 (0.0, 4.0) day in the robust category to 3 (1.0, 6.0) days in the frail category ($p<0.001$). Compared to geriatric trauma patients classified as robust, those categorized as pre-frail and frail had 1.7 (95% CI: 1.23 – 2.34) and 2.1 (95% CI: 1.41 – 3.22) times the adjusted odds of hospital admission. With a median (Q1, Q3) hospital stay being two days (0.0, 5.0), those classified as pre-frail (Adjusted MD: 0.7; 95% CI: 0.07 – 1.42) and frail (Adjusted MD: 1.2; 95% CI: 0.39 – 2.04) had longer lengths of hospital stay compared to those classified as robust.

Conclusions: Frailty, using the FRAIL scale, among geriatric trauma patients is independently associated with increased hospital admission and longer hospital stay. Early identification of pre-frail and frail geriatric trauma patients may inform the need for multidisciplinary care, prevent hospital-related comorbidities, and improve the quality of care.

No, authors do not have interests to disclose

## 306 Traumatic Injuries in Sexual Assault Patients Included in the 2020 National Trauma Data Base

Melville L, Porturas T, Milad M, Datillo P, Gaeta T/New York Presbyterian Brooklyn Methodist Hospital, Brooklyn, New York, US

Objectives: In the United States, it is estimated that approximately 43.6% of women and 24.8% of men have experienced sexual assault (SA) in their lifetime. While we know most SA victims have "normal" physical exams, one inner-city trauma center found that 36% of their SA patients suffered physical trauma on presentation, and approximately a fifth of those patients experienced major trauma. Data on the injuries experienced by SA patients is lacking. The National Trauma Data Base (NTDB) is a large data set of anonymized trauma patient information. We sought to characterize the injuries, disposition, and demographics of patients included in the NTDB who also were identified as being sexually assaulted.

Methods: The NTDB was obtained from the American College of Surgeons for 2020. This dataset contained 1,135,018 trauma patient records from 780 participating hospitals in the United States. The anonymized dataset was queried for all patients with a sexual assault ICD10 code (T74.2 or T76.2). All analysis was performed using the Python Anaconda 3 distribution. This study received institutional IRB exception.

Results: There were 79 patients in the 2020 NTDB with sexual assault diagnoses. 65 patients were female and 14 were male. The youngest patients were under 1 year of age, the oldest was 61, and the median age was 17. The three most common injuries were laceration of the vagina and vulva, laceration of rectum, and contusion of the head. The mean injury severity score is 6.3 with a maximum of 26. 16 patients were admitted directly to the operating room, 8 to the ICU, 26 to the floor, 6 to the observation unit, 5 transferred to another hospital and one expired from the ED.

Conclusions: The most commons injuries reported were anogenital injuries followed by head and facial trauma in SA victims. In the 2020 NTDB, the majority of victims identified were female, and under the age of 18. This is the first report of data regarding sexual assaulted patients from the NTDB that we could identify. Important limitations to consider are that the NTDB only includes patients who suffered trauma requiring admission or transfer and therefore is not representative of SA victims at large. It is also impossible to know if there is a difference in patients who chose not to reveal sexual assault. We are currently planning to add 2019 and 2021 data to this analysis.

No, authors do not have interests to disclose

## 307 Identification of Patients With Low-Risk Traumatic Brain Injury Initially Treated at a Rural Emergency Department

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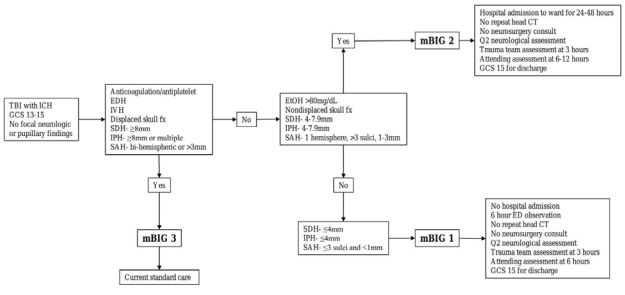
Objectives: Traumatic brain injury (TBI) is associated with high morbidity and mortality, and the standard of practice is that any patient with radiographic intracranial injury requires transfer to a trauma center for evaluation by a trauma surgeon, neurosurgeon, and repeat head imaging. This can be especially burdensome for patients initially treated at a rural institution, where transfer is expensive, and patients are removed from their community. The Brain Injury Guidelines (BIG), and its modification (mBIG), have been proposed as a way to categorize TBIs according to size, type, and patient risk factors, to determine appropriate management. Our goal here was to determine if low-risk isolated TBI patients who were initially treated at a rural emergency department may have been safely managed without transfer to the tertiary referral center.

Methods: This was a retrospective observational analysis of all isolated TBI patients who were transferred from El Centro Regional Medical Center (ECRMC), a rural underresourced hospital, to University of California San Diego (UCSD) between 2018 and 2022. Patients were excluded if they had a Glasgow Coma Scale (GCS) of $\leq 12$, required mechanical ventilation, or had significant injuries to any other body region. Data abstracted from the electronic medical record at UCSD included patient demographics, head computed tomography (CT) results, and hospital course. Patients were categorized as mBIG1-3 according to the algorithm proposed by Khan et al (figure).

Results: During the study period, 250 isolated TBI patients were transferred from ECRMC to UCSD. 28 patients (11.2%) were categorized as mBIG1, 29 (11.6%) as mBIG2, and 193 (77.2%) as mBIG3. Fall was the most common mechanism of injury (69.2%). No mBIG1 patients suffered a progression of neurological injury, had worsening of intracranial hemorrhage on repeat head CT, or required neurosurgical intervention. One mBIG2 patient had progression of neurologic injury but did not require surgery. Of the mBIG3 patients, 28 (14.5%) required surgery and 6 (3.1%) expired. 20/28 (71.4%) of mBIG1 patients had a hospital length of stay of 3 days or less, typically for observation alone. Those with longer lengths of stay were due to medical complications, such as sepsis, or difficulty in arranging disposition.

Conclusion: BIG is a validated classification system for management of TBI. Per the original guidelines, BIG1 patients should be observed for 6 hours, but do not require hospitalization, repeat head CT, or neurosurgical consultation. However, the typical management is for all TBI patients initially presenting to non-trauma centers to be transferred for further evaluation. We have shown here that mBIG1 patients who were transferred to the regional trauma center did not decompensate and did not require neurosurgical intervention. We propose that such patients can be safely observed at the original treating site and do not require transfer. This would be of considerable benefit to the patients, who do not need to leave their community, and would represent a significant source of savings to the system. We hope to develop an algorithm whereby patients at ECRMC who are identified as mBIG1 can be discussed with a trauma physician at UCSD, and if deemed appropriate, can be managed locally.




No, authors do not have interests to disclose

## 308 Barriers to Early Adoption of Novel Program to Train and Evaluate Resident Performance as Trauma Team Leaders

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Objectives: Training emergency medicine (EM) residents in trauma leadership is a critical component of EM residency programs. Routine evaluation and feedback of the program revealed a perceived "feedback desert" in trauma education. As a result, faculty within the emergency medicine department, in collaboration with surgical

and medical education faculty, developed a quality improvement (QI) program featuring a standardized direct observation tool (SDOT) to provide structured methodology for training and evaluating residents as trauma team leads. As designed, the SDOT is completed by EM and/or surgical faculty during each trauma (level 1 or 2) led by an EM resident. It documents critical aspects of the case and provides structure for specific and actionable feedback that is reviewed with residents before the end of the shift. The QI program was implemented for a pilot period of 3 months, and a process evaluation during the first month demonstrated key barriers to early adoption of the program.

Methods: A designated member of the QI team collected weekly feedback via semi-structured interviews and team meetings with resident leaders and faculty. He documented granular and unabridged information about the challenges and successes of the SDOT program in field notes. The team used thematic content analysis from the field notes to determine key barriers to early adoption of the new program.

Results: Thematic content analysis revealed three common barriers to early adoption of the SDOT program: lack of buy-in from EM faculty not involved with the QI project, challenges with interdepartmental cooperation, and uncertainty/inconsistency of SDOT form completion. The lack of early buy-in from EM faculty was principally due to an increase in "paper burden" without evidence of benefit to the resident. Additionally, the time spent reviewing the SDOT after leading the trauma, compared to on-the-fly feedback the faculty formally practiced, contributed to the lack of early adoption of the structured SDOT.

Interdepartmental cooperation between the primary trauma leads, surgery and EM, served as a unique and intriguing barrier in SDOT adoption. Some EM faculty perceived the SDOT as an opportunity for surgery faculty to criticize EM residents. The new program also required clear delineation of shared trauma leadership that caused some confusion at the onset of the SDOT program. Lastly, the absence of formal training to complete the SDOT form itself resulted in inconsistent implementation (e.g., residents completing the form themselves) and many forms missing key data.

Conclusion: Process evaluation is a critical aspect of QI program evaluation. The barriers identified during the first month of the pilot enabled program leadership to address barriers and adjust processes for greater success. Other EM residency programs interested in implementing the SDOT tool can learn from and develop strategies to overcome similar challenges.

No, authors do not have interests to disclose

## 309 Search and Rescue: Techniques for Ear Foreign Body Removal in the Emergency Department

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Objectives: Ear foreign bodies (EFB) are a common complaint in the emergency department (ED), especially among children. The aim of this community-based study was to describe our success rate with various techniques and devices for EFB removal in a large cohort of children and adults presenting to the ED in West Michigan.

Methods: This is a retrospective cohort analysis of patients presenting to the EDs of twelve affiliated hospitals in West Michigan with a diagnosis of EFB. Spanning 19 counties in Michigan, affiliated institutions included four rural medical centers, three community hospitals, four university-affiliated hospitals, and a children's tertiary care facility. All eligible cases were seen between December 2011 and December 2021 (120 months). Patient demographics, type of EFB, treatment in the ED, complications, and final disposition were recorded using a standardized abstract form. Main outcome criteria were the first attempt success rate of each technique. Descriptive statistics (mean, SD) and 95% confidence intervals (95% CI) were used to describe key demographic and outcome variables.

Results: During the study period, 1,186 patients presented to the ED with a total of 1,216 EFBs. The mean age was 24.4 years; 50.8% were children (< 13 years) and 10.7% were elderly (> 64 years). Sixty-five different types of EFBs were identified, typically located in the right ear (56.3%) for a mean duration of 19.0 hours.

Overall, 47.5% of the EFBs were not visible without direct instrumentation. Fifteen different extraction techniques were documented during the study period. First- attempt success rates included the alligator forceps (89.2%), ear curettes/loop (70.1%), irrigation (67.6%), hemostats (51.9%), suction catheters (33.0%), and Katz extractor (29.4%). Overall, 71.5% (95% CI, 68.8 to 74.0%) of EFB were removed on the first attempt; 5.3% (95% CI, 4.1 to 6.7%) on the second attempt; and 3.1% (95% CI, 2.2 to 4.3%) required three or more attempts. Complications occurred in 94 patients (7.9%) and included mild bleeding, abrasions, pain, and displacement of EFB. Sixty-nine patients (5.8%) required sedation for the procedure. A total of 248 (20.9%) were referred to *otolaryngology*. Risk factors that indicated difficult removal were young age, round objects, EFBs deep within the auditory canal (not visible without direct instrumentation), trauma during attempted removal, multiple removal attempts, button batteries, and objects in the ear canal for more than 24 hours.

Conclusions: Many simple removal techniques and devices are available for EFBs depending on the type of foreign body, location, age of the patient, and degree of obstruction. These methods are not time-consuming and do not require complex equipment. Risk factors that indicate difficult removal should be considered for referral to an otolaryngology specialist.

No, authors do not have interests to disclose

## 310 National Utilization of Focused Assessment With Sonography for Trauma Compared to Computed Tomography From 2019 – 2021

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Objectives: The majority of deaths in trauma patients occur secondary to hypovolemic shock. Intraperitoneal bleeds occur in 12% of blunt trauma, therefore rapid and accurate assessment is imperative. Computed tomography (CT) is the gold standard in the assessment of intra-abdominal injuries; however, this imaging modality takes time and patients are at risk for rapid decompensation in the radiology suite. Focused Assessment with Sonography for Trauma (FAST) is well established ultrasound protocol that allows for rapid assessment of hemodynamically unstable patients with sensitivities for pathology ranging from 85-96% and specificities greater than 98%. Here we aim to describe the current utilization of this imaging in adult trauma patients using the National Trauma Data Bank (NTDB) for years 2019 – 2021.

Methods: The NTDB was obtained from the American College of Surgeons for years 2019, 2020 and 2021. This dataset contained 3,441,203 trauma records from 796 participating hospitals. The anonymized datasets were queried for all patients above the age of 15 for trauma type, initial vitals, abdominal imaging modality, emergency department (ED) disposition, and final hospital disposition. Records missing queried data were removed. All analysis was performed using the Python Anaconda 3 distribution.

Results: Of the patients who presented with blunt trauma and hypotension, 41.1% received a FAST scan and 58.5% received a CT scan. Within this subgroup, 22.2% of patients were taken to the OR, 3.1% expired in the ED, and an additional 15.7% expired after admission.

The final dataset contained 2,847,145 patient records with 87.1% of patients suffering from blunt trauma. 18.2% of patients had a FAST scan done, while CT scans were performed on 36.1%. 2.2% of patients presented with hypotension on initial vitals and 3.5% expired. 11.3% of patients were taken directly to the operating room from the ED without imaging.

Conclusions: In this study, FAST may be underutilized in hypotensive blunt trauma patients relative to CT. Rates of imaging for both CT and FAST are trending upwards from 2019 to 2021. CT imaging of the abdomen is more common than FAST imaging overall. Limitations of the study include lack of imaging results, no detailed course of events in the dataset, limited vitals data, possible improper coding of FAST scans, retrospective nature of the study and missing data within the dataset. In conclusion, further research is needed to determine why the rate of CT imaging is outpacing FAST imaging and what impact this has on trauma care.

No, authors do not have interests to disclose

## 311 A Machine Learning Approach to Predicting Boarding and Admission Surges Using Triage Information

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Objectives: Large numbers of patients boarding in the emergency department (ED) while awaiting hospitalization have led to a crisis of overcrowding and reduced

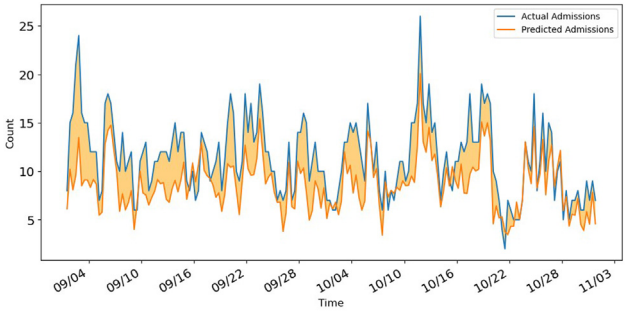
access to care. Accurate prediction of boarding may alleviate crises by allowing additional inpatient nursing staff to be flexed in, increasing ED throughput. No validated tools exist to predict future boarding. The objective of our study was to leverage an admission prediction model to predict future boarding load through two retrospective months of emergency department operations.

Methods: A cross-gradient boosting (XGBoost) model was trained to predict an admission target using features collected during the very early ED evaluation (within 5 minutes of patient arrival): vital signs, arrival modality, subjective pain score, emergency severity index, and a free text chief complaint. The model was trained on 75% of the encounters presenting to a single academic center Jan – Oct 2019 and Nov 2021 – Aug 2022 and validated on the remaining 25%. The chief complaint was transformed by a bag-of-words model created with the training dataset. The XGBoost model was then used to predict the probability of admission for all patients in the ED at 30-minute intervals in Sept – Oct 2022, which were summed to calculate expected boarders 8 hours in the future and compared to the actual number of ED boarders using linear regression. We also calculated the number of patients currently in the ED at 8-hour intervals that would eventually require admission and compared these to an algorithm that predicted admission for any patients with ESI $< 3$.

Results: A total of 126,453 ED visits were analyzed, with a mean age of 47 (standard deviation (SD) = 18.4), mean ESI of 2.9 (SD = 0.84), 52% female (N = 65,462), and 20% (N = 25,363) of which resulted in hospital admission. 23,444 records were dropped due to missing features, 71996 were used for training, 23,999 for testing, and 7,014 to simulate real ED conditions for boarding prediction. The XGBoost model achieved a ROC AUC of 0.93. When used to predict the total number of future boarders, at 8 hours the model predicted the correct number of boarders (+/- 5 patients) 94% of the time and achieved an $R^2$ score of 0.5. Given a list of ED patients at 8-hour intervals, the model correctly predicted the expected number of admitted patients (+/- 5 patients) in 85% of cases (Figure 1), compared to 56% with the ESI cutoff algorithm.

Conclusions: Machine learning models may be used to effectively predict patient hospitalization and ED boarding volume up to 8 hours in advance. This improved situational awareness of the future state may help drive more creative and efficient solutions to mitigate the negative impacts of overcrowding that we are currently experiencing. More work is needed to improve model performance on live ED data and validate generalizability to other ED settings.

Figure 1. Given a list of patients in the ED at a given time (in 8-hour time intervals), the actual vs predicted total number of admissions over time. The blue line represents actual admissions. Orange shading represents the difference between actual admissions and the admission number predicted by the XGBoost model.




No, authors do not have interests to disclose

## 312 When AI Meets the Emergency Department: Realizing the Benefits of Large Language Models in Emergency Medicine

Ashenburg N, Preiksaitis C, Dayton J, Ribeira R, Bunney G, Kabeer R, Riley F, Chu A, Rose C/Stanford University, Palo Alto, California, US

Objectives: The recent emergence of large language models (LLMs) like ChatGPT and Med-PaLM has sparked interest in leveraging their capabilities across various domains. With their ability to process and synthesize massive amounts of data, generate text, and perform translations, LLMs are well-suited for the dynamic and high-pressure environment of emergency departments. It is crucial to assess the practical applications and challenges of employing LLMs in emergency medicine to pave the way for their integration into clinical practice. To this end, we conducted a comprehensive scoping review to examine the present and potential applications of LLMs in emergency medicine.

Methods: Adhering to the Arksey and O'Malley framework for scoping reviews, we executed a systematic search strategy across electronic databases such as PubMed, Google Scholar, Web of Science, and Scopus. We also explored gray literature, preprint servers, and conference presentations to identify articles published until May 1, 2023. Our search terms and queries were refined through an iterative process, with a librarian's assistance. Two independent reviewers screened the identified studies and charted the data, resolving discrepancies through discussion or by consulting a third reviewer.

Results: Our search criteria yielded thirty-eight (38) articles, with nine (9) being relevant to emergency medicine. Notably, no presentations have been given at national emergency medicine meetings. The literature highlights the potential of LLMs in various aspects of emergency medicine, encompassing decision support, triage, diagnostics, clinical documentation, patient communication, and medical education. However, no LLMs have been deployed for live use in emergency settings. Identified challenges to implementation include technical, practical, and ethical limitations. Technical limitations involve data silos in medical data storage and accessibility, while practical limitations concern the generalizability of existing models to medical and emergency concepts, and the limited explainability of LLM-generated answers. Ethical limitations encompass data privacy, search term privacy, LLM accessibility for underserved communities, overreliance on AI, potential biases in training datasets, and accountability and liability for medical decision-making.

Conclusions: LLMs possess immense potential to revolutionize emergency medicine practice by enhancing clinical decisionmaking and streamlining documentation processes. To realize this potential, it is imperative to address challenges related to data privacy, model interpretability, and biases, ensuring the safe and efficient use of these sophisticated tools in emergency care settings. Further research and implementation are required to assess the real-world impact of LLMs on patient outcomes and explore their integration into existing clinical workflows.

No, authors do not have interests to disclose

## 313 Leveraging Decision Trees to Forecast Ambulance Traffic in Emergency Departments

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Objectives: It is crucial to understand the patterns of emergency medical services (EMS) arrivals to optimize resource allocation and throughput in emergency departments (EDs). The purpose of this study was to analyze and predict daily ambulance arrivals to the ED, using data-driven insights to inform resource planning.

Methods: We conducted a cohort study that examined patients visiting an urban, academic ED that cares for a predominantly Black patient population from January 1, 2021, to February 28, 2023. The data extracted from patient electronic health records comprised daily ED patient arrival and departure time stamps, demographic information (such as age, gender, and race), mode of arrival, chief complaints, primary diagnosis, ED disposition, and the patient's emergency severity index (ESI). Only ED patients that arrived by ambulance were included in the final analytic cohort. A decision tree (DT) machine learning model was developed to forecast daily EMS arrivals. The DT model was adjusted for seasonality and trends (e.g., holidays or day-of-the-week trends). The data were split into training (90%) and testing (10%) sets to develop and evaluate the model's performance. Evaluation criteria included root mean squared error (RMSE), defined as the average squared difference between predicted and actual ED ambulance arrival rates per day, and the mean absolute percentage error (MAPE), defined as the average of the absolute percentage errors. Smaller MAPE and RMSE values indicate more accurate forecasting.

Results: During the study period, a total of 175,577 patients arrived at the ED, out of which 26.68% (46,840) arrived via ambulance. The average age of EMS patients was 52.99 years, with a standard deviation of 19.14 years. 47.11% (22,067) of patients were female, and 70.73% (33,128) were Blacks. On average, 59 patients arrived by ambulance daily, with approximately three ambulance arrivals per hour. Of the patients

arriving by ambulance, 57.77% (27,058) had an ESI triage score of 2, and 30.45% (14,264) were admitted from the ED. The five most common reasons for ambulance transport to the ED were shortness of breath (7.60%), abdominal pain (7.51%), fall (4.28%), chest pain (3.84%), and seizures (3.19%). Figure 1 shows the observed and predicted daily ED ambulance arrivals. Our DT model achieved a MAPE of 7.69% on the test data, indicating that the predicted arrival was approximately 8% different from the actual number of ambulance arrivals. The RMSE was 6 patients, suggesting that, on average, the model's predictions deviated by approximately 6 patients from the actual values.

Conclusions: The DT model developed in this study shows promising potential for accurately forecasting daily ambulance arrivals to the ED. By anticipating daily EMS traffic patterns, EDs can better allocate resources and streamline patient flow. The model's ability to predict ambulance arrivals with approximately 8% MAPE has significant implications for ED operations, where resource allocation and patient flow management are critical factors affecting overall patient outcomes.

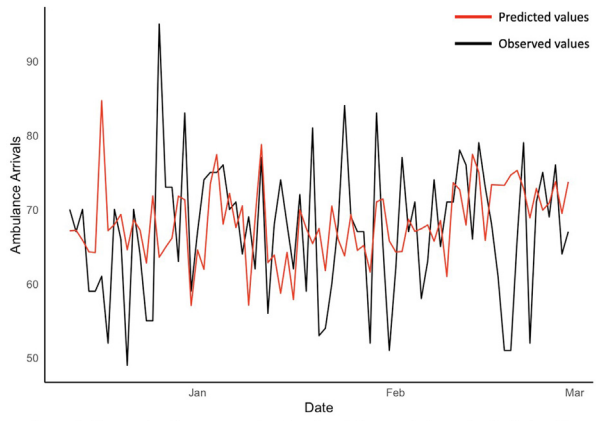


**Figure 1**: The number of emergency department ambulance arrivals per day is displayed from December 12, 2022, to February 28, 2023. The predicted values generated by the DT machine learning model closely resemble the actual number of arrivals seen in the test data (i.e., unseen data).

No, authors do not have interests to disclose

## 314 Machine Learning Model to Predict Emergency Department Length of Stay

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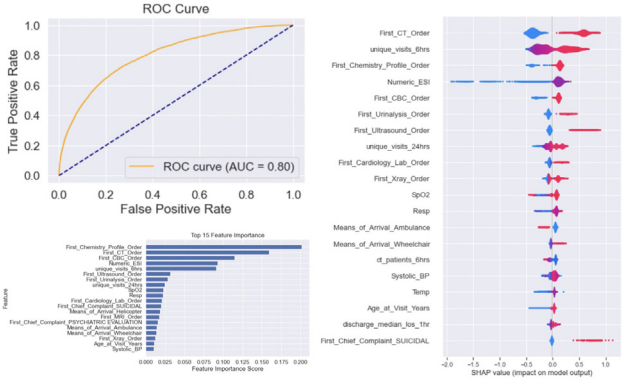
Objectives: Over the past several years increasing emergency department (ED) waiting times have become a major issue for American health care. Longer waiting times are associated with lower patient experience scores and increased numbers of patients who leave without being seen (LWBS), with overall negative effect on patients' morbidity and mortality. Being able to predict individualized waiting times has the potential to improve ED throughput by informing staff and helping with workup planning decisions. Communicating these predictions to patients may improve patient experience, though inaccurate estimates, particularly underestimates, are likely to have the opposite effect. Our study is aimed to develop a machine learning (ML) model to predict individualized LOS at the time of initial triage.

Methods: We included all adult ED visits (age $\geq$ 18 years) at our academic institution from 01/01/2019 to 12/31/2022. We created an ML model that used 80% of the dataset for training and 20% for testing. Input variables included demographics and triage data (age, sex, emergency severity index (ESI), means of arrival, time and day of arrival, initial vital signs, etc.), chronic diseases, recursive data (number of patients who arrived, LWBS, were admitted or discharged in the past 1, 6, 24 hours and their median LOS), and orders placed (laboratory testing, imaging, electrocardiogram).

Results: A total of 184,995 unique ED visits were included in the analysis. The model demonstrated good performance for predicting which patients were likely to have LOS of less than 2 hours (AUC 86%), greater than 2 (AUC 88%) and greater than 4 hours (AUC 80%). The model did not perform as well at 6 hours (AUC 74%), 8 (AUC 67%), 10 (AUC 71%) and 12 hours (AUC 76%); this might be secondary to a relatively small sample size of the patients with LOS of longer than 4 hours. The most predictive features for LOS $>$ 4 hours include high resource utilization including computer tomography (CT), laboratory testing, urine studies, ultrasound, and x-ray orders, higher ESI, older age, and psychiatric chief complaints (Figure 1). Each of these features adds incremental probability of prolonged length of stay. Patients with LOS of less than 2 hours had lower ESI scores, lower chances of having a CT, chemistry, complete blood count, urinalysis, or X-ray ordered, and were less likely to arrive via walk in or wheelchair and be on Medicare or Medicaid.

Conclusions: This shows that ML models can predict ED LOS with reasonable accuracy for short to moderate ED LOS, suggesting they could be useful for improving ED resource allocation and communication to patients about their potential waiting times. The model we created accurately identified patients at risk of having a LOS for over 2 and 4 hours. More research to increase model accuracy and precision and clinical implementation to assess patient-centered outcomes are needed.




No, authors do not have interests to disclose

## 315 Ethical Consequences of Disagreements Between Clinicians and Artificial Intelligence Recommendations: A Scoping Review

Matin A, Cabrera D, Cummins N, Bellolio J, Stewart J, Gerberi D, Bellolio F/Mayo Clinic, Rochester, Minnesota, US

Objectives: Artificial intelligence (AI) tools are becoming more prevalent in healthcare settings, particularly for diagnostic and therapeutic recommendations, with an expected surge in the incoming years. The bedside use of this technology for clinicians opens the possibility of disagreements between the recommendations from AI algorithms and clinicians' judgment. There is a paucity in the literature analyzing the nature and possible outcomes of these potential conflicts, particularly related to ethical considerations. The goal of this scoping review is to identify, analyze and classify current themes and potential strategies addressing ethical conflicts originating from the conflict between AI and human recommendations.

Methods: A protocol was written prior to the initiation of the study. Relevant literature was searched by a medical librarian for the terms of artificial intelligence, healthcare and liability, ethics, or conflict. Search was run in 2021 in Ovid Cochrane Central Register of Controlled Trials, Embase, Medline, IEEE Xplore, Scopus, and Web of Science Core Collection. Articles describing the role of AI in healthcare that mentioned conflict between humans and AI were included in the primary search. Two investigators working independently and in duplicate screened titles and abstracts and reviewed full-text of potentially eligible studies. Data was abstracted into tables and reported by themes. We followed methodological guidelines for Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).

Results: Of 6846 titles and abstracts, 225 full texts were selected, and 48 articles included in this review. 23 articles were included as original research and review papers. 25 were included as editorials and commentaries with similar themes. There was a lack of consensus in the included articles on who would be held liable for mistakes incurred by following AI recommendations. It appears that there is a dichotomy of the perceived ethical consequences depending on if the negative outcome is a result of a human versus AI conflict or secondary to a deviation from standard of care. Themes identified

included transparency versus opacity of recommendations, data bias, liability of outcomes, regulatory framework, and the overall scope of artificial intelligence in healthcare. A relevant issue identified was the concern by clinicians of the "black box" nature of these recommendations and the ability to judge appropriateness of AI guidance (Table 1).

Conclusions: AI clinical tools are being rapidly developed and adopted, and the use of this technology will create conflicts between AI algorithms and healthcare workers with various outcomes. In turn, these conflicts may have legal, and ethical considerations. There is limited consensus about the focus of ethical and liability for outcomes originated from disagreements. This scoping review identified the importance of framing the problem in terms of conflict between standard of care or not, and informed by the themes of transparency/opacity, data bias, legal liability, absent regulatory frameworks and understanding of the technology. Finally, limited recommendations to mitigate ethical conflicts between AI and humans have been identified. Further work is necessary in this field.

| Themes | # articles included (max 23) | Example |
|---|---|---|
| Transparency | N = 12 | "Unlike traditional software, the machine learning algorithms and the models AI uses to make decisions are highly complex and, in some cases, opaque….referred to as "black box" of healthcare" [1] |
| Data bias | N = 14 | "The prevailing concern with algorithms was that they are developed by humans, who are by nature fallible, and subverted by their own values and implicit biases" [2] |
| Liability for outcomes | N = 15 | "Under the heading of liability. It seems clear, though, that meaningful redress depends on information about the wrong that happened in the first place. Against the opacity of AI systems accountability of decision-makers has been described as a primary challenge in the reviewed literature" [3] |
| Regulatory framework | N = 10 | "When unintended events occur, one can clearly argue that the state-of-the-art was used at the time of development….This becomes problematic, however, when extending this emergency service in the context of civilian casualties—civilian deaths during autonomous robotic surgery could result in prosecution for manslaughter." [4] |
| Overall scope of AI in healthcare | N = 5 | "There must be a discussion, con-sidering the [level of abstraction] and concerns, on whether these services have de facto overstepped the boundaries into healthcare in any of those levels."[5] |

No, authors do not have interests to disclose

## 316 Artificial Intelligence to Predict Billing Code Levels of Emergency Department Encounters

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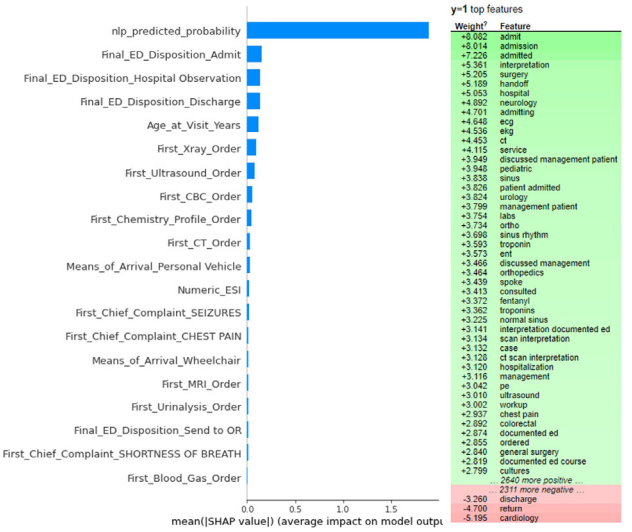
Objectives: Health care costs continue to be a major source of financial hardship to people in the United States. Administrative tasks contribute to rising costs and many, like medical billing and coding, are repetitive. Advances in artificial intelligence (AI), specifically in natural language processing (NLP) and machine learning, may help with automatization of such tasks. Emergency department (ED) encounters are billed at different levels from minimal to high complexity, corresponding to specific current procedural terminology (CPT) codes. Our objective is to use AI to predict billing code levels for ED encounters.

Methods: We accessed ED encounters from our health system from Q1 2023. We used ensemble learning methods, specifically with a gradient boosting classifier, to combine natural language processing (NLP) techniques with orders, patient demographics, and ED arrival parameters, such as mode of arrival, chief complaint, etc. NLP was used for text-preprocessing of ED clinical notes and to identify important features. Explainable AI techniques, Explain Like I'm 5 (ELI5) and Shapley Additive exPlanations (SHAP) values, were used to help determine the most salient model features. Our model was trained to predict evaluation and management billing codes (CPT codes 99282-99285).

Results: There were 17,283 ED encounters analyzed that were coded at levels 4 (40%), 5 (58%), and other (3%). The ensemble model performance for billing code levels of 4 and 5 were AUC 0.95 and 0.94, accuracy 0.86 and 0.86, and F1 score 0.83 and 0.87, respectively. For level 5 billing, the model would overbill 5% and underbill 10% of the time. The most salient features for level 5 billing from SHAP values was the NLP predicted probability based on term frequency-inverse document frequency (weighted importance of a feature), final ED disposition (especially to the operating room), age, and seizures. ELI5 had the top features for level 5 billing as admit, interpretation, and surgery, and lowest features as cardiology, return, and discharge (Figure).

Conclusions: Currently available AI models can accurately predict billing code levels for ED visits based on clinical notes, orders, patient demographics, and ED arrival parameters. Improvements in AI modeling provide opportunities to increase sensitivity and specificity. This has the potential to automate coding of ED encounters and save significant administrative costs.




No, authors do not have interests to disclose

## 317 Outcomes in High-Risk Pulmonary Embolism Patients Presenting in Advanced Shock: Insights From the FLAME Study

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Objectives: Patients with high-risk pulmonary embolism (PE) present with hemodynamic instability and have reported short-term mortality of over 25%. The FLAME study was designed to evaluate outcomes in high-risk PE patients undergoing mechanical thrombectomy with the FlowTriever (FT) System or other contemporary treatments. Primary outcomes from FLAME have been previously reported; the objective of this expanded analysis is to report the rate of emergency department (ED) presentation and to assess outcomes in the most emergent patients with advanced shock.

Methods: The FLAME study was a prospective, multicenter, non-randomized, parallel group, observational study of high-risk PE (NCT04795167). Patients were treated with FT mechanical thrombectomy (FT Arm) or other contemporary therapies (Context Arm), as determined by the treating physician or Pulmonary Embolism Response Team. SCAI shock stage was assessed at presentation (stage A, least severe; stage E, most severe). The primary endpoint was an in-hospital composite of all-cause mortality, bailout to an alternate thrombus removal strategy, clinical deterioration, and major bleeding.

Results: FLAME enrolled 115 patients in total, including 53 patients in the FT Arm, 61 in the Context Arm, and 1 additional patient who received advanced therapy for non- high-risk PE before deteriorating. The majority (57.4%) of all patients presented via the ED at the study hospital (Table). In the FT Arm, 62.3% presented via the ED and 20.8% were in advanced shock (SCAI shock stage D/E). In the Context Arm, 54.1% presented via the ED and 52.5% were in advanced shock. The median time to treatment initiation was similar in both treatment arms: 6.1 [IQR: 2.4-27.6] hours in the FT Arm and 4.1 [IQR: 1.5-19.6] hours in the Context Arm. Context Arm patients were treated with systemic thrombolysis (68.9%),

anticoagulation alone (23.0%), catheter-directed thrombolysis (6.6%), and surgical thrombectomy (1.6%).

Overall, the primary endpoint was reached in 9/53 (17.0%) FT Arm patients and 39/61 (63.9%) Context Arm patients. In patients with advanced shock, the primary endpoint was reached in 4/11 (36.4%) FT Arm patients and 25/32 (78.1%) Context Arm patients. Overall, in-hospital mortality rates were 1.9% for FT and 29.5% for Context Arm patients. In patients with advanced shock, in-hospital mortality occurred in 0/11 (0%) FT Arm patients and in 15/32 (46.9%) Context Arm patients.

Conclusions: FT mechanical thrombectomy was associated with a low rate of adverse clinical outcomes, including in-hospital mortality of 1.9% overall and 0% in patients with advanced shock. In high-risk PE patients, including those presenting to the ED, large-bore mechanical thrombectomy can be performed safely with favorable outcomes.

**Table. ED Presentation and Outcomes in FT and Context Arms**

| | FT Arm (N=53) | Context Arm (N=61) |
|---|---|---|
| Presentation to ED | 33/53 (62.3%) | 33/61 (54.1%) |
| Advanced Shock | 11/53 (20.8%) | 32/61 (52.5%) |
| Time to treatment initiation, median | 6.1 [2.4-27.6] hours (n=47) | 4.1 [1.5-19.6] hours (n=45) |
| Primary Endpoint | 9/53 (17.0%) | 39/61 (63.9%) |
| In Advanced Shock | 4/11 (36.4%) | 25/32 (78.1%) |
| In-hospital Mortality | 1/53 (1.9%) | 18/61 (29.5%) |
| In Advanced Shock | 0/11 (0%) | 15/32 (46.9%) |

Advanced shock defined as SCAI shock stage D or E. ED: Emergency Department; FT: FlowTriever.

No, authors do not have interests to disclose

## 318 Implementation and Evaluation of a Single Center, Multi-Component Intervention to Avoid Hospitalization of Patients With Low-Risk Acute Pulmonary Embolism

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Background: Evidence from multiple studies and society-backed guidelines recommend the use of simple tools, like the Pulmonary Embolism Severity Index (PESI), to identify low risk patients with pulmonary embolism (PE) who may be appropriate for outpatient management (1-8). Adoption by emergency physicians has been slow, with recent nationwide studies indicating a less than 5% rate of outpatient management (9,10). Prior efforts to implement outpatient management pathways have largely failed to engage stakeholders to identify barriers to clinical practice change or to leverage formal implementation science frameworks to measure the reach, adoption, implementation, and maintenance of the intervention.

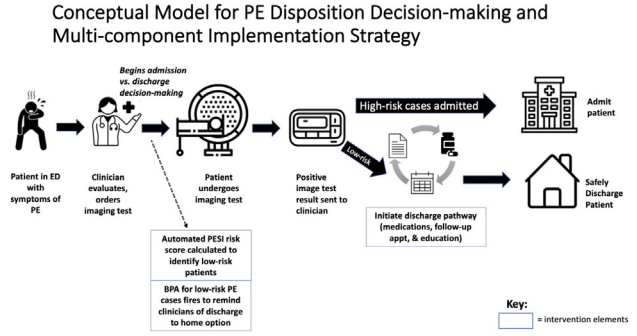
Objectives: To design and implement an intervention to promote outpatient management of low-risk PE patients at our tertiary care institution and evaluate key implementation outcomes over the one-year intervention period.

Methods: To define barriers to outpatient management of low-risk PE, we conducted structured interviews with ED attendings, residents, and physician assistants. Based on the common themes identified in these interviews, we designed a four-point intervention, including a best practice alert based on an automated PESI-score calculator, a clinical practice guideline (with smart order set, automated documentation containing PESI score, and tailored low-risk PE discharge instructions), prescription assistance, and dedicated outpatient follow up. We performed a 12-month, prospective, single center, intervention study at a tertiary academic center.

Our primary outcome of interest, adoption, was defined as change in the proportion of acute, low-risk PE patients discharged from the ED. Secondary outcomes included implementation, quantified as administration of first DOAC dose in the ED, utilization of the social work prescription assistance program, provision of validated discharge instructions, and referral placement to vascular medicine follow up.

Results: Between 3/24/2022 and 3/31/2023, 120 of the patients diagnosed with acute PE in our adult ED were classified as low risk by PESI score (≤85). 22.5% (27/120) of patients were managed as outpatients, as compared to a historical rate of 5.1% (17/331) in our acute PE registry from 2016-19 ($p < 0.001$). Sixty-seven percent (18/27) of patients receiving first dose of DOAC in ED, 78% (21/27) received voucher for first month of medication, and 100% (27/27) of patients receiving prescription for DOAC. Outpatient follow-up referral to vascular was placed in majority of patients 63% (17/ 27) and 74% (20/27) of patients had follow up with any outpatient provider within 10 days. During the intervention period, the outpatient management pathway was also utilized for 10 patients with PESI scores >85. Ninety percent (9/10) of these patients had an active malignancy. Of these patients, 66% (6/9) followed up with oncology while 22% (2/9) followed up with vascular medicine.

Conclusions: Our multi-component intervention significantly increased outpatient management in patients with acute PE with low-risk PESI scores. Most of the elements of the pathway were highly utilized. The outpatient management pathway was also utilized in a small number of acute PEs with non-low risk PESI scores (>85). The majority of these cases were established cancer patients and utilization of individual components of the pathway was lower.




No, authors do not have interests to disclose

## 319 Performance of the Khorana Score in the Prediction of Pulmonary Embolism in ED Patients With Cancer

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Objectives: Pulmonary embolism (PE) is the most common cause of mortality among patients with cancer, after cancer itself. The Khorana Score was created as a predictive tool to assess venous thromboembolism (VTE) risk among patients with cancer. The score includes high (2) and moderate (1) risk cancer types, as well as thrombocytopenia (1), anemia (1), leukocytosis (1), and morbid obesity (1) as the predictive elements. A score of 0 is considered low risk, 1 is moderate risk, and 2 or greater is high risk. Proponents of the score suggest all moderate and high risk patients should receive a screening duplex ultrasound of the legs, while high risk patients should receive prophylactic anticoagulation. We designed a study to assess the Khorana Score in a population of cancer patients presenting to the ED.

Methods: We conducted a retrospective observational study at 2 academic EDs in Southern California among ED patients with cancer who were diagnosed with PE between 6/1/12 – 6/1/19. We assessed whether these patients had an ED visit within 30 days of the index PE visit, and if so, the Khorana score was applied to the visit most proximal to the index PE visit. We report descriptive statistics as well as test sensitivity.

Results: Among 404 patients enrolled in the study, we identified 201 ED cancer patients with PE who had a previous ED visit within 30 days. Among this group 20.9% were considered low risk (0), 33.8% were considered moderate risk (1) and 45.3% were considered high risk (2 or greater) at their preceding ED visit. This represents a sensitivity of 79.1% in the prediction of PE.

Conclusions: Although the Khorana Score only predicted 4/5 of the PE events in our study, it would have recommended a screening ultrasound for nearly 80% of the cohort and anticoagulation for 45.5% of the cohort, which may have played a role in preventing the eventual thromboembolic events. Although further prospective analyses are necessary, the Khorana Score may be a useful tool in the identification of ED cancer patients at risk of PE, allowing emergency physicians to risk stratify and intervene when appropriate.

No, authors do not have interests to disclose

# 320 Effects of the COVID-19 Pandemic on Incidence of Thrombotic Events in Patients Presenting to the Emergency Department

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Objectives: The COVID-19 pandemic has caused significant morbidity and mortality worldwide. Although the virus predominantly affects the respiratory system, recent studies have shown that it can also have a profound impact on the body's coagulation cascade. Patients infected with COVID-19 have been found to be at an increased risk of pulmonary emboli (PE) and deep vein thrombosis (DVT). This increased risk is significant as pulmonary emboli can have mortality rates of greater than 30% if left untreated, while sequelae of untreated DVTs carry a 1-year risk of mortality of 20%. Studies have demonstrated that there has been increased PE diagnoses. There have been few studies regarding the incidence of DVT diagnosis incidence in the ED. The early detection and treatment of DVT in the emergency department can help to limit the morbidity associated with untreated DVTs. We thus sought to determine if there was an increased incidence of DVT and PE in emergency department (ED) visits since the COVID-19 pandemic.

Methods: The National Hospital Ambulatory Medical Care Survey - Emergency Department (NHAMCS-ED) was queried from 2016-2020. To counteract the overall drop in ED volume in 2020, it was decided to compare rates of VTE in potentially symptomatic patients presenting to the ED. First, all visits with an ED diagnosis of DVT or PE were isolated. DVT included the following diagnoses: Acute embolism and thrombosis of deep veins of lower extremity, Acute embolism and thrombosis of veins of upper extremity, chronic embolism and thrombosis of deep veins of lower extremity, embolism and thrombosis of other specified veins, embolism and thrombosis of unspecified vein, other venous embolism and thrombosis PE included the following diagnoses: Pulmonary embolism, Pulmonary embolism without acute cor pulmonale. The chief complaints from those visits were collated, and the authors arbitrated whether the chief complaint was related to a DVT or PE. Then, rates were calculated for DVT in DVT-symptomatic patients and PE in PE-symptomatic patients. Due to the large sample sizes included, frequentist testing was not performed, as it would likely be "significant" even at low clinical relevance. Instead, trends were visually inspected for clinical importance.

Results: In 2016-2020, there were 922 and 591 rows of DVT and PE visits, respectively, representing 7,132,000 and 4,674,000 visits. One hundred ninety- three unique chief complaints were associated with those visits, of which 33 were arbitrated to represent possible DVT symptoms and 27 PE symptoms. There was a total of 696,489,000 yearly visits during this period, of which 320,494,000 (46%) demonstrated DVT symptoms and 507,059,000 (73%) PE symptoms. From prior to 2020, compared to 2020, DVT rates, both total and symptomatic, stayed largely similar, whereas the PE rates, which had been roughly stable, spiked upwards.

Table 1 shows these rates, as well as the percent change in total ED volume compared to the previous year.

Conclusions: The DVT rate remained stable in patients with symptoms suspicious for thrombosis at 2% in the year 2020. However, the rate of PE in patients with suspicious symptoms increased from 0.88% to 1.1%. Early detection and treatment of DVT and PE in the ED is crucial to help limit the morbidity and mortality associated with these disease processes, and it is up to emergency physicians to remain vigilant in making these diagnoses.

| Year | Rate of Change | DVT Total | DVT Symp | PE Total | PE Symp |
|---|---|---|---|---|---|
| 2016 | 6.3% | 1.09% | 2.37% | 0.63% | 0.87% |
| 2017 | -4.5% | 1.05% | 2.22% | 0.70% | 0.94% |
| 2018 | -6.5% | 0.89% | 2.03% | 0.59% | 0.84% |
| 2019 | 15.9% | 1.06% | 2.31% | 0.63% | 0.86% |
| 2020 | -12.8% | 1.02% | 2.15% | 0.81% | 1.10% |

No, authors do not have interests to disclose

# 321 Sonography for Pulmonary Embolism in the Emergency Department

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Objectives: Pulmonary embolism (PE) is a disease fraught with diagnostic uncertainty and is associated with high morbidity and mortality. The objective of this study was to determine if point-of-care ultrasound (POCUS) was associated with reduced time to completion of chest computed tomography (CT) to confirm diagnosis of PE and treatment with anticoagulation.

Methods: This retrospective cohort study took place at an academic level 1 trauma center in South Carolina from July 1st, 2019 to June 30th, 2022 and included adults aged 18 and older with a diagnosis of PE in the ED. Outcomes evaluated included time to chest CT and time to anticoagulation. These times were measured from the time the patient either checked in at the ED triage desk or arrived via emergency medical services to the time the outcome occurred. Results were compiled using chi-square and T tests. Linear regression was used to evaluate the association between POCUS and time to CT, as well as POCUS and time to anticoagulation.

Results: Of the 466 eligible patients, 71 (15.5%) received POCUS in the ED with an average time to POCUS of 192.9 minutes. On average, individuals who received POCUS had a chest CT performed 39.4 minutes sooner compared to individuals who did not receive POCUS (p=0.0654). Of the 466 patients, 380 (83.0%) received anticoagulation with an average time to treatment of 317.1 minutes. Those who were evaluated with POCUS received anticoagulation 64.7 minutes sooner than those who were not evaluated with POCUS (262.8 minutes vs. 327.5 minutes, p=0.0034). This relationship persisted after accounting for age, sex, race, smoking status, and the Emergency Severity Index (p=0.0042).

Conclusions: Use of POCUS was associated with shorter times to chest CT by 39.4 minutes and shorter time to treatment by 64.7 minutes compared to patients who did not receive POCUS. This suggests that POCUS may have the potential to improve patient outcomes by reducing the time to diagnosis and treatment of PE. Future prospective studies should be performed to confirm these associations.

**Table 1. Demographic and Clinical Characteristics of Patient by POCUS Status (n=466)**

| Variable | Total | Non-POCUS N=387, 84.5% | POCUS N=71, 15.5% | p-value |
|---|---|---|---|---|
| **Age**[a] | 58.9 (17.9) | 58.8 (17.7) | 59.6 (19.0) | 0.7144 |
| **Gender** | | | | |
| Male | 225 (49.1) | 191 (49.4) | 34 (47.9) | 0.8202 |
| Female | 233 (50.9) | 196 (50.7) | 37 (52.1) | |
| **Race** | | | | |
| White | 328 (71.6) | **270 (69.8)** | **58 (81.7)** | **0.0498** |
| Black | 110 (24.0) | **97 (25.1)** | **13 (18.3)** | |
| Hispanic/Other | 20 (4.4) | **20 (5.2)** | **0 (0.0)** | |
| **Smoking Status** | | | | |
| Non-Smoker | 240 (53.1) | 208 (54.5) | 32 (45.7) | 0.3897 |
| Smoker | 65 (14.4) | 54 (14.1) | 11 (15.7) | |
| Former Smoker | 147 (32.5) | 120 (31.4) | 27 (38.6) | |
| **Acuity** | | | | |
| Immediate/Emergent | 237 51.86 | 195 (50.5) | 42 (59.2) | 0.1807 |
| Urgent/Less Urgent | 220 48.14 | 191 (49.5) | 29 (40.9) | |
| **Baseline Vitals** | | | | |
| **Pulse**[a] | 98.7 (21.1) | 97.9 (20.9) | 102.9 (22.0) | 0.0708 |
| **Respirations**[a] | 19.8 (6.1) | 19.6 (6.2) | 20.9 (5.3) | 0.1131 |
| **Systolic BP**[a] | 132.6 (22.8) | 133.3 (22.5) | 128.6 (24.1) | 0.1079 |
| **Diastolic BP**[a] | 80.1 (16.2) | 80.3 (16.4) | 79.2 (14.6) | 0.5965 |
| **Past Medical History** | | | | |
| **Cancer (Yes)** | 157 (34.3) | 133 (34.4) | 24 (33.8) | 0.9267 |
| **Clot Disorders (Yes)** | 7 (1.5) | 6 (1.6) | 1 (1.4) | 0.9286 |
| **COPD (Yes)** | 43 (9.4) | 39 (10.1) | 4 (5.6) | 0.2380 |
| **CHF (Yes)** | 63 (13.8) | 58 (15.0) | 5 (7.0) | 0.0740 |
| **Anticoagulants in the ED (Yes)** | 380 (83.0) | 319 (82.4) | 61 (85.9) | 0.4725 |
| **Time to Anticoagulants**[a] | 317.1 (158.5) | **327.5 (157.8)** | **262.8 (152.5)** | **0.0034** |
| **Time to Chest CT**[a] | 251.6 (134.4) | **257.7 (135.1)** | **218.2 (126.7)** | **0.0229** |
| **Time to POCUS**[a] | 192.9 (229.1) | | | |
| **ED Disposition** | | | | |
| Admission | 385 (84.1) | 324 (83.7) | 61 (85.9) | 0.6424 |
| Discharge/AMA/Other | 73 (15.9) | 63 (16.3) | 10 (14.1) | |

POCUS=point of care ultrasound, ED=emergency department, AMA=against medical device, CT=computerized tomography, COPD=chronic obstructive pulmonary disease, CHF=congestive heart failure, BP=blood pressure, N=sample size
[a]Mean (Standard Deviation)

No, authors do not have interests to disclose

## 322 Effect of Danegaptide on Gap Junction Preservation at the Blood-Brain Barrier After Sudden Cardiac Arrest

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Objectives: Sudden cardiac arrest (SCA) is devastating and affects more than 350,000 individuals. Although rates of return of spontaneous circulation (ROSC) are improving, survivors may face devastating neurologic dysfunction due to damage to the blood brain barrier (BBB) secondary to ischemic injury. Maintaining BBB integrity may lead to improved neurologic outcomes. Gap junctions have been shown to be critical for BBB preservation. We recently demonstrated that SCA increased systemic proinflammatory cytokines and decreased the gap junction protein conexin 43 (Cx43) at the BBB with associated disruption. Danegaptide, a dipeptide that specifically promotes gap junctions, has been shown to be neuroprotective in stroke but has not been tested in SCA. The purpose of this study to determine if Danegaptide can preserve Cx43 at the BBB after resuscitation from cardiac arrest.

Methods: All experiments were approved by the Institutional Animal Care and Use Committee. We utilized a model of SCA in Sprague-Dawley rats (300-500g). Rodents were intubated and underwent rapid electrical pacing, via an esophageal electrophysiologic catheter, until ventricular fibrillation or pulseless electrical activity occurred. Rodents remained in arrest for 4-6 minutes, were resuscitated using Advanced Cardiac Life Support (ACLS), and then placed into two groups: Danegaptide (75 micrograms/kg IV after ROSC followed by 300 microgram/kg/hr IP for 3 hr, n=8) and Control (n=3). Sham experiments (n=3) without cardiac arrest were also performed. After 6 hours the rodents were euthanized and brain tissue obtained. Endothelial Cx43 at the BBB in the hippocampus was identified using immunohistochemistry. The primary outcome was percent volume of endothelium colocalized with Cx43. Colocalization was performed using Huygens software (Scientific Volume Imaging, Netherlands). Statistical analysis was performed using t-test for continuous variables.

Results: Gap junction localization was significantly preserved at the endothelium in the Danegaptide versus control group at 6 hours after cardiac arrest (Average Volume= 12.08±7.06% vs. 4.01 ±1.12%, p=0.014). Average volumes in the Sham experiment measured 9.32±6.71%.

Conclusions: Danegaptide significantly preserved gap junction Cx43 in the endothelium at the BBB and was comparable to nonischemic experiments. BBB preservation via gap junction promotion may be a novel therapeutic target to preserve neurologic function after cardiac arrest.

No, authors do not have interests to disclose

## 323 Increased Burden of Cardiovascular Disease Risk Factors Associated With Short Term Emergency Department Bounceback Admission Related to Sepsis

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Objectives: A small proportion of patients with early sepsis are discharged from the emergency department (ED). Despite less severe outcomes in this cohort compared to their admitted counterparts, this group experiences notable admission and mortality rates, presenting an opportunity for improvements in clinical care. Our objective was to determine whether an increased burden of cardiovascular disease (CVD) risk factors are associated with higher odds of ED bounceback among discharged septic patients.

Methods: We conducted an analysis of historical data from adults who presented to two academic EDs in Southern California between Jan 1, 2019-Feb 28, 2022 and were discharged home with an ICD10 diagnosis of pneumonia, UTI, and/or cellulitis. CVD risk factors included a history of coronary artery disease, diabetes, hypertension, dyslipidemia, cigarette use, and/or morbid obesity (BMI>30). Using bivariate regression analysis, we assessed if higher numbers of cardiovascular risk factors were associated with higher odds of ED bounceback sepsis related admission within 7 days of an ED index visit.

Results: The study cohort contained 10179 unique patients. Bounce-back sepsis admission within 7 days occurred in 102 visits (1.0% of discharged patients). The odds of ED bounceback admission related to sepsis for those with one CVD risk factor were 1.92 (95% CI: 0.90-4.10), while being 2.49 (95% CI: 1.17 – 5.29), 2.56 (95% CI: 1.19-5.50) and 3.22 (95% CI: 1.07-9.71) for those with 2, 3 or 5 CVD risk factors.

Conclusions: Increased burden of cardiovascular disease risk factors is associated with short term ED bounceback admission related to sepsis. These findings may be used to create risk stratification tools to guide outpatient disposition decisions for ED patients with infection and early sepsis and to determine which patients need to be closely monitored outpatient following ED discharge.

No, authors do not have interests to disclose

## 324 Comparison of Outcomes After Treatment of Asymptomatic Hypertension in the Emergency Department in Admitted Patients

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Objectives: Hypertension, or elevated blood pressure (BP), is very prevalent in the United States with 45.4% of adults being affected and is a well- established risk factor for heart disease, kidney disease, and stroke. It is a common complaint in emergency departments (EDs), and hypertension-related hospitalizations have been growing over the years, with a 27% increase from 2000 to 2011. Current ED guidelines do not recommend treating asymptomatic hypertension in the ED for discharged patients. Studies have been done that show there are no significant benefits to starting antihypertensive treatment on these patients in the ED. However, little is known about outcomes in admitted patients who receive treatment for asymptomatic hypertension. Therefore, we hypothesized that administration of antihypertensive medication in the ED for admitted asymptomatic hypertensive patients improves outcomes, by reducing ICU admissions, Rapid Response Team calls, deaths, and adverse events.

Methods: We conducted a retrospective chart review study of patients presenting to a Corewell Health East (formerly Beaumont Health) ED from 2015-2022 who were admitted to an inpatient or observational unit with at least one BP reading of >160/100 in the ED. We compared patients who received IV or oral antihypertensive medications with those who did not. We also compared results in patients that were taking antihypertensive medications prior to the ED visit and those that were not. Logistic regression was used to assess the effects of ED antihypertensive medication after adjusting for age, sex, race, BMI, hypertension stage, and Elixhauser comorbidity index. Odds ratios (OR) were reported with 95% confidence interval (CI) and p-value.

Results: We found that in all patients who received antihypertensive treatment, the number of ICU admissions was significantly reduced, regardless of antihypertensive use prior to ED visit (OR 0.800, 95% CI 0.720-0.900, p<0.001). There were no changes in rate of death or Rapid Response Team calls. However, in patients not previously prescribed antihypertensives, treating hypertension with medications in the ED was associated with a significantly increased rate of ischemic strokes (OR 3.530, 95% CI 1.420-8.720, p=0.01).

Conclusions: ED treatment of elevated BP is associated with a decrease in ICU admissions, particularly in patients being treated with antihypertensive medications outpatient. However, there is risk associated, as demonstrated by the increased risk of ischemic strokes in treated patients. This study highlights the importance of using caution when treating asymptomatic hypertensive patients in the ED, especially in patients not taking antihypertensive medications outpatient.

No, authors do not have interests to disclose

## 325 A Convolutional Neural Network for the EKG Detection of Wolff-Parkinson-White Syndrome

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Background: Wolff-Parkinson-White (WPW), a congenital cardiac disorder, presents with a distinct electrocardiogram (ECG) pattern, and prompt recognition is necessary to reduce the morbidity and mortality that may accompany it as multiple studies show an associated risk of sudden cardiac death. Since WPW is diagnosed largely in part by performing an ECG, and although computer interpreted algorithms for electrocardiograms have advanced since the inception of the ECG, studies by Alpert, and Estes, concluded that errors remain in these computerized interpretations. Therefore, in order to reduce a missed diagnosis of WPW, it is imperative to optimize the ECGs interpretations by finding effective models that can accurately detect this disorder.

Objectives: Our aim is to develop a machine learning algorithm that would be able to distinguish and identify non-WPW from WPW rhythms. To meet this objective, we built and trained a Convolutional Neural Network (CNN) on WPW ECG data. CNNs are machine learning algorithms that have been used with much success in a wide variety of medical applications including image classification and signal analysis.

Methods: We present a deep convolutional neural network that classifies the ECG as either normal (non-WPW), or abnormal (WPW). The proposed CNN model was trained on a dataset of 205 samples without WPW and 135 samples with WPW using a 70% training/30% validation split. This sequential model was built with 4 layers of 16, 32, 64 and 128 filters respectively, each using rectified linear unit activation and batch normalization. Dropout was applied in 3 of the layers to prevent overfitting. The *global average pooling* method to classify the ECGs was also used.

Results: Our model accurately classified the non-WPW ECGs from the WPW ECGs with a Sensitivity of 92.85 %, a Specificity of 100 %, with a Test accuracy of 90.90 %. The Area Under the Receiver Operating Characteristics Curve for our model is 0.9.

Conclusions: Wolff-Parkinson-White Syndrome is a congenital disorder that may predispose the individual to tachyarrhythmias, as well as sudden cardiac death. After evaluating the positive results, we predict that our CNN model could potentially decrease the morbidity and mortality of this patient population by better identifying those who present with this disorder. Future work will focus on increasing the testing accuracy while keeping the specificity at 100%, an important metric in ECG interpretation and medicine in general. We also look forward to applying this model in a clinical setting to validate actual patient populations.

No, authors do not have interests to disclose

## 326 Tracheal Intubation Prior to Arrival or Cardiac Arrest in the Emergency Department Is Associated With Lower Odds of Return of Spontaneous Circulation: A Video Review Registry Study

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Objectives: The optimal timing of tracheal intubation of cardiac arrest (CA) is of particular interest recently. In CA, shorter time to critical interventions is thought to be associated with improved outcomes. This study aims to determine if intubation prior to arrival to emergency department (ED) or prior to CA is associated with shorter time to critical interventions, including time to rhythm check, defibrillation, and higher rates of return of spontaneous circulation (ROSC). We hypothesized that intubation prior to ED arrival/CA is associated with faster time to critical interventions in the ED and higher ROSC rates.

Methods: This is a single-center retrospective analysis of our CA registry between 01/2018-3/2023 including all patients $\geq$ 18 years with video recordings of initial ED management at our quaternary care academic ED, which treats 112 CAs annually with 65% arriving by Emergency Medical Services. All videos were reviewed by two dually board-certified Emergency Medicine and Critical Care physicians with extensive experience in video review. Demographics, initial ED rhythm, ROSC, intubation status on arrival, times from arrival to rhythm detection, from detection of shockable rhythm to defibrillation, and time to intubation were recorded in CA registry. Intubation status on arrival was defined as whether patients had advanced airway placement at the start of the ED CA video recording, either prior to ED arrival, or prior to CA in cases of in-hospital CA. The Wilcoxon rank sum, Chi Square tests, and linear and logistic regression models were performed, where appropriate.

Results: A total of 324 CA patients were in the registry, with a median age of 79 years, 181(56%) male, 37(14.2%) with an initial shockable rhythm in ED. Overall, 47.6% had ROSC (n=128/269). 42 patients' initial intubation status could not be determined. Of the remaining 282, 195 (69.2%) were intubated prior to arrival, and 87 (31.8%) were not. The median time to intubation among those who were not intubated prior to arrival (n=71) was 390 (IQR 246-583) seconds. Patients intubated prior to arrival had median time-to rhythm detection and defibrillation of 188 (IQR 96-281), and 29 (IQR 14-60) seconds compared to those who were not intubated on arrival of 180.5 (IQR 77-289) and 26.5 (IQR 5-38) (p values 0.5 and 0.4), respectively. Among patients intubated prior to arrival 42.5% (n=77/181) achieved ROSC compared to 60.2% (n=50/83) of those not intubated prior to arrival ($p = 0.008$). After controlling for age, initial rhythm, and number of ED technicians involved in care, the time to initial rhythm was not different between the two groups ($p = 0.8$). Regression analysis could not be performed for time to defibrillation due to low sample size. Compared to patients not intubated prior to arrival, patients who were had 50% lower odds of achieving ROSC, after controlling for age, initial rhythm and number of ED technicians (OR=0.50, 95%CI 0.26-0.96, $p = 0.04$).

Conclusions: In this video review-based registry of CA, intubation on arrival is not associated with faster ED rhythm detection or defibrillation and had lower odds of ROSC. These findings suggest factors other than accounted for in our model (e.g. IHCA vs. OHCA, delays to critical interventions from intubation prior to video recording) may influence time to intervention and ROSC in this population. Future studies should aim to further elucidate the underlying reasons for this observation.

Yes, authors have interests to disclose

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Zoll foundation grant to investigate cardiac arrest handoff process

Disclosure: Zoll foundation grant support to study cardiac arrest outcomes

Grant Support

Zoll foundation grant support to study cardiac arrest outcomes

## 327 Does Guideline Implementation Affect Sex and Race/Ethnicity Differences in Objective Cardiac Testing for Patients Evaluated for Acute Coronary Syndrome in the Emergency Department?

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Objectives: To determine if implementation of a standardized method of cardiac risk stratification modifies the association between age, race/ethnicity, and receipt of guideline recommended functional cardiac testing following an emergency department (ED) evaluation for chest pain concerning for acute coronary syndrome (ACS).

Methods: We performed a secondary analysis using data from a before-after quasi-experiment study evaluating implementation of a HEART Score-based ACS guideline in a large, urban, safety-net ED. The before cohort was seen from February 1, 2017 through April 30, 2017, and the after cohort was seen from December 1, 2017 through February 28, 2018. The intervention was implementation of a HEART Score based risk stratification guideline with specific recommendation for functional cardiac testing for patients with a HEART Score $\geq$4 (and no normal functional testing within prior year). The base cohort was identified through the electronic medical record with the following inclusion criteria: (1) age $\geq$ 18 years, (2) a cardiac troponin completed during the encounter, and (3) at least one ICD-10 code for chest pain or ACS. We performed standardized medical record review with emergency physicians to restrict the base cohort to only patients for whom clinicians were concerned for ACS and a non-ACS diagnosis was not identified. In patients with no documented HEART Score, one was calculated retrospectively. The outcome was whether patients with a HEART Score $\geq$4 had functional cardiac testing obtained in the ED prior to discharge, ordered as an urgent outpatient stress test, or admitted the patient for functional cardiac testing (stress or cardiac catheterization). To estimate associations between patient demographics and the outcome, we used multivariable logistic regression with the following conceptual model: Referral to Functional Cardiac Testing $= f$ [Patient Characteristics (race/ethnicity, sex, race/ethnicity * sex, cardiac comorbidities, age) + HEART Score Implementation.

Results: During the study period, a total of 1,170 patients were included (521 in the before cohort and 649 in the after cohort), and 31.3% (n=366) were ultimately referred for cardiac testing. The median age was 52 (IQR: 42-62) and 46.7% (n=546) were female, 18.6% (n=218) were Black Non-Hispanic, 40.1% (n=469) were Hispanic, 36.4% (n=426) were White Non-Hispanic, and 4.9% (n=57) were of Asian ancestry or listed their race as other. There were no significant differences in race/ethnicity (p=0.98), sex (p=0.64), age (p=0.33), or referral (p=0.14) between

the cohorts. We determined 42.2% (n=220) of the before cohort and 36.5% (n=237) of the after cohort should have been referred for functional cardiac testing. After adjusting for sex, race, ethnicity, age, and cardiac comorbidities, implementation of the HEART Score was associated with an increased odds of referral for functional cardiac testing (OR 2.29, 95% CI: 1.54–3.42, p<0.001). Using the same model adjusting for implementation, age, and cardiac comorbidities we found no difference in referral based on sex, race, or ethnicity (Table). Further, the interaction between sex and race/ethnicity did not significantly contribute to the model (p= 0.19-0.61).

Conclusions: Implementation of the HEART Score resulted in increased odds of referral for functional cardiac testing. Implementation of the guideline did not affect the odds of referral based on sex, race, or ethnicity.

**Table.** Associations between sex, race/ethnicity, age, and atherosclerotic risk and referral[1] for cardiac testing from the emergency department (ED).

| | Unadjusted | | | | | | Adjusted | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pre-[2] OR | (95% CI) | p | Post-[2] OR | (95% CI) | p | OR | (95% CI) | p |
| **Sex** | | | | | | | | | |
| Male | ref | | | ref | | | ref | | |
| Female | 1.09 | (0.63-1.89) | 0.76 | 1.45 | (0.81-2.61) | 0.21 | 1.17 | (0.77-1.78) | 0.47 |
| **Race/Ethnicity** | | | | | | | | | |
| White, Non-Hispanic | ref | | | ref | | | ref | | |
| Black, Non-Hispanic | 1.22 | (0.59-2.52) | 0.84 | 1.16 | (0.52-2.61) | 0.62 | 1.21 | (0.7-2.1) | 0.61 |
| Hispanic | 1.39 | (0.75-2.58) | 0.76 | 1.48 | (0.77-2.86) | 0.77 | 1.41 | (0.88-2.26) | 0.81 |
| Other | 1.64 | (0.49-5.44) | 0.59 | 2.02 | (0.41-9.99) | 0.51 | 1.96 | (0.75-5.1) | 0.3 |
| **Age (years)** | | | | | | | 1.02 | (0.99-1.03) | 0.06 |
| **Atherosclerotic risk[3]** | | | | | | | 1.35 | (0.9-2.04) | 0.15 |

**Abbreviations:** OR = odds ratio; CI = confidence interval.
1. Referral = Determined by documentation in health record that for patients with moderate or high MACE risk (HEART Score ≥4) ED clinician successfully referred or attempted to refer patient for cardiac testing (e.g., stress test in ED, admission, hospitalist consult, or stress within 6 weeks).
2. Pre and post implementation of HEART Score-based guidelines with explicit recommendations on referral for functional cardiac testing.
3. Atherosclerotic risk = history of AMI, stroke, or PAD as documented in the patient's medical record.

No, authors do not have interests to disclose

## 328 Modified Early Warning Score as a Triage Tool for Streamlined Admission

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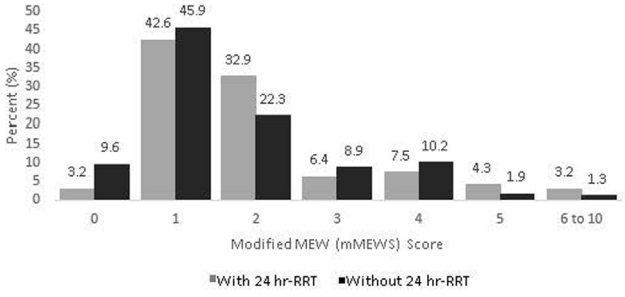
Objectives: Interventions to streamline the emergency department (ED) admission process have potential to positively impact patient outcomes. For patients awaiting admission, the gap in time from the admitting provider's assessment to their admission orders may delay patient flow. Alternatively, sending a patient to an inpatient bed without being seen by the admitting provider may cause concern over the potential for decompensation requiring resources like rapid responses. We set out to characterize preadmit modified MEWS (mMEWS) score and 24-hour Rapid Response Team (RRT) activation among adults admitted to the adult hospital medicine (HM) service from the ED under a mMEWS driven patient flow process. Additionally, we assessed the association between mMEWS and resource utilization defined by transferring to higher level of care.

Methods: The mMEWS score is calculated on the basis of vital signs. The mMEWS patient flow intervention consisted of the automated display of a patient's mMEWS score on their electronic health record for ED patients at a Level 1 Trauma Center in PA with an annual census of approximately 90,000 visits. We conducted a retrospective cross-sectional analysis of observational data of adults patients aged ≥ 18 years of age admitted from the ED to the hospital medicine (HM) service during time period 2/19/2019-2/18/2020. Patients with a low (less acute) mMEWS score of 0-1 requiring admission from the ED to the HM service were admitted using an abridged order set by the ED provider. This streamlined the patient transition to the inpatient room where the HM provider later evaluated the patient. More acutely ill patients with a mMEWS score ≥2, awaited the HM provider assessment in the ED. The activation of inpatient RRT within 24 hours of admission and the transfer to a higher level of care were the primary outcomes evaluated.

Results: There were 16,408 admissions using the mMEWS mediated process of which 51.8% were female. The average age was 68.3±17.2. In 61.6% the mMEWS score prior to admission was 0 or 1. There were 94 RRTs within the first 24 hours (RRT-24 hr.) with a median of 8 hours (IQR: 4.1 to 11.8 hours). Among the 94 RRT-24s that occurred, 45.7% had a mMEWS ≤1 compared to 54.3% had mMEWS≥2. Figure 1 displays the distribution of mMEWS scores among those with/without a RRT -24 hr. The leading discharge diagnosis-related groups (DRGs) among those with a RRT-24hr included sepsis (15.4%) followed by heart failure (13.8%), other kidney and urinary tract disorders (5.3%), and pneumonia (4.1%). Among those with an RRT-24hr, 57.5% were transferred to a higher level of care while 42.5% remained at the same level of care to which they had been admitted. Among those with a RRT-24hr, preadmission mMEWS (mMEWS > 1 vs. mMEWS ≤1: OR, 0.59 [95% CI: 0.24 to 1.41]) was not significantly associated with transferring to higher level of care after the RRT after adjusting for age (per 1-year: OR, 1.02 [95% CI: 0.99 to 1.04]) and gender (Male vs. Female: OR, 3.51 ([95% CI: 1.44 to 8.55]).

Conclusions: In this cohort, there was less than a 1% chance of an RRT-24 in an admission to HM. Using a preadmission mMEWS cutoff of 0-1 as a triage tool to allow patients to go to the floor shows promise. Even those with a preadmission mMEWS ≤1 who had a RRT-24 were not associated with transferring to a higher level of care. Either a discharge DRG of sepsis or heart failure was nearly 3 times more likely to be associated with an RRT-24hr than other diagnoses.

**Figure 1.** mMEWS score Prior to Admission by 24 hr-RRT Status




No, authors do not have interests to disclose

## 329 Trends and Analysis of Medicare Reimbursement of Emergency Department Coding Levels

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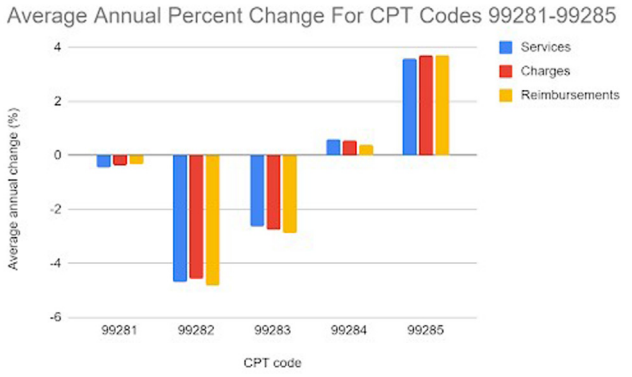
Objectives: In 1992, a code set for emergency medicine was developed that placed patient encounters in the emergency department under level 1, 2, 3, 4 or 5. Level 1 being the least complex encounters and level 5 being the most complex. This project trends and analyzes the coding levels and Medicare reimbursement of each coding level used in emergency departments from 2010 to 2017. There are two primary questions: #1: How has the utilization of level 1 through level 5 services in the emergency department changed during the time period of 2010-2017? #2: How has Medicare reimbursement for these coding levels changed during the time period of 2010-2017?

Methods: The Center for Medicare (CMS) has a publicly available dataset that gives information on Medicare services. Each medical service has a specific Current Procedural Terminology (CPT) code assigned to it. The CPT codes for level 1-5 emergency services provided are 99281-99285, respectively. The CMS data set for Medicare services was downloaded as excel files. The CPT codes 99281-99285 were identified and the services, charges, and reimbursement data for these were extracted from each year and isolated into another excel file. The data was then organized and trended in chronological order, and tables and graphs were created using excel.

Results: The volume of services charged to Medicare have always increased stepwise from level 1 to level 5 over these years, and charges to Medicare and reimbursement from Medicare have also followed suit (Table 1). The number of services charged, total charges, and total reimbursements for CPT codes 99281-99283 have decreased on average over the years 2010-2017 while CPT codes 99284 and 99285 increased over the same time period (Figure 4). Though while CPT code 99281 did decrease in all three variables on average, it had a relatively modest change over the years (CAGR -0.45%, -0.36%, -0.31% for services, charges, and reimbursement respectively) when compared to how much these variables decreased for CPT codes 99282 (CAGR -4.69%, -4.58%, -4.80%) and 99283 (CAGR -2.61%, -2.74%, -2.88%). Similarly, CPT code 99294 had relatively modest increases annually in all three variables (CAGR 0.61%, 0.56%, 0.42%) when compared to CPT code 99285 (CAGR 3.61%, 3.70%, 3.70%).

Conclusions: The current Medicare reimbursement system incentivizes healthcare systems and providers to participate in activities that decrease quality and value of care in order to make up for the financial losses and decreasing reimbursements built into the system. The switch to new coding criteria in 2023 may improve reimbursement and produce higher quality care but it could also create incentives to make the medical decisionmaking section of a chart more extensive in order to obtain the largest reimbursement. Alternative payment methods are an important area which could fix incentives in the ED but this requires legislation and governmental policy changes to Medicare law. Future studies comparing how the new chart coding criteria has affected coding level charges and comparison with this study to determine whether the change has improved the problems outlined would be recommended.




No, authors do not have interests to disclose

## 330 A Quality Improvement Initiative to Improve Influenza Vaccinations in the Emergency Department During a Tripledemic

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Objectives: Influenza vaccination has been demonstrated to reduce transmission risk and disease severity, although barriers including access and hesitancy reduce full compliance. The emergency department (ED) is an appropriate venue to administer these vaccines, especially during the rise of the "tripledemic" and specifically in vulnerable populations. Our urban EDs undertook several quality improvement efforts to encourage vaccination. We found modest success in delivering vaccinations to the ED population, although not all who requested or agreed to vaccination received one. We analyzed those that had vaccines ordered to understand barriers to receiving them.

Methods: Sixty-nine Epic charts were reviewed retrospectively and data points such as age, date, gender, chief complaint, diagnosis, ESI, and length of stay were extracted. Statistical analysis included two tailed t-tests and two tailed z-tests to identify differences among demographic and case specific factors in rates of vaccination order completion.

Results: Sixty-nine patients requested or agreed to vaccination. Forty-eight (70%) received the vaccine successfully during their visits; vaccination orders on the remaining 21 (30%) were not completed. Patients who successfully received the vaccine were noted to be significantly younger than those who did not end up receiving it (41 vs 56, p-value $<0.01$). ED length of stay did not achieve statistical difference between those who received vaccination vs those who did not (259 vs 238 minutes, p-value 0.59). Though rates of vaccination order completion in the main ED vs the low acuity unit also did not achieve statistical significance, a clinical trend was appreciated (61% main vs 74% low acuity, p-value 0.25).

Conclusions: In the realm of ED boarding and crowding reaching an all-time high during this "tripledemic" era, the ED is an appropriate setting for influenza vaccination, in hopes of preventing severe disease. Successful influenza vaccination order completion was associated with younger age and did not increase ED length of stay. Given their higher risk profile, increased attention to elderly patients may be warranted to ensure they do not leave prior to vaccination. Administering vaccines early in the course of patient stays may improve compliance.

No, authors do not have interests to disclose

## 331 Implementation of Integrated Electronic Health Record Access for Out-of-Hospital Clinicians

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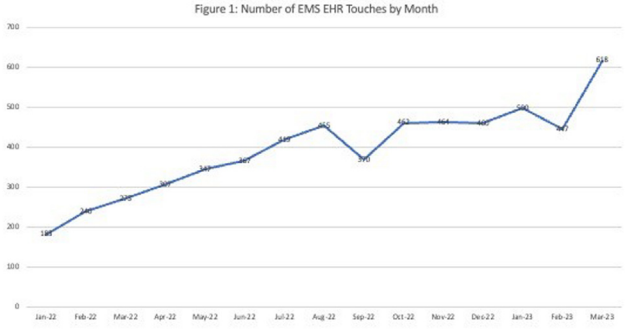
Objectives: Care integration using the electronic health record (EHR) prevents error and improves healthcare delivery by allowing key components of patients' medical history to accompany them across different clinical settings. However, connectivity obstacles still silo the prehospital environment from brick-and-motor hospitals. The growing scope of practice and sophisticated clinical care provided by emergency medical services (EMS) personnel demands connection with the EHR to ensure continuity of care. However, EHR access for EMS personnel is uncommon and little is known about the feasibility of implementing its operation in the prehospital setting.

Methods: An instrument was administered to EMT-Basic and paramedic level providers fifteen months after the launch of EMS-EHR integration via the Epic Haiku application. The instrument assessed demographic information, frequency and reasons for EHR use, and ratings of EHR usability and usefulness. All subjects were also administered the Streamlined Technology Readiness Assessment (TRI 2.0). Additionally, the system's EHR was queried to describe the frequency of access by EMS users in the 15 months prior to the administration of the study. All data were reported descriptively. Pearson correlations were used to demonstrate association between the primary and secondary outcomes of frequency of EHR utilization and TRI 2.0 score with independent variables including demographical factors, and responses to usability and usefulness questions.

Results: In total, 33 subjects were enrolled (mean age 37 years, 84.5% male). During the study period, participants accessed the EHR 5,912 times (21% of all transports). The number of chart touches per month increased over the study period by 21%. Figure 1 illustrates EHR access trends over time. Twenty-two (66%) of participants reported that they access the EHR for more than 50% of all patient encounters. The most common reasons reported for EHR use were identifying past medical history and current medications. 62% of subjects agreed or strongly agreed that access to the EHR impacted their patient care decisions. The TRI 2.0 instrument demonstrated strong reliability with a Cronbach's coefficient of 0.80. Mean subject TRI score was 3.31 (Std 0.5). Higher TRI scores were associated with younger age ($R=0.54$, $p = 0.009$) and higher EHR usability ratings ($R=0.43$, $p = 0.03$), but not frequency of EHR use or beliefs about the importance of EHR access in patient care ($p=0.63$ and $p=0.95$ respectively).

Conclusions: The EMS service of interest demonstrated high levels of adoption of EHR utilization to support patient care during a 15-month implementation period. Overall, EMS felt that the EHR was useful and usable for their professional duties. TRI scores among EMS providers were moderately high, suggesting potential to technology embracive behaviors in this population. Further research is needed to determine the impact of EMS EHR use on patient care and outcomes as well as interface optimization for the prehospital setting.




No, authors do not have interests to disclose

# 332 Geriatric Population Triage: The Risk of Real-Life Over and Under Triage in a Crowded Emergency Department: 4- and 5-level Triage Systems Compared: The CREONTE (Crowding and R E Organization National TriagE) Study

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Objectives: We sought to determine the effects of introducing a 5-level-triage system (5LT) on wait times in general and geriatric (>75 years old) populations. The secondary aim was to evaluate the impact of introducing a 5LT on undertriage (UT), and overtriage (OT) in the general and geriatric (> 75 years old) populations. Other outcomes included the impact of crowding on triage. The crowding indices considered were the length of ED stay, total access block time, and rate of access block. Finally, we analyzed the functioning of the 5LT during the COVID-19 pandemic, both in the general and geriatric (>75 years old) populations.

Methods: We examined geriatric ED access both in the context of 4-level (4LT) and 5-level triage systems (5LT), from January 1, 2014, to December 31, 2020.

Results: 423,257 ED presentations were included. With time, accesses to the ED by geriatric, more fragile and seriously ill individuals increased, with progressive increases in crowding. Older (>75 years) patients represented abut 24% of the tested population. During the same period, the number of ambulatory arrivals decreased significantly in favor of ambulance ones. A progressive increase in patients requiring higher triage codes was also reported (Table1). There were small statistically significant differences between geriatric (> 75 years of age) and younger patients within the subdivision of triage priority codes for medical examination and care intensity (table 2). Geriatric patients are at increased risk of UT compared to the general population (odd ratio (OR) =2.22; p<0.001). However, this trend disappeared and reverted when separately analyzing the low-intensity (OR=0.85; p<0.001) and medium-high-care intensity areas (OR=0.56; p<0.001). The geriatric subjects are however also more frequently subjected to over-triage than the younger subjects, this phenomenon persists both in the period of 4LT and in that of 5LT and remains in both areas of intensity of care (table3).

The rise in the length of stay (LOS), exit block, boarding, and processing times showed a net increase in throughput and output factors, with a consequent lengthening of wait times. Boarding in 4LT substantially correlates with a marked increase in the risk of UT in geriatric patients in medium-high intensity care area. In the transition to 5LT, boarding no longer correlates with an increased risk of under triage in elderly patients, while in young people the risk of under triage is reduced.

Boarding correlates with an increased risk of over-triage in young people and a reduction in the risk of over-triage in the elderly. The increased risk of over-triage in young people is lower in 5LT, while the reduction in the risk of OT in the elderly is greater in 5LT (Table 4). In the pandemic phase many more accesses of older and more serious patients were observed. There has been a general reduction in waiting times, an increase in crowding indices and high intrahospital mortality.

Conclusions: Introducing a 5LT improved ED performance and patient care; however, geriatric triage remains a challenge in EDs since this population is more prone to UT.

**Table 1. a**–Principal personal and ED presentation features of patients included in the study, by period of observation.

| | Period* 4LT N (%) | 5LT N (%) | p# |
|---|---|---|---|
| **Sex** | | | |
| Male | 59,432 (*51.2*) | 158,914 (*51.7*) | |
| Female | 56,628 (*48.8*) | 148,283 (*48.3*) | *0.002* |
| **Age** | | | |
| <75 | 91,102 (*78.5*) | 234,512 (*76.3*) | |
| 75+ | 24,968 (*21.5*) | 72,686 (*23.7*) | *<0.001* |
| **Triage priority code** | | | |
| Code 5 | 13,443 (*11.6*) | 25,748 (8.4) | |
| Code 4 | 78,777 (*67.9*) | 191,981 (*62.5*) | |
| Code 3 | 0 (-) | 17,297 (*5.6*) | |
| Code 2 | 22,711 (*19.6*) | 67,688 (*22.0*) | |
| Code 1 | 1,129 (*0.9*) | 4,484 (*1.5*) | *<0.001* |
| **Priority code at discharge** | | | |
| Code 5 | 29,240 (*25.2*) | 43,141 (14.0) | |
| Code 4 | 73,995 (*63.8*) | 224,039 (*72.9*) | |
| Code 3 | 0 (-) | 425 (0.1) | |
| Code 2 | 11,952 (*10.3*) | 36,341 (*11.8*) | |
| Code 1 | 873 (*0.7*) | 3,252 (*1.2*) | *<0.001* |
| **Care intensity** | | | |
| Low | 92,220 (*79.5*) | 235,026 (*76.5*) | |
| Medium-to-high | 23,840 (*20.5*) | 72,172 (*23.5*) | *<0.001* |
| **Outcome** | | | |
| Discharge | 94,701 (*81.6*) | 246,413 (*80.2*) | |
| Hospitalization | 17,347 (*14.9*) | 51,043 (*16.6*) | |
| Transfer | 2,166 (*1.9*) | 5,746 (*1.9*) | |
| Left without being seen | 1,385 (*1.2*) | 2,933 (*0.9*) | |
| Other | 461 (*0.4*) | 1,063 (*0.4*) | *<0.001* |

2The 4LT period (T4) spanned 01/01/2014 to 30/11/2015; the 5LT period (T5) spanned 01/12/2015 to 31/12/2020. #: $\chi^2$ test.

**Table 1. b**–Principal personal and ED presentation features of patients included in the study, by period of observation.

| Pathology at ED access | N | % |
|---|---|---|
| 4TL | | |
| Trauma | 39,713 | 34.22 |
| Major trauma | 271 | 0.23 |
| Minor symptoms | 25,614 | 22.07 |
| Dyspnea | 5,399 | 4.65 |
| Thoracic pain | 5,870 | 5.06 |
| Abdominal pain | 9,455 | 8.15 |
| Headache | 4,353 | 3.75 |
| Neurologic symptoms | 1,630 | 1.40 |
| Bleeding | 2,024 | 1.74 |
| Fever/Sepsis | 1 | 0.00 |
| Other | 28,4811 | 18.73 |
| 5TL | | |
| Trauma | 12,233 | 5.03 |
| Major trauma | 933 | 0.38 |
| Minor symptoms | 35,712 | 14.70 |
| Dyspnea | 14,117 | 5.81 |
| Thoracic pain | 17,321 | 7.13 |
| Abdominal pain | 26,159 | 10.76 |
| Headache | 3,494 | 1.44 |
| Neurologic symptoms | 14,319 | 5.89 |
| Bleeding | 5,757 | 2.37 |
| Fever/Sepsis | 8,048 | 3.31 |
| Other | 104924 | 43.18 |

**Table 2** –Wait time, by period, code at presentation and age.

| | Period* | Age<75 years N | Median (min) | Interquartile range (min) | p# | Age>=75 years N | Median (min) | Interquartile range (min) | p# |
|---|---|---|---|---|---|---|---|---|---|
| Wait time | | | | | | | | | |
| Non urgency | | | | | | | | | |
| Code 4 | 4LT | 12,335 | 51.6 | 17.9-108.3 | | 1,108 | 57.4 | 21.4-116.5 | |
| Code 5 | 5LT | 23,379 | 48.3 | 17.5-103.8 | 0.001 | 2,369 | 50.0 | 18.2-109.0 | 0.037 |
| Minor urgency | | | | | | | | | |
| Code 3 | 4LT | 64,636 | 48.4 | 19.0-102.9 | | 14,141 | 71.2 | 30.6-134.1 | |
| Code 4 | 5LT | 156,088 | 53.1 | 20.6-115.9 | <0.001 | 35,893 | 79.4 | 32.5-151.6 | <0.001 |
| Deferrable urgency | | | | | | | | | |
| Code 3 | 5LT | 13,403 | 23.4 | 12.4-43.9 | - | 3,894 | 26.9 | 14.5-48.3 | - |
| Very urgency | | | | | | | | | |
| Code 2 | 4LT | 13,535 | 22.5 | 10.7-47.9 | | 9,176 | 24.7 | 12.3- 51.2 | |
| Code 2 | 5LT | 39,098 | 31.7 | 13.4-73.9 | <0.001 | 28,590 | 33.4 | 15.1-73.3 | <0.001 |
| Emergency | | | | | | | | | |
| Code 1 | 4LT | 596 | 4.6 | 2.4-9.3 | | 533 | 5.3 | 2.6-10.8 | |
| Code 1 | 5LT | 2,544 | 3.6 | 1.9-7.1 | <0.001 | 1,940 | 5.2 | 2.6-10.1 | 0.369 |

* The 4LT period spanned 01/01/2014 to 30/11/2015; the 5LT period spanned 01/12/2015 to 31/12/2020. #: Kruskal–Wallis test.

**Table 3.** Distribution of UT and OT percentage during 4LT and 5LT periods, in geriatric and younger patients.

| Variable | | Period* 4 levels triage N (%) | 5 levels triage N (%) | p# |
|---|---|---|---|---|
| Age <75 years | | | | |
| | OT | | | |
| | No | 81,483 (*89.4%*) | 205,378 (*87.6%*) | |
| | Yes | 9,619 (*10.6%*) | 29,134 (*12.4%*) | <0.001 |
| | UT | | | |
| | No | 83,837 (*92.0%*) | 215,494 (*91.9%*) | |
| | Yes | 7,265 (*8.0%*) | 19,018 (*8.1%*) | 0.204 |
| Age ≥75 years | | | | |
| | OT | | | |
| | No | 19,705 (*79.0%*) | 55,553 (*76.4%*) | |
| | Yes | 5,253 (*21.0%*) | 17,133 (*23.6%*) | <0.001 |
| | UT | | | |
| | No | 22,898 (*91.8%*) | 66,104 (*90.9%*) | |
| | Yes | 2,060 (*8.2%*) | 6,582 (*9.1%*) | <0.001 |

* The 4LT period (T4) spanned 01/01/2014 to 30/11/2015; the 5LT period (T5) spanned 01/12/2015 to 31/12/2020; #: $\chi^2$ test.

**Table 4a.** trend of crowding indices over the years

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | *p for trend* |
|---|---|---|---|---|---|---|---|---|
| Boarding# | 926 | 1,010 | 1,241 | 1,431 | 1,475 | 2,033 | 4,230 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *9.0%* | *10.1%* | *11.4%* | *12.8%* | *12.8%* | *18.8%* | *36.7%* | *<0.001* |
| Access block[#] | 786<br>*7.0%* | 951<br>*9.5%* | 1,141<br>*10.5%* | 1,289<br>*11.5%* | 1,368<br>*11.9%* | 2,022<br>*18.7%* | 3,833<br>*33.3%* | <0.001 |
| Accesses per day | *165.8* | *165.3* | *170.8* | *174.4* | *176.8* | *175.8* | *129.8* | |
| Number of accesses | *60,512* | *60,336* | *62,527* | *63,662* | *64,540* | *64,181* | *47,500* | |

[#] Boarding and access block were calculated only on hospitalized patients.

**Table 4.b.** Selected time variables accounting for crowding, by age and intensity of care.

| **Wait time** | | **Age <75** | | | | **Age 75+** | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Observations (N)** | **Median (min)** | **Interquartile range (min)** | ***p*[a]** | **Observations (N)** | **Median (min)** | **Interquartile range (min)** | ***p*[a]** |
| Low-intensity care | | | | | | | | | |
| | No boarding[*] | 18,128 | 46.5 | 18.4-104.4 | | 10,603 | 64.3 | 27.4-131.1 | |
| | Boarding[#] | 4,579 | 55.6 | 22.5-129.7 | <0.001 | 2,837 | 75.5 | 29.5- 156.6 | <0.001 |
| Medium-to-high care intensity | | | | | | | | | |
| | No boarding[*] | 16,716 | 15.9 | 6.5- 39.3 | | 18,509 | 21.3 | 9.5-48.5 | |
| | Boarding[#] | 2,100 | 24.5 | 10.3-56.0 | <0.001 | 2,830 | 22.0 | 9.5-53.9 | 0.041 |
| Low-intensity c are | | | | | | | | | |
| | No access block[°] | 265,186 | 48.4 | 18.9-106.4 | | 53,915 | 67.5 | 27.6-134.4 | |
| | Access block [°°] | 4,655 | 92.7 | 34.0-182.4 | <0.001 | 3,490 | 113.7 | 43.8-205.5 | <0.001 |
| Medium-to-high care intensity | | | | | | | | | |
| | No access block[°] | 46,443 | 27.2 | 11.0-27.2 | | 32,584 | 29.2 | 12.7-65.3 | |
| | Access block [°°] | 1,998 | 32.0 | 12.9-85.3 | <0.001 | 2,912 | 29.6 | 11.4-80.2 | 0.122 |

[a]: Kruskal–Wallis test.

**No boarding * = mean number and percentage of patients who did not go to boarding (for example patients who did not have to wait for the bed)**

**Boarding[#] =** mean number and percentage of patients who have experienced boarding

° No access block : **mean number and percentage of patients who did not go to access block**

°° Access block : mean number and percentage of patients who have experienced boarding

**Table 4.** c Risk of under triage (UT), by age, triage level period and presence of boarding.

| **Period** | **Age** | **Intensity of care** | **Boarding** | **OR[a]** | **95% confidence interval** | ***p*** |
|---|---|---|---|---|---|---|
| 4 levels triage | < 75 | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.70 | 0.59–0.83 | <0.001 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.99 | 0.53-1.86 | 0.987 |
| | **>=75** | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.75 | 0.60–0.94 | 0.014 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.38 | 0.77–2.48 | 0.279 |



| | | | | | | |
|---|---|---|---|---|---|---|
| **5 level triage** | **< 75** | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.01 | 0.94–1.09 | 0.753 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.49 | 0.34–0.69 | <0.001 |
| | **>=75** | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.03 | 0.94–1.12 | 0.570 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.02 | 0.81–1.30 | 0.849 |

[a]: Odds ratios (OR) estimated by multiple regression analysis adjusted by age and sex.

**Table 4d.** Risk of over triage (OT), by age, triage level period and presence of boarding.

| **Period** | **Age** | **Intensity of care** | **Boarding** | **OR[a]** | **95% confidence interval** | ***p*** |
|---|---|---|---|---|---|---|
| 4 levels triage | < 75 | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.27 | 1.01-1.61 | 0.044 |
| | **>=75** | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.96 | 0.77–1.19 | 0.711 |
| **5 level triage** | **< 75** | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.12 | 0.99–1.26 | 0.06 |
| | **>=75** | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.03 | 0.94–1.12 | 0.570 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.75 | 0.68–0.84 | <0.001 |

[a]: Odds ratios (OR) estimated by multiple regression analysis adjusted by age and sex. No presence of OT for low intensity of care during the 4 levels triage period and in 5 levels triage period for patients <75 years of age was observed.



**Table 4e.** Risk of under triage (UT), by age, triage level period and presence of access block.

| **Period** | **Age** | **Intensity of care** | **Access block** | **OR[a]** | **95% confidence interval** | ***p*** |
|---|---|---|---|---|---|---|
| 4 levels triage | < 75 | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 4.37 | 3.75-5.10 | <0.001 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.12 | 0.35-3.60 | 0.847 |
| | **>=75** | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 4.53 | 3.79–5.43 | <0.001 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.18 | 0.47–2.95 | 0.724 |
| **5 level triage** | **< 75** | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 6.92 | 6.47-7.39 | <0.001 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.94 | 0.63–1.41 | 0.761 |
| | **>=75** | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 6.09 | 5.63–6.59 | <0.001 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 1.82 | 1.43– 2.32 | <0.001 |

[a]: Odds ratios (OR) estimated by multiple regression analysis adjusted by age and sex.

**Table 4f.** Risk of over triage (OT), by age, triage level period and presence of access block.

| **Period** | **Age** | **Intensity of care** | **Access block** | **OR[a]** | **95% confidence interval** | ***p*** |
|---|---|---|---|---|---|---|
| 4 levels triage | < 75 | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.23 | 0.16-0.31 | <0.001 |
| | **>=75** | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.34 | 0.27–0.45 | <0.001 |
| **5 level triage** | **< 75** | *Low* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.05 | 0.01-0.36 | 0.003 |
| | | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.16 | 0.15–0.18 | <0.001 |
| | **>=75** | *Moderate-to-high* | No | 1.00 (ref.) | - | |
| | | | Yes | 0.21 | 0.19– 0.23 | <0.001 |

[a]: Odds ratios (OR) estimated by multiple regression analysis adjusted by age and sex. No presence of OT for low intensity of care during the 4 levels triage period and in 5 levels triage period for patients >=75 years of age was observed.



No, authors do not have interests to disclose

## 333 Artificial Intelligence to Predict Emergency Department Workups From Nurse Triage Notes and Registration Data

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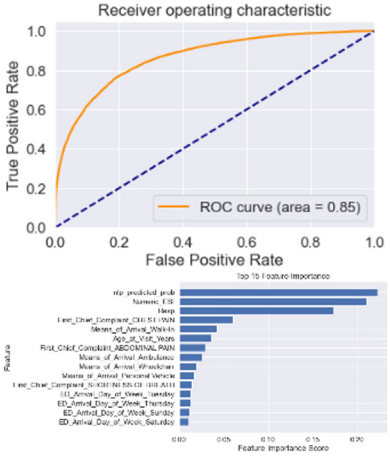
Objectives: Prolonged emergency department (ED) waiting times to see clinicians has become a major issue in recent years and further exacerbated by the COVID-19 pandemic. This has led to what has been termed as "waiting room medicine," referring to starting workups in the waiting room before the ED has capacity for a formal evaluation. Various models have been explored to expedite workups, including orders placed by nurses based on predefined protocols, placing a provider in triage, and even telemedicine. Advances in artificial intelligence (AI) may be able to augment the decision-making process for placing orders at the time of triage to expedite workups. Our objective was to develop and evaluate an AI-based model to predict workups, including labs, imaging, and medications, at the time of initial nurse triage.

Methods: We accessed adult ED visits at our academic institution from 2019 to 2022. Patients under the age of 18 were excluded. We designed an ensemble model that consisted of natural language processing (NLP; term frequency-inverse document frequency) and machine learning techniques (gradient boosting classifier). Explainable AI (XAI) techniques, Explain Like I'm 5 (ELI5) and Shapley Additive exPlanations (SHAP) values, were used to help understand the most important features in the model. The dataset was split into training (80%) and testing (20%). The model inputs included nurse triage and intake notes, as well as registration data, such as demographics, arrival information, and initial vital signs. The primary endpoints were predicting the need for laboratory testing, imaging, pain medication, and antibiotics. The model was evaluated with accuracy, area under the receiving operating curve (AUC), precision, recall, and F1 score.

Results: A total of 115,098 ED visits were included in the analysis. The model performed well in predicting the need for labs, with an accuracy and AUC of 0.79 and

0.84 for complete blood counts, 0.80 and 0.84 for chemistries, 0.79 and 0.82 for urinalyses, and 0.83 and 0.87 for cardiology labs, respectively. Predicting the need for imaging was slightly more variable with accuracy and AUC calculated at 0.75 and 0.81 for x-rays, 0.70 and 0.74 for CT scans, and 0.90 and 0.69 for ultrasounds, respectively. The accuracy and AUC for predicting the need for pain medications were 0.66 and 0.71. The most salient features of the model were specific for the order. For example, important features for cardiology labs identified by SHAP values were "chest," "sob," "breath," "cp," and "heart" and ELI5 were NLP results, Emergency Severity Index, "respiratory," and chief complaint of "chest pain."

Conclusions: AI may be able to augment decisionmaking for starting workups at the time of initial triage, prior to formal evaluation by ED clinicians. Our model was able to accurately identify patients requiring labs with slightly less accuracy for predicting the need for imaging or medications. More research into further improving model performance and implementation into practice is warranted.




| Weight | Feature |
|---|---|
| 0.5333 ± 0.4567 | chest |
| 0.0831 ± 0.1570 | sob |
| 0.0570 ± 0.1445 | breath |
| 0.0221 ± 0.1652 | cp |
| 0.0207 ± 0.1451 | heart |
| 0.0181 ± 0.1288 | weakness |
| 0.0165 ± 0.1652 | ems |
| 0.0151 ± 0.1305 | syncopal |
| 0.0147 ± 0.1548 | cardiac |
| 0.0130 ± 0.1301 | nitro |
| 0.0122 ± 0.1410 | dyspnea |
| 0.0112 ± 0.0921 | denies |
| 0.0094 ± 0.1023 | chest pain |
| 0.0080 ± 0.1285 | afib |
| 0.0076 ± 0.1447 | right |
| 0.0063 ± 0.0649 | cp sob |
| 0.0061 ± 0.0935 | shortness |
| 0.0059 ± 0.1293 | dizziness |
| 0.0057 ± 0.1275 | chf |
| 0.0056 ± 0.1248 | bleeding |
| 0.0054 ± 0.1382 | mi |
| 0.0048 ± 0.1211 | oxygen |
| 0.0046 ± 0.1134 | exertion |
| 0.0043 ± 0.1040 | palpitations |
| 0.0038 ± 0.0757 | pain |
| ... 4975 more ... | |

No, authors do not have interests to disclose

## 334 Novel Application of Artificial Intelligence in Ultrasound of Solid Organ Adjacent Morison's Pouch by Object Segmentation

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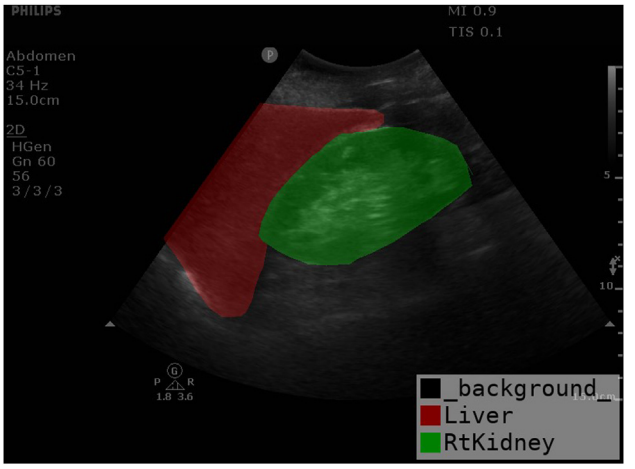
Objectives: FAST (Focused abdominal sonography for trauma) is crucial in emergency medicine. However, the interpretation of ultrasound images can be subjective and dependent on the experience of the operator. Otherwise, the learning and understanding of ultrasound can be a challenge for novice emergency residents. Artificial intelligence (AI) has the potential to improve diagnostic accuracy and decrease variability of ultrasound images among different emergency physicians. The purpose of this study is to develop an artificial intelligence assistant for detecting solid organ adjacent Morison's pouch.

Methods: We retrospectively utilized ultrasound images of emergency patients in this study during 2020/01/01～2022/12/31. The images are labeled by two independent experienced emergency physicians. The inter-observer variability or conflicting judgments will be discussed by the two emergency attending physicians to guarantee the quality of image labels. The organs adjacent to Morison's pouch including liver and right kidney are the targets in this study. We use U-Net as the backbone of our research which is a classical neural network architecture for object segmentation. We also set up a notebook next to the emergency ultrasound to synchronize the acquisition of ultrasound images and use AI for analysis and computation. The metric in this study is dice coefficient which can be focused on the positive finding area in the ultrasound image.

Results: We initially labeled 1000 ultrasound images for our AI training database. The preliminary results of this study show that the dice coefficient can exceed 0.8, barely enough for a novice emergency physician to practice and learn. In addition, the AI can be used as a tool to determine whether or not the ultrasound image is adequate enough to determine the actual organ.

Conclusions: The study develop a novel AI assistant for emergency physicians to practice FAST especially in Morison's pouch. The results may have implications for the future use of AI in emergency medicine and the potential for improved diagnostic accuracy and efficiency in ultrasound.




Yes, authors have interests to disclose
Disclosure: National Science and Technology Council
Scientific Study/Trial
National Science and Technology Council

## 335 Comparison of the Frequency of Transvaginal Ultrasound Utilization Between Radiology and Point-of-Care Ultrasound in First Trimester Pregnancy

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Objectives: Transabdominal (TAUS) and transvaginal (TVUS) ultrasound can both be utilized in the evaluation of emergency department (ED) patients with early pregnancy complaints. While TVUS can provide improved imaging quality, it may not be necessary in cases where an intrauterine pregnancy (IUP) can be seen on TAUS. Specialty societies provide mixed guidance on when TVUS is needed and there may be a difference in utilization of TVUS between radiology-performed (RP) studies and point of care ultrasound (POCUS) studies by the emergency physician. We sought to investigate the difference in utilization rates of TVUS in early pregnancy ED patients between RP and POCUS studies. In addition, we evaluated the length of stay in each cohort, as well as the impact of emergency ultrasound fellowship (EUSF) training on usage of TVUS.

Methods: This was a retrospective study at a single academic ED from March 1, 2021 to February 28, 2022. Study population was all patients who underwent first trimester ultrasound during their ED visit. A standardized data form was used to record chief complaint, gestational age, length of stay (LOS), TAUS and TVUS utilization, ultrasound findings, EUSF status of the attending physician, body mass index (BMI), and presence of abnormal adnexal findings. Two separate investigators abstracted data to ensure accuracy and any differences were resolved with consensus and discussion. The Mann Whitney test was used to assess statistical significance for nonparametric data and Chi squared test used for comparison of categorical variables.

Results: There were 133 cases of POCUS ultrasound and 254 cases of RP ultrasound. 50 patients who underwent POCUS later received RP ultrasound. All cases had TAUS imaging performed. Median BMI in the RP cohort was 28.5 (Interquartile Range (IQR) 24-35) and 29 (IQR 24-35) in the POCUS cohort, p=0.65. Median LOS for patients when POCUS was utilized was 207 minutes (IQR 151-294) and 258 minutes (IQR 208-328) for those only using RP ultrasound, p = < 0.001. In the POCUS cohort, 38% (95% CI 30%-46%) received TVUS, while 94% received TVUS in the RP cohort (95% CI 90%-96%), p = < 0.001. The reason for not pursuing TVUS in 13 of the 15 non-TVUS RP cases was patient refusal. EUSF trained faculty were the attendings of record in 36% of the POCUS cases and 5% of the RP cases. Overall, patients seen by EUSF faculty had TVUS 53% of the time (95% CI 41%-65%), while those seen by non-EUSF faculty

had TVUS 79% (95% CI 74%-83%) of the time, p=0.035. Regarding significant adnexal findings, amongst patients who had a TVUS where an IUP was identified (n=184), there were 2 large simple cysts where follow up was recommended and 1 dermoid cyst that had been previously identified on prior imaging.

Conclusions: POCUS in early pregnancy is associated with a significant reduction in TVUS usage. TVUS utilization was almost universal in the RP cohort, while more selective in the POCUS cohort. We suspect that POCUS users elect not to pursue TVUS after an IUP is identified on TAUS, while technicians perform protocol-based TVUS irrespective of TAUS findings. While further study is needed to evaluate confounding variables that might influence choice of study in our cohort, POCUS may offer the benefit of reduced LOS and reduced TVUS utilization. This could also highlight a benefit of EUSF training and the potential cost savings to early pregnancy patients of this ED physician cohort.

No, authors do not have interests to disclose

## 336 Trends in Point-of-Care Ultrasound Image Acquisition and Interpretation Within a Regional Hospital System

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Objectives: Point-of-care ultrasound (POCUS) is a valuable diagnostic modality that enables emergency providers to answer focused clinical questions. POCUS relies on the operator to acquire quality images and correctly interpret these images in real-time. The objective of this study is to evaluate quality assurance (QA) data within a single health system to identify patterns of misinterpretation or technical limitations based on application type.

Methods: We performed a retrospective chart review of POCUS images and procedure notes for one regional health system from 6/2020-4/2023. These images and provider interpretation are reviewed weekly by emergency ultrasound fellowship-trained physicians and scored as true negative (TN), true positive (TP), false negative (FN), false positive (FP), or technically limited study (TLS; ie, images do not meet minimal criteria or the quality is insufficient for interpretation) for QA purposes. The primary outcome was the rate of misinterpretation (FN, FP) and TLS. Secondary outcomes included a comparison of rates of misinterpretation and TLS from a tertiary care academic center to those from 8 community sites. Chi-square analysis was used for nominal data. Significance was $\alpha < 0.05$. Scans submitted from the academic site were primarily completed by EM residents. Scans submitted by ultrasound faculty and applications with less than 40 scans were excluded.

Results: We analyzed 2,868 POCUS records obtained from 2020-2023. Overall misinterpretation rate was 5.5% while the five highest rates by scan type were: cardiac 6.6%, focused assessment with sonography in trauma (FAST) 6.7%, transabdominal (TA) pelvis 1.8%, soft tissue 4.8%, and renal 9.8%. Overall TLS rate was 17% while rates by scan type were: cardiac 13%, FAST 32%, TA pelvis 20%, soft tissue 6.9%, and renal 22%. Differences in rates of misinterpretation between academic and community hospitals were not statistically significant between cardiac (6.2% vs. 8.3%, $\chi 2[1, N=1127]=1.2$, p=0.27), FAST (7.1% vs. 6.1%, $\chi 2[1, N=254]=0.08$, p=0.77), TA pelvis (1.9% vs. 1.1%, $\chi 2[1, N=562]=0.32$, p=0.57), soft tissue (5.3% vs. 3.2%, $\chi 2[1, N=270]=0.44$, p=0.51), or renal scans (8.8% vs. 14%, $\chi 2[1, N=153]=0.78$, p=0.38). Rates of TLS were significantly higher for community hospitals for FAST (22% vs. 45%, $\chi 2[1, N=254]=22.7$, p<0.04), TA pelvis (17% vs. 32%, $\chi 2[1, N=562]=14.1$, p<0.04) and soft tissue scans (4.6% vs. 13%, $\chi 2[1, N=270]=7.3$, p<0.04); however there was no significant difference for cardiac (12% vs. 15%, $\chi 2[1, N=1127]=2.1$, p=0.15) and renal scans (19% vs. 30%, $\chi 2[1, N=153]=2.1$, p=0.14).

Conclusions: Overall, renal and FAST scans were the most commonly misinterpreted and technically limited applications, respectively. Rates of misinterpretation did not vary significantly between academic and community sites; however, there was a significant difference in rates of TLS between sites, with community sites consistently higher. These data suggest image acquisition skills may decline more precipitously than image interpretation following residency, thus informing the need for hands-on practice to improve ultrasound quality across the system.

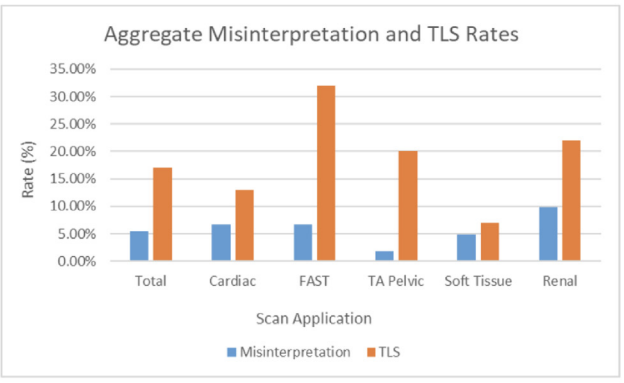



Figure 1: Aggregate Rates of Scan Misinterpretation and TLS Including All Sites

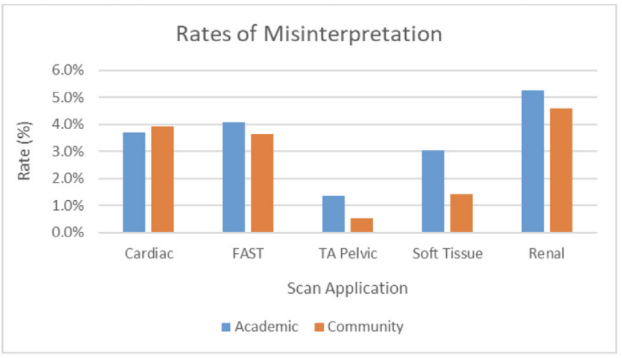
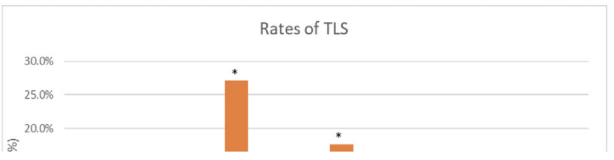



Figure 2: Rates of Scan Misinterpretation Between Academic and Community Sites




No, authors do not have interests to disclose

## 337 Can the Presence of Gestational Sac Alone on Emergency Physician-Performed Point-of-Care Ultrasound Safely Exclude Ectopic Pregnancy?

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Objectives: The objective of this study was to determine the proportion of patients presenting in early pregnancy who ultimately had an intrauterine pregnancy (IUP) confirmed after a point of care ultrasound (POCUS) in the emergency department (ED) showed only an intrauterine gestational sac (GS). While the obstetric and radiology literature traditionally use a threshold of GS to confirm IUP, ED studies use yolk sac (YS) or fetal pole (FP) as a cutoff due to a concern about pseudogestational sac leading to a missed ectopic diagnosis.

Methods: This was a retrospective chart review of pregnant patients evaluated in the ED who had POCUS performed by the emergency physician (EP). Cases where POCUS showed a GS only, which would typically not meet EP criteria for IUP, were reviewed. Results of comprehensive radiology ultrasound, obstetrics (OB) clinic and consult notes, and ED notes were reviewed to identify whether the final diagnosis was IUP, Ectopic, or Indeterminate. Cases were abstracted from an ultrasound image repository system used by five EDs across a single health system ranging from community to academic tertiary care practice environments.

Results: 1604 cases were included for analysis. 77% of patients had a yolk sac or fetal pole on EP POCUS (confirming IUP by EP standards), 7% had gestational sac only, 15% had an empty uterus, and 1% were found to have ectopic pregnancy. All patients without confirmed IUP had follow up by radiology ultrasound and/or OB consult. Of these 113 POCUS GS only patients, 99% [112] were ultimately diagnosed

with IUP by radiology or OB, 1% [1] were diagnosed as indeterminate, and no cases were found to be ectopic.

Conclusions: In this pilot study, we found that if EP-performed POCUS detected an intrauterine GS, an IUP was confirmed by radiology and/or OB in 99% of cases. There were no adverse outcomes in the POCUS GS group. This is relevant because currently EP-performed POCUS requires a yolk sac to be visualized to confirm IUP, which differs from radiology criteria which can confirm IUP by GS alone. This discrepancy in diagnostic criteria leads to a subset of ED patients having repeat transabdominal/transvaginal ultrasounds and OB consults added to their visit. In this data set, using GS as the threshold for IUP would have increased the yield of POCUS by 7% without missing ectopic pregnancy. However, the sample size is too small to make that recommendation without further study. Future studies with larger sample sizes would be beneficial to determine if using GS only on EP POCUS can safely rule out ectopic pregnancy in patients with first trimester complications. If larger studies show similar results, this could have significant impact on patient length of stay and reduce the need for additional confirmatory testing by radiology or OB without compromising patient safety.

No, authors do not have interests to disclose

## 338 Impact of Point-of-Care Ultrasound on Time to Operating Room for Patients With Ruptured Abdominal Aortic Aneurysms

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Objectives: A ruptured abdominal aortic aneurysm (AAA) is a rare diagnosis with high morbidity and mortality. Point-of-care ultrasound (POCUS) can rapidly diagnose an AAA at the bedside, but there is limited evidence on its impact on care. This study assessed the association between POCUS and time to computed tomography (CT) and time to operating room (OR) for patients with ruptured AAAs in the emergency department (ED).

Methods: This study was an IRB-approved multi-hospital retrospective chart review of adult patients who were diagnosed with a ruptured AAA in the ED. Data was reviewed from seven hospitals including one tertiary referral center which together had 1,265,575 patient visits during the study period of August 1, 2017 to March 1, 2022. Patients diagnosed with or operatively treated for the AAA at an outside facility were excluded. The independent variable, whether POCUS was performed, was recorded as yes/no. Chi-square analysis and T-tests examined differences in demographic/clinical characteristics by POCUS status. Linear regression assessed relationship between the major outcomes (times to CT acquisition and OR). Adjusted linear regression examined the same relationships accounting for hospital transfer.

Results: Over the four-year, seven-month study period, thirty-three patients (0.003% of visits) met inclusion criteria. These patients had a mean age of 76.6 (STD=10.9) and average BMI of 26.7 (STD=5.6). The population was mostly white (81.8%) and male (75.8%). Eleven of the 33 patients received POCUS, and only one of those presented to a hospital other than the tertiary referral center (9.1% vs 90.9%, p=0.0118). The average time to POCUS was 70.7 minutes (STD=71.6).

Patients in the POCUS group were more likely to have CT ordered as "Life or Death" priority compared to non-POCUS group (45.5% vs 9.1%, p=0.0411). There was a 9.9-minute decrease in time to CT acquisition in those who received POCUS compared to those who did not (98.7 vs 108.6, p=0.7814). Twenty-three of the thirty-three patients went to the OR. Of those, time to OR in the POCUS group was shorter by 70.2 minutes (188.9 vs 259.1, p=0.4432). After accounting for transfers from another facility, the POCUS group had an average decrease of 4.9 minutes (p=0.9038) for time to CT acquisition and 27.3 minutes (p=0.8064) for time to OR.

| | Total | POCUS | Non-POCUS | p-Value |
|---|---|---|---|---|
| Time to CT (min) | 105.3 | 98.7 | 108.6 | p=0.9038 |
| Time to OR (min) | 236.6 | 188.9 | 259.1 | p=0.8064 |

Conclusions: Patients were more likely to have POCUS if presenting to the tertiary care center, which might be related to presence of a residency training program and increased physician comfort incorporating POCUS into clinical care. Use of POCUS to identify ruptured AAAs likely also contributed to the increased use of "Life or Death" CT priority in the POCUS group. While not statistically significant, the decreased times to CT and OR in the POCUS group could still be clinically relevant. Despite a population pool of 1,265,575 from seven hospitals over four and a half years, the rarity of the condition limits the power of the study, and larger studies are needed to assess the influence of POCUS on diagnosis and treatment of ruptured AAAs.

No, authors do not have interests to disclose

## 339 Are Measurements of the Abdominal Aorta Affected by the Type of Ultrasound Gel Used?

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Objectives: Ultrasonography relies on acoustic couplant, ultrasound gel, to facilitate images from the probe to the structure in contact. Financial limitations in low-resource settings preclude the use of commercial ultrasound gels, and alternative gels have been proposed from locally sourced materials. The quality of images produced by non-commercial gels has been studied previously, however the accuracy of measurements has not been evaluated. Our objective was to determine whether measurements taken from cassava root-based gel (cassava) and water-soluble lubricating jelly (lube) are inferior to those taken from sterile ultrasound gel (US gel).

Methods: This was a single-blinded randomized controlled study approved by the Institutional Review Board performed at an academic tertiary care emergency department. Our sample size calculation was based on $\alpha$ 0.5, power 80% and prior literature citing the abdominal aorta ultrasound measurement error of 0.1 cm (95% CI –0.93 cm to 0.73 cm) as compared to CT abdomen/pelvis measurement. The patient's distal aorta just proximal to the aortic bifurcation was imaged in random order using US gel, lube, and cassava. A separate blinded ultrasound fellow measured the aortic diameter using the outer wall to outer wall technique. The measured vertical and horizontal aortic diameters were recorded. The aortic diameter measurements obtained were then compared to measurements obtained from CT images at the same anatomic location. The error in measurement for each gel type was calculated by taking the absolute value of the CT measurement minus the ultrasound measurement. A paired t-test was used to compare error measurements between couplants.

Results: We enrolled a convenience sample of 29 patients in the emergency department who had abdominal or pelvic CT imaging. The ranges of CT aorta measurements were 1.04–2.4 cm (vertical) and 1.28–2.28 cm (horizontal). Mean vertical ultrasound measurement errors were as follows: US gel 0.28 cm (95% CI 0.18–0.38), lube 0.30 (95% CI 0.19–0.41), cassava 0.29 cm (0.18–0.40). There were no significant differences in vertical measurement error for US gel versus lube (P=0.7) or US gel versus cassava (P=0.8). Mean horizontal measurement errors were as follows: US gel 0.33 cm (95% CI 0.21–0.45), lube 0.37 (95% CI 0.24–0.50), cassava 0.24 (95% CI 0.15–0.33). There were no significant differences in horizontal measurement error for US gel versus lube (p=0.4) or US gel versus cassava (P=0.08).

Conclusions: In aorta measurement, ultrasound measurement errors are similar for US gel, sterile lubricating jelly and cassava root-based gel.

No, authors do not have interests to disclose

## 340 Feel the Burn, While You Learn: The Impact of Exercise on Podcast Knowledge Acquisition and Retention

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Objectives: Podcasts are a common tool used by residents as part of their learning process, with many listening to them concomitant with other activities (e.g., driving, exercise). Data on the effect of exercise while learning have been controversial, with some suggesting potential benefit while others suggest harm. This study compared knowledge acquisition and retention among resident physicians listening to a podcast while exercising versus undistracted listening.

Methods: This was a multicenter, randomized, crossover trial among postgraduate year 1-4 emergency medicine residents across five institutions. Each resident listened to one podcast while seated and a second podcast while engaging in 30 minutes of continuous aerobic exercising. The residents were randomized to the order of which was first with stratification by site and postgraduate training year. Each podcast was 30 minutes in length and could only be listened to once. Within 30 minutes of

completing the podcast, they completed a 20-question multiple-choice test. They subsequently crossed over to the other intervention and listened to a different 30-minute podcast followed by a second 20-question test. Each podcast was professionally recorded and focused on emergency medicine-relevant journal articles which had not been covered in journal club or curriculum at any of the institutions. Residents also completed a new 40-question delayed recall test on both podcasts at 30 days. All questions were derived and validity evidence gathered specifically for this study. Data were analyzed using a paired-sample t test and ANOVA.

Results: Ninety-five residents completed the initial recall and 92 (97%) completed the delayed recall tests. There were no statistically significant differences between the exercise and undistracted cohorts on the initial recall (74.4% versus 76.3%) or delayed recall (52.3% versus 52.5%).

Conclusions: Exercising while listening to podcasts does not appear to meaningfully affect knowledge acquisition or retention at 30 days when compared with listening while seated and undistracted.

No, authors do not have interests to disclose

## 341 Breaking Bad News: How Doctors Communicate Life-Threatening Diagnoses on Television

Croft A, Elzinga K, Ramon K, Bivins K, Devireddy D, Steffan R, Fellows A, Frick K, Johnson A, Jones J/Michigan State University College of Human Medicine, Grand Rapids, Michigan, US

Objectives: Death notification and the delivery of bad news in the emergency department (ED) is a difficult task that is important to address in medical education.

Medical television (TV) programs can act as educational tools and have demonstrated the ability to shape patient-physician communication. Examples from popular medical dramas may serve as a means of educating students and residents by providing readily available vignettes. This study evaluated the portrayal of death-telling or delivering bad news on television and their potential value in medical education.

Methods: In this retrospective cross-sectional study, consecutive TV episodes of 10 popular television programs (eg, *House, Boston Med, ER*) were viewed by trained researchers to identify all incidents in the programs that depicted death-telling or delivering bad news in the hospital. Each TV program's most recent, complete season was analyzed (181 episodes). Our classification scheme was based on 16 criteria recommended by a panel of ED clinicians and educators. After coding, each incident was classified as exemplary to dreadful based on the number of criteria met. One investigator performed a blinded critical review of a random sample of 10% of the TV episodes to determine data reliability using kappa statistics. Descriptive statistics (95% confidence intervals) and frequency tables were used to describe outcomes.

Results: A total of 133 incidents that depicted death-telling or delivering bad news were identified (mean, 0.7 incidents/TV episode). Overall, 24.5% of the incidents were classified as excellent to good, 46.6% as satisfactory, and 28.9% as poor to dreadful. Twenty-one of the incidents (15.8%) involved children as patients.

Incidents depicting death-telling or delivering bad news were complicated by ethically questionable departures from standard practice (23.3%) or complicated professionalism issues (18.0%). The reliability of the data collection ($k = 0.81$) showed strong agreement.

Conclusions: Television medical dramas contain many examples of death notification and the delivery of bad news, which, in an educational setting, could help to engage students and residents in discussions of the best (and worst) techniques to communicate with fearful patients and families. Unfortunately, the public will inadvertently pick up on details that will shape their understanding of the medical profession – good or bad.

No, authors do not have interests to disclose

## 342 Incorporating Point-of-Care Ultrasonography to Enhance Anatomy Learning for the First Year Medical Student

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Objectives: Ultrasonography is widely used to visualize anatomy, diagnose pathology, and monitor physiological function. As such, there is a movement to introduce ultrasound imaging into undergraduate medical education, mostly in the third and fourth years. However, a more natural introduction would be during the anatomy course, while other imaging modes are incorporated. The objective was to ascertain the feasibility and usefulness of incorporating ultrasonography into first year undergraduate medical education to improve anatomy learning and begin familiarity with the imaging modality.

Methods: Five guided ultrasound modules were created and incorporated into the first-year medical student anatomy lab. Topics were selected that demonstrate the usefulness of point of care ultrasonography: forearm nerve visualization for nerve blocks, deep vein thrombosis scans of the lower extremities, abdominal scans for hemoperitoneum identification in trauma, pelvic scans for hemoperitoneum in trauma, and ocular scans for retinal detachment. Students were anonymously surveyed before and after each ultrasound module to obtain data on student attitudes toward the ultrasound materials being incorporated into the anatomy course and their effectiveness in promoting student knowledge. Paired t-test were used to analyze pre and post intervention surveys.

Results: Confidence significantly increased in answering anatomy-based questions on ultrasound images ($p < 0.001$), in applying anatomical relationships ($p < 0.001$), and in ultrasound structure identification questions on lab practical exams ($p < 0.001$).

Conclusions: The overwhelming majority of students recommended including more point of care ultrasonography content into the anatomy course. Anecdotally the students were vocal about their appreciation of the ultrasound additions to the lab guides. Introducing ultrasonography early in medical education offers a unique opportunity to incorporate point of care imaging to help master clinical anatomy knowledge, improve identification of pathology, and begin understanding basic ultrasound concepts.

No, authors do not have interests to disclose

## 343 Assessing the Educational Value of YouTube and TikTok Videos on Home Suture Removal

Jones J, Dean L, Hak L, Sellers L, Thompson J, Vu A, Fleeger T, Kolacki C, Seamon J, Chassee T, Jones J/Michigan State University College of Human Medicine, Grand Rapids, Michigan, US

Objectives: Many adult patients are willing and capable of removing their own nonabsorbable sutures at home if discharged from the emergency department (ED) with a suture removal kit and simple instructions. YouTube and TikTok are global online video-sharing and social media platforms which offer videos that instruct people on how to remove their sutures at home. This content is not screened and does not go through an editorial process. The purpose of this study was to evaluate the quality and educational value of these shared videos on suture removal at home.

Methods: This was a retrospective content analysis of videos available through YouTube and TikTok using specific search terms relating to suture or stitch removal. Videos without sound, duplicate content, news reports, or non-English were excluded. A standardized data abstraction form was used to collect qualitative and quantitative variables, including the number of views, sponsors, and suture removal techniques demonstrated. The quality of the instructions provided in the videos was rated using a set of 10 criteria developed by a panel of board-certified emergency physicians and classified as excellent to poor. Descriptive statistics and frequency tables were used to analyze the data, and the interrater reliability was calculated using the Kappa score.

Results: During the study period, a total of 55 YouTube and 6 TikTok videos on how to remove sutures at home were identified. The videos were collectively viewed 20,841,940 times with an average of 341,671 views per video. These videos were marked as a "favorite" 150,681 times. The process of suture removal was demonstrated using a live individual in 62.3% of the videos, models in 26.3%, and photographs in 11.4%. Unfortunately, none of these videos were classified as good to excellent; 21.3% were satisfactory, and 78.7% were rated poor. Most of the videos failed to provide essential information, such as wound complications (95.1%); when to seek medical attention (91.8%); when not to remove sutures at home (90.2%); when to remove sutures (75.4%); and how to clean the wound (29.5%).

Moreover, 23 videos (37.7%) contained incorrect information, primarily about follow-up wound care and suture removal technique. The reliability of the data collection ($k = 0.81$) showed strong agreement.

Conclusions: Although there are many popular videos on social media platforms providing instructions for removing sutures, all of them were found to be lacking in important medical information, rendering them insufficient to meet patients' needs. This highlights the need for healthcare professionals to create high-quality, evidence-based self-care content for suture removal on social media platforms. By doing so, they

can provide patients with accurate and reliable information that will help them properly care for their wounds and prevent complications.

No, authors do not have interests to disclose

## 344 Successful Implementation of Structured Flipped Classroom Through Case-Based Learning and Board Review Questions

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Objectives: To evaluate the effect of small group structured flipped classroom content and discussion on perceived learning, attitudes, and preferences of resident learners in two formats: case-based learning and board-review style questions.

Methods: A needs assessment was performed in a single emergency medicine (EM) residency program that historically utilized an unstructured form of flipped classroom delivered by an attending in small group format. The assessments included an anonymous open-field survey and structured resident interviews, targeted anonymous open-field surveys, targeted structured resident interviews, and direct observation of flipped classroom sessions. The educational strategies of Case-based learning and Board Review-style question learning flipped classroom sessions were compared using anonymous survey questionnaires performed at two phases (after 3 months of initiation and at end of academic year) evaluating perceived learning, attitudes, and preference based on a Likert-scale of 1-5. For the survey questions regarding perceived learning and preference, a Likert-scale score of 1 corresponded to "disagree," and a score of 5 corresponded to "agree." For the question regarding preference between the two formats; a score of 1 corresponded to "preferred case-based learning," and a score of 5 corresponded to "preferred board review/question-based learning." For the question assessing enthusiasm, a score of 1 corresponded to "low enthusiasm, whereas a score of 5 corresponded to "high enthusiasm." Means were compared by a two-tailed t-test, and the interactions over time were assessed by repeated measures ANOVA.

Results: The needs assessment identified a resident need for perceived learning during flipped classroom, small group attending consistency and delivery of the material. 42/44 (95%) of residents responded to both surveys. The results are shown in the table.

Conclusions: Adding structure to flipped classroom increased residents' perception of gaining knowledge. This effect was sustained over time for case-based learning, but not for board review question flipped classroom sessions. Residents initially had a strong preference for board review style questions compared to case-based learning, but this diminished over time. Enthusiasm for structured flipped classroom was moderate and improved over time. These results suggest further studies on structured flipped classroom should be performed to assess whether these results are generalizable to other EM residency programs.

| | Initial Phase | End of Year |
|---|---|---|
| Cased-based versus unstructured for perceived knowledge | 4.0 v 3.5 (p=0.001) | 4.4 v 3.0 (p=0.01)<br>ANOVA p=0.04 |
| Question-based versus unstructured for perceived knowledge | 4.4 v 3.5 (p=0.001) | 4.0 v 3.0 (p=0.001)<br>ANOVA p=0.08 |
| Case-based versus Question-based for preference over unstructured flipped classroom | 4.5 v 4.3 (p=0.2) | 4.3 v 3.9 (p=0.01) |
| Case-based preference over Question-based | 1.6 | 2.8<br>ANOVA p=0.001 |
| Enthusiasm for structured flipped classroom | 3.6 | 4.1<br>ANOVA p=0.01 |

No, authors do not have interests to disclose

## 345 Comparing Scenario-Based Simulation Education to Escape Room Simulation Education With Emergency Medicine Residents

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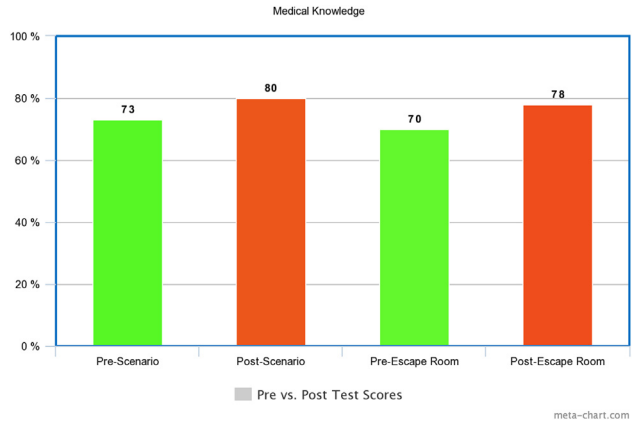
Objectives: A new learning modality being incorporated into medical education across the country is the concept of gamification education, specifically creating "escape room" simulation scenarios. Escape rooms are a popular team building activity, and in the last several years, medical communities have utilized them by modifying the clinical scenario into clues and activities to teach core concepts while attempting to remove the anxiety that may come from performing in a simulation environment. However there have not been studies comparing the efficacy of escape room education against scenario-based simulation education in regard to teaching the same medical knowledge while decreasing anxiety levels. The purpose of this study was to compare scenario-based simulation education to gamified escape room simulation education, the hypothesis being that an escape room simulation will teach the same core medical knowledge as a scenario-based simulation while decreasing participant anxiety.

Methods: A pediatric emergency medicine case was selected by a peer reviewed source of standardized simulation cases, available for all emergency medicine residency programs, and modified into both a scenario-based simulation and an escape room simulation. The study included emergency medicine residents who were randomly assigned either the scenario-based simulation case or the escape room case. The primary endpoint of the study was evaluating medical knowledge of core content, which was assessed using a pre- and post- simulation session quiz with 5 board style questions on the material. The secondary outcomes measured the residents self-reported anxiety levels using a 1-100 sliding scale pre- and post the simulation session they were assigned to.

Results: A total of 40 emergency medicine residents participated in the study, 21 were assigned the scenario-based simulation and 19 were assigned the escape room. Both learner groups showed improvement on their post quiz knowledge scores, with the scenario-based simulation improving from 73.3 % to 80% answers correct (p= 0.0155) and escape room improving from 70.5% to 78.9% correct (p=0.0036). There was no statistical difference between the two groups' improvements (P=0.6648) when compared using a two-tailed t test. Anxiety levels for the scenario-based simulation slightly increased on average using the sliding scale from 50.71 to 52.38, while average anxiety levels of the escape room group decreased significantly from a reported 52.05 to 31.10 with a decrease of 20.95. There was a statistically significant difference between these groups (p=0.0022).

Conclusions: When comparing scenario-based simulation to the escape room simulation, both groups of residents improved on their post-simulation medical knowledge quiz without a statistical difference between their improvements. However, participants of the escape room simulation experienced a significant decrease in anxiety performing the escape room when compared to the scenario-based simulation group. This is a good indicator that escape room education can be a viable learning resource that can enhance medical knowledge and improve anxiety around education in residency programs.




No, authors do not have interests to disclose

## 346 Stroke Risk After Emergency Department Treatment of Elevated Blood Pressure in Transient Ischemic Attack

Biel A, Todd B/Oakland University William Beaumont School of Medicine, Rochester, Michigan, US

Objectives: Hypertension (HTN) is a well-known risk factor for developing stroke after transient ischemic attack (TIA); however, it is unknown whether acute treatment

of elevated blood pressure (BP) in TIA patients in the emergency department (ED) alters stroke risk. We aimed to evaluate the effect of lowering BP on stroke risk in this population. Additionally, we aimed to investigate alteration in intensive care unit (ICU) admit rates, hospital length of stay (LOS), and discharge disposition.

Methods: A retrospective cohort study was conducted evaluating TIA patients in the ED with elevated BP. This study was conducted at the 8 hospital Beaumont System in Metro Detroit and included adult patients diagnosed with TIA in the ED with a diastolic BP $\geq$ 140 mm Hg and/or systolic $\geq$ 90 mm Hg. Demographic data collected included age, sex, race, degree of HTN, and past medical history of HTN. Further data included whether or not anti-HTN therapy was administered in the ED, stroke occurrence in the subsequent hospital stay, hospital LOS, ICU admission rates, and discharge disposition.

Patient characteristics were summarized using descriptive statistics and tests of bi-variant analysis were performed using a t-test. We assessed the effects of anti-HTN treatment using multivariable logistic regression controlling for patient characteristics.

Results: A total of 3,095 patients were included in the final analysis, with a median age of 73 years old; 55.8% were female. Of these, 649 (21.0%) received anti-HTN treatment while in the ED. 429 (13.9%) patients suffered a stroke after admission. We observed no significant decrease in stroke in the treatment group compared to the no-treatment group after adjusting for age, sex, race (15.1% vs 13.5%) (aOR, 0.95 [95% CI, 0.72-1.26]). We observed a minimal increase in hospital LOS in the treatment group compared to non-treatment group (2.12 days vs 1.92 days), (aOR, 0.44 [95% CI, 0.27-0.61]), (p <.0001), but no significant differences were seen in ICU admissions (2.77% vs 2.17%), (aOR, 1.24 [95% CI, 0.72 - 2.14]) or discharge disposition.

Conclusions: In this observational study of TIA patients with elevated BP in the ED, there was no difference seen in subsequent stroke between patients who were treated with anti-HTN therapy compared to those who were not. Future studies should evaluate these results using a randomized controlled study design.

Table 1. Effect of administration of anti-hypertensive medication on stroke risk in ED patients presenting with TIA

| | | Anti-HTN Administered in ED | | | | |
|---|---|---|---|---|---|---|
| **Outcomes** | **All** | **Yes** | **No** | **Unadjusted OR [yes vs no]** | **p value** | **Adjusted OR [yes vs no]** | **p value** |
| Total Stroke | 429 (13.9%) | 98 (15.1%) | 331 (13.5%) | 1.14 (0.89 - 1.45) | 0.300 | 0.95 (0.72 - 1.26) | 0.723 |
| Ischemic Stroke | 419 (13.5%) | 95 (14.6%) | 324 (13.2%) | 1.12 (0.87 - 1.43) | 0.372 | 0.92 (0.69 - 1.23) | 0.582 |
| Stage 1 HTN | 122 (11.36%) | 8 (10.13%) | 114 (11.46%) | 0.87 (0.41 - 1.86) | 0.720 | 0.79 (0.36 -1.71) | 0.548 |
| Stage 2 HTN | 298 (14.75%) | 87 (15.26%) | 211 (14.54%) | 1.06 (0.81 - 1.39) | 0.681 | 1.04 (0.79 - 1.37) | 0.760 |
| Hemmorhagic Stroke | 9 (2.1%) | 3 (0.5%) | 6 (0.2%) | 1.62 (0.42 - 6.27) | 0.486 | | |
| No Stroke | 2666 (86.1%) | 551 (84.9%) | 2115 (86.5%) | | | | |

Abbreviations: HTN = Hypertension; ED = Emergency Department
Stage-1 HTN, systolic blood pressure (SBP) 140-159 mmHg or diastolic blood pressure (DBP) 90-99 mmHg; Stage-2 HTN, SBP ≥ 160 mmHg or DBP ≥ 100 mmHg
Adjusted odds ratio were estimated by multivariable logistic regression, adjusting for age, sex, and race

No, authors do not have interests to disclose

## 347 Effect of an AI Tool on Stroke Metrics in Endovascular Thrombectomy Patients

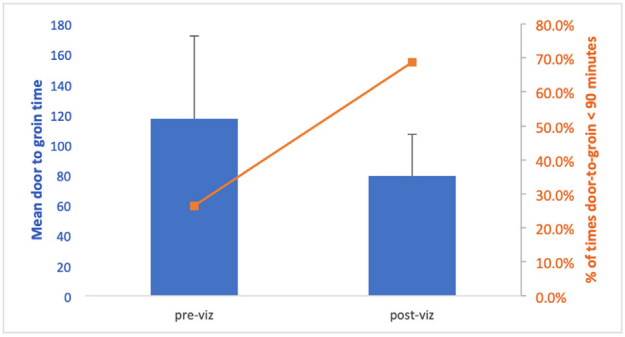
Akhter M, Igoe O, Anzardo CM, Ibrahim C/Penn State Hershey, Hershey, Pennsylvania, US

Objectives: Endovascular thrombectomy (EVT) is a highly effective treatment for acute ischemic stroke caused by large vessel occlusion (LVO). Door-to-groin (DTG) time, which is the number of minutes from hospital arrival to initiation of EVT, is a critical factor that affects patient outcomes. Artificial intelligence (AI) technology has shown promise in improving the efficiency of stroke care delivery. We aimed investigate the effect of an AI-powered decision support system at our institution on DTG times and thrombolysis in cerebral infarction (TICI) grading system scores.

Methods: We conducted a retrospective analysis of electronic medical records for all patients who presented to a tertiary care community hospital between July 22, 2018, and July 24, 2022, and underwent EVT. The hospital is a comprehensive stroke center, and the AI-system Viz.ai was implemented in July of 2020. Viz.ai is a medical device that uses deep learning algorithms to analyze computed tomography images of the brain to detect LVOs in parallel to standard care image interpretation. If a suspected LVO is detected, Viz LVO sends a notification to a specialist communicating that a suspected LVO has been identified. From within the mobile platform, a specialist can securely communicate with other members of the stroke team via HIPAA-compliant text messaging, phone calls, and telecommunication functionality. To assess effect, we compared mean DTG times, fraction of patients who underwent thrombectomy in under 90 minutes, and fraction of patients with good TICI scores (defined as TICI 2b or higher), in EVT patients before vs. after Viz implementation. Student t-test and chi-square tests were used for analyses. Proportions were reported with confidence intervals using Mid-P exact.

Results: A total of 221 patients were included in the analysis, of which 83 received care before the implementation of the AI system (pre-Viz), and 138 received care after the implementation (post-Viz). The median DTG time was significantly lower for patients who received care after the implementation of the AI system (79 minutes vs. 117 minutes, $p < 0.0001$). The fraction of patients who underwent thrombectomy in under 90 minutes significantly improved – from 26.5% (95% CI 17.9-36.8%) pre-Viz to 68.8% post-Viz (95% CI 60.8-76.2%, $p < 0.0001$). (Fig. 1). Similar percentages of patients underwent successful reperfusion (TICI score 2b or higher) in pre-Viz and post-Viz (93.5% and 90.3% respectively).

Conclusions: Our study suggests that the implementation of an AI-powered decision support system can yield significant reductions in DTG times. While other implementations could confound our findings, there were no major specific interventions that otherwise occurred within this period that would have necessarily affected DTG times. In our study, TICI scores were similar in both groups. Further research is needed on the effect of AI on not only time and imaging metrics but also neurological outcomes.




No, authors do not have interests to disclose

## 348 Effect of Prior Antithrombotic Medication Use on Patients Receiving Emergent Comprehensive Stroke Treatment

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Objectives: The use of anticoagulant and antiplatelet medication is frequently cited as a contraindication for acute ischemic stroke treatments such as tissue plasminogen activator (tPA) administration or thrombectomy. This study examines the difference in post-intervention intracranial hemorrhage (ICH) and modified Rankin score (mRS) between patients receiving comprehensive stroke treatment who were taking these medications versus patients who were not on antithrombotic pharmacotherapy.

Methods: This study was a retrospective chart review. Inclusion criteria were patients evaluated in the emergency department for stroke and received either tPA or procedural intervention, between March 2018 and May 2020. Data collected include pre-stroke antiplatelet use, anticoagulant use, initial NIH stroke score (NIHSS), post-intervention mRS, and incidence of ICH at 3 months. ICH and mRS outcomes were compared between patients based on their antithrombotic use for each of the neurointervention groups. NIHSS and mRS were compared using Mann-Whitney U test, and ICH using Chi-square.

Results: 251 patients met inclusion criteria. Patients taking antiplatelets who received both tPA and thrombectomy had significantly higher mRS compared to patients not taking these agents. Patients taking antiplatelets who had tPA only tended to have higher mRS, but failed to reach significance. Patients taking only anticoagulants had no difference in mRS for any intervention. Patients taking both anticoagulants and antiplatelets had a higher mRS than those not taking either medication. There were no differences in rate of ICH after any intervention for any medication usage. There was also no difference in any outcomes between patients on single versus dual antiplatelets.

Conclusions: Our results suggest that patients on antiplatelet and anticoagulant medication may be able to safely receive procedural neurointervention and tPA for acute ischemic stroke. Further research should focus on validating these findings in a larger, broader patient population.

Table: Outcomes by pre-stroke antiplatelet (AP) and anticoagulant (AC) use and intervention.

| | AP only | AC only | Both | Neither |
|---|---|---|---|---|
| **All stroke alert patients with any intervention** | N=84 | N=25 | N=9 | N=133 |
| NIHSS, median (IQR) | 3 (6-13) | 18 (4-26) | 15 (11-22) | 6 (3-14) |
| ICH, n (%) | 10 (12%) | 5 (20%) | 3 (33%) | 24 (18%) |
| mRS, median (IQR) | 4 (2-4) | 4 (3-4) | 5 (4-5)* | 3 (1-4)* |
| **tPA only patients (excluding thrombectomy)** | N=62 | N=5 | N=2 | N=71 |
| NIHSS, median (IQR) | 6 (2-10) | 13.5 (1-26) | 8 (1-15) | 5 (3-7) |
| ICH, n (%) | 7 (11%) | 0 (0%) | 0 (0%) | 5 (7%) |
| mRS, median (IQR) | 4 (2-4) | 1 (1-3) | 3 (1-4) | 2 (1-4) |
| **Thrombectomy only patients (excluding tPA)** | N=16 | N=20 | N=6 | N=35 |
| NIHSS, median (IQR) | 13 (3-14) | 18 (6-25.5) | 22 (15-26) | 10 (6-14.5) |
| ICH, n (%) | 3 (19%) | 5 (25%) | 2 (33%) | 12 (34%) |
| mRS, median (IQR) | 3 (3-4) | 4 (3-5) | 5 (4-5) | 3 (1-5) |
| **Patients with both tPA and thrombectomy** | N=6 | N=0 | N=1 | N=27 |
| NIHSS, median (IQR) | 27 (25-29) | | 11 (11-11) | 16 (5-26) |
| ICH, n (%) | 0 (0%) | | 1 (100%) | 7 (26%) |
| mRS, median (IQR) | 5 (4-5)* | | 5 (5-5) | 3 (2-4)* |

* indicated values within row significant difference at p<0.05.

No, authors do not have interests to disclose

## 349 Effect of an AI Tool on Length of Stay and Mortality in Endovascular Thrombectomy Patients

Akhter M, Ibrahim C, Igoe O, Anzardo CM/Penn State Hershey, Hershey, Pennsylvania, US

Objectives: Recent advances in artificial intelligence (AI) have shown potential in improving stroke care. Viz.ai uses an AI algorithm to potentially diagnose and inform of large vessel occlusion (LVO) quickly. We aim to investigate the effect of an AI-powered decision support system, Viz AI, on length of stay (LOS) for patients admitted for acute ischemic stroke at our interventional stroke center. We aimed to investigate the impact of an AI-powered decision support system at our institution on LOS and in-hospital mortality and/or discharge to hospice.

Methods: We conducted a retrospective analysis of electronic medical records for all patients who presented to a tertiary care community hospital between July 22, 2018, and July 24, 2022, and underwent EVT. The hospital is a comprehensive stroke center, and the AI-system Viz.ai was implemented in July of 2020. Viz.ai is a medical device that uses deep learning algorithms to analyze computed tomography images of the brain to detect LVOs in parallel to standard care image interpretation. If a suspected LVO is detected, Viz LVO sends a notification to a specialist communicating that a suspected LVO has been identified. From within the mobile platform, a specialist can securely communicate with other members of the stroke team via HIPAA-compliant text messaging, phone calls, and telecommunication functionality. To assess effect, we compared the LOS of patients who received care before and after the implementation of Viz AI. We also compared the percentage of patients who either died or were discharged to hospice before and after the implementation of this system. Student t-test and chi-square tests were used for analyses. Proportions were reported with confidence intervals using Mid-P exact.

Results: A total of 222 patients were included in the analysis, of which 84 received care before the implementation of the AI system, and 138 received care after the implementation. The median LOS was lower for patients who received care after the implementation of the AI system (10.4 days vs. 12 days) but did not reach statistical significance (p 0.38). Prior to AI implementation, 29.4% of patients (95% CI 20.5-39.7%) died or went to hospice, whereas after AI, 25.9% (95% CI 19.1- 33.7%, p-value 0.571) died or went to hospice.

Conclusions: Our study suggests that the implementation of an AI-powered decision support system can potentially reduce LOS and improve outcomes, but our results did not reach statistical significance. Our study was not powered to show a difference in mortality. Furthermore, it is unknown what the 30-day outcomes were for these patients. It is possible that AI has more of an effect at hospitals that are not already comprehensive stroke centers. Further studies are needed to identify best practices for integrating AI technology in order to optimize stroke care delivery.

No, authors do not have interests to disclose

## 350 Accuracy of Published Screening Tools for Large Vessel Occlusion in Patients With Suspected Acute Ischemic Stroke: A Prospective Cohort Study

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Objectives: According to the World Stroke Organisation, there are over 12.2 million new acute ischemic strokes (AIS) each year. Timely recognition is crucial to provide function and life-saving interventions. Endovascular thrombectomy is a promising therapy for AIS caused by large vessel occlusion (LVO), with benefits, both in terms of mortality and residual disabilities, reported up to 24 hours after symptoms onset. However, this therapy is resource-intensive and available only in few specialized centers. Hence, accurate identification of potentially eligible patients is a cornerstone to improve patient care and resource utilization. All patients with suspected AIS must have an immediate clinical evaluation and appropriate brain imaging to establish a diagnosis. When a LVO is confirmed, patients eligible for endovascular thrombectomy should be transferred to a thrombectomy-capable center, and better clinical outcomes correlates with faster door-to-reperfusion time. To this day, numerous screening tools have been developed to facilitate identification of patients with LVO even before brain imaging, but a recent systematic review concluded that no tool was superior in terms of sensitivity and specificity. Quality of evidence was low and risk of bias high. In this prospective cohort study, we aim to identify the most accurate screening tool to predict LVO in patients with potential AIS, amongst eight published tools.

Methods: Between November 2021 and February 2023,395 patients with a suspected AIS and for which an emergency physician had activated the "code stroke" (potential patient eligible for thrombolysis and/or thrombectomy) at Hôpital de l'Enfant-Jésus - CHU de Quebec, a tertiary care center for neurologic diseases, were included. Of them, data are currently available for 182 patients (45.9% were men with a mean age of 74.6 y/o (median 76, range 35-96 y/o) and 55 (30.2%) had a confirmed LVO). Amongst the group with LVO, 52.7% had an altered level of consciousness, 63.6% had facial paralysis, 29.1% had conjugate eye deviation, 5.5% had visual field cut, 63.6% had speech impairments, 78.2% had arm weakness, 70.9% had an altered grip strength, 63.6% had leg weakness and 40.0% had unilateral neglect. In comparison, amongst the group without LVO, 48.0 % had an altered level of consciousness, 51.2% had facial paralysis, 7.1% had conjugate eye deviation, 3.9% had visual field cut, 73.2% had speech impairments, 48.8% had arm weakness, 38.6% had an altered grip strength, 29.1% had leg weakness and 12.6% had unilateral neglect. Demographic data was collected by the emergency physician prior to the head computed tomography using a standardized data collection form. The accuracy, sensitivity, specificity, negative predictive value and positive predictive value of each screening tools to predict LVO (primary outcome) or thrombectomy (secondary outcome) will be assessed.

Results: Results are currently being analyzed. As this study is observational, no patient consent was required, and approval by the ethics committee was obtained.

Conclusions: This study will provide valuable information relative to the accuracy of different LVO screening tools for our patients. It will inform the development of evidence- based pathways of care and ultimately improve patient care and resource utilization. This study was funded by the Département de médecine familiale et de médecine d'urgence (DMFMU) de l'Université Laval and by l'Association des spécialistes en médecine d'urgence du Québec (ASMUQ).

No, authors do not have interests to disclose

## 351 Inaccurate Use of HINTS Exam by Emergency Physicians in Patients With Dizziness

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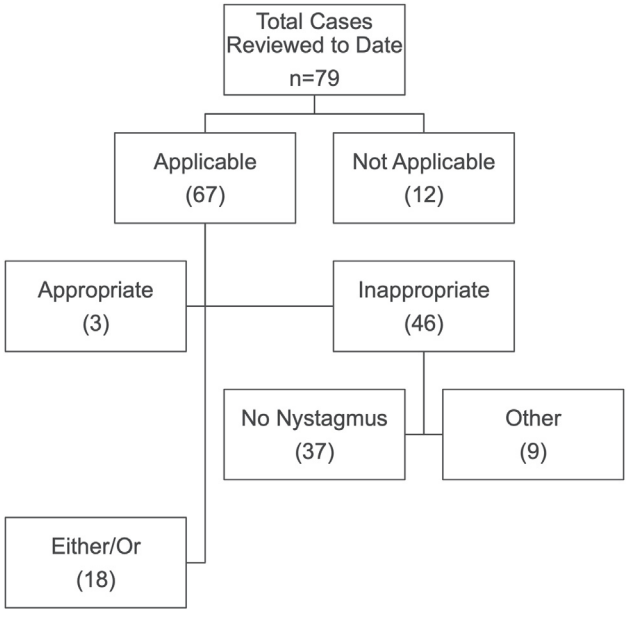
Objectives: The HINTS exam is a useful clinical tool for the emergency physician (EP) to differentiate between a central or peripheral cause of dizziness in patients with continuous dizziness and nystagmus. When performed correctly, a negative HINTS examination can rule out a stroke more accurately than can a negative MRI, and GRACE guidelines strongly recommend that emergency physicians utilize this test. However, previous data show that emergency physicians have poor diagnostic accuracy when performing HINTS. It is still unknown how often EPs perform the HINTS exam on the appropriate patients. We aimed to assess, based on documentation, how accurately EPs select patients for (and therefore correctly perform) the HINTS exam.

Methods: A retrospective study was conducted using patient charts from the emergency department of a public hospital with an emergency residency program from January 1 to June 30, 2017. Charts were pulled from the EMR if they contained the words: "hints," "skew," or "impulse." Charts were then manually reviewed, with irrelevant charts (ie, charts that had one of the keywords but not for the HINTS exam for vertigo) excluded. Remaining charts were analyzed for documentation and interpretation of the HINTS exam and categorized as appropriate vs inappropriate vs. unable-to-assess. Descriptive statistics were performed using proportions. Confidence intervals were calculated using mid P exact method.

Results: A total of 79 patient encounters were reviewed in this study, of which 12 cases were inapplicable. Of the remaining 67 cases, 46 (68.7%; 95% CI 56.9-78.9%) of HINTS exams were performed on inappropriate patients. The majority of these (80.4%, 95% CI 67.1-90.0%) was due to the exam's being performed on patients without nystagmus (Figure 1).

Conclusions: Based on our findings, EPs utilize the HINTS exam inappropriately the majority of the time. Despite these being preliminary data and thus limited in samples, our confidence interval shows that there is significant misunderstanding around the HINTS exam. This is particularly important given the Society of Academic Emergency Medicine's GRACE guideline that strongly recommends the use of HINTS exam by emergency physicians. While previous literature has shown that the HINTS exam is inaccurately diagnostic in the hands of emergency physicians, our findings suggest that much of this may be due to poor screening of which patients are appropriate candidates for the HINTS exam. Further research is needed, including at community hospitals nationally, to determine how much education is needed to train EPs on the correct use of the HINTS exam.




No, authors do not have interests to disclose

## 352 Evaluating ACEP Clinical Policy Awareness and Trustworthiness Among Emergency Medicine Residents and Attendings Using the National Guideline Clearinghouse Extent of Adherence to Trustworthy Standards (NEATS) Instrument

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Objectives: Clinical practice guidelines (CPG) are an essential resource for disseminating evidence-based practice to the bedside. Within emergency medicine, clinical policies have been developed by the American College of Emergency Physicians (ACEP) since 1993. Awareness and trustworthiness of these policies among emergency medicine clinicians is unknown. The NEATS instrument is a validated tool to evaluate trustworthiness based on the Institute of Medicine standards. The objectives are two-fold: first, to assess the familiarity of ACEP clinical policies and guideline evaluation tools among resident and attending physicians at three different sites across the US and Canada; second, to evaluate ACEP clinical policy trustworthiness using the NEATS tool in this cohort.

Methods: Resident and attending physicians from two sites in the United States and one in Canada were invited to complete a seven-question survey to assess familiarity with ACEP clinical policies, CPG appraisal tools, and to inquire how often clinical policies are used in daily patient care. They were also randomly assigned two ACEP clinical policies to evaluate using the NEATS instrument. The NEATS tool contains 12 sections with 15 separate items from which we calculated a raw score ranging from 12 to 75 and a standardized score to 100 with higher values reflecting increased adherence to NEATS. Data were assessed qualitatively, and we calculated intraclass correlation coefficients (ICCs) to assess reliability between different participants rating the same clinical policy. Participants received an honorarium after completion of the survey and both clinical policy assessments.

Results: Thirty-seven participants completed the background survey, of which 14 were attending physicians and 23 were resident physicians at various stages in training. Most participants were only slightly familiar with the ACEP clinical policies prior to participating in the NEATS study and none identified as being "Extremely" familiar. Eighty-six percent of participants had not heard of NEATS prior to participating. Sixty percent of participants identified as either rarely or very rarely using ACEP clinical policies in daily patient care, with a higher proportion routinely using other CPGs. Twenty-three participants further completed NEATS assessments on two clinical policies (9 attendings, 15 residents). The average standardized NEATS score for all the clinical policies ranged from 52.4 to 89.7. The average [HJ2] mean score for attendings and residents was 71 and 76 [HJ3] , respectively ($p=0.13$). The ACEP clinical policies with the highest trustworthiness measured by NEATS are the policies on opioids, NSTEMI, and community-acquired pneumonia while the lowest ranked policies were headache, appendicitis, and sedation. The ICC for policies with 4 raters ($n=3$) were all less than 0.6 with a 95% CI lower bound less than 0.3, indicating low reliability of NEATS in this cohort.

Conclusions: We evaluated ACEP clinical policy awareness and usage among a cohort of resident and attending physicians in the US and Canada. We observed generally low awareness and usage of ACEP clinical policies in practice. Trustworthiness measured by NEATS was highest for the CPG on opioids and lowest for sedation. The reliability between raters was generally poor, though this study was limited by a small number of raters.

No, authors do not have interests to disclose

## 353 Medication Adherence Among Patients Who Initiated Naltrexone for Treatment of Alcohol Use Disorder in the Emergency Department

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Objectives: The primary objective of this study is to evaluate the rate of adherence to naltrexone among patients who initiated naltrexone for their alcohol use disorder (AUD) in the emergency department (ED). The secondary objectives are to identify the reasons why some patients discontinue the medication.

Methods: This is a 90-day prospective observational survey study of patients who initiated treatment for alcohol use disorder with naltrexone via an established clinical pathway in our safety-net county ED. Patients who were diagnosed with AUD by the clinical staff and who were either administered intramuscular (IM) naltrexone or prescribed an oral (PO) formulation of the medication upon discharge were eligible to

participate in the study. Measures included demographic information, years of struggle with AUD, and formulation of medication (IM vs. PO). The primary outcome was adherence at 90 days and secondary outcome was reason for discontinuation in those who were not adherent.

Results: One hundred forty-nine patients were eligible for the study and 100 patients were enrolled. Of those, 82 engaged in the surveys. The mean age was 41 years. Eighty three percent of the participants identified as Hispanic/Latino and 79% were male. Sixty-six percent completed the study in English and 33% completed the study in Spanish. Thirty-two percent had less than 12 years of education. Sixty-one percent were employed and 26% had struggled with alcohol use for more than 20 years. Fifty-seven percent of subjects received a prescription for oral naltrexone and 43% received IM naltrexone. Fifty-four (54) patients (67%) were retained in the study at 30 days, and 47 patients were retained in the study at 90 days (58%). At 90 days, 36% of subjects were still using naltrexone. Those that discontinued the medication were asked to select the various reasons for discontinuation. Twenty six percent cited concerns about the side-effects of the medication, 19% believed the medication was no longer necessary, 19% stopped taking it because they thought it made them feel worse, 15% said their primary doctor did not refill the medication, and 44% cited "other" reasons—the majority of which referred to the logistics of getting the medication refilled.

Conclusions: We found that of patients started on naltrexone in the ED, approximately one third were adherent to the medication at 90 days. Our study suggests that adherence to naltrexone among ED patients was comparable to adherence among other inpatient and outpatient settings where naltrexone has historically been initiated. These results support the position that medication-assisted treatment for AUD may be effectively initiated from the ED.

No, authors do not have interests to disclose

## 354 Administration of Potassium Binders in the Emergency Department Reduces Return Visits

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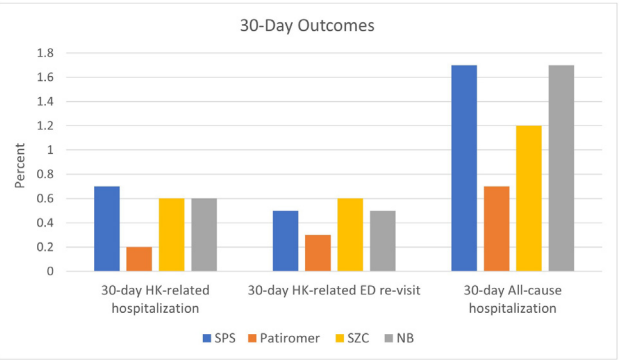
Objectives: Hyperkalemia (HK) is a potentially life-threatening disorder and contributes to >800,000 annual US emergency department (ED) visits. This study aimed to compare outcomes in patients diagnosed with HK and treated with sodium polystyrene sulfonate (SPS), patiromer, sodium zirconium cyclosilicate (SZC) or no binder (NB) in the ED.

Methods: This is a retrospective observational study using the chargemaster data from the PINC AI™ Healthcare Database (PHD). Patients enrolled were age ≥18 years and diagnosed with HK or received a potassium binder in the ED between January 1, 2019, through December 31, 2021. Patients were excluded if they received multiple binders, were pregnant, or had missing data during the 180-day look-back or 30-day follow-up periods. Data were stratified by receipt of SPS, patiromer, SZC and NB. Descriptive statistics were used to assess patient characteristics and outcomes.

Results: Overall 883,001 patients were enrolled, of which 90,583 were discharged home from the ED. Of the discharged, 52.5% were male, median (interquartile range [IQR]) age was 66 (54-76) years, and 63.8% were White, 22.9% Black and 13.2% Hispanic. Common comorbidities were renal disease (48.5%), diabetes (38.0%), congestive heart failure (25.7%), and chronic pulmonary disease (24.8%). The median (IQR) Charlson Comorbidity Index was 3 (1-5). Other specific comorbidities were acute kidney injury (18.8%), chronic kidney disease (43.8%) and end-stage renal disease (19.2%). Of the 90,583 discharged patients, 21.5%, 2.1%, 7.1% and 69.3% received SPS, patiromer, SZC and NB, respectively. HK-related 30-day ED re-visits occurred at similar rates, 0.5% overall, and 0.5%, 0.3%, 0.6% and 0.5% in SPS, patiromer, SZC and NB cohorts, respectively, p>0.05 between all groups. HK-related 30-day hospitalization occurred in 0.6% overall and 0.7%, 0.2%, 0.6% and 0.6% in SPS, patiromer, SZC and NB cohorts, respectively; all between group differences were significant, except SZC vs SPS, p=0.31, and SZC vs NB p=0.84. For HK-related hospitalization, patients in the NB group had a 3-fold greater relative risk (RR) vs patiromer (RR=3.0), while NB vs SPS (RR=0.86) and vs SZC (RR=1.0) were similar. All-cause 30-day hospitalization occurred in 1.7% overall and 1.7%, 0.7%, 1.2% and 1.7% in SPS, patiromer, SZC and NB cohorts, respectively. There were differences between the newer binders (patiromer or SZC) vs SPS (p=0.001 and p=0.002, respectively) but not between patiromer vs SZC (p=0.11).

Conclusions: HK-related hospitalization was lower when patients were treated in the ED with patiromer, showing the greatest RR reduction. For all-cause hospitalization, patiromer and SZC were non-inferior to each other.




Yes, authors have interests to disclose

Disclosure: Zubaid Rafique reports consulting for AstraZeneca and CSL Vifor.

Consultant/Advisor

Zubaid Rafique reports consulting for AstraZeneca and CSL Vifor.

Disclosure: Jennifer Kammerer and Jeffrey Budden are employees of CSL Vifor.

Employee

Jennifer Kammerer and Jeffrey Budden are employees of CSL Vifor.

Disclosure: Ning Rosenthal, Julie Gayle, and Harold Brown are employees of Premier Inc

Employee

Ning Rosenthal, Julie Gayle, and Harold Brown are employees of Premier Inc

Disclosure: James Neuenschwander reports consulting for AstraZeneca, Janssen Pharmaceutical, ThermoFisher, Ortho Diagnostics, Siemens, Fisher & Paykal Healthcare, and Bridgesource, participating in speakers' bureau for AstraZeneca, Janssen Pharmaceutical, ThermoFisher, and Fisher & Paykal Healthcare, and ownership of AseptiScope.

Other

James Neuenschwander reports consulting for AstraZeneca, Janssen Pharmaceutical, ThermoFisher, Ortho Diagnostics, Siemens, Fisher & Paykal Healthcare, and Bridgesource, participating in speakers' bureau for AstraZeneca, Janssen Pharmaceutical, ThermoFisher, and Fisher & Paykal Healthcare, and ownership of AseptiScope.

Disclosure: W. Frank Peacock reports consulting for AstraZeneca, CSL Vifor, Quidel, Roche, Abbott, and RCE, and stock in RCE, AseptiScope, and Prevencio.

Other

W. Frank Peacock reports consulting for AstraZeneca, CSL Vifor, Quidel, Roche, Abbott, and RCE, and stock in RCE, AseptiScope, and Prevencio.

## 355 Unique Implementation of an Emergency Department Human Immunodeficiency Virus Routinized Screening Program

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Background: More than 1.1 million people live with the human immunodeficiency virus (HIV) in the United States, according to the Centers for Disease Control and Prevention (CDC); and 18% of those living with HIV are unaware of their infection. Men who have sex with men (MSM) and intravenous drug users (IVDUs), regardless of race or ethnicity, continue to bear a disproportionate share of the burden of the epidemic. Current literature indicates the HIV epidemic recently plateaued, however in some geographical pockets, it may still be on the rise. Engaging a unique venue for bloodborne virus universal screening, such as an emergency department, was inspired by the End HIV Epidemic (EHE - 2030) campaign of the CDC. We are unaware of any emergency department-based study that has been published on an EMR-integrated identification, screening, and linkage to care process for HIV, utilizing the current CDC universal guidelines.

Objectives: We assessed the feasibility of an opt-out routine screening program with linkage to care (LTC) among patients who attended two high-volume emergency departments.

Methods: Study design was a retrospective chart review of patients screened via this initiative. All ED encounters were screened post hoc via an EMR- EPIC logic build; the epic algorithm was triggered based on no prior positive HIV result in the EMR or no positive history of the disease. A best practice advisory (BPA) alert was offered to providers to order testing for patients who met the criteria for HIV universal screening.

ED patients who tested positive for HIV were informed by their providers of their HIV status. Patients were contacted within 72 hours by a patient navigator who arranged the outpatient visit and a social worker who provided brief counseling.

Results: 14,549 patients were tested for HIV, and 79 were confirmed HIV-positive (1%). Linkage to Care (LTC) occurred in 22 patients. 47 were already in HIV care, and 10 were either "in progress," with multiple calls to achieve LTC or wrong contact information.

Conclusions: Data examined over the 11 months yielded 79 positive cases. This ED-based opt-out, EMR-integrated, routine screening program demonstrated the ability of routinized screening in the ED via a unique model, to diagnose and address HIV infection, leveraging ED providers. Barriers to linkage to care included incorrect contact information, HIV diagnosis not disclosed to the patient by provider oversight, death, and incarceration. The immediate next steps for this EMR-routinized program initiative will include implementing Comprehensive Preventive Services for high-risk negative patients, including pre-exposure prophylaxis (PrEP), post-exposure prophylaxis (PEP), and patient education in partnership with community-based organizations in our catchment area, as well as introducing status-neutral care.

No, authors do not have interests to disclose

## 356 Five-Level Triage vs Four-Level Triage in a Quaternary Emergency Department: National Analysis on Waiting Time, Validity, and Crowding

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Objectives: This analysis was carried out analyzing the total emergency department (ED) accesses during two periods: a 4-level triage (4LT) system period and a 5-level triage (5LT) system period. We sought to determine the effects of introducing a 5LT on wait times. The secondary aim was to evaluate the impact of introducing a 5LT on validity, measured as undertriage (UT), and overtriage (OT). We also sought to determine if the 5LT system codes were better correlated (in comparison to 4LT system codes) to patients' actual acuity; we verified this outcome by measuring the correlation between the triage code and severity code at discharge. Other outcomes included the impact of triage on crowding indices such as the length of ED stay, total access block time, and rate of access block. Finally, we analyzed the functioning of the 5LT during the COVID-19 pandemic.

Methods: This observational study was based on a retrospective review of the epidemiologic and clinical records of patients who visited the Foundation IRCCS Policlinic San Matteo from 1 January 2014 to 31 December 2020.

Results: We evaluated 423,257 ED presentations. A progressive increase in patients requiring higher triage codes was also reported ($p < 0.001$). The need for hospitalization progressively increased (32.6% vs. 55.5%; $p < 0.001$), transfers to spoke hospitals decreased (2.8% vs. 2.1%, $p < 0.001$), and the number of patients discharged decreased (64.2% vs. 42.1%, $p < 0.001$). Simultaneously, more patients presented by ambulance (27.6% vs. 37.2%, $p < 0.001$), and required specialized nursing staff (30.5% vs. 39.1%, $p < 0.001$) and medical assistance (2.5% vs. 2.7%, $p < 0.001$) for the transportation. There was a minimal reduction in wait times for life-threatening triage codes (5 min for Code 1 patients during the 4LT system period vs. 4.3 min during the 5LT system period, $p < 0.001$). In contrast, wait times rose for very urgent codes (23.5 min for Code 2 patients during the 4LT system period vs. 32.5 min during the 5LT system period, $p < 0.001$). Comparing the twelve months prior to the introduction of the 5LT with the twelve months that followed 5LT implementation (10,636 cases in T4 and 13,608 in T5), we noted a minimal, non-significant increase of ~3 min. Considering triage code 2 data acquired over various years, we saw a slight (non-significant) yet constant increase in wait times of ~3–4 min per year, corresponding with the increase in the number of triage code 2 patients and crowding at our hospital The wait times for Code 3 in the 5LT system period were similar to those of Code 2 in the 4LT system period (24.3 min for Code 3 during the 5LT system period vs. 23.5 min for Code 2 patients during the 4LT system period). The wait times for Codes 4 and 5 during the 5LT system period were comparable to those of Codes 3 and 4 during the 4LT system period. The length of stay (LOS), exit block, boarding, and processing times increased, reflecting a net raise in throughput and output factors, with a consequent lengthening of wait times. The risk of UT tended to decrease in the 5LT compared to the 4LT system period (Table 3; OR = 0.87, $p < 0.001$). The risk of OT tended to slightly increase during the 5LT period compared to the 4LT period (Table 3; OR = 1.16; $p < 0.001$). Conversely, a slight rise in OT was reported, although this did not affect the medium-high-intensity care area.

Conclusions: Introducing a 5LT improved ED performance and patient care.

**Table 1.** (**a**) Principal personal and ED presentation features of patients included in the study, by period of observation. The 4LT period (T4) spanned 01/01/2014 to 30/11/2015; the 5LT period (T5) spanned 01/12/2015 to 31/12/2020. *: $\chi^2$ test. (**b**) Pathology at admission for the patients included in the study, by period of observation.

**(a)**

| | 1-1-2014/30-11-2015 | 1-12-2015/31-12-2020 | |
|---|---|---|---|
| Sex | 4LT *n* (%) | 5LT *n* (%) | p [a] |
| Male | 59,432 (51.2) | 158,914 (51.7) | |
| Female | 56,628 (48.8) | 148,283 (48.3) | 0.002 |
| Age | | | |
| <18 | 11,333 (9.8) | 27,267 (8.9) | |
| 18–29 | 15,975 (13.8) | 39,128 (12.7) | |
| 30–39 | 13,711 (11.8) | 32,049 (10.4) | |
| 40–49 | 16,376 (14.1) | 40,943 (13.3) | |
| 50–59 | 14,132 (12.2) | 41,339 (13.5) | |
| 60–69 | 12,698 (10.9) | 34,955 (11.4) | |
| 70–79 | 14,902 (12.8) | 41,001 (13.4) | |
| 80+ | 16,933 (14.6) | 50,516 (16.4) | <0.001 |
| Triage priority code | | | |
| Code 5 | 13,443 (11.6) | 25,748 (8.4) | |
| Code 4 | 78,777 (67.9) | 191,981 (62.5) | |
| Code 3 | 0 (-) | 17,297 (5.6) | |
| Code 2 | 22,711 (19.6) | 67,688 (22.0) | |
| Code 1 | 1129 (0.9) | 4484 (1.5) | <0.001 |
| Priority code at discharge | | | |
| Code 5 | 29,240 (25.2) | 43,141 (14.0) | |
| Code 4 | 73,995 (63.8) | 224,039 (72.9) | |
| Code 3 | 0 (-) | 425 (0.1) | |
| Code 2 | 11,952 (10.3) | 36,341 (11.8) | |
| Code 1 | 873 (0.7) | 3252 (1.2) | <0.001 |
| Care intensity | | | |
| Low | 92,220 (79.5) | 235,026 (76.5) | |
| Medium-to-high | 23,840 (20.5) | 72,172 (23.5) | <0.001 |
| Outcome | | | |
| Discharge | 94,701 (81.6) | 246,413 (80.2) | |
| Hospitalization | 17,347 (14.9) | 51,043 (16.6) | |
| Transfer | 2166 (1.9) | 5746 (1.9) | |
| Left without being seen | 1385 (1.2) | 2933 (0.9) | |
| Other | 461 (0.4) | 1063 (0.4) | <0.001 |

**(b)**

| | Pathology at ED Access | *n* | % |
|---|---|---|---|
| 4TL | | | |
| | Trauma | 39,713 | 34.22 |
| | Major trauma | 271 | 0.23 |
| | Minor symptoms | 25,614 | 22.07 |
| | Dyspnea | 5399 | 4.65 |
| | Thoracic pain | 5870 | 5.06 |
| | Abdominal pain | 9455 | 8.15 |
| | Headache | 4353 | 3.75 |
| | Neurologic symptoms | 1630 | 1.40 |
| | Bleeding | 2024 | 1.74 |
| | Fever/Sepsis | 1 | 0.00 |
| | Other | 28,4811 | 18.73 |
| 5TL | | | |
| | Trauma | 12,233 | 5.03 |
| | Major trauma | 933 | 0.38 |
| | Minor symptoms | 35,712 | 14.70 |
| | Dyspnea | 14,117 | 5.81 |
| | Thoracic pain | 17,321 | 7.13 |
| | Abdominal pain | 26,159 | 10.76 |
| | Headache | 3494 | 1.44 |
| | Neurologic symptoms | 14,319 | 5.89 |
| | Bleeding | 5757 | 2.37 |
| | Fever/Sepsis | 8048 | 3.31 |
| | Other | 10,4924 | 43.18 |

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*3.2. Wait Time (Table 2)*

**Table 2.** (**a1**) Selected time variables accounting for crowding, by period. * The 4LT period (T4) spanned 01/01/2014 to 30/11/2015; the 5LT period (T5) spanned 01/12/2015 to 31/12/2020; *: Kruskal–Wallis test. (**a2**) Wait time, by period and code at presentation. * The 4LT period (T4) spanned 01/01/2014 to 30/11/2015; the 5LT period (T5) spanned 01/12/2015 to 31/12/2020. *: Kruskal–Wallis test. (**b**) Selected time variables accounting for crowding, by presence of boarding and exit block. *: Kruskal–Wallis test. (**c**) Wait time (Mean; minutes) for triage code 2 the 12 months before, and the 12 months immediately following, the introduction of the 5LT system. * Kruskal–Wallis test. (**d**) Wait time (Mean; minutes) for triage code 2 during the seven years of the study. The 4LT period (T4) spanned 01/01/2014 to 30/11/2015; the 5LT period (T5) spanned 01/12/2015 to 31/12/2020.

**(a1)**

| | Period * | Observations | Median (min) | *p* * | Interquartile Range (min) |
|---|---|---|---|---|---|
| Wait time | | | | | |
| | T4 | 116,060 | 43.3 | | 16.7–96.1 |
| | T5 | 307,198 | 45.5 | <0.001 | 17.7–104.5 |
| Process time | | | | | |
| | T4 | 116,060 | 105.7 | | 52.1–194.1 |
| | T5 | 307,198 | 118.4 | <0.001 | 57.5–232.2 |
| Length of stay (LOS) | | | | | |
| | T4 | 116,060 | 174.2 | | 99.0–290.8 |
| | T5 | 307,198 | 195.8 | <0.001 | 108.2–338.1 |

**(a2)**

| | Period * | Observations | Median (min) | Interquartile Range (min) | *p* * |
|---|---|---|---|---|---|
| Wait time | | | | | |
| Code 5 | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | T4 | 13,443 | 52.2 | 18.2–109.1 | |
| | T5 | 25,748 | 48.4 | 17.5–104.3 | <0.001 |
| Code 4 | | | | | |
| | T4 | 78,777 | 52.1 | 20.7–108.9 | |
| | T5 | 191,981 | 57.5 | 22.3–122.9 | <0.001 |
| Code 3 | | | | | |
| | T5 | 17,297 | 24.3 | 12.9–44.9 | - |
| Code 2 | | | | | |
| | T4 | 22,711 | 23.5 | 11.4–49.1 | |
| | T5 | 67,688 | 32.5 | 14.2–73.8 | <0.001 |
| Code1 | | | | | |
| | T4 | 1129 | 5.0 | 2.6–9.8 | |
| | T5 | 4484 | 4.3 | 2.2–8.5 | <0.001 |

(b)

| | | | Observations | Median (min) | Interquartile Range (min) | *p* [a] |
|---|---|---|---|---|---|---|
| Wait time | Low-intensity care | | | | | |
| | | No boarding | 28,731 | 52.7 | 21.5–114.7 | |
| | | Boarding | 7416 | 62.4 | 24.8–141.1 | <0.001 |
| | Medium-to-high care intensity | | | | | |
| | | No boarding | 35,225 | 18.7 | 8.0–44.3 | |
| | | Boarding | 4930 | 23.1 | 9.9–54.6 | <0.001 |
| | Low-intensity care | | | | | |
| | | No exit block | 29,005 | 48.6 | 20.3–105.4 | |
| | | Exit block | 7142 | 94.3 | 34.3–186.5 | <0.001 |
| | Medium-to-high care intensity | | | | | |
| | | No exit block | 35,907 | 18.4 | 8.0–43.1 | |
| | | Exit block | 4248 | 28.2 | 11.5–71.2 | <0.001 |

(c)

| | N | Wait Time (Median; min) | Interquartile Range | *p* * |
|---|---|---|---|---|
| 4LT | 10,636 | 25.3 | 12.3–52.9 | |
| 5LT | 13,608 | 28.1 | 13.2–58.2 | 0.001 |

(d)

| Year | | N | Mean | Median | Interquartile Range |
|---|---|---|---|---|---|
| 2014 | T4 | 12,075 | 36.2 | 22.0 | 10.7–46.4 |
| | T5 | - | - | - | - |
| 2015 | T4 | 10,636 | 40.0 | 25.3 | 12.3–52.9 |
| | T5 | 1011 | 43.8 | 28.9 | 14.5–60.9 |
| 2016 | T4 | - | - | - | - |
| | T5 | 12,597 | 43.7 | 28.0 | 13.1–58.0 |
| 2017 | T4 | - | - | - | |
| | T5 | 13,263 | 45.5 | 28.3 | 12.8–60.6 |
| 2018 | T4 | - | - | - | - |
| | T5 | 14,576 | 52.7 | 33.5 | 14.5–72.9 |
| 2019 | T4 | - | - | - | - |
| | T5 | 14,525 | 70.9 | 43.6 | 17.2–103.5 |
| 2020 | T4 | - | - | - | - |
| | T5 | 11,716 | 58.5 | 32.7 | 13.8–80.1 |

### 3.3. *UT and OT*

**Table 3.** Risk of UT and OT by period.

| | Period * | OR [a] | 95% Confidence Interval | *p* |
|---|---|---|---|---|
| Over-triage | | | | |
| Low-intensity care | 4LT | 1.00 (Ref.) | - | |
| | 5LT | - | - | - |
| Moderate-to-high-intensity care | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 1.05 | 1.01–1.11 | 0.03 |
| Total | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 1.16 | 1.14–1.19 | <0.001 |
| Under-triage | | | | |
| Low-intensity care | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 0.85 | 0.82–0.88 | <0.001 |
| Moderate-to-high-intensity care | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 1.35 | 1.12–1.65 | 0.002 |
| Total | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 0.87 | 0.84–0.91 | <0.001 |
| | **Period *** | **OR [a]** | **95% Confidence Interval** | ***p*** |
| Over-triage | | | | |
| Low-intensity care | 4LT | 1.00 (Ref.) | - | |
| | 5LT | - | - | - |
| Moderate-to-high-intensity care | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 1.03 | 1.00–1.07 | 0.07 |
| Total | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 1.08 | 1.04–1.12 | <0.001 |
| Under-triage | | | | |
| Low-intensity care | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 1.05 | 1.03–1.08 | <0.001 |
| Moderate-to-high-intensity care | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 1.18 | 1.03–1.34 | 0.014 |
| Total | 4LT | 1.00 (Ref.) | - | |
| | 5LT | 1.03 | 1.01–1.06 | 0.019 |

* The 4LT period (T4) spanned 01/01/2014 to 30/11/2015; the 5LT period (T5) spanned 01/12/2015 to 31/12/2020. [a]: Odds ratios (OR) estimated by multiple regression analysis adjusted by age, sex, and year of observation.

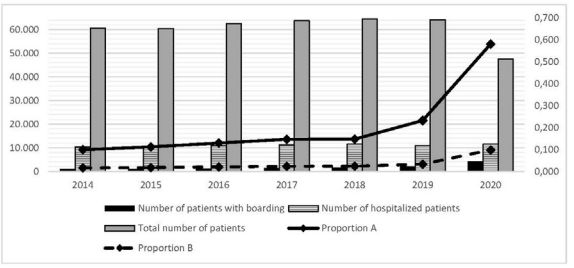
**Table 4.** (**a**) [#] Proportion of boarding and exit block (calculated only on hospitalized patients) from 2014 to 2020; (**b**) Table + Figure. Evolution of boarding from 2014 to 2020; (**c**) Table + Figure. Evolution of Over Triage (OT) from 2014 to 2020; (**d**) Table + Figure. Evolution of Under Triage (UT) from 2014 to 2020.

(a)

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | *p* for Trend |
|---|---|---|---|---|---|---|---|---|
| Boarding [#] | | | | | | | | |
| No | 9404 | 9030 | 9617 | 9792 | 10,041 | 8781 | 7291 | |
| | 91.0% | 89.9% | 88.6% | 87.2% | 87.2% | 81.2% | 63.3% | |
| Yes | 926 | 1010 | 1241 | 1431 | 1475 | 2033 | 4230 | |
| | 9.0% | 10.1% | 11.4% | 12.8% | 12.8% | 18.8% | 36.7% | <0.001 |
| Exit Block [#] | | | | | | | | |
| No | 9544 | 9089 | 9717 | 9934 | 10,148 | 8792 | 7688 | |
| | 92.4% | 90.5% | 89.5% | 88.5% | 88.1% | 81.3% | 66.7% | |
| Yes | 786 | 951 | 1141 | 1289 | 1368 | 2022 | 3833 | |
| | 7.6% | 9.5% | 10.5% | 11.5% | 11.9% | 18.7% | 33.3% | <0.001 |
| Accesses per day | 165.8 | 165.3 | 170.8 | 174.4 | 176.8 | 175.8 | 129.8 | |
| Number of accesses | 60,512 | 60,336 | 62,527 | 63,662 | 64,540 | 64,181 | 47,500 | |

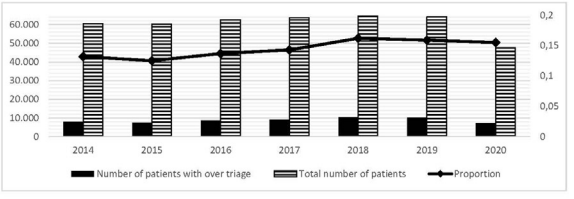
(b)

| Year | Number of Patients with Boarding | Number of Hospitalized Patients | Proportion A | Total Number of Patients | Proportion B |
|---|---|---|---|---|---|
| 2014 | 926 | 10,330 | 0.098 | 60,512 | 0.016 |
| 2015 | 1010 | 10,040 | 0.112 | 60,336 | 0.017 |
| 2016 | 1241 | 10,858 | 0.129 | 62,527 | 0.020 |
| 2017 | 1431 | 11,223 | 0.146 | 63,662 | 0.023 |
| 2018 | 1475 | 11,516 | 0.147 | 64,540 | 0.023 |
| 2019 | 2033 | 10,814 | 0.232 | 64,181 | 0.033 |
| 2020 | 4230 | 11,521 | 0.580 | 47,500 | 0.098 |



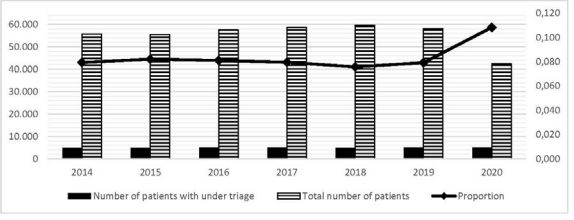

(c)

| Year | Number of Patients with OT | Total Number of Patients | Proportion |
|---|---|---|---|
| 2014 | 8006 | 60,512 | 0.132 |
| 2015 | 7553 | 60,336 | 0.125 |
| 2016 | 8550 | 62,527 | 0.137 |
| 2017 | 9097 | 63,662 | 0.143 |
| 2018 | 10,396 | 64,540 | 0.162 |
| 2019 | 10,198 | 64,181 | 0.159 |
| 2020 | 7339 | 47,500 | 0.155 |




(d)

| Year | Number of Patients with UT | Total Number of Patients | Proportion |
|---|---|---|---|
| 2014 | 4806 | 55,706 | 0.079 |
| 2015 | 4952 | 55,384 | 0.082 |
| 2016 | 5069 | 57,458 | 0.081 |
| 2017 | 5065 | 58,597 | 0.080 |
| 2018 | 4890 | 59,650 | 0.076 |
| 2019 | 5000 | 58,181 | 0.079 |
| 2020 | 5143 | 42,357 | 0.108 |




### 3.4. *Crowding*

**Table 5.** (**a**) Risk of UT and OT, by presence of boarding. (**b**) Risk of UT and OT, by presence of exit block.

(a)

| | Boarding | OR [a] | 95% Confidence Interval | *p* |
|---|---|---|---|---|
| Over-triage | | | | |
| Low-intensity care | No | 1.00 (Ref.) | - | |

| | | | | |
|---|---|---|---|---|
| | Yes | 0.60 | 0.07–5.20 | 0.641 |
| Moderate-to-high-intensity care | No | 1.00 (Ref.) | - | |
| | Yes | 0.98 | 0.91–1.05 | 0.576 |
| Total | No | 1.00 (Ref.) | - | |
| | Yes | 0.68 | 0.63–0.73 | <0.001 |
| Under-triage | | | | |
| Low-intensity care | No | 1.00 (Ref.) | - | |
| | Yes | 0.92 | 0.88–0.98 | 0.004 |
| Moderate-to-high-intensity care | No | 1.00 (Ref.) | - | |
| | Yes | 0.82 | 0.69–0.98 | 0.032 |
| Total | No | 1.00 (Ref.) | - | |
| | Yes | 0.91 | 0.87–0.96 | 0.001 |

(b)

| | Exit Block | OR [a] | 95% Confidence Interval | *p* |
|---|---|---|---|---|
| Over-triage | | | | |
| Low-intensity care | No | 1.00 (Ref.) | - | |
| | Yes | 0.65 | 0.07–5.60 | 0.691 |
| Moderate-to-high-intensity care | No | 1.00 (Ref.) | - | |
| | Yes | 1.12 | 1.04–1.20 | 0.004 |
| Total | No | 1.00 (Ref.) | - | |
| | Yes | 0.69 | 0.64–0.74 | <0.001 |
| Under-triage | | | | |
| Low-intensity care | No | 1.00 (Ref.) | - | |
| | Yes | 0.92 | 0.87–0.97 | 0.004 |
| Moderate-to-high-intensity care | No | 1.00 (Ref.) | - | |
| | Yes | 0.72 | 0.58–0.88 | 0.001 |
| Total | No | 1.00 (Ref.) | - | |
| | Yes | 0.91 | 0.86–0.96 | <0.001 |

[a]: Odds ratios (OR) estimated by multiple regression analysis adjusted by age, sex and calendar year of observation.

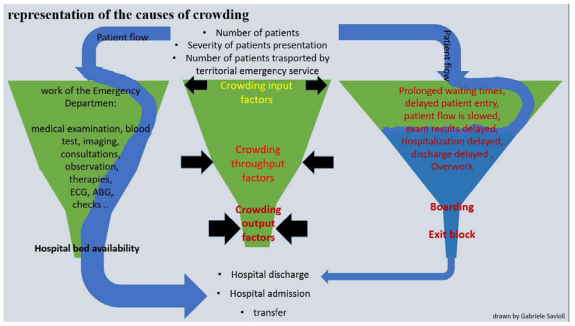



**Figure 4.** Graphic representation of the causes of crowding.

This figure represents crowding in EDs. The ED is represented by a funnel. The volume of patients who present to the ED is represented by the water which enters the funnel (blue arrow). The input factors (number of incoming patients, number of serious incoming codes, number of patients arriving by ambulance) are a large part of the funnel input. The throughput factors (blood tests, imaging, instrumental tests, consultations, checks, number of staff on medical and nursing shifts, tight shifts) comprise the body of the funnel. The output factors (exit block, boarding) are represented by the neck of the funnel.

In a normal situation (left column), the flow of patients (blue arrow) enters the ED (the funnel) and leaves after normal processing (medical examination performed, any blood, any imaging, any consultations). The times, imaginatively represented by the time required for water to flow through the funnel, are normal in this situation. The central column represents crowding or increases in input factors, as in the case of hyper-influx or simultaneous arrival of medically complex or critically ill patients (situation represented by an enlarged funnel base), or due to internal factors, such as presentation of medically complex patients who require prolonged stabilization or numerous medical procedures (as represented by an enlarged funnel body) or for the worsening of the outgoing factors, as is necessary in the case of exit block (situation represented in this case by a restricted funnel neck). The resulting situation (right column) sees a global and marked slowdown in patient flow (blue arrow) and prolongation of time points (waiting, process, LOS). Normally, the outgoing flow is wider. In cases of crowding, it is markedly slowed, as represented by a thinner blue arrow at the exit.

No, authors do not have interests to disclose

## 357 The Effects of Patterns of Polysubstance Use on Frequent Emergency Department Utilization and One-Year Mortality

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Objectives: Co-occurring substance misuse, or polysubstance use (PSU), has substantially contributed to the rise in substance-related overdose deaths. Screening, Brief Intervention, and Referral to Treatment (SBIRT) programs have been implemented in many emergency departments (ED) across the nation to help identify and link patients to care. While these programs have been instrumental in linking patients to treatment for opioid use disorder, few have utilized screening data from these programs to identify patterns of polysubstance use (PSU) among their participants, and none have investigated the effects of PSU on patient outcomes. The objectives of this study were to: 1) identify patterns of PSU among patients screened as part of SBIRT in two southern EDs and 2) determine the association between patterns of PSU on frequent ED utilization and one year mortality.

Methods: This IRB-approved retrospective cohort study utilized adults (age $\geq$ 18) participating in a SBIRT program in EDs within a level 1-academic trauma center and a community hospital in the southern United States between December 1, 2018 and November 30, 2022. Latent class analysis, a statistical method which finds unobserved subgroups or patterns within large populations was utilized to identify patterns of PSU among patient's self-reported use of 7 types of substances, including amphetamines, benzodiazepines, cocaine, marijuana, opioids, severe alcohol misuse, and "other." Severe alcohol misuse was defined as individuals with an Alcohol Use Disorders Identification Test score $\geq$ 8. Frequent ED utilization was defined as use of the ED $\geq$ 4 times following the SBIRT index visit and 1-year mortality was defined an individual who died within 12 months of the SBIRT index visit. Multivariable logistic regression demonstrated how each class of PSU was associated with frequent ED utilization and 1-year mortality.

Results: A total of 11,747 patients were screened and reported misuse of at least one substance. The majority reported marijuana use (64.4%), followed by amphetamines, (26.6%), severe alcohol misuse (20.5%), and opioid misuse (13.9%). Five patterns of PSU were identified, 1) primarily marijuana use (54.9%), 2) amphetamines paired with marijuana use (19.9%), 3) opioids paired with amphetamines use (13.3%), 4) primarily cocaine use (8.3%), and 5) severe PSU use (3.6%), which was made up of individuals with a high likelihood of reporting simultaneous use of amphetamines, marijuana, cocaine, and opioids. Compared to the marijuana-only pattern, all other patterns of PSU were 1.3-2.6 times more likely to be a frequent ED utilizer. All 5 patterns displayed a possible increased odds of one-year mortality as compared to marijuana-only but failed to reach statistical significance.

Conclusions: Several patterns of PSU are at increased odds of frequently returning to the ED, and identifying commonly occurring patterns of PSU could aid development of targeted interventions which could better connect these individuals to treatment. Further study is needed to align better recognition and linkage to services for all substances to address the growing problem of PSU in the US.

**Table 1. Association between classes of polysubstance use with frequent ED utilization and 1-year mortality**

| | Frequent ED Utilization | | 1-year mortality | |
|---|---|---|---|---|
| | OR (95%CI) | aOR (95%CI)[a] | OR (95%CI) | aOR (95%CI)[a] |
| C1: Primarily Marijuana | *Referent* | | *Referent* | |
| C2: Amphetamines and Marijuana | **2.56 (2.29-2.86)** | **2.58 (2.28-2.91)** | 1.42 (0.98-2.07) | 1.45 (0.97-2.19) |
| C3: Opioids and Amphetamines | **1.36 (1.18-1.56)** | **1.39 (1.20-1.62)** | 1.67 (1.11-2.51) | 1.97 (1.27-3.05) |
| C4: Severe PSU | **2.18 (1.75-2.72)** | **2.22 (1.76-2.81)** | 1.13 (0.49-2.61) | 1.29 (0.55-3.06) |
| C5: Primarily Cocaine | **2.55 (2.19-2.96)** | **2.03 (1.73-2.38)** | **2.21 (1.42-3.43)** | 1.54 (0.96-2.47) |

[a]Adjusted for age, sex, race, insurance status, ed, year, Urine drug screen performed, discharge disposition, received ED intervention, minutes in the ed

No, authors do not have interests to disclose

## 358 Time and Day of Cardiac Arrest Presentation to the Emergency Department Associations With Time to Critical Interventions and Outcomes: A Video Review Study

McLaughlin A, McCann-Pineo M, Kalotai K, Gilman S, Li T, Haddad G, Young E, Becker L, Rolston D, Jafari D/Northwell Health, Manhasset, New York, US

Objectives: There is ample evidence that the outcomes of cardiac arrest (CA) differ between day vs nighttime, and weekday vs weekend, with poorer outcomes associated with nighttime and weekends. The factors contributing to this are poorly understood. Critical interventions including shorter times to rhythm analysis (TTRA), first defibrillation (TTFD) of a shockable rhythm, and intubation (TTI) are established benchmarks associated with better CA outcomes. We investigated whether the TTRA, TTFD and TTI differed between daytime vs nighttime and weekday vs weekends. We hypothesize that TTRA, TTFD and TTI in emergency department (ED) CAs are shorter, with higher return of spontaneous circulation (ROSC) during daytime and weekdays.

Methods: This is a single-center retrospective analysis of video recorded CAs at a quaternary care academic ED between 01/2018-03 /2023. Our CA data registry

contains data on various aspects of CA care and patient outcomes. Two board certified Emergency Medicine and Critical Care physicians with extensive experience in video review collected data from all CA patients 18 years or older with available audio and video recordings. The number of ED technicians involved (shown to be associated with shorter times to interventions), age, initial ED rhythm, placement of mechanical chest compression device (MCCD) prior to arrival, and time stamps necessary for calculation of TTRA, TTFD, and TTI were recorded. Daytime was defined as 7 AM to 11 PM. Weekend was defined as Friday midnight to Monday 7 AM. These timeframes were chosen based on different staffing models over these periods. Wilcoxon rank sum and Chi-square tests were used where appropriate. Crude and adjusted regression models were created to assess the relationship between time of day and, separately, day of week, with time to critical interventions and ROSC.

Results: A total of 323 CA patients were analyzed, with a median age of 79 years, 140 (43.4%) being female, and 37 (14.3%) with shockable initial ED rhythm. 118 (42.9%) arrived with MCCD applied. With 40 patients missing data-points necessary for analysis, the remaining 283 were analyzed. 218 (77.0%) CAs arrived during the daytime, 65 (23.0%) during the nighttime. 195 (68.9%) arrived during weekdays and 88 (31.1%) during the weekend. Daytime vs nighttime median and interquartile (IQR) times were as follows: TTRA: 179 (90-279) vs 164 (80-263); TTFD: 24 (14-38) vs 23 (4-35); TTI: 479 (345-639) vs 390 (255-584). Weekday vs weekend medians and IQRs were TTRA: 178 (85-289) vs 175 (92-231); TTFD: 24 (22-36) vs 23 (19-38); TTI: 459 (312-630) vs 454 (338-639). ROSC achieved did not vary by weekend/weekday (p-value=0.6) or by daytime/nighttime (p-value = 0.9); of those achieving ROSC, 69.2% occurred on a weekday and 76.1% occurred during the daytime. After controlling for patient age, initial ED rhythm, ED techs involved, and MCCD prior to arrival, the time to critical interventions were not significantly different between daytime vs nighttime and weekday versus weekend (all p-values>0.05).

Conclusions: In this video review study of CA, TTRA, TTFD, and TTI were not associated with daytime or weekday, suggesting similar ED team performances. Given comparable ROSC rates between daytime vs nighttime and weekday vs weekend in our population are in contrast with previously published literature, other factors such as small sample size or our practice patterns could have contributed and warrants further research.

Yes, authors have interests to disclose

Disclosure: Zoll foundation grant to study cardiac arrest care

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Consultant/Advisor Philips

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Zoll foundation grant to study cardiac arrest hand off process

## 359 Manual Versus Mechanical Cardiopulmonary Resuscitation Complications After Successful Resuscitation for Out-of-Hospital Cardiac Arrest

Chen C, Keeley J, Sit J, Swor R/Oakland University William Beaumont School of Medicine, Rochester, Michigan, US

Objectives: Mechanical cardiopulmonary resuscitation (CPR) is increasingly being used for field out of hospital cardiac arrest (OHCA) care. However, existing literature does not identify a survival benefit of mechanical versus manual CPR. We hypothesized the CPR-related injury may impact patient outcomes. For that reason, our primary objective in this study is to compare rates of field mechanical and manual CPR-related injury in patients resuscitated from OHCA. Our secondary objective is to compare hospital outcomes including length of stay and survival between these two CPR methods.

Methods: We performed a retrospective study of adult OHCA patients admitted to three teaching hospitals in Southeastern Michigan from 2017-2021. Patients from the CARES registry were matched to hospital electronic medical records (EMRs), included if they had CT imaging of chest or abdomen/pelvis, and then dichotomized based on CPR method. Patients were excluded if unable to match with hospital EMR or CPR method was unknown. Hospital EMRs were queried for CT imaging results, hospital, and ICU length of stay (LOS), mechanical ventilation duration, and survival to hospital discharge. Injuries are identified using hospital ICD-10 codes. Univariate statistics using means and proportions are reported.

Results: There were 808 cardiac arrest records admitted after OHCA, with 235 patients (103 mechanical CPR, 132 manual CPR) meeting the inclusion criteria. Demographics between groups were similar in age, gender, or body mass index (BMI). Any CPR associated injury was more common in patients with manual CPR identified in (28.8% vs 15.5%, p=0.02). No abdominal visceral injuries and few (4) had a pneumothorax. Manual CPR was associated with an increased rate of rib(s), sternum, or thoracic spine fracture (27.3% vs 14.6%, p=0.02). We identified no difference in median hospital LOS and ICU LOS, and ventilator time between groups (see table) but are underpowered to detect meaningful differences. We also identified no differences in survival to hospital discharge (39 (29.5%) vs. 29 (28.2%), p=0.8).

Conclusions: We identified a higher rate of injury with manual CPR compared to mechanical CPR. We also did not identify any association between CPR method and ICU LOS, ventilator time, and hospital outcomes overall. Further work is needed to assess impact of CPR method and injuries typically associated with resuscitation.

| | Manual CPR (N=132) | Mechanical CPR (N=103) | Total (N=235) | P-value |
|---|---|---|---|---|
| **Hospital LOS (Hours), Median (IQR)** | 132.1 (49.4, 248.9) | 130.3 (62.0, 329.9) | 130.5 (53.2, 285.4) | 0.271 |
| **ICU LOS (Hours), Median (IQR)** | 99.2 (41.0, 175.5) | 99.9 (64.4, 235.7) | 99.7 (47.1, 215.3) | 0.547 |
| **Ventilator Time (Hours), Median (IQR)** | 89 (36.9, 142.3) | 85.6 (40.1, 202.4) | 86.9 (39.9, 160.8) | 0.447 |
| **Chest CT Imaging, n (%)** | 105 (79.5%) | 86 (83.5%) | 191 (81.3%) | 0.441 |
| **Fracture of rib(s), sternum and thoracic spine, n (%)** | 36 (27.3%) | 15 (14.6%) | 51 (21.7%) | 0.019 |
| **Any Injury, n (%)** | 38 (28.8%) | 16 (15.5%) | 54 (23.0%) | 0.017 |
| **Hospital Outcome, n (%)** | | | | |
| **Died in the hospital** | 67 (50.8%) | 50 (48.5%) | 117 (49.8%) | 0.799 |
| **Discharged Alive** | 39 (29.5%) | 29 (28.2%) | 68 (28.9%) | |
| **Patient made DNR** | 26 (19.7%) | 24 (23.3%) | 50 (21.3%) | |

No, authors do not have interests to disclose

## 360 Positioned for Success: A Novel Exploration of Changes to Chest Compressions During Cardiopulmonary Resuscitation and Associated Patient Outcomes

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Objectives: High-quality chest compressions are the cornerstone of effective cardiopulmonary resuscitation (CPR), and adequate compression of the left ventricle is essential to improving patient outcomes. Yet, there is a paucity of evidence on how changes to compression location and/or modality (manual or mechanical chest compression device (MCCD)) impact patients. As such, we explored the frequency of chest compressions changes during CPR, characterized these changes, and reported associated patient outcomes.

Methods: Our quaternary care emergency department (ED) receives an average volume of 112 cardiac arrests (CAs) annually. All adult CAs between 01/2018- 12/2022 with a video recording available were reviewed by two emergency medicine and critical care board certified physicians with extensive experience in CA video review, and the data were entered in our CA data registry. A schematic which divided the chest into distinct zones was used by reviewers to standardize documentation of compression location. Patients with changes to location and/or modality of compressions after initial MCCD application were included. We did not include initial MCCD application in our analysis, as the impact of initial MCCD placement on patient outcomes has been studied before. Any interruption to compressions associated with location and/or modality changes was evaluated for duration and concomitant interventions. Patient systolic blood pressure (SBP), survival to hospital admission, return of spontaneous circulation (ROSC) duration and proximity to compression changes were recorded. Data were described with simple descriptive statistics.

Results: Of 313 CAs reviewed, 18 cases had chest compression changes, two of which presented to the ED with a shockable rhythm. Ten (56%) were out-of-hospital CAs, seven (70%) of which arrived with a MCCD applied. There were 24 total changes: 14 (58%) changed location, two (8%) changed modality, and eight (33%) changed both. Twenty of these changes occurred during an interruption to compressions (median duration: 22s (seconds); interquartile range (IQR): 18s-25s) and

included concomitant pulse checks in 18 cases and defibrillation in one case. The most common change in location was from the lower half of the sternum (American Heart Association recommended zone) to the left of the sternum, occurring in 45% (n=10) of the location changes. All modality changes were from MCCD to manual compressions, indicating that once a MCCD was removed, it was not reapplied. Arterial line SBP was available before and after a change to location and/or modality in six cases, and in five of these cases the SBP increased following this change (median increase: 59 mmHg; IQR: 26-62 mmHg). ROSC occurred after 42% (n=10) of location and/or modality changes, a median of 235s after a change (IQR: 183s-324s). Nine of these 10 ROSC episodes had a median duration of 237s each (IQR: 211s-249s), and one lead to survival to hospital admission. Of all 18 patients, 11 experienced ROSC, two of whom survived to hospital admission.

Conclusions: During CPR, changes to chest compression location and/or modality are rare. Yet, this preliminary report suggests that such changes can result in SBP improvements and ROSC, and therefore, further research should evaluate the impact of compression changes on patient outcomes using additional hemodynamic markers.

Yes, authors have interests to disclose

Disclosure: Zoll foundation grant to study chest compression adjustments

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Disclosure: Zoll Foundation grant recipient to investigate hand off process of cardiac arrest

Grant Support

Zoll Foundation grant recipient to investigate hand off process of cardiac arrest Disclosure: Nihon Kohden, Zoll Foundation

Grant Support

Nihon Kohden, Zoll Foundation

## 361 Assessing Targeted Temperature Management for Cardiac Arrest Patients in the Interfacility Transfer Setting

Burla MJ, Wishengrad J, Stevens H, York D, Michalakes P, May TL/MaineHealth, Biddeford, Maine, US

Background: Out-of-hospital cardiac arrest (OHCA) is a major public health concern, affecting more than 420,000 Americans annually. In the state of Maine, a majority of the patients with OHCA are initially stabilized at rural and regional hospitals, then require an interfacility transfer (IFT) to a tertiary care center for definitive care. Little is known about the variation of care being delivered during IFT of OHCA patients in the state of Maine. Given the vulnerable state of this patient population, it is paramount that all aspects of care during transfer are addressed, including temperature management.

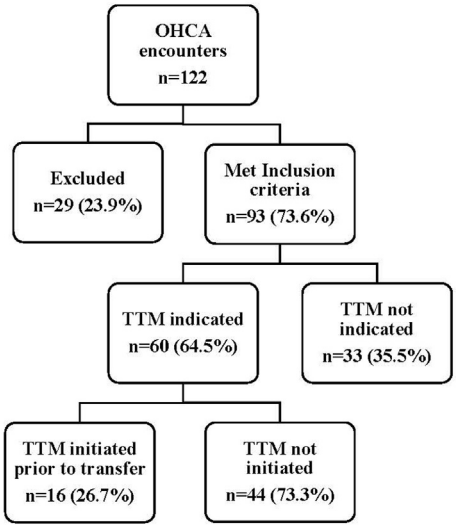
Objectives: The objective of this study is to compare variation in targeted temperature management (TTM) initiation prior to the transfer of OHCA patients.

Methods: This was a retrospective study, with data collection from 1/1/2019 to 12/31/2021. Data were collected through MaineHealth's electronic medical record (EMR) via a query of Epic (Epic Systems Corp.; Verona, WI), as well as a data query of the state of Maine EMS database. These data sets were combined to gather both accurate hospital and pre hospital information. Only OHCA encounters requiring an IFT to Maine Medical Center (MMC) or Southern Maine Health Care (SMHC) for definitive post cardiac arrest care were included criteria (primary diagnosis of ICD10 code I46.*, age 18-89, transferred to MMC/SMHC within 24 hours of encounter). Age, sex, emergency medical service (EMS) agency, post IFT vital signs, comorbidities, initial rhythm, initial temperature at receiving facility, TTM initiation prior to IFT and other descriptive variables were collected. Initiation of TTM was identified by reviewing the EMS run sheet of the IFT, the EMR of the receiving facility, and the notes scanned from sending facility. Fisher's exact test, Welch two sample T-Tests, and logistic regression were used to analyze the variables.

Results: Out of 122 patient encounters that were linked from the Maine EMS data base to the MaineHealth's data base, 93 (76.2%) met inclusion (Figure 1). There was no statistical difference in comorbidities and variation in vital signs or initial rhythm between the 22 EMS agencies that performed the IFT (p-value = 0.23). None of the physician orders for the IFT included TTM (0/39). Only 21.9% (16/73) of patients received TTM prior to transfer, in the appropriate setting. There was no statistical significance in initial temperature at receiving facility of patients who received TTM compared to those who didn't (36.7°C vs 36.4°C; p-value = 0.5). Of these encounters, 13 patients arrived with an initial temperature below 36°C.

Conclusions: While there was no statistically significant variation between EMS agencies on if TTM was initiated, there was a large portion of patients that did not receive TTM prior to transfer (78.1%). Moreover, regardless of receiving TTM prior to transfer, presenting to the receiving facility within a temperature range recommended by the American Heart Association (32°C – 36°C) was rare. We suspect the lack of specific physician orders for the IFT contributes to the deficit in TTM initiation, and our future work involves implementing a plan to address this deficit when transferring patients who experienced an OHCA.

Figure 1: Flow diagram of OHCA patients requiring IFT




No, authors do not have interests to disclose

## 362 Role of Real-Time Visual Feedback Device on Cardiopulmonary Resuscitation Training Among School Children: A Randomized Controlled Trial

Sahu A, Thakur N, Mathew R, Bhoi S, Aggarwal P/AAIMS New Delhi, Delhi, IN

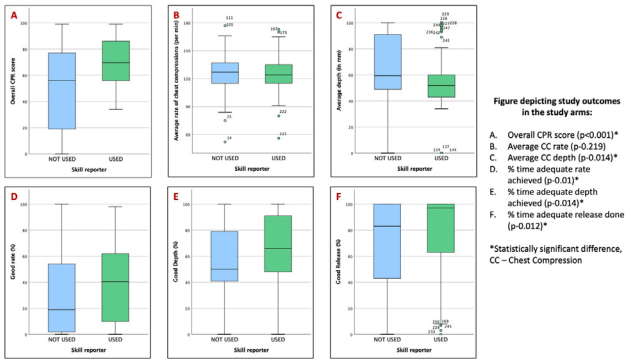
Objectives: This study investigated the role of adding a real-time visual feedback device to standard instructor-led practical chest compression-only cardiopulmonary resuscitation (CPR) training among school children in India.

Methods: School children of classes 8$^{th}$ and 11$^{th}$ from three different schools were included in this study. All children underwent baseline CPR skill and knowledge testing. They were randomized to either a "real-time visual feedback group (FG)" or an "instructor-led standard group (SG)" in a 1:1 ratio. In the FG arm, students were asked to perform compression-only CPR on Little Anne QCPR (R) mannikins with a real-time visual feedback device (Laerdal Skill Reporter (R)) and instructor guidance. In the SG arm, students performed compression-only CPR only according to instructor guidance. CPR skills were assessed using QCPR software (R) in both arms. QCPR software (R) recorded the overall CPR performance using the "overall CPR score" derived from chest compression rate, depth, and recoil. The primary outcome of this study was to compare the "overall CPR score" in both study arms. Secondary outcomes were (1) participants achieving "advanced performer status" (overall CPR score > 75%), (2) individual skill metrics such as "mean compression depth" and "mean compression rate," (3) the percentage of time the children performed chest compression (CC) at "adequate depth" (CC done with adequate depth of 5-6mm), "adequate rate" (CC done at an appropriate rate of 100-120/min), and "adequate recoil."

Results: Two hundred sixty students were randomized to FG and SG arms (130 in each). Of 260, 178 students were female (68.5%), with a median age of 15 years (IQR: 14- 16). Baseline variables like age, gender, CPR knowledge, and skills were similar in both arms. The "overall CPR score" was found to be significantly higher ($p < 0.001$) in the FG arm (median: 69.5, IQR: 56-86) compared to that in the SG arm (56, 19-77).

The advanced CPR performance status was achieved in 46.2% of participants in the FG arm and 26.9% in the SG arm (p = 0.001). The mean compression depth was lower (p = 0.005) and appropriate in the FG arm (52mm, 43-60) compared to the SG arm (59.5mm, 49-91). Percentage of time adequate CC depth achieved (FG: 66%, 48-91; SG: 50%, 41-79), the adequate CC rate reached (FG: 40.5%, 10-62, SG: 19, 2-54), and the adequate recoil done (FG: 97%, 63-100; SG: 83, 43-100) were significantly higher (p = 0.01) in FG, compared to SG. Unlike the above findings, the mean compression rate was statistically similar in both arms. All the outcomes are graphically represented in the Figure attached.

Conclusions: Incorporating real-time visual feedback improved the skills significantly during hands-only CPR training among schoolchildren.




No, authors do not have interests to disclose

## 363 External Validation of the Relationship Between Lactate Level and In-Hospital Cardiac Arrest in the Emergency Department

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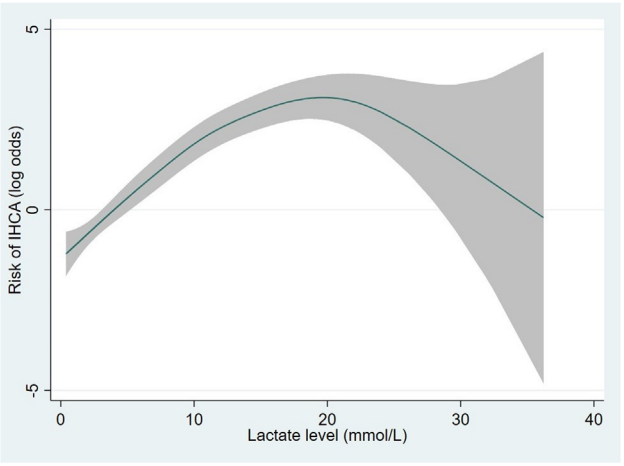
Objectives: We previously showed that higher lactate levels predicted emergency department (ED)-based in-hospital cardiac arrest (IHCA). The purpose of this research is to externally validate this finding in an independent ED population. We have also developed and validated a scoring system, called the Emergency Department In-hospital Cardiac Arrest Score (EDICAS), for predicting ED-based IHCA. Biomarkers, such as lactate levels, may have independent or incremental effects (in addition to scoring systems) on the occurrence of ED-based IHCA. Thus, this investigation aimed to provide external validation of the predictive value of lactate levels for IHCA in a different emergency department.

Methods: The retrospective cohort study retrieved electronic medical record data of 269,208 patients who visited the ED of a medical center over a 2-year period. Patients who had out-of-hospital cardiac arrest, were younger than 18 years old, or did not have any lactate measurement were excluded. Patients were classified into three groups based on their initial serum lactate levels: normal ($\leq$2 mmol/L), moderately elevated (2 $<$ lactate $\leq$ 4), and highly elevated ($>$4 mmol/L). The primary outcome was ED-based IHCA.

Results: Based on the descriptive analysis of the study population, patients with highly elevated lactate level had the highest IHCA rate (6.9%) and admission rate (70.7%). Additionally, patients with elevated lactate levels ($>$ 2mmol/L) were more likely to arrive via ambulance, present with dyspnea, and have a higher triage level (1 and 2). Compared to others, patients in the highly elevated lactate level group had a higher proportion of impaired consciousness (GCS score $<$13) and a lower proportion of pain sensation expression. The multivariable analysis indicated that patients in the highly elevated lactate group had an 11.18-fold higher risk of IHCA than those in the normal lactate group, and the triage level 1 (vs. 3) was associated with a 3.32-fold higher risk. Furthermore, the dose-response analysis suggested a positive linear correlation between the risk of IHCA and the elevation of lactate level when the lactate level was under 20 mmol/L.

Conclusions: This study showed that serum lactate levels were a strong predictive marker for IHCA in the emergency department. By validating the predictive value of lactate levels for IHCA, the logical next step would be to incorporate lactate levels into existing early warning systems to prevent IHCA in the ED.




No, authors do not have interests to disclose

## 364 Older Adults' Knowledge of Code Status and Perceived Outcomes After Cardiopulmonary Resuscitation

Albert E, Crispo M, Strout T, Bunting S/Maine Medical Center, Portland, Maine, US

Objectives: Code status is a patient-determined designation communicating a patient's wishes surrounding cardio-pulmonary resuscitation (CPR). An accurate understanding of CPR and resuscitation outcomes is necessary for a patient to apply informed decisionmaking to the selection of their code status designation. We sought to describe older adults' understanding of the term "code status." where their education about CPR comes from, and perceived outcomes after CPR occurs.

Methods: We surveyed a convenience sample of patients aged $\geq$65 years in our tertiary emergency department (ED). Group differences were evaluated using chi-square analysis.

Results: One hundred forty-nine patients participated in the study; 54% (n=81) were male, mean age 75 years (range 65-100). While 28% (n=42) endorsed knowing what code status is, only 7% (n=11) provided a correct definition. Participants reported receiving information about CPR from medical clinicians (17%, n=92), word of mouth 16% (n=84), personal experience 16% (n=82), family 15% (n=78), and television 12% (n=65). Most participants overestimated survival of both in-hospital (62%, n=93 survival to ROSC; 87%, n=130 survival to discharge) and out of hospital (77%, n=115) cardiac arrest. Participants who received information about CPR from a medical provider were significantly more likely to provide a correct definition of code status (p=.005) and more likely to accurately predict CPR survivability (0% vs. 100%, p=0.005).

Conclusions: In this survey of ED older adults, most participants demonstrated poor understanding of the term 'code status' and very few could provide an accurate definition. This has implications for how we approach code status conversations with older adults and suggests that the term should not be used as it is poorly understood. The majority of participants grossly overestimated survival after CPR. Our findings suggest that conversations with medical providers improve older adult understanding of "code status" and CPR survival.

No, authors do not have interests to disclose

## 365 Trends in Hospice and Palliative Medicine Consults Initiated in the Emergency Department: A Seven-Year Utilization Analysis

Gunaga S, Al-Hage A, Buchheister A, Welchans M, Awada M, Smiles B, Savage A, Latack K, Schultz L, Miller J/Henry Ford Wyandotte Hospital & Envision Healthcare, Wyandotte, Michigan, US

Objectives: Emergency departments (EDs) play a central role in end-of-life care, yet early integration of high-quality palliative care and hospice services is often under-utilized. Studies have shown that early access to these services improves patient

outcomes, goal-concordant care and reduces health care costs. Translation of this evidence into clinical practice remains inconsistent, and the extent to which these services are utilized remains unclear. This retrospective cross-sectional cohort study aimed to describe the clinical prevalence and trends of ED ordered hospice and palliative medicine consults over a seven-year period in a large metropolitan health system.

Methods: We conducted a retrospective cohort study of electronic health records (EHR) from five EDs within a large, integrated urban and suburban health system. The study period spanned from January 1st, 2016, to December 31st, 2022, and included data from all ED visits by patients > 18 years old who had a hospice and/or palliative medicine consult ordered in the ED. A variety of patient specific demographic, clinical, and outcome variables were collected. The yearly number of hospice and palliative medicine consults ordered in each ED were also obtained and compared by year and by site. Across years, we compared incident rates of hospice and palliative consults per 1,000 ED patients who were over 50 years old, had an ESI $\leq$ 3, and were admitted. Data analysis included descriptive statistics, chi-square testing, and regression analysis to examine trends over time.

Results: A total of 6,097 hospice and palliative medicine consults were ordered in the ED for 5,687 ED encounters, and 5,345 unique patients meeting the inclusion criteria. The mean age of participants was 77.9 years $\pm$13.7, with 57.2% being female and 74.7% identifying as White. Of the total cohort, 90.6% (5,152) were admitted to the hospital, 7.2% (410) were discharged home, 2.0% (112) died in the ED, and 55.2% (2,843) died during their hospital stay. Hospice and palliative medicine consults initiated in the ED showed a significant annual increase from 324 in 2016 to 1,328 in 2022, representing a 410% overall increase ($p < 0.001$). This seven-year trend is detailed in Figure 1. ED-ordered hospice consults outnumbered palliative consults 1.68 to 1 in 2016; however, in 2022 that ratio flipped to where ED palliative consults were 1.66 times more common. After the onset of the COVID-19 pandemic, there was a significant 188% increase in daily ED hospice and palliative consults when compared to pre-pandemic levels ($p < 0.001$). The calculated prevalence of hospice and palliative medicine consults in the ED for patients who were over 50 years old, had an ESI $\leq$ 3, and were admitted was 5.9 consults for every 1,000 visits (0.59%) in 2016. This prevalence significantly increased to 19.7 consults (1.97%) for every 1,000 visits in 2022 ($p < 0.001$).

Conclusions: This study reveals an increasing trend of ED initiated hospice and palliative consults in our health system. Though promising, this effort likely only touches the surface of the unmet palliative needs of our ED patients and families. Further research is required to examine if these trends are observed across other healthcare facilities nationwide and to identify potential obstacles to implementation.

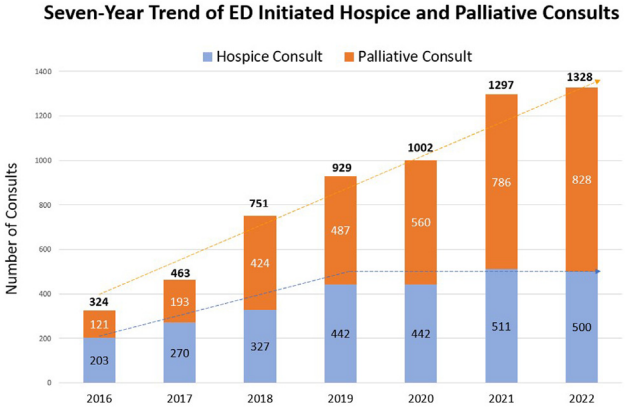



**Figure 1:** Illustration of ED initiated hospice and palliative medicine consults between 2016 and 2022.

No, authors do not have interests to disclose

## 366 Patient Preferences for Social Interventions to Reduce Social Isolation in Older Adults Discharged From the Emergency Department

Zheng D, Engel T, Yeung J, Mohindra R, Kohler S, McLeod S, Boarguundvaag B, Melady D, Wesson V, Lowthian J, Lee J/Schulich School of Medicine and Dentistry, London, Ontario, CA

Background: Older adults who use the emergency department (ED) have a higher risk of social isolation and loneliness (SIL) making the ED a novel setting to initiate screening and interventions for SIL. Patient preferences for different social interventions have not been studied.

Objectives: 1) To assess patient preferences for ED based SIL interventions; 2) To report a novel method using waitlist controls to assess feasibility of subsequent trials in a program of research.

Methods: We included the waitlist control group of an ongoing RCT who were $\geq$70 years old discharged from the Mount Sinai ED in Toronto. We excluded those with cognitive impairment, no telephone, living at a nursing home, or unable to communicate in English. Following the 12-week waiting period, participants chose either an arts-based intervention (MAMC) or a volunteer support program (HOW R U?). The HOW R U? group was also offered: 1) video vs telephone, and 2) similar-aged peer support vs younger intergenerational volunteers. Patient preferences were reported as proportions with 95% confidence intervals.

Results: Of 53 control participants, 3 withdrew, 8 were lost to follow-up and 5 were yet to be reached. Of the remaining 37 participants, 25 were offered both MAMC and HOW R U? – 7 chose MAMC (28%), 12 (48%) chose HOW R U? and 6 (24%) chose none. The remaining 12 participants were only offered HOW R U? due to limited space in the MAMC program. Thus, there were a total of 24 participants in the HOW R U? intervention. 15/24 (95% CI: 40.6-81.2%) chose the telephone version, 7/24 (95% CI: 12.6-51.1%) chose the video version, and 2/24 (95% CI: 1.0%-27.0%) had no preference. Intergenerational volunteers were preferred by 7/24 (95% CI: 12.6-51.1%) participants, 9/24 (95% CI: 18.8-59.4%) preferred peers and 8/24 (95% CI: 15.6-55.3%) had no preference.

Conclusions: More than half of participants preferred the HOW R U? support program. There was no strong preference for peer versus intergenerational volunteers. There was a preference for the telephone format. Further research should investigate whether preference-matching can optimize outcomes for complex behavioral interventions targeting SIL.

No, authors do not have interests to disclose

## 367 Metric Impact of Embedded Emergency Department Palliative Care Provider in Patients With Unmet Palliative Care Needs

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Objectives: Patients with advanced illness are likely to find themselves in an emergency department (ED) in their last months of life and oftentimes they die in the acute care setting. Most inpatient palliative care (PC) consults are bred by ED admitted patients; however, few occur during the ED encounter. To date, little research has focused on palliative consultations that occur during the emergency department encounter. We present an innovative approach to ED embedded palliative care consultations. We intend to expedite the time to palliative involvement for appropriate ED patients with enhanced downstream institutional metrics.

Methods: Using a modified version of the Palliative Care and Rapid Emergency Screening (P-CARES) tool we identified adult patients presenting to the ED with life limiting disease and unmet palliative care needs. A dedicated EM-Palliative boarded physician (EMP) was assigned to the ED on average one day per week from June - December 2021 during the hours of 11a-8p. Palliative care consultation was ordered by the ED physician without impact on overall workflow. At 6 months from onset of project, manual chart review was performed and descriptive data was retrospectively evaluated for ED disposition, length of stay, overall admission days, readmissions, and mortality statistics.

Results: The embedded EMP was in the ED for a total of 24 days over 6 months. 57 unique patient encounters were captured with an average age of 73y. It was noted that this group accounted for 67 ED visits and 43 admissions in the 6-month period preceding their sentinel study visit. Regarding ED disposition there were: 1 ICU and 48 inpatient admissions, 6 discharges, and 2 hospice enrollments. There were only 8 readmissions found on 6-month chart review. Average time to palliative consult was 0.2days (Mdn 0d). Median length of stay in this complex population was 4 days. 21

patients subsequently enrolled in hospice over the 6-month review period. Most impressive, 36.8% patients died during the 6-month study period with ZERO inpatient mortality; half of these deaths occurred under hospice care.

Conclusions: ED patients with life limiting diagnoses often have unmet palliative care needs. We believe prompt EDP engagement better aligned goal directed care with compatible health care resources to impact downstream institutional metrics. There is ample opportunity for more robust and rigid emergency palliative research protocols.

No, authors do not have interests to disclose

## 368 Comprehensive Geriatric Assessments in the Emergency Department Impact Inpatient Length of Stay

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Objectives: The marked increase in emergency department (ED) visits among the aging population and their unique needs has led to the development of geriatric EDs (GEDs). GEDs often incorporate targeted assessments and interventions for older adult patients in the ED to assess several social and clinical factors specific to a patient. The purpose of this study was to assess the impact of consultation by specialized geriatric nurses on inpatient length of stay (LOS) and disposition.

Methods: This is a retrospective case-control study of patients 65 years of age and older at a level 1 geriatric ED (GED) from January 2018 through March 2020 with an annual census of about 35,000. Geriatric nurse specialists provided comprehensive geriatric evaluations (cognitive, falls, polypharmacy, etc.) and management for GED patients. Not all GED patients that qualified for a specialized consultation received one due to resource limitations. The impact of the GED consultations on inpatient LOS and disposition were assessed using logistic regression.

Results: There were 4,284 ED visits to the GED by seniors who met vulnerability criteria on screening, 1,927 (45.0%) resulted in an admission during the study period. Of these, 517 (26.8%) cases had an evaluation by the specialized geriatric nurse prior to the admission and 1,410 (73.2%) patients received an order but did not receive a consultation prior to admission. The impact of consultations on inpatient LOS were minimal with consultation vs without (OR=0.79, 95% CI 0.611, 1.016, p=0.07). However, consultations did show significant positive impact on those with a Charlson Comorbidity Index Score of 3+ (OR=1.73, 95% CI 1.353, 2.208, p=<0.001), in age groups 75-84 (OR=1.45, 95% CI 1.117, 1.89, p=0.005), and among those who identify as Hispanic (OR=1.49, 95% CI 1.035, 2.152, p=0.032). Consultations that occurred for this subset when a geriatric nurse specialist was on shift also impacted inpatient LOS with consultation vs without (OR=1.54, 95% CI 1.173, 2.025, p=0.002).

Conclusions: At our level 1 GED, the use of a specialized nurse consultation to conduct geriatric evaluation and management of vulnerable seniors resulted in a decreased inpatient LOS among certain patient populations. Findings from this study may be useful for ED administrators considering similar interventions or GED accreditation. Future studies should focus on validation with prospective studies and multiple sites.

No, authors do not have interests to disclose

## 369 Geriatric Emergency Department Guidelines 2.0: Systematic Review on the Comparative Safety of Sedating Medications Used in the Treatment of Older Adults With Acute Agitation

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Background: Managing acute, undifferentiated agitation in older adults (ie, ≥65 years old) often requires sedating medications in the emergency department (ED). Unfortunately, these medications are associated with serious adverse events – including respiratory depression, hypotension, and/or prolonged delirium in older adults. Little is known about the comparative safety of sedating medications that are used to treat acute agitated older adults in the ED.

Objectives: To determine which sedating medications are associated with the least adverse events in controlling acute, undifferentiated agitation among older adults presenting in the out-of-hospital or ED settings.

Methods: We conducted a systematic review to identify observational or randomized comparative effectiveness studies on the efficacy and safety of sedatives used in the treatment of acute agitation or behavioral disturbance among older adults in the pre-hospital or ED setting. We searched 8 databases including PubMed, EMBASE, SCOPUS Cochrane library, CINAHL, Proquest Central, Ageline, PsycInfo for studies relevant to geriatrics, emergency care, acute agitation, and sedation. Studies were included if they examined the use of first generation antipsychotics, second generation antipsychotics, benzodiazepines, or ketamine. Studies were excluded if they had no participants ≥65 years old, were restricted to an inpatient unit, used a case series study design, lacked an active comparator (ie, no comparisons between different sedating agent used or type of dosing), or used antihistamines. Data were extracted on serious adverse events including arrhythmia, QTc prolongation, hypotension, respiratory depression, hypoxia, intubation, or mortality among older adults. Secondary efficacy outcomes included the need to re-dose sedatives and time to sedation. Two reviewers independently performed abstract screening, full text review, data extraction, and risk of bias assessment.

Results: The database search yielded 5318 abstracts. After applying our exclusion criteria, 8 studies met eligibility for further qualitative and quantitative analysis. Among the eligible studies, all 8 were observational cohort studies. The studies included a total of 194 older adults receiving haloperidol, droperidol, ketamine, midazolam, olanzapine, or some combination of these agents. Among older adults requiring pharmacologic sedation, we observed adverse events in 10.8% (21/194) subjects. Adverse events were seen with greater frequency among older adults initially receiving a combination of sedatives (28.6%; 2/7) as compared to those initially receiving a single sedative (10.2%; 19/187; p = 0.09). We were unable to directly compare the safety of individual sedatives choices due to small sample size. All eight included studies were found to have a high risk of bias.

Conclusions: Serious adverse drug events are not rare when sedating older adults with acute agitation. High-quality data on the comparative safety of different sedatives used to treat acute agitation in older adults in the out-of-hospital and ED setting is lacking. Larger, randomized studies are needed to determine optimal treatment selection regarding safety for sedating the acutely agitated older adult.

No, authors do not have interests to disclose

## 370 Accuracy of Clinical Assessment in Predicting Source of Infection for Septic Patients in the Emergency Department

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Background: Many sepsis cases are first encountered in the Emergency Department (ED), and it is essential to identify and assess the severity of patient illnesses as well as their mortality risks as soon as possible after they present to the ED. The Sepsis Core Measure requires that clinicians rapidly screen patients and administer antimicrobial treatment within 3 hours of identification of severe sepsis and septic shock. Although much research has been done on the importance of early fluid administration, antimicrobial initiation, and hemodynamic resuscitation of septic patients, less is known about clinician ability to diagnose or predict the presumptive source of a septic patient's clinical syndrome. Despite limitations in patient presentation and physical findings, clinicians must make a scientific judgment for the potential source of infection and initiate appropriate therapy swiftly.

Objectives: To evaluate the predictive ability of clinicians to determine the likely source or site of infection leading to severe sepsis and septic shock.

Methods: This was a prospective observational trial. Data was collected at an urban tertiary care medical center ED from September 2017 to December 2019. Data was collected with the assistance of undergraduate research associates.

Results: There were 111 patients included in the analysis, 62 (55.9%) were female, 89 (80.2%) were Black, and the mean age was 53.1 (SD 19.2) years. A high proportion had diabetes (36.9%) and hypertension (54.1%). The median time from patient arrival to treating clinician survey was 2 [IQR 1, 3] hours. The median time to antibiotic administration was 4 [IQR 2, 5] hours. Median ED length of stay was 8 [IQR 6, 12] hours. The accuracy of clinician suspicion for the source of infection was modest: 70.0% (95% CI 60.0 - 78.2%) for skin and soft tissue or abdominal sources, 82.2% (95% CI 74.7 - 89.6%) for urinary, and 42.3% (95% CI 32.6 - 52.3%) for pneumonia. In 8 cases of bacteremia, antibiotics were initiated for all patients.

Conclusions: In conclusion, this study provides insight into the clinical characteristics and outcomes of a cohort of patients with suspected sepsis in an ED. The majority of patients were Black and had comorbidities such as diabetes and hypertension. Overall hospital mortality was low, and the accuracy of clinician suspicion for the source of infection was variable. The highest clinician suspicion accuracy was observed for urinary infections, followed by skin and soft tissue or

abdominal sources. In such patients, clinical suspicion is a valuable tool in rapid identification of infection sources as it enables swift administration of treatment specific to the source of infection. In contrast, the accuracy for diagnosing pneumonia was particularly low so clinician suspicion is of much less utility in such cases. This highlights the need for improved diagnostic tools and protocols to aid clinicians in accurately identifying the source of infection in patients with suspected sepsis. The study also highlights potential areas for improvement in care, such as reducing the time to antibiotic administration. Addressing these issues could lead to superior, more targeted treatments for patients, ultimately improving outcomes and reducing the risk of morbidity and mortality associated with sepsis.

No, authors do not have interests to disclose

## 371 WITHDRAWN

## 372 Comparison of Resource Utilization Between Geriatric Falls on Anticoagulation Evaluated at Trauma Centers Versus Non-Trauma Centers

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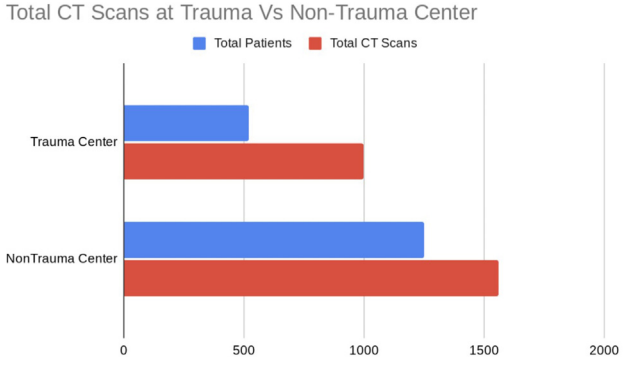
Objectives: Studies indicate that mobilizing trauma teams for low impact trauma with minimal injuries is costly. The primary objective of this study was to evaluate the difference in CT-resource utilization, as a proxy for cost, for discharged patients older than 65 years on anticoagulation who have experienced a mechanical ground level fall. The study aimed to determine the difference in CT-resource utilization when primarily evaluated at a trauma center vs non-trauma center.

Methods: We conducted a retrospective analysis of data between two trauma centers and eight non-trauma center emergency departments (EDs) within the same healthcare network. Data included ED visits for discharged patients >65 years old on oral therapeutic anticoagulation who sustained a mechanical fall; by protocol these patients are seen by the ED and Trauma Surgery teams at the studied trauma centers. Data collection included age, and imaging studies obtained during the ED visit where the Chief Complaint included terms designating a significant traumatic injury. Patients that were admitted, held for observation, or those with coinciding complaints/impressions that may include a medical cause of fall rather than a mechanical mechanism were excluded.

Results: A total of 2556 CT scans were included in this study: 998 scans from 518 patients at trauma centers and 1558 scans from 1251 patients at non-trauma centers. This results in 1.92 CTs per patient at trauma centers vs 1.25 CTs per patient at non-trauma centers. Using the same data and excluding head CTs, 562 CT scans were obtained at trauma centers resulting in 1.08 CTs per patient, and 653 at non-trauma centers resulting in 0.52 CTs per patient.

Conclusions: Resource utilization among trauma centers is higher than non-trauma centers for ground level falls in patients > 65 years old on anticoagulation who were discharged. In an age group that is rapidly growing in size in a country that is increasing in health care expenditure, it is important that we take resource utilization into consideration when treating these patients. Future studies should assess a broader population to determine if increased CT utilization led to changes in patient outcomes, and work towards identifying low-risk patients who may not require advanced imaging.




No, authors do not have interests to disclose

## 373 Massive Transfusion in Trauma: Does Payer Status Decrease Futile Transfusion?

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Objectives: Blood shortages are a national crisis creating dangerous scenarios for patients requiring massive transfusion protocol (MTP) in the trauma setting. Judicious use of blood product is critical to rescue salvageable patients while refraining from unnecessary MTP to save precious resources. We evaluate RBC transfusion volume and in-emergency department (ED) deaths relationship to payer status as markers of futility in trauma patients receiving MTP.

Methods: ED trauma activations from database of an urban Level I trauma center was analyzed from 1/1/2017 to 06/30/2022. RBC transfusion volume during initial resuscitation, as well as baseline patient and trauma event characteristics and payer status was analyzed. Patients for whom MTP was activated were compared to those for whom it was not. Multivariate analysis assessed relationships between MTP transfusions activations in the ED and demographic characteristics as well as markers of futility. All analyses were conducted in R.

Results: Among the 10,846 patients, ED mortality rate was 1.2% (n=130). The median age of patients receiving MTP was younger (42.7 years vs. 52.7 years, $p < 0.01$). Patients with penetrating trauma were more likely to receive MTP than those without (12.5% vs. 2.3%, $p < 0.001$), while those with blunt force trauma were less likely to have received MTP (2.2% vs. 10.7%, $p < 0.001$). There was a statistically significant difference in MTP activation status based on gender, with more men than women receiving MTP ($p < 0.001$). Medicare patients were less likely to have received MTP than non-Medicare patients (1.2% of all Medicare patients received MTP vs. 3.9% of all non-Medicare patients received MTP respectively, < 0.001). Likewise, Medicaid patients were less likely to receive MTP than non- Medicare patients all (3.8% of all Medicare patients received MTP vs. 3.0% of all non-Medicaid patients received MTP respectively $p < 0.05$). Injury severity score (ISS) and Probability of Survival (PS) reported in the data were significantly negatively correlated (Kendall coefficient -0.60, $p < 0.01$). ISS was higher in patients receiving MTP than in those who did not (19.5 vs. 6.42, $p < 0.01$). Median PS was lower in this MTP transfusion group (0.80 vs 0.97, $p < 0.001$). Patients who received MTP were more likely to have died-in-ED than those who did not (10.3% vs. 0.9%, $p < 0.001$). The discriminatory value for MTP activation alone on whether a patient lived or died was high (AUROC 0.624 [95% CI 0.59 to 0.66]). Multivariable logistic regression was used to examine the relationship between age, presence of penetrating trauma, Medicaid or Medicare payor status on MTP transfusion status. Results showed that only penetrating trauma and PS were statistically important variables ($p < 0.001$), with the likelihood of receiving MTP increasing with penetrating trauma and with lower PS. AUROC for this model was high (0.97 [95%CI 0.94 to 0.99]).

Conclusions: Patients with penetrating trauma and higher ISS are more likely to receive MTP, regardless of their probability of survival, age or payor status. MTP transfusion is associated with in-ED death. Assessing futility of MTP should be equitable and future transfusion guidelines should consider salvageability in cases with low probability of survival despite age and mechanism.

| | Coefficient | Standard Error | z=value | Pr(>\|z\|) | t-value | p-value |
|---|---|---|---|---|---|---|
| Age | -0.01 | 0.00 | -3.31 | 0.00 | -3.31 | 0.001 |
| Medicaid | -0.04 | 0.14 | -0.30 | 0.76 | -0.30 | 0.764 |
| Medicare | -0.24 | 0.24 | -0.98 | 0.33 | -0.98 | 0.325 |
| Penetrating Trauma | 2.11 | 0.16 | 13.19 | 0.00 | 13.19 | 0.000 *** |
| ISS | 0.00 | 0.01 | -0.25 | 0.80 | -0.25 | 0.801 |
| PSS | -5.07 | 0.53 | -9.51 | 0.00 | -9.51 | 0.000 *** |
| ISS*PSS Interaction | 0.16 | 0.02 | 10.11 | 0.00 | 10.11 | 0.000 *** |
| *Intercept* | 0.04 | 0.56 | 0.07 | 0.94 | 0.07 | 0.941 |

Note: '*' indicates statistical significance at the 5% level (p<0.05), '**' indicates statistical significance at the 1% level (p<0.01), '***' indicates statistical analysis at the 0.01% level (p<0.001)

**Multivariable Logistic Regression of Association of Patient/Trauma Factors and MTP Transfusion Activation Status**

No, authors do not have interests to disclose

## 374 Comparison of Arterial Oxygen Levels of Mechanical Ventilators Versus Bag-Valve Ventilation During Cardiopulmonary Resuscitation: A Randomized Trial

Tangpaisarn T, Kotruchin P, Tosibphanom J, Sata R, Phungoen P/Faculty of Medicine, Khon Kaen University, Khon Kaen, Khon Kaen, TH

Background: Effective ventilation is crucial for successful cardiopulmonary resuscitation (CPR). Previous studies suggest that higher arterial oxygen levels (PaO2)

during CPR increase the chances of successful resuscitation. However, the advantages of mechanical ventilators over bag-valve ventilation for achieving optimal PaO2 during CPR remain uncertain.

Objectives: The primary outcome was to compare the difference in PaO2 from arterial blood gases (ABG) during CPR between the MV and BV groups.

Methods: We conducted a randomized trial involving non-traumatic adult cardiac arrest patients (aged >18 years) who received CPR in the emergency department. After the intubation, patients were randomly assigned to receive ventilation with a mechanical ventilator (MV) or a bag valve ventilations (BV). In MV group, ventilator setting was tidal volume 6-7 ml/kg (500 ml in male, 400 in female if unknown weight), positive end-expiratory pressure (PEEP) 0, respiratory rate 10, inspiratory time (Ti) 1 second, fraction of inspired oxygen (FIO2) 1.0. In BV group, the patients was ventilated by a bag-valve-mask with a reservoir bag connecting with an oxygen, tidal volume 6-7 ml/kg to make adequate chest rise, respiratory rate 10, Ti 1 second.

Results: A total of 60 patients were randomized and included in the analysis (30 in each group). The median time of obtaining ABG was 5.0 (interquartile range,4.0-9.8) minutes in the BV group and 7.0 (interquartile range,5.0 – 8.8) minutes in the MV group. The baseline characteristics of both groups were similar. The PaO2 was not significantly different in the BV group compared to MV [36.5 mmHg (interquartile range 14.0 – 70.0) vs. 29.0 mmHg (interquartile range 15.0-70.0), P = 0.879]. Other parameters of ABG were no different in both groups (Table 1). The 24-hour survival rate, 28 days survival rate, survival to discharge rate, and survival with good neurological outcome rate were no different (Table 2).

Conclusions: The arterial oxygen levels during CPR were comparable between mechanical ventilations and bag-valve ventilation. Our study suggests that mechanical ventilation is feasible and safe for use during CPR in cardiac arrest patients.

**Table 1:** Arterial blood gases comparing between mechanical and bag-valve ventilation

| ABG parameter | Bag-valve ventilation (N=30) | Mechanical ventilation (N=30) | Median difference (95%CI) | P-value |
|---|---|---|---|---|
| pH, median (IQR) | 7.05 (7.00, 7.16) | 7.06 (7.01, 7.25) | 0.01 (-0.1, 0.2) | 0.72 |
| $PaO_2$, mm Hg, median (IQR) | 36.5 (14,70) | 29 (15, 70) | -7.5 (-47.1, 35.8) | 0.879 |
| $PaCO_2$, mm Hg, median (IQR) | 74 (60, 93) | 77 (48, 101) | 3 (-16.1, 12.1) | 0.824 |
| $HCO_3$, mEq/L, median (IQR) | 14.5 (12, 18) | 11.9 (8, 18) | -2.6 (-5.8, 2.4) | 0.267 |

IQR: interquartile range

**Table 2:** Resuscitation outcome of patients comparing between mechanical and bag-valve ventilation

| Outcome | Bag-valve ventilation (N = 30) | Mechanical ventilation (N = 30) | Proportion difference, (95%CI) | P-value |
|---|---|---|---|---|
| ROSC | 13 (43.3%) | 15 (50.0%) | 6.7 (-21.9, 35.1) | 0.796 |
| Survival to admission | 10 (33.3%) | 11 (36.7%) | 3.3 (-24.1, 31.8) | 1 |
| Survival to hospital discharge | 3 (10.0%) | 5 (16.7%) | 6.7 (-13.8, 27.1) | 0.706 |
| 24-hour Survival | 6 (20.0%) | 9 (30.0%) | 10.0 (-15.1, 35.1) | 0.552 |
| 28-day Survival | 1 (3.3%) | 4 (13.3%) | 10.0 (-7.1, 27.1) | 0.353 |
| Survival with good neurological outcome | 0 (0%) | 2 (6.7%) | 6.7 (-5.6, 18.9) | 0.492 |

ROSC: Return of spontaneous circulation

No, authors do not have interests to disclose

## 375 Laboratory Risk Assessment for Intracranial Bleeding in Mild Traumatic Brain Injury for Elderly and Anticoagulated Patients

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Objectives: The presentation of mild traumatic brain injury represents a clinical conundrum for emergency departments. The combination of advanced age, anticoagulation and falls lead to frequent utilization of CT of the Brain for evaluation of intracranial bleeding (ICB) in the acute setting. Decision tools are not helpful for this patient group in excluding the need for imaging. The objective of this retrospective review was to determine the potential impact of brain biomarker testing to predict the presence of a CT finding of intracranial bleeding.

Methods: A comparison was made of the brain biomarkers GFAP and UCH-L1 using a plasma-based test to brain CT results for patients presenting as "GAP Alerts" at two sites for 242 sequential presentations. "GAP Alerts" are defined as a fall or trauma on anticoagulation and/or age over 64 with suspicion of head trauma within the past 48 hours and not meet trauma team activation criteria. Anticoagulation was inclusive of any anticoagulation or antiplatelet therapy including aspirin. Application of Canadian Head CT Rule, NEXUS Head CT Instrument, or the New Orleans Head Trauma Rule would indicate that any patient in this group would meet current Head CT recommendations. The laboratory test was viewed as a qualitative test with two possible results, positive or negative, based on the quantitative result of the GFAP or UCH-L1 result individually or in combination of the two.

Results: The average age was 78.3. There were 130 women and 112 men. 134 (55%) of the patients were taking qualifying medications. 39 (16%) of the patients tested negative and none of these patients had intracranial bleeding identified on CT. The negative lab group average age was 66.9 and all 39 had an initial Glasgow Coma Scale (GCS) of 14 or 15. 25 of the negative lab group were taking anticoagulation including 9 on aspirin alone and 16 with rivaroxaban, warfarin, apixaban, or clopidogrel and 2 of these with aspirin. 8 of the total patients had evidence of ICB and one with significant edema without bleeding on CT and all 9 of these patients had positive laboratory testing. The positive lab group average age was 80.0. Two of the positive lab patients took aspirin and two took apixaban. All the lab positive group with ICB had GCS of 15.

Conclusions: We found low specificity (16.7%) and a low positive predictive value (4.4%) and high sensitivity (100%) and a high positive predictive value (100%) for the laboratory testing in this group of patients. This small study demonstrates the potential use of laboratory testing in the decision process for excluding imaging in the elderly and those on anticoagulation therapy after minor head injury.

Yes, authors have interests to disclose

Disclosure: Abbott

Consultant/Advisor Abbott

## 376 WITHDRAWN

## 377 WITHDRAWN

## 378 Effect of Intravenous Push and Piggyback Administration of Ceftriaxone on the Mortality in Sepsis

Lim SY, Jo YH, Baek S, Im C, Lee JH, Um YW, Kim HE, Han D/Seoul National University Bundang Hospital, Seong Nam, Gyung gi, KR

Objectives: Sepsis is defined as organ dysfunction resulting from the dysregulation of host response to infection. Delay of administration of antibiotics in sepsis patients has been reported to be associated with high mortality. A comparative study found that intravenous push (IVP) required about 3 minutes for antibiotic delivery, while intravenous piggyback (IVPB) took around 30 minutes. This study was performed to compare the effects of administering ceftriaxone via IVP and IVPB forms on 28-day mortality in patients with sepsis.

Methods: A retrospective study was conducted on patients aged 18 years or older with sepsis or septic shock who visited an emergency department and treated with ceftriaxone as an initial antibiotic between March 2010 and February 2019. Patients were divided into the IVP group and the IVBP group based on the administration methods. The primary outcome was 28-day mortality, and multivariable Cox proportional hazards regression analysis was performed to evaluate the relationship between antibiotic administration methods and 28-day mortality. The secondary outcomes were antibiotics administration time, the determination of whether antibiotics were administered within 1 hour or 3 hours, the occurrence of adverse reactions of antibiotic, the administration of appropriate antibiotics, the presence of septic shock, and the necessity for hospitalization in an intensive care unit (ICU).

Results: During the study period, a total of 939 patients were included in the final analysis, and the overall mortality rate was 12.2%. The time of antibiotic administration was significantly faster in the IVP group than in the IVBP group, and the rates of antibiotic administration within 1 hr and within 3 hr were also higher in the IVP group than in the IVBP group ($P < 0.05$). However, there was no significant difference in 28-day mortality between the two groups (Hazard ratio, 1.07, 95% confidence interval, 0.69 – 1.65).

Conclusions: The IVP administration of ceftriaxone reduced the time of antibiotic administration compared to IVBP, but there was no difference on 28-day mortality.

Fig. 1: Flow chart of the study populations

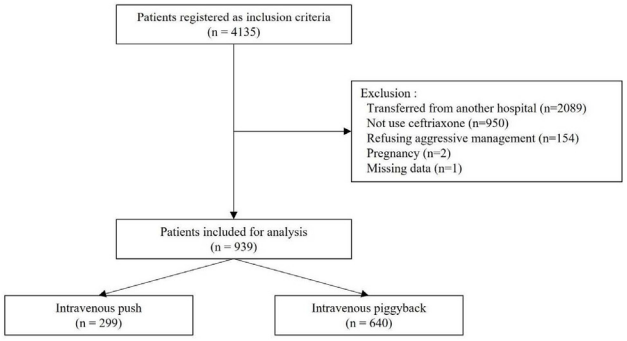


Fig. 2: Figure 2 shows survival probabilities after arrival at the emergency department for intravenous push (IVP) and intravenous piggyback (IVBP). The numbers of patients at risk at 0, 7, 14, 21, and 28 days for each of these two groups are shown in the table immediately below the survival curves.

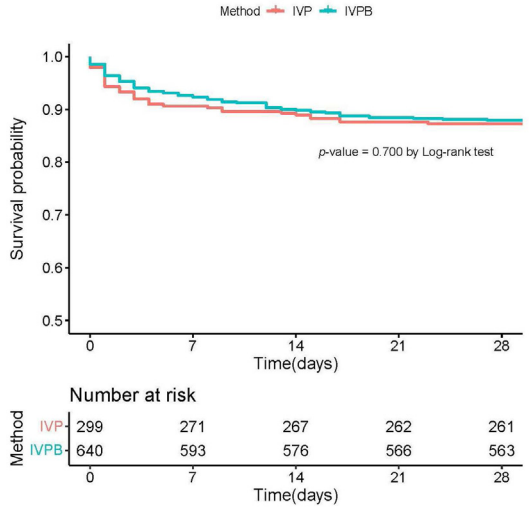


Table 1. Baseline characteristics according to antibiotics administration methods

| | Total (n=939) | IVP (n=299) | IVPB (n=640) | p-value |
|---|---|---|---|---|
| Age (year) | 73.0 (65.0-80.0) | 72.0 (64.5-78.0) | 74.0 (66.0-80.0) | 0.052 |
| Sex (male) | 541 (57.6%) | 174 (58.2%) | 367 (57.3%) | 0.861 |
| Body mass index | 22.4 (19.5-25.0) | 22.4 (19.3-25.2) | 22.4 (19.6-24.9) | 0.732 |
| Comorbidity | | | | |
| Hypertension | 447 (47.6%) | 133 (44.5%) | 314 (49.1%) | 0.215 |
| Diabetes mellitus | 329 (35.0%) | 99 (33.1%) | 230 (35.9%) | 0.440 |
| Chronic liver disease | 57 (6.1%) | 20 (6.7%) | 37 (5.8%) | 0.692 |
| Chronic heart failure | 41 (4.4%) | 19 (6.4%) | 22 (3.4%) | 0.062 |
| Chronic lung disease | 104 (11.1%) | 33 (11.0%) | 71 (11.1%) | 1.000 |
| Chronic renal failure | 86 (9.2%) | 29 (9.7%) | 57 (8.9%) | 0.786 |
| Malignancy | 345 (36.7%) | 108 (36.1%) | 237 (37.0%) | 0.844 |
| Initial vital sign | | | | |
| Systolic blood pressure (mmHg) | 94.0 (81.0-120.0) | 103.0 (84.5-127.0) | 89.0 (79.0-116.0) | <0.001 |
| Heart rate (beat/min) | 105.0 (88.0-122.0) | 111.0 (92.5-128.0) | 103.0 (86.5-119.5) | <0.001 |
| Respiratory rate (breath/min) | 20.0 (18.0-25.0) | 20.0 (18.0-25.0) | 21.0 (18.0-25.0) | 0.727 |
| Temperature (°C) | 37.8 (36.8-38.7) | 37.9 (36.9-38.8) | 37.7 (36.7-38.6) | 0.059 |
| Initial laboratory finding | | | | |
| White blood cell ($\times 10^3/\mu L$) | 11.3 (7.0-16.5) | 11.4 (7.0-17.1) | 11.3 (7.0-16.3) | 0.560 |
| Hemoglobin (g/dL) | 11.9 (10.3-13.4) | 12.0 (10.6-13.4) | 11.9 (10.3-13.5) | 0.557 |
| Platelet ($\times 10^3/\mu L$) | 168.0 (113.0-238.0) | 167.0 (113.5-238.5) | 169.0 (113.0-237.5) | 0.804 |
| Creatinine (mg/dL) | 1.4 (1.0-2.2) | 1.4 (0.9-2.1) | 1.4 (1.0-2.2) | 0.687 |
| Albumin (g/dL) | 3.3 (2.9-3.7) | 3.4 (3.0-3.8) | 3.3 (2.8-3.7) | 0.003 |
| C-reactive protein (mg/dL) | 13.3 (5.8-21.3) | 15.7 (5.9-23.0) | 12.8 (5.6-20.0) | 0.025 |
| Lactate (mmol/L) | 2.7 (1.7-4.8) | 3.5 (2.0-5.5) | 2.6 (1.6-4.5) | <0.001 |
| Infection site | | | | |
| Pulmonary | 335 (35.7%) | 98 (32.8%) | 237 (37.0%) | 0.232 |
| Genitourinary | 209 (22.3%) | 66 (22.1%) | 143 (22.3%) | 0.993 |
| Intra-abdominal | 316 (33.7%) | 108 (36.1%) | 208 (32.5%) | 0.308 |
| Other | 79 (8.4%) | 27 (9.0%) | 52 (8.1%) | 0.734 |
| Initial SOFA score | 7.0 (5.0-9.0) | 7.0 (5.0-9.5) | 6.0 (5.0-8.0) | 0.025 |

Table 2. Clinical outcomes according to antibiotics administration methods

| | IVP (n=299) | IVPB (n=640) | p-value |
|---|---|---|---|
| 28-day mortality | 38 (12.7%) | 77 (12.0%) | 0.851 |
| Antibiotics | | | |
| Administration time (min) | 160.0 (100.0-242.5) | 186.5 (129.0-256.0) | <0.001 |
| Administration within 1hr | 19 (6.4%) | 15 (2.3%) | 0.004 |
| Administration within 3hr | 178 (59.5%) | 300 (46.9%) | <0.001 |
| Allergic reaction | 1 (0.3%) | 0 (0.0%) | 0.697 |
| Appropriate antibiotics | 220 (73.6%) | 507 (79.2%) | 0.065 |
| Septic shock | 180 (60.2%) | 366 (57.2%) | 0.423 |
| ICU admission | 88 (29.4%) | 188 (29.4%) | 1.000 |

Table 3. Multivariable Cox proportional hazards regression analysis for 28-day mortality in patients with sepsis or septic shock

| | Hazard ratio | 95% CI | p-value |
|---|---|---|---|
| Age (year) | 1.03 | 1.01-1.05 | 0.005 |
| Sex (male) | 0.85 | 0.56-1.29 | 0.446 |
| Body mass index | 0.89 | 0.85-0.94 | <0.001 |
| Initial SOFA score | 1.28 | 1.21-1.36 | <0.001 |
| Initial systolic blood pressure | 1.00 | 0.99-1.01 | 0.577 |
| Infection site | | | |
| Pulmonary | 0.66 | 0.34-1.25 | 0.201 |
| Genitourinary | 0.25 | 0.11-0.58 | 0.001 |
| Intra-abdominal | 0.47 | 0.24-0.90 | 0.023 |
| Appropriate antibiotics | 0.80 | 0.49-1.30 | 0.374 |
| Antibiotics administration within 3hr | 0.69 | 0.46-1.04 | 0.075 |
| Antibiotics administration method | | | |
| IVP | (reference) | | |
| IVPB | 1.07 | 0.69-1.65 | 0.761 |

No, authors do not have interests to disclose

## 379 Vital Signs Among Emergency Department Trauma Patients in the Setting of Alcohol or Drug Use

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Objectives: The incidence of alcohol use among trauma patients has been estimated at 19-55%. This study was undertaken to identify any relationship between vital signs and alcohol and drug use among emergency department (ED) patients with trauma.

Methods: In this retrospective case control study, eligible subjects included trauma patients ages 18 and over, with trauma and drug or alcohol use, between 2018 to 2022. The control group was comprised of trauma patients ages 18 and over, with trauma and no drug or alcohol use, who were matched by Injury Severity Score (ISS). Vital signs on ED arrival were compared among patients with and without alcohol use, and with and without recreational drug use.

Results: Among 16,159 eligible trauma subjects, 684 subjects were identified with alcohol intoxication, 707 subjects were identified with recreational drug use. Patients with alcohol use had lower mean systolic blood pressure, compared to patients without alcohol use ($p < 0.001$). Patients with alcohol use had higher mean heart rate compared to patients without alcohol use ($p = 0.01$). Patients with recreational drug use had lower mean systolic blood pressure compared to patients without alcohol use ($p < 0.001$). Patients with drug use had higher mean heart rate, compared to patients without alcohol use ($p = 0.002$). Cannabinoids were associated with lower SBP. Opioids were associated with lower SBP. Benzodiazepines were associated with increased HR and decreased SBP and RR.

Conclusions: Trauma patients with alcohol intoxication had lower systolic blood pressure and higher mean heart rate compared to controls. Trauma patients with recreational drug use had lower mean systolic blood pressure and higher mean heart rate, compared to controls.

No, authors do not have interests to disclose

## 380 Prediction of a Therapeutically Active Dose of the Cannabinoid Type 1 Receptor Antagonist ANEB-001 for Reversal of Acute Cannabis Intoxication Using a Pharmacokinetic/Pharmacodynamic Model

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Objectives: With expanding liberalization of cannabis laws across the US, emergency department (ED) visits related to acute cannabinoid intoxication (ACI) continue to increase. The clinical effects of ACI can include neuropsychiatric symptoms (eg, panic attacks, psychosis), tachycardia, and hypotension, which are mediated primarily through the cannabinoid type 1 ($CB_1$) receptor. ANEB-001 is a CB1 receptor antagonist under development as an antidote to ACI. Conducting studies in the ED setting, where intoxicated patients cannot give consent, or giving extremely high cannabinoid doses to healthy volunteers presents ethical limitations. We conducted a clinical study in healthy subjects to assess the potential of ANEB-001 to reverse the effects of low to moderate doses of delta-9- tetrahydrocannabinol (THC). The aim of the current analysis was to develop a population model based on the pharmacokinetic (PK) and pharmacodynamic (PD) data from that study, in order to predict efficacious doses of ANEB-001 for reversing ACI in the ED setting.

Methods: Data were obtained from a randomized, double-blind, placebo-controlled trial evaluating single oral doses of ANEB-001 (10-50 mg) in cannabis-experienced adults challenged with oral THC (10.5-40 mg) (NCT05282797). Plasma PK (THC + active metabolite 11-OH-THC) and PD outcomes (visual analogue scales [VAS] for feeling high) were assessed pre-dose and at various timepoints up to 8 h after the ANEB-001 dose. The ANEB-001 PK dataset was supplemented with PK data from 3 historical studies of ANEB-001 and 9 historical studies of THC. Model development was performed with NONMEM software (version 7.5.1). Population PK models were developed for ANEB-001 and THC, which included a component for the active metabolite, 11-OH-THC. Next, a PD model was developed to characterize the interacting effects of THC, 11-OH-THC, and ANEB-001 on VAS High. The combined PK/PD model was used to predict the potential of ANEB-001 to reverse the increase in VAS High induced by oral THC doses up to 80 mg.

Results: The PK models for ANEB-001 and THC/11-OH-THC adequately described the observed data across the range of tested doses. The PD model also describes the observed data for VAS High from oral THC administered with placebo, and the dose-dependent inhibitory effects of ANEB-001. The ANEB-001 concentration needed to inhibit 50% of the THC-induced increase in VAS High ($IC_{50}$) was 3.3 ng/ml. No correlation was found between subject age or sex and any PK or PD parameter. Based on the model, a 10 mg oral dose of ANEB-001 is predicted to robustly reverse VAS feeling high following an oral THC dose of 80 mg (Figure 1).

Conclusions: A PK/PD model was developed to describe available clinical data for ANEB-001 and THC. Based on this model, 10 mg ANEB-001 is predicted to reverse the effects of THC at high doses that we believe to be relevant to ACI, but that cannot easily be tested in healthy volunteers. Further clinical data will be collected to validate and extend the predictions of this model.

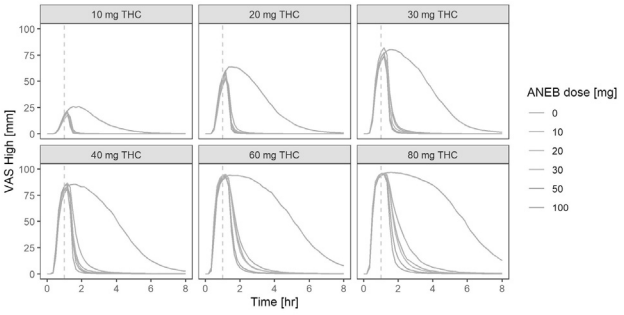


**Figure 1. VAS High projections with ANEB-001 administration delayed 1 h relative to THC.**

Yes, authors have interests to disclose
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Employee
Anebulo Pharmaceuticals, Inc.
Disclosure: Anebulo Pharmaceuticals, Inc.
Consultant/Advisor
Anebulo Pharmaceuticals, Inc.
Disclosure: Anebulo Pharmaceuticals, Inc.
Scientific Study/Trial Anebulo Pharmaceuticals, Inc.

## 382 Moral Distress in Resuscitation Policy Implementation During the COVID-19 Pandemic: A Mixed Methods Study

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Objectives: This study aims to assess health care clinicians' experiences with a health system's resuscitation policies for restricting potentially inappropriate medical care during the COVID-19 public health emergency. These policies were active during COVID-19 surges from April 2020 through January 2022.

Methods: This mixed-methods study consisted of an online questionnaire (n=204) followed by qualitative interviews (n=22) conducted from July 2021 to June 2022. The targeted population was ED and ICU providers and hospitalists, including physicians, nurses, and advanced practice providers in a large health system. Survey questions assessed: clinician awareness of the policy, experiences with resource allocation, and code status discussions. The ethical and psychological impact of the COVID-19 surge and the resuscitation policy on medical staff was also assessed. Participants for qualitative interviews were recruited through the questionnaire and subsequent snowball sampling. Data was collected through Zoom interviews using pretested, semi-structured questionnaires. Quantitative data was analyzed with bivariate and multivariate analyses. Qualitative data was analyzed via the Corbin and Strauss variant of grounded theory methodology to understand provider experiences with and impact of the contingency policies.

Results: Of the respondents who cared for COVID-19 patients, approximately half (53.5%) reported moral distress. Common sources of moral distress included: setting goals of care, the resuscitation policy, resource limitations, visitor restrictions, personal risk, and emergency department boarding. Emergency department personnel were most likely to report experiencing scarce resources; rooming (64%), COVID-19 testing (64%), and PPE (63%) were the most common. In those who experienced or witnessed resource limitations, higher numbers of limited resources correlated with a higher probability of

moral distress ($p<0.001$). Slightly more than half (54.8%) of clinicians reported enacting the resuscitation policy. 70.2% of clinicians felt supported or very supported by the hospital contingency policy, with nurses and attending physicians more likely to feel supported or very supported compared to trainees. Main themes from qualitative data included how ED physicians felt the policy was: 1) supportive to their practice during the COVID-19 surges; 2) adapted according to resource availability and provider values; and 3) transparent its development, dissemination, and review.

Conclusions: The COVID-19 pandemic resulted in changes to hospital resuscitation policies to address risks of resource shortages, staff safety and futility of care. Given the association between resource limitation and moral distress, this study revealed particular burdens carried by emergency medicine clinicians. Lessons from providers with direct experience with these policies in the health system may provide critical information for designing improved policies in the case of future public health emergencies.

No, authors do not have interests to disclose

## 383 Accuracy of AIIMS Sepsis Protocol in Early Identification of Sepsis in Patients Presenting to Emergency Department

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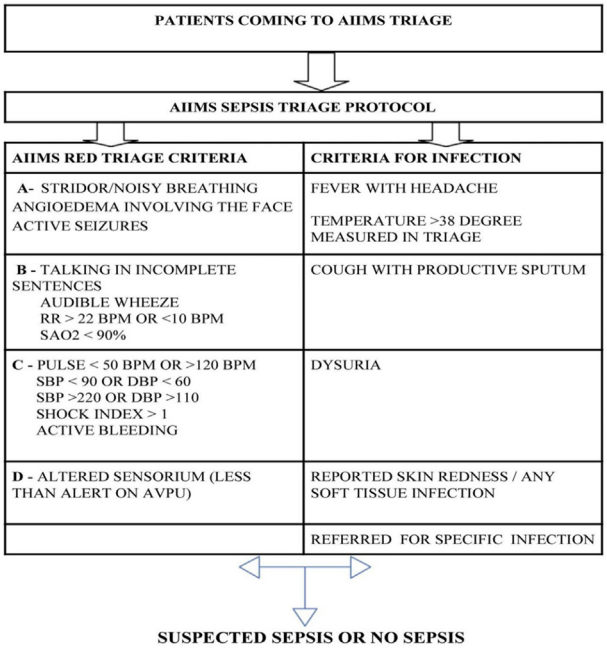
Background: Sepsis is a life-threatening condition which can present in a subtle manner and may be difficult to detect. It is vital to identify sepsis patients early to instigate management. None of the emergency department (ED) protocols or clinical tools can detect sepsis with high sensitivity and specificity. As part of a previous quality improvement initiative in our ED to improve sepsis care, a novel sepsis screening tool was developed by expert consensus. However, the validity of this tool was not tested.

Objectives: The objective of our study was to validate the AIIMS Sepsis Protocol (ASP) (Figure 1) against the gold standard diagnosis by sequential organ failure assessment (SOFA) scoring in patients presenting to ED and also to compare ASP with qSOFA score in identifying sepsis.

Methods: A prospective observational study was conducted in the Department of Emergency Medicine between January 2020 and December 2021. Seven hundred thirty patients above the age of 18 and who were triaged red as per our triage protocol were included. All patients who fulfilled the ASP for sepsis were labelled as suspected sepsis and followed up for 6-12 hours to calculate SOFA score based on laboratory investigations. Change in SOFA score from baseline (on arrival of patient to ED) to repeat SOFA at 6- 12 hours of more than 2 was considered gold standard for diagnosis of sepsis. The accuracy of ASP tested against SOFA score was assessed using sensitivity, specificity, negative and positive predictive value. Data analysis was done in IBM SPSS Statistics for Windows, Version 27 (IBM Corp., Armonk, N.Y., USA).

Results: A total of 730 patients were included in the study with 508 patients suspected of sepsis and 222 not suspected of sepsis when using ASP. Overall, the study population had a median age of 49 years and 66.71% were males. Respiratory tract infections were the commonest suspected source of sepsis among our patients. The most common comorbidity associated with sepsis was diabetes, followed by malignancy. SOFA score was calculated in patients by collecting the laboratory values within 6-12 hours of ED arrival. SOFA score was positive in 431(85.85%) patients. The sensitivity of ASP in identifying sepsis was 95.6%, specificity was 67.9% and negative predictive value was 91.4%. The secondary objective was to compare the AIIMS Sepsis Protocol with qSOFA. The sensitivity of qSOFA score was 57.7 with positive and negative predictive value of 95.5 and 55.7 respectively.

Conclusions: ASP was effective as a screening tool in our high volume ED for early identification of sepsis. It decreases the time of initiation of treatment in patients with suspected sepsis.




No, authors do not have interests to disclose

## 384 A Cluster Randomized Controlled Trial of Interventions to Increase Influenza Vaccine Uptake Among Underserved Emergency Department Patients

Rodriguez R, Rising K, Rafique Z, Eucker S, Nichol G, Ford J, Goicochea K, Morse D, Kean E, Keene K, Molina M/UCSF San Francisco, California, US

Objectives: Influenza vaccine hesitancy and low uptake disproportionately affect racial and ethnic minorities and underserved populations whose primary health care access occurs in emergency departments (EDs). These groups have historically suffered high morbidity and mortality from influenza. We have previously demonstrated that COVID-19 vaccine messaging increases vaccine acceptance and uptake in underserved ED populations. In this prospective cluster-randomized- controlled trial, we sought to evaluate the effects of two influenza vaccine interventions on influenza vaccine uptake in ED patients: (a) asking patients a question as to whether they would accept an influenza vaccine in the ED, and (b) provision of influenza vaccine messaging platforms (developed via in-depth interviews of vaccine-hesitant ED patients) prior to asking the influenza vaccine acceptance question.

Methods: We prospectively enrolled alert, non-critically ill, adult patients who had not received an influenza vaccine, in a 3-arm cluster randomized controlled trial at six hospital EDs in five US cities during a single influenza vaccination season (from October 2022 through February 2023). The unit of randomization was single days. Randomization groups were: Messaging (M) = delivery of three COVID-19 vaccine messaging platforms (an English or Spanish 3-minute video, a 1-page informational flyer and a brief, scripted message delivered by an ED physician or nurse) and then asking patients a question as to whether they would accept an influenza vaccine in the ED; Question (Q) = no messaging platforms but asking the same vaccine acceptance question in the ED; and Control (C) = no messaging and no question. Our dual primary outcomes were receipt of an influenza vaccine in the ED and within 30 days, ascertained by electronic health record (EHR) review and phone follow-up. Our intention-to-treat analysis used mixed effects logistic regression with a random center effect to accommodate potential within-center characteristics, as well as terms for time and randomized intervention.

Results: Of 831 eligible patients screened, 776 (64%) agreed to participate (214 on M days, 245 on Q days, and 317 on C days). Their median age was 46 years, 46% were female, 36% were African American, 21% were Latinx, and 32% lacked primary care physicians. We attained 100% EHR follow-up in participants. As compared to the C group, the Q and M groups had higher rates of influenza vaccination in the ED and

at 30 days ($p < 0.0001$ for all comparisons). Similar proportions of the M and Q groups received an influenza vaccine in the ED (M 27% vs Q 24%) and at 30 days (M 41% vs Q 32%). In comparison to the C group, the number needed to treat (NNT) to achieve vaccination at 30 days in the M group was 4 (95% CI 3-6) and the NNT in the Q group was 6 (95% CI 4-10).

Conclusions: Asking ED patients whether they would accept an influenza vaccine results in greater vaccine uptake in the ED and at 30 days. The addition of influenza vaccine messaging platforms to the influenza vaccine question may lead to greater uptake at 30 days, but the incremental value of this additional intervention is unclear.

| Influenza vaccination status | All % (95% CI) | Control % (95% CI) | Intervention Q % (95% CI) | Intervention M % (95% CI) |
|---|---|---|---|---|
| Vaccinated in the ED | 17 (15 - 20) | 5 (3 - 9) | 24 (19 - 30) | 27 (21 - 33) |
| Vaccinated at 30 days | 28 (25 - 31) | 15 (12 - 20) | 32 (27 - 39) | 41 (35 - 48) |

Yes, authors have interests to disclose

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## 385 Underage Alcohol Intoxication in the Emergency Department

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Background: Underage drinking is a common problem. In 2019, 24.6% of 14-15-year-olds reported having at least one drink. Alcohol intoxication can lead to a wide variety of problems such as death, injuries, physical and sexual assault and increased risk of using other substances. Care of acute intoxication accounts for numerous hours in the emergency department (ED).

Objectives: Determine clinical presentation, past medical history, and social support for patients between age 13 and 21 in the ED with acute alcohol intoxication. Compare between pre-COVID-19 years and during COVID-19.

Methods: Retrospective chart review over 4 years, 2018, 2019 (pre-COVID) and 2020, 2021 (COVID) at 4 urban ED sites. Included are all patients under 21 who presented to the ED and discharged from the ED with a diagnosis of alcohol intoxication. Excluded are patients with alcohol withdrawal, suicidal complaints, or trauma. Data abstracted included demographics, past medical history, live with parents, EMS/police involved, where picked up, who discharge with, and initial alcohol levels if done. Significance tested with Student-t or Chi-squared tests as appropriate, alpha set at 0.05. A priori analysis suggested a sample size of 500 would have 80% power to detect at least 15% difference between comparison groups.

Results: There were 481 cases. The mean age was 18.4 (range 13-20). 89.8% arrived by ambulance with 11.8% accompanied by police. 30.6% were picked up from a friend's home, 19.5% at a public space, and 12.7% from own home. Only 4.4% were picked up from a concert, while 22.2% were picked up at school or campus. 38.9% lived with their parents. There were 120 (25.0%) cases with a behavioral history, including 83 (17.3%) depression, 36 (7.5%) ADHD, and 27 (5.6%) bipolar disorder. Blood alcohol levels were done on 143 (29.7%) with mean level of 225 mg% (SD:68.5). The mean ED length of stay was 264 hours (SD:207). There were 302 cases during 2018 and 2019 pre-Covid and 179 cases during Covid 2020 and 2021. During COVID, there were significantly less arrivals by EMS (92.7% versus 84.9%; p=0.006) and less picked up at school (27.6% versus 14.0%; p<0.001).

Conclusions: Ninety percent of cases were brought in by EMS with 25% having a past history of behavioral issues. Only 38.9% lived with parents while 22.2% were picked up at school. During the COVID years, there were significantly fewer arrivals by EMS and from school. This study highlights the need to consider more intervention at the school/college level.

Table 1

| | Total | Pre-Covid | Covid | p-value |
|---|---|---|---|---|
| n | 481 | 302 | 179 | |
| Age | 18.4 | 18.5 | 18.2 | 0.055 |
| Gender (% F) | 49.1% | 56.0% | 37.4% | <0.001 |
| Live with Parents | 38.9% | 41.1% | 35.2% | 0.255 |
| Behavior history | 24.9% | 23.2% | 27.9% | 0.244 |
| Arrived from School | 22.2% | 27.6% | 14.0% | <0.001 |
| Arrived by Ambulance | 89.8% | 92.7% | 84.9% | 0.006 |
| Accompany by Police | 11.9% | 11.9% | 11.7% | 0.951 |
| Alcohol Level (n) | 225 mg% (143) | 223 mg% (87) | 229 mg% (56) | 0.590 |
| Discharged with Parents | 37.4% | 36.4% | 39.1% | 0.557 |
| ED LOS hours (SD) | 264 (207) | 245 (195) | 296 (222) | 0.010 |

No, authors do not have interests to disclose

## 386 COVID-19 Vaccine Messaging Platforms in the Emergency Department

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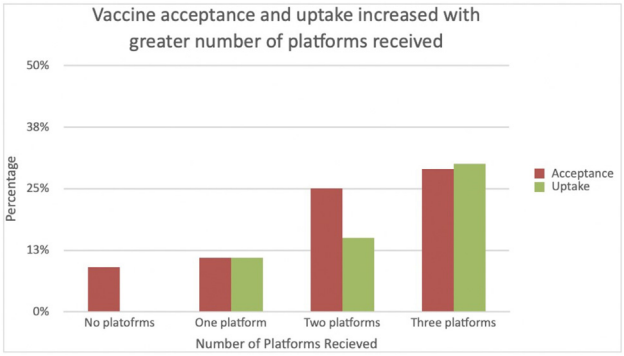
Objectives: In a cluster randomized controlled trial (RCT), we found that delivery of a triad of COVID-19 vaccine messaging platforms in emergency departments (EDs) led to greater vaccine acceptance and uptake in ED patients, with high impact on underserved populations. In this pre-planned analysis, we sought to assess the perceived efficacy of individual COVID-19 vaccine messaging platforms (videos, informational flyers, and scripts for provider messages) on vaccine acceptance and uptake, and what recommendations trial participants had about modifying the messaging platforms.

Methods: We conducted the RCT in 7 EDs in 4 US cities from December 2021 to July 2022. Adult patients who had not received a COVID-19 vaccine were eligible with these exclusions: major trauma, intoxication, altered mental status, critical illness, incarceration, psychiatric chief complaint, and suspicion of acute COVID-19 illness. Eligible participants received three COVID-19 vaccine messaging platforms (4-minute video, 1-page informational flyer and a scripted face-to-face message from an ED physician or nurse). One to six hours later, we administered a survey in which participants were queried about 1) whether they would accept a COVID-19 vaccine; 2) whether individual platforms had affected their feelings about getting a COVID-19 vaccine; 3) which platform(s) had the greatest effect; and 4) what (if anything) they would change about the platforms.

Results: We had 221 participants in the intervention arm. Of participants viewing the videos, 41% (95% CI 33-49%) stated they made it more likely they would get a COVID- 19 vaccine; of participants viewing the flyers, 29% (95% CI 22-36%) stated they made it more likely they would get the vaccine; of participants who received a message from a provider, 48% (95% CI 40-57%) stated they made it more likely they would get a vaccine. When asked which of the three platforms was the most useful to them, 47 (28%, 95% CI 21-34%) said the videos, 32 (19%, 95% CI 13-25%) said the ED provider message, 22 (13%, 95% CI 8-18%) said the flyers, and 69 (41%, 95% CI 33-48%) said all three were the same. Vaccine acceptance and uptake increased with number of platforms received (Figure). When recommending changes, participants emphasized the importance of offering patient perspectives, better graphics/illustrations, and more specific details in messaging platforms.

Conclusions: Considering the relatively low-cost and efficacy of the three platforms, we recommend inclusion of all three with minor modifications and templates for adaptation to specific communities that we have provided on open access portals. Our data from this trial informs messaging platform development and delivery for other trials of vaccine messaging (such as for COVID-19 booster and influenza vaccines).




No, authors do not have interests to disclose

## 387 Age-Related Trends in Laboratory Testing, Radiologic Imaging, Empiric Antibiotics, Intravenous Fluids, and Hospital Admission Among Adult Patients Presenting With Diarrhea to United States Emergency Departments (2016-2020)

Azqul M, Krakower D, Kalim S, Merchant R/Harvard Medical School, Boston, Massachusetts, US

Objectives: Our current understanding is limited in regards to how older age might affect laboratory testing, radiologic imaging, intravenous fluids (IVFs) and antibiotics administration, and admission in emergency departments (EDs) in the United States (US) for adults presenting with diarrhea. The evaluation of diarrhea among older patients in the ED might be more complex than for younger patients due to the higher likelihood of age-related comorbidities, complications associated with prior and ongoing medical or surgical conditions, or adverse drug reactions in this population. To address these knowledge deficits, we estimated laboratory testing and radiologic imaging use, antibiotics and IVFs administration, and admission frequency to the hospital among adults presenting to US EDs with diarrhea. We specifically examined if testing, treatment, and admission were more frequent among older patients (≥65 years old).

Methods: Data from the National Hospital Ambulatory Medical Care Survey (2016-2020) were analyzed. We calculated the proportions with corresponding 95% confidence intervals (CIs) of ED patient visits for diarrhea during which laboratory testing was performed (blood culture, complete blood count (CBC), and metabolic panel); radiologic imaging obtained (abdominal/pelvic computed tomography (CT), ultrasound); treatment rendered (antibiotics, IVFs); and admission was ordered. Adjusted odds ratios (ORs) for the usage of laboratory testing, radiologic imaging, treatment and admission were calculated through multivariable logistic regression models using age group (18-24, 25-34, 35-44, 45-54, 55-64, and ≤ 65 years old), sex, race/Hispanic ethnicity, patient residence, ED US geographic region, healthcare insurance payer type, ED medical staff involved in visit, and associated symptoms as adjusting covariates.

Results: Diarrhea accounted for 3% of adult US EDs visits from 2016 to 2020. Laboratory testing, radiologic imaging, treatment, and admission across all age groups were as follows: blood culture 8% (95% CI 7-10), CBC 80% (95% CI 76-83), metabolic panel 94% (95% CI 84-98), abdominal/pelvic CT 31% (95% CI 28-35), ultrasound 8% (95% CI 6-9), antibiotics 4% (95% CI 3-5), IVFs 64% (95% CI 60-68), and hospital admission 16% (95% CI 14-19). Admissions (OR 5.97; 95% CI 2.41-14.8) and abdominal/pelvic CT (OR 2.86; 95% CI 1.35-6.07) were greater among ≥65 than 18-24-year-olds (Table).

Conclusions: Adult visits to US EDs from 2016 to 2020 for diarrhea were notable for substantial utilization of laboratory testing, radiographic imaging and hospital admission. In particular, CBC, metabolic panel, and abdominal/pelvic CT were commonly obtained, and IVFs were often administered. However, only antibiotic administration and abdominal pelvic CT scanning were greater among older adults (≥65 years old), as compared to younger, ED patient visits. Further studies are needed to understand the link between patient medical and surgical history and presenting complaints, signs, and symptoms to the medical decision-making involved in testing, treatment, and admission for adult ED patients with diarrhea. Such studies might help determine if the decisions are evidenced-based, and perhaps inform future guidance on the evaluation and management of these patients.

**Table: Odds by age groups of laboratory testing, radiologic imaging, antibiotics and intravenous fluids administration, and hospital admission among adult patients presenting with diarrhea to US EDs (2016-2020)**

| Age groups (years old) | Blood culture OR (95%CI) | CBC OR (95%CI) | Metabolic panel OR (95%CI) | Abdominal/ pelvic CT OR (95%CI) | Ultrasound OR (95%CI) | Antibiotics OR (95%CI) | IVFs OR (95%CI) | Hospital admission OR (95%CI) |
|---|---|---|---|---|---|---|---|---|
| 18-24 | REFERENCE GROUP | | | | | | | |
| 25-34 | 0.64 (0.17-2.30) | 1.22 (0.75-1.99) | 0.64 (0.08-4.86) | 1.89 (1.04-3.43) | 0.43 (0.21-0.88) | 0.51 (0.19-1.33) | 1.21 (0.77-1.90) | 1.41 (0.57-3.49) |
| 35-44 | 1.48 (0.44-4.98) | 1.96 (1.22-3.17) | 0.67 (0.07-6.32) | 2.22 (1.33-3.71) | 0.34 (0.13-0.93) | 0.36 (0.08-1.72) | 1.67 (0.98-2.80) | 2.53 (1.02-6.31) |
| 45-54 | 2.38 (0.71-7.92) | 1.89 (1.13-3.17) | 3.84 (0.50-29.47) | 3.42 (2.03-5.75) | 0.27 (0.11-0.64) | 1.06 (0.34-3.34) | 1.65 (1.00-2.71) | 3.97 (1.54-10.24) |
| 55-64 | 1.31 (0.38-4.56) | 2.47 (1.19-5.09) | 5.85 (0.71-48.17) | 2.97 (1.54-5.74) | 0.56 (0.23-1.35) | 2.36 (0.70-7.97) | 2.25 (1.45-3.51) | 8.45 (3.26-21.92) |
| ≥65 | 1.27 (0.38-4.23) | 1.62 (0.69-3.79) | 3.09 (0.29-33.51) | 2.86 (1.35-6.07) | 0.45 (0.14-1.37) | 3.03 (1.00-9.57) | 1.69 (1.00-2.89) | 5.97 (2.41-14.77) |

No, authors do not have interests to disclose

## 388 Increasing Incidence of Methamphetamine Use in Hospitalized and Critically Ill Patients

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Objectives: Methamphetamine use is highly prevalent and increasing in the United States, paired with an increase in overdose mortality in recent years. Methamphetamine use has cardiac, pulmonary, neurologic, and psychiatric consequences – all of which might require hospitalization. Notably, few recent data exist on the scope of methamphetamine use and its consequences for patients admitted to the hospital including the intensive care unit (ICU). The objective of this study is to identify the reasons for admission, hospital course, and critical care interventions in patients who have recently used methamphetamine.

Methods: Design: Retrospective chart review project using data automatically extracted from the electronic health record with systematic manual quality checks for each variable.

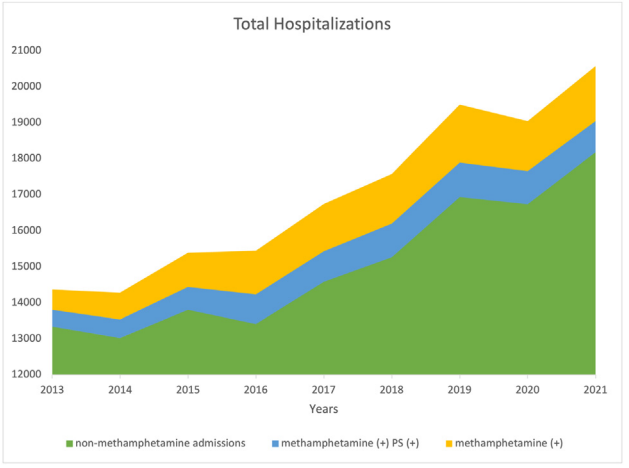
Setting: Academic medical center (University of California, San Diego)

Types of Participants: Patients aged 18-89, from January 2012 to January 2022, admitted to the UCSD health system, that had a Positive or "pending confirm" value for methamphetamine in a Urine Drug Screen on admission and/or an ICD-10 code related to stimulant use disorder as an active issue on admission. Urine drug screen data is reported as methamphetamine +/- and polysubstance (PS) +/- (reporting any benzodiazepines, barbiturates, cocaine, opiates, oxycodone, phencyclidine as PS +). Data extracted included basic patient demographics, reason for admission, hospital course details and ventilation duration.

Results: 19,159 encounters were included, representing 12,057 unique patients. 24.7% of patients returned within the study period, and 71.5% of return encounters were within one year of the previous encounter. Median age was 43 (IQR 22, range 81). 71.5% of encounters were men. Most encounters were identified based on drug screen, while only 18% of encounters did not have a drug screen. Co-occurrence of other substances was common (49.8% of encounters were methamphetamine +, but PS - screen; 31.8% of patients had a methamphetamine +, polysubstance + screen). Opiates were the most common co-ingestion. Hospitalizations per year increased from 883 in 2012 to 2532 in 2021 (see Figure 1). The most common reasons for admission included psychosis (N=274), Sepsis/SIRS (N=161), altered mental status (N=133), and mood disorders (N=132). The median hospital stay was 48 hours (IQR 72 hours). ICU admission occurred in 16.8% encounters, in which the median ICU stay was 42 hours (IQR 66 hours). Of those in the ICU, 16.3% were mechanically ventilated, with the median duration of 41 hours (IQR 81 hours). Eleven percent of encounters had a concomitant diagnosis of heart failure, 2.5% with cirrhosis, 0.3% with chronic kidney disease, and 0.3% with hematologic malignancy.

Conclusions: Hospitalizations for people who have recently used methamphetamine increased by 193% at our institution from 2012-2022, outpacing the increase in total admissions over the same period. Use of methamphetamine was associated with a variety of admission diagnosis and services, including resource-intensive ICU care in a minority (1 out of 6) of patients. Additionally, there is a high recidivism rate (24.7%), with the majority of these return visits occurring within a year of the initial visit. Our work shows the scope of methamphetamine use and its impact on a health center, with an

urgent need to improve outcomes for patients with methamphetamine use disorder.




No, authors do not have interests to disclose

## 389 The Use of a Viral Pandemic Dispatch Protocol to Filter Out Minor Illness Cases of COVID

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Background: Suffolk County New York has an annual 911 EMS call volume over 180,000 calls per year and serves a population over 1.5 million people. The average daily EMS call volume is 500 calls and is handled by a central dispatch system that uses a CAD system for EMD using the International Academies of Emergency Dispatch cardset. Card 36 is for Pandemic Flu. During the COVID-19 pandemic, the Emergency Medical Dispatchers observed that the EMS system in Suffolk County received many calls for EMS service from young healthy persons for which an ambulance transport seemed unnecessary. The current EMD36 Pandemic Flu card did not seem appropriate for this pandemic situation, and a new EMD36 Viral Pandemic Dispatch Protocol to filter out minor illness cases was used.

Objectives: To employ a set of simple criteria to filter out of the EMS system minor illness cases from dispatch and to monitor that process to ensure that no patient harm or serious adverse event occurred in real time from not sending an ambulance to young healthy patients experiencing symptoms of COVID-19 illness.

Methods: In Suffolk County New York, during the COVID-19 pandemic, the EMS system put into place a viral pandemic dispatch protocol to select patients who warranted dispatch of an ambulance based on patient age and severity of complaint. The International Academies of Emergency Dispatch Card 36 was adjusted to the coronavirus pandemic situation so that any patient less than age 35, without complaints of altered mental status, without difficulty breathing or chest pain, and without a major medical comorbid condition such as diabetes or cancer, was selected not to dispatch an EMS ambulance to the scene and the caller was instructed to call their health clinic, urgent care center, or private physician and too seek medical care by alternate means. These callers were instructed to call 911 again if the situation changed and their symptoms worsened. The callers were given a list of local resources for health clinics, urgent care centers and physician offices that were available as well as non-EMS system transport information. The EMD 36 Viral Pandemic Dispatch Protocol was implemented from April 3, 2020 to July 7, 2020 and a second time from December 24, 2020 to March 3, 2021 during the first and second waves of the COVID-19 pandemic. The 911 Dispatch and Communications Center, Suffolk County Medical Control, and the 11 Suffolk County hospitals were monitored on a daily basis at first and then weekly for (1) any repeat calls to 911 (2) any hospital admissions and (3) any deaths related to COVID-19 to screen for any patients who may have been selected for not dispatching an EMS ambulance to any caller in the 911 system.

Results: There were a total of 1281 calls over a total of 164 days that were selected for not dispatching an EMS ambulance. This represents an average of 7.8 calls per day (1% of the total calls) that were filtered out of the EMS system by the use of the EMD 36 Viral Pandemic Dispatch Protocol. There were 14 second calls within 24 hours to 911 from the original callers who were filtered out (which is 0.01%) and 26 second calls within 72 hours (which is 0.02%). All second calls were dispatched an EMS ambulance. The 11 Suffolk County hospitals reported a total of 4 admissions (all were second calls) to the area hospitals for serious COVID-19 illness (none to ICU) in the use of the EMD 36 Viral Pandemic Dispatch Protocol and 0 deaths were reported.

Conclusions: The use of the EMD36 Viral Pandemic Dispatch Protocol effectively selected minor illness cases not to dispatch an EMS ambulance. This saved EMS units for more serious cases, saved EMS provider infectious exposure, and saved EMS PPE supplies without causing any significant patient harm.

No, authors do not have interests to disclose

## 390 A Before and After Comparison of a Novel Device for ECG

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Objectives: Accurate interpretation of ECGs is crucial for diagnosing and managing cardiac conditions. However, errors in ECG acquisition, particularly electrode misplacement, can lead to incorrect interpretations and impact patient care. We present data on the comparison of a novel device that is utilized to obtain diagnostic 12 Lead ECGs. The device is screen printed and uses anatomical markers to ensure proper alignment and has a single connection terminal.

Methods: This is a case-control study of utilizing a novel 12 lead electrode system with licensed paramedics and emergency nurses. This is a human factors study evaluating the utility of the novel device. Participants volunteered to perform a traditional 12 lead ECG with the same subject and then utilize the novel device to perform another 12 lead ECG. We used a 7-point Likert survey (ranging from strongly disagree to strongly agree) to measure the participant preference for using the device and characteristics related to ease of use, reduced mental effort, improved patient safety, and confidence with placing electrodes correctly. Still photos were analyzed for the positioning of electrodes. We used STATA, College Station TX for all statical analyses of intra- and inter-operator agreements.

Results: N=22 licensed and active EMTs and RNs. There were 60 misplaced electrodes vs 3 misplaced electrodes with the novel system ($p<0.001$). The participants reported significantly high agreement regarding the novel system (reported in medians and interquartile range): ease of use (7, 7-7), reduced mental effort (7, 7-7), improves patient safety (7, 7-7), improved positioning of electrodes (7, 7-7), made their workday better (7, 7-7) and reported they correctly place traditional electrodes (7, 5-7). The inter-rater agreement between electrode placement between participants versus with the novel device differed significantly with correlation coefficients for accurate placement of all 10 electrodes of kappa (0.82) novel device vs kappa (0.24) traditional electrodes, $p<0.001$).

Conclusions: This study demonstrated that the novel device had more reliable placement of electrodes with greater inter-rater agreement in comparison to traditional electrodes and that the providers reported strong agreement that they found it easier to use, improves patient safety and reduces mental effort. Subjects reported a higher level of confidence with placement of traditional electrodes than was observed. Further inquiry into the factors that reflect that misplacement of electrodes may be unappreciated by the user is an important concern.

Yes, authors have interests to disclose
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Other
CB Innovations LLC
Disclosure: CB Innovations LLC
Other
CB Innovations LLC

## 391 Sensitivity of Software Automated Interpretation of STEMI

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Objectives: Automated EKG interpretation software has long been deemed inferior to physician interpretation. With improvements in software technology, namely machine learning, there is increasing evidence of both non inferior and superiority studies in software interpretation's favor. These advances in

automated software technology have great potential to improve EKG interpretation accuracy, patient care, and emergency department efficiency. We aimed to analyze our current automated EKG interpretation software against emergency medicine physician interpretation in cases of STEMI as compared to cardiac catheterization results.

Methods: We identified all patients presenting to the emergency department who had a STEMI code activation and subsequently received cardiac catheterization between 2021 - 2022. Automated software interpretation of the EKG, emergency physician interpretation, and cardiac catheterization results for accuracy of the diagnoses of STEMI were compared.

Results: In total there were 87 STEMI activations from the SUNY Upstate Emergency Department confirmed by cardiology on catheterization. We found that 60.9% (53) of the cases were interpreted as STEMI by both the software and the emergency physician. Software did not interpret a STEMI in 35.6% (31) of the cases where the emergency physician did indicate STEMI. In 2 cases neither the automated software nor physician interpreted STEMI and in 1 case only automated software interpreted STEMI. The automated software had a 62.07% sensitivity in detecting a STEMI. Sensitivity of emergency physician interpretation at our institution was significantly greater at 96.55%.

Conclusions: The current automated software utilized for EKG interpretation is inferior for interpretation of STEMI EKGs as compared to cardiac catheterization results. Emergency physician EKG interpretation for STEMI was more accurate than the automated software when compared to cardiac catheterization.

No, authors do not have interests to disclose

## 392 Descriptive Study of Utilization of Urine Drug Screen for Abdominal Pain Complaints in the Emergency Department

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Objectives: Urine drug screening (UDS) is a tool that can be used to detect evidence of recent usage of a variety of substances such as prescription medications, prohibited or illegal substances, or medications administered in a clinical setting. While UDS may be utilized in caring for patients with symptoms arising from substance usage or toxic effects of medications, its utilization often does not create a significant impact on clinical decisionmaking in the emergency department setting. Additionally, urine drug screen results could be falsely positive or negative and lead to incorrect assumptions guiding patient care.

Administration of a test that may have little to no effect on clinical decision making or in the overall treatment of the patient can increase the cost of care, increase the duration of stay, and delay care to other patients in the emergency department. In this study, we seek to characterize the usage of UDS in the emergency department for patients with a chief complaint of abdominal pain.

Methods: The study was conducted using a single-center, retrospective, observational study. The study cohort included all patients who came to the emergency department over the age of 21 with a chief complaint of "abdominal pain." Patient charts were reviewed by the study team to extract indications for ordering the UDS, results, ordering provider, along with demographic characteristics of the patients presenting. To assess differences in length of stay and age between visits where the patient received UDS or not, student T-tests were conducted.

Results: Out of the 149 patients presenting in the emergency department for abdominal pain for whom UDS was ordered, 8% had clear reasons for UDS order while 2% did not. Among those who did not have a clearly specified reason for UDS, a reason for ordering UDS could be inferred in 7% of these patients. Five percent of UDS ordered in the study had negative results. Average length of stay was greater in patients for whom UDS was ordered compared to patients without UDS, 12.1 hours and 7.9 hours, respectively ($p<0.0001$). Age difference was also significantly different between the UDS group and no UDS group, median age 36 and 39, respectively ($p<0.001$). 60.4% of UDS were ordered by Advanced Practice Practitioner (APP), while 38.9% were ordered by physicians. Among the 149 patients whose charts were reviewed, 22% of UDS were ordered by a single APP.

Conclusions: The goal of this study was to better understand the utilization patterns of urine drug screens. In this descriptive study, it was found that while urine drug screens were ordered not infrequently in the emergency department, the reasoning for the test was often nonspecific and contributed little in regards to patient management. It was found that certain patient demographics had more UDS ordered than others, but to better characterize this, more patient variables should be adjusted for and a larger prospective study should be conducted. In order to investigate further whether there was a significant impact of UDS on clinical management among admitted patients, future studies may involve chart review of notes throughout the admission for documentation of interventions based on UDS results.

No, authors do not have interests to disclose

# EMF

## 393 WITHDRAWN

## 394 Pre- and Post-implementation Comparison of the Impact of Emergency Department-Based COVID-19 Point-of-Care Testing on Emergency Department Patient Metrics

Fenstermacher K, Klein E, Mumford J, Colburn T, Gardner H, Maliszewski B, Cole G, Clarke W, Saheed M, Rothman R/Johns Hopkins University School of Medicine, Baltimore, Maryland, US

Objectives: Use of point-of-care Testing (POCT) in emergency departments (EDs) may afford the opportunity to improve key ED operational metrics. We evaluated the impact of COVID-19 POCT on time to delivery of test results, rates of patients who left the ED with or without a COVID-19 diagnosis, and the amount of time COVID-19-negative patients spent in isolation.

Methods: Retrospective pre-POCT (7/1/2020 – 8/31/2020, N=4105) and post-POCT (1/1/2021 – 3/31/2021, N=4795) implementation analysis of patients presenting to the Johns Hopkins Hospital Adult ED who received symptomatic COVID-19 testing. Both pre- and post-implementation POCT was performed using the Cepheid GeneXpert SARS-CoV-2 or SARS-CoV-2/Flu A/B/RSV nucleic acid tests, which have a run time of 45 minutes; pre-POCT occurred in the hospital central lab and POCT occurred in a POC testing lab established in the ED.

Results: Post-implementation, the time from arrival to test result for all patients decreased by an average of 133.2 $\pm$ 3.3 minutes; the time to delivery of test result decreased by 177.4 $\pm$ 16.02 minutes for COVID+ patients. Reduction in time to test result was associated with a significant decrease in the percentage of patients who were discharged from the ED without their result being known prior to departure: pre-implementation, 8.7% of all tested patients left without a known result, with 21% of COVID+ patients leaving prior to receiving a diagnosis; post-implementation, only 0.92% of all tested patients and 0.68% of COVID+ patients left the ED without a final COVID diagnosis. The amount of time COVID-19 negative patients spent in isolation in the ED decreased by an average of 129.7 $\pm$ 3.3 minutes post-POCT implementation.

Conclusions: Use of ED POCT for COVID-19 in the ED resulted in more rapid time to test results and fewer patients leaving the ED who did not know their COVID-19 status, decreasing the likelihood that a COVID+ patient would unknowingly expose others in the community. Additionally, the improved time-to-test-result reduced the amount of time COVID-negative patients spent in isolation, enabling clinical staff to avoid unnecessary PPE usage and free up negative pressure beds.

Yes, authors have interests to disclose

Disclosure: Cepheid

Grant Support Cepheid

## 395 Brazilian Airway Registry COoperation: Comparison Between Intubations Performed by Emergency Physicians or Non-Emergency Physicians

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Objectives: There is a lack of knowledge about how airway management is performed in severely ill patients at Emergency Departments (EDs) in Brazil. We addressed this gap by creating the Brazilian Airway Registry COoperation (BARCO) to collect data on endotracheal intubations (ETI) performed across Brazilians EDs. Here we compare intubations that were performed by physicians trained (or in training) as emergency specialists (EME) with the ones performed by non-emergency physicians (NON).

Methods: This is an observational prospective cohort study of intubations performed in 11 EDs across several regions of Brazil for one year, beginning in March

2022. Data about each procedure were collected in a standardized REDCap survey immediately after intubations, filled by an intubation observer. Centers with a compliance rate < 90% during a month had the respectively data excluded. Outcomes evaluated were the first pass success (FPS) rates and major adverse peri-intubation events (including hypoxemia, new hemodynamic instability and cardiac arrest) presented within 30 minutes after tracheal intubation. Risk ratios (RR) with 95% confidence intervals (CI) were calculated.

Results: A total of 996 endotracheal intubations (ETI) were included, 421 (42.3%) performed by emergency physicians and 575 (57.6 %) by non-emergency physicians. FPS rates were higher in the EME group (82.3 %) compared to the NON group (75.1 %). First attempt by an emergency specialist had a higher chance of success (RR 1.10; CI 1.03 - 1.17) when compared to non-emergency specialists. Regarding major adverse peri-intubation events, intubations in EME group had a lower chances of severe hypoxemia (RR 0.59; CI 0.40 - 0.87). There was no difference between the incidence in EM and NON regarding hemodynamic instability (18.5 % vs 20.05, respectively), and cardiopulmonary arrest (3.3% vs 2.9%, respectively).

Conclusions: We conclude that in ETIs performed by emergency medicine specialists present a higher chances of FPS and are associated with lower severe hypoxemia events during ETI when compared to the procedures performed by physicians without emergency medicine training. This shows the importance of developing emergency medicine in Brazil and its possible impact on clinical outcomes.

No, authors do not have interests to disclose

## 396 Brazilian Airway Registry COoperation: Comparison Between Intubations Performed With or Without Videolaryngoscope

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Objectives: There is a lack of information about how airway management is performed in emergency departments (EDs) in Brazil. We addressed this gap by creating the Brazilian Airway Registry COoperation (BARCO) to collect data on endotracheal intubations (ETI) performed across Brazilian EDs. Here we compare the intubations that were performed with videolaryngoscopy (VL) with that performed with direct laryngoscopy (DL).

Methods: This is an observational prospective cohort study of intubations performed in 11 EDs across several regions of Brazil for one year, beginning in March 2022 and ending in March 2023. Data about each procedure were collected in a standardized form, filled by an assigned researcher in each center. Centers with a compliance rate < 90% during a month were excluded. Outcomes evaluated were the first-pass success (FPS) rates and major adverse peri-intubation events (including hypoxemia, new hemodynamic instability and cardiac arrest) are presented. Risk ratios (RR) with 95% confidence intervals (CI) were calculated.

Results: We collected data from 996 ETIs. VL was used in a minority of intubations (209, 20.9%), while DL was the primary choice in 787 cases (79.1%). FPS was observed in 781 of the intubations (78.4%), while 21.6% of patients needed more than one attempt. When VL was used, FPS rate was 85.1%, compared to an FPS rate of 76.7% when DL was the first choice ($p<0.05$). These data show that the probability of FPS with VL is higher (RR 1.11; CI 1.03 - 1.19) than with DL in our sample. We also observed 300 major adverse peri-intubation events (MAE) in our sample (30.1%); however, the incidence of MAE was not different between the procedures performed with VL or DL, 64 (30.6%) vs 236 (30%), respectively.

Conclusions: We concluded that using videolaryngoscope for the first intubation attempt improves the success rate. There was no significant difference in adverse events between VL and DL. Videolaryngoscope was not widely available across all centers, which resulted in a preference for DL as the primary method for airway management. Pre-intubation optimization may have a greater impact on reducing adverse events than the choice of intubation device. These findings emphasize the significance of promoting investment in VL equipment and training as a crucial step in enhancing airway management outcomes within the Brazilian public health system.

No, authors do not have interests to disclose

## 397 Analysis of Follow-Up Chest Radiography for Adult Emergency Department Patients

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Objectives: In our emergency department (ED), the consultants in emergency medicine review all radiology reports ordered by ED clinicians. Since 2019, all discharged ED patients for whom the radiologist advised that follow-up chest X-ray (CXR) were sent an appointment for a repeat outpatient CXR. The patients were told that they would be contacted if a further follow up CXR was indicated. The consultants in emergency medicine checked the repeat CXR report and organized follow-up as required. The primary objective was to determine how often follow-up CXR altered the patient's outcome disposition. The secondary objectives were to ascertain the number of follow up CXRs required on discharged patients and to itemize the indications for repeat CXRs.

Methods: A single center retrospective chart review study was conducted on all discharged emergency department patients recalled for a repeat CXR in 2019.

Results: 52,398 patients presented to TUH ED for the year 2019 and of those 39,071 were discharged directly from ED. 15,379 of all patients attending our ED in 2019 had a CXR as part of their assessment. Four percent of patients (614/15,379) who had a CXR in the ED were recalled for a repeat chest radiograph in 2019.This included 305 male and 309 female patients, mean age 56.7 (range 17 to 95 years). 414 follow-up radiographs were completed in 2019. 200 patients did not attend for follow-up radiography. The three commonest clinical indications for CXR requests on initial ED attendance were respiratory symptoms (n= 298), non-traumatic chest pain (n= 150) and thoracic trauma (n= 55). The four main indications for repeat CXR as identified by the reporting radiologist included follow-up to confirm resolution of infectious/inflammatory changes initially identified (n=360), to monitor a potential lung nodule for stability (n=104) and to repeat the imaging with appropriately positioned 'nipple markers' for bilateral opacities (n=37). Of the 414 patients who had follow-up radiographs completed, the radiological concerns for 311 (75.6%) had resolved and these patients did not require any further management. 49 patients (49/414, 11.83%) were referred to the respiratory outpatient department: 9 had a final diagnosis of chronic obstructive pulmonary disease; 6 had a diagnosis of pulmonary fibrosis or interstitial lung disease; 1 had a diagnosis of tuberculosis; 1 had a diagnosis of asbestosis sequealae; one had a diagnosis of bronchietasis. Four patients were discharged back to their primary physician; 5 were referred to another specialty; 5 patients were lost to follow up and three died (cause unknown) prior to follow-up. 3 patients (3/49, 6.12%) were diagnosed with primary lung carcinoma, 1 patient was diagnosed with lung metastases and one patient was found to have a progression of a known lung carcinoma.

Conclusions: Follow-up chest radiographs for discharged emergency department patients resulted in a small number of patients requiring further assessment in respiratory outpatients. The majority of findings identified by radiologists which required follow-up imaging were ultimately benign.

No, authors do not have interests to disclose

## 398 Patient Variables Associated With High/Moderate Acuity Abdominal/Pelvis CT Scan Results in the Adult, Non-Traumatic Emergency Department Patient

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Objectives: Abdominal pain is a common emergency department complaint, and abdominal/pelvis CT is frequently used to evaluate many complaints in the adult emergency department (ED) patient. Due to the breadth of processes that may present with abdominal pain as a symptom, no clinical prediction tools have been developed to aid the physician in deciding whether an abdominal/pelvis CT is necessary. We aimed to identify patient characteristics that independently predict high or moderate acuity CT findings.

Methods: We performed a retrospective observational study of randomly selected patients who presented to the ED at Vidant Medical Center between 1/1/2014 and 6/30/2016 whose assessment included an abdominal/pelvis CT. Patients under 18 years of age and those with traumatic complaints were excluded. The study was reviewed and approved by the University and Medical Center Institutional Review Board of East Carolina University (IRB#16-001596). CT results were categorized into high/moderate or low/negative groups. The primary outcome was patient variables that significantly correlated with high or moderate CT scan results. We analyzed data on 31 patient

variables, including demographics, features of the HPI and review of systems, vital signs, exam findings, and lab results that were available to the provider during the ED visit. Binary Logistic regression was used to identify those variables that correlated with high/moderate CT finding with $p < 0.05$ indicating significance (SPSSv.27). Odd's ratios and 95% confidence intervals are reported for significant variables.

Results: A total of 150 patients (median age of 47 years, 60% female) were included in the study. Only 2.6% (n = 4) had high acuity results (ex: obstruction, infarction, surgical process) while 32% (n=51) had high or moderate acuity results (ex: mass/cyst, kidney stone, infection). Patients with left lower quadrant pain or periumbilical pain had the highest rate of positive CT findings (72% and 83%, respectively). Flank pain was most often associated with high/moderate acuity (64% of cases). Variables correlated with high/moderate acuity CT results included female sex (n=90; p = 0.02, OR = 2.25, 95% CI = 1.13-4.49), hematuria with 20-50 RBC per HPF (n=10; p = 0.006, OR = 10.7, 95% CI = 2.0-57.6), and IV contrasted studies (n=111; OR=3.7; 95% CI= 1.7-7.8). A past medical history of pelvic surgery reduced the likelihood of high acuity findings (n=66; OR=; 95% CI= 0.12-0.59) Additionally, hematuria with >50 RBC per HPF trended towards significance (n=12; p = 0.05, OR = 3.7, 95% CI = 1.0 – 14.1).

Conclusions: High acuity results were rare, suggesting that abdominal/pelvis CT may be overutilized in the adult ED population. Additionally, nearly 20% of our CT results were categorized as "other," demonstrating that our diagnosis categories need refinement and are potentially confounding our categorization of the acuity of CT results. While no reliable clinical guidelines can be made from this study, a higher index of suspicion in female patients and those with significant hematuria could potentially be appropriate. These results may also represent substantial overlap with independent predictors of CT scans positive for kidney stones, given their prevalence in our data. The small number of patients with high acuity findings limits the power of our study. A higher-powered study with better representation of high acuity diagnoses is needed prior to suggesting clinical decision guidelines.

No, authors do not have interests to disclose

## 399 Extracorporeal Membrane Oxygenation in Hemodynamically Unstable Stanford Type A Aortic Dissection: Case Series

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Objectives: Acute Stanford type A aortic dissection (AAD) has a high mortality rate. Circulatory support using venous-arterial extracorporeal membrane oxygenation (VA- ECMO) for AAD is a relative contraindication given the concern for exacerbation of false lumen perfusion, valve regurgitation or propagation of the flap which could lead to a cardiac arrest, due to insufficient perfusion to the coronary arteries, or cardiac tamponade. Because of the difficulty in identifying that a hemodynamically unstable patient has AAD at the time of presentation to the emergency department, some cases receive VA-ECMO for circulatory support. However, such cases are rare and the prognosis for these patients is unclear. The aim of this study is to investigate the effectiveness of VA-ECMO in patients with AAD and cardiac arrest.

Methods: We conducted a case series including six AAD cases transferred to our hospital from 2012 to 2022. All six cases experienced cardiac arrest before or soon after arrival, and VA-ECMO was introduced based on the general indication for cardiopulmonary resuscitation. The median age was 65 (interquartile range [IQR], 55-74), and four cases were male. Five cases were in cardiac arrest when they arrived at our emergency department. When cardiac arrest was identified, two cases were shockable rhythm (ventricular fibrillation), and four cases were pulseless electric activities. Three cases regained their own spontaneous circulation, while the other three cases remained in cardiac arrest until VA-ECMO was established. The median time for the establishment of VA-ECMO was 21.5 minutes (IQR, 14-25 minutes). Four cases could undergo the surgery for AAD, but all six cases died within a few days.

Results: When cardiac arrest occurs due to AAD, the overall prognosis is extremely poor. The main causes of cardiac arrest in AAD are cardiac tamponade and mal-perfusion of the coronary arteries due to the extension of the dissection. The only way to treat these complications is immediate surgical intervention. Generally, VA-ECMO is considered contraindication as circulatory support for AAD due to the risks of exacerbation. Given the fact that VA-ECMO could effectively maintain cerebral perfusion in the operating room, VA-ECMO can potentially play a role in temporizing cerebral circulation until the patient is admitted to the operating room for definitive treatment of AAD.

Conclusions: Given this case series, VA-ECMO might potentially play a role in maintaining cerebral circulation until the patients with AAD and cardiac arrest are transferred to the operating room.

No, authors do not have interests to disclose

## EMF 400 Staff Attitudes and Experiences With Implementation of an Emergency Department Community Health Worker-Peer Recovery Specialist Program for Patients With Substance Use Disorders

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Objectives: In 2020, the Rhode Island Hospital (RIH) emergency department (ED) launched the Substance Misuse Assistance Response Team (SMART), an ED- based multidisciplinary care team of dually certified community health workers (CHWs)- peer recovery specialists and emergency medicine clinicians. SMART engages patients with substance use disorder (SUD) and provides ED initiated and outpatient linkage to harm reduction and addiction treatment service and assistance with health-related social needs. Our objective in this study is to examine ED staff experiences with and attitudes toward SMART.

Methods: We conducted a convenience sample through a survey distributed via email to all RIH ED staff members, including physicians, residents, advanced practice practitioners, nurses, social workers, and nursing assistants. Survey questions included questions regarding staff utilization of the program, attitudes, and challenges in effectively using the program. Responses were analyzed descriptively.

Results: The survey yielded 79 respondents. A little more than half of the survey respondents had utilized SMART services (55.6%, 44/79). Of the 35 that didn't, primary reasons for not contacting SMART included: did not know about SMART services (68.4%, 26/35), did not know how to contact SMART (18.4%, 7/35), difficulty in contacting SMART (2/35, 5.3%), attempted to contact but the team was not available (1/35, 2.6%), and feeling that the program was not needed (1/35, 2.6%). Amongst the 44 that did utilize SMART, a majority of respondents stated SMART improved their ability to help patients with SUD (mean 4.27, SD 0.96, scale 1 - 5) and that the service was easy to utilize (mean 4, SD 1, scale 1 - 5). When asked if SMART delayed patient care, on average, people disagreed (mean 2.93, SD 1.07, scale 1 - 5). Almost all respondents that used SMART felt the program was useful in linking patients to treatment (95.4%, 42/44). Many respondents felt SMART was useful in engaging and supporting patients (79.5%, 35/44), disposition planning (79.5%, 35/44), and assisting with patient shelter and other housing needs (59.1%, 26/44). Nearly half (40.9%, 18/44) of respondents who had used SMART experienced at least one attempt when they tried to contact SMART but services were unable. Other barriers to utilization included hours of availability (mean 3.53, SD 1.23, scale 1 - 5), availability of outpatient services (mean 3.14, SD 1.37, scale 1- 5), and patient interest in receiving services (mean 3.07, SD 1.26, scale 1- 5).

Conclusions: Ultimately, implementation of this program varied amongst staff mostly due to lack of staff knowledge about SMART. Amongst staff who had utilized the program, a majority found it very acceptable with direct improvements in patient care. More broadly educating staff members about SMART, creating easier ways of contacting the team, and expanding hours will be key to improving implementation.

No, authors do not have interests to disclose

## 401 Great Expectations: A Randomized Controlled Trial of a Novel Patient Expectations Communication Tool

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Objectives: Lower patient-reported satisfaction with healthcare visits is linked to suboptimal patient outcomes, decreased adherence to healthcare treatments, higher health care utilization, and increased rates of litigation. Prior studies demonstrate that clinician awareness of patient expectations is linked to improved patient satisfaction. The objective of this study was to determine whether utilization of a novel patient-completed expectations questionnaire increases satisfaction with emergency department (ED) visits.

Methods: We performed a multi-site randomized controlled trial at three community EDs where patients are seen by attending physicians, resident physicians and non-physician clinicians. The study was treated as exempt by our institution's human subjects review board. We developed and refined a novel patient-expectations questionnaire based on feedback from structured interviews with ED patients. The final tool queried reasons for seeking ED care, expected diagnostic testing and treatment. Patients were included if they were walk-in, adult, did not necessitate immediate intervention, and were able to complete a paper survey. They were excluded if a medical screening exam was already in progress at the point of study staff contact or if their visit was involuntary in nature. Participants were enrolled by staff who were not the patient's treating clinician after ED check-in but prior to contact with the clinician who would be providing their care. Once consented, participants were randomly allocated 1:1 using permuted blocks with variable block size through an online randomization platform. Allocation was concealed until a participant's name was submitted in the platform. Intervention participants were asked to complete the questionnaire and hand it back to their clinician upon first meeting. Participants in the control group were provided no additional information or questionnaire. At discharge or at time of disposition for admitted patients, all participants were asked by study staff to complete a survey including three healthcare provider-related satisfaction questions from Press Ganey and two novel patient expectations questions. Demographics data was also collected. The primary outcome was Likert response to the question: "My ER provider understood my expectations for my ER visit today". Intention to treat Mann-Whitney-U testing and ordinal logistic regression (adjusting for age, sex, and education level) was performed for the primary unadjusted and adjusted analyses, respectively. A priori power analysis required 262 exit surveys to detect a small to moderate effect between groups, with alpha = 0.05 and power of 0.8.

Results: 308 enrolled. 141 and 123 exit surveys were collected for intervention and control groups. 70% of the intervention group strongly agreed that their provider understood their expectations versus 61% for control, however this unadjusted difference was not statistically different. The adjusted analysis was significant, such that participants who received an expectations questionnaire had a 2.1 times greater odds of reporting their ER provider understood their expectations (95% confidence interval: 1.2 - 3.7).

Conclusions: An expectations questionnaire can be leveraged to improve patient satisfaction in the ED without additional provider burden.

No, authors do not have interests to disclose

## 402 Sedation After Intubation

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Objectives: Timely post intubation analgosedation is important to prevent pain, and awareness during paralysis which can lead to perceived threats and long term psychological effects for patients. Common factors that delay post intubation sedation include peri/post intubation hypotension, long acting paralytics. There has been no study on the level of training on the rate of post intubation sedation. The findings of this study will contribute to our understanding of post intubation sedation patterns among resident physicians and help modify training to improve patient safety and outcomes.

Methods: This is a retrospective cohort study in intubated patients in the ED from at 4 new teaching hospitals within Valley Health System in Las Vegas. Exclusion criteria include pediatric patients, pregnant patients, cardiac arrest patients that expired in the ED, definitive airway achieved prior to ED arrival, and cases involving researchers in this project. Descriptive statistics were calculated for time between intubation and sedation, rate of timely post-intubation sedation (less than 15 minutes from intubation time). T-test analysis would determine if a statistically significant difference exists in rate of timely post-intubation sedation between attending only and attending + resident cases.

Results: There were a total of 181 cases, of which 145 cases involving attending only, and 36 cases involving attending + residents. There was not a significant difference in the time to sedation order in rocuronium cases between attending only (27 minutes) and attending + resident (17 minutes); t(df) = 0.6277, p = 0.5391]. Only 58% of attending only cases and 61.1% of attending + resident cases had time to sedation order less than 15 mins. Only 29% of attending only cases and 21% of attending + resident had time to sedation start less than 15 mins. A chi-square test showed that there was no significant association between resident involvement and a) delayed time to sedation order, X2 (2, N = 102) = 0.7213, p = .396 b) delayed time to sedation start, X2 (2, N = 102) = 0.48, p = .488.

Conclusions: There was no difference in time to sedation order or time to sedation start between resident and attending physicians. Overall, approximately half of the cases failed to have timely post intubation sedation. Ongoing education should be provided for both residents, attending, and involved ED staff on the need for sedation in patients intubated with rocuronium.

No, authors do not have interests to disclose

## 403 Comparison of Point-of-Care Testing Versus Hospital Lab Testing in the Emergency Department: A Time to Results Evaluation of the iSTAT Device

Pandey S, Douglas S, Taghizadeh L, Hurreh K, Driver B/Hennepin Healthcare Research Institute, Minneapolis, Minnesota, US

Objectives: Timely accurate lab testing is critical in the emergency department (ED). Point-of-care testing (POCT) may provide faster laboratory results, which is particularly relevant in critically ill patients. The primary objective of this study was to compare the time taken for results retrieval between critically ill ED patients using POCT compared to hospital lab testing. The secondary objective was to evaluate the accuracy of the POCT device compared to hospital lab testing for the same range of laboratory tests.

Methods: We performed a prospective observational study of the accuracy and time to lab result of the Abbott iSTAT device with CHEM8+ and CG4+ cartridges in the resuscitation bays of a Level 1 Trauma Center, including all patients who presented due to critical illness or trauma. The CHEM8+ cartridge measures chemistry and hematology parameters, including sodium, potassium, chloride, calcium, $CO_2$, glucose, BUN, creatinine, and hematocrit. The CG4+ cartridge provides results for blood gas analysis and co-oximetry, including pH, $HCO_3$, $pCO_2$, $pO_2$, and lactate. Per study protocol, clinical nurses retrieved blood samples from eligible patients. To ensure comparability of results, both hospital laboratory and POCT tests were conducted on patient venous blood samples within a 30-minute timeframe. The time taken for results retrieval was compared between the two methods and the accuracy of the POCT device was evaluated by comparing its results to those obtained from the central hospital laboratory. Afterwards, we conducted a descriptive statistical analysis to summarize the collected data, followed by a comparison of the median values of time to results between the groups.

Results: During January 2023, there were 186 patients enrolled. Of these, 181 patients had simultaneous samples taken and analyzed with the POCT device. The POCT device had shorter time to results from the first blood draw in comparison to central laboratory testing. The POCT CHEM8+ test produced a median result time of 8 minutes (IQR: 5 - 14 minutes), while the central lab chemistry test had a median result time of 14 minutes (IQR: 11 - 18 minutes) and the central lab hematology test had a median result time of 29 minutes (IQR: 24 - 33 minutes). The median difference calculated with the Hodges-Lehmann estimator between the POCT CHEM8+ and central lab chemistry and hematology tests were 5 and 19 minutes, respectively. The POCT CG4+ test produced a median result time of 8 minutes (IQR: 5 - 15 minutes), while the central lab venous blood gas test had a median result time of 10 minutes (IQR: 8 - 13 minutes) and the central lab lactate test had a median result time of 10 minutes (IQR: 8 - 14 minutes). The median difference calculated with the Hodges-Lehmann estimator between the POCT CG4+ and central lab venous blood gas and lactate tests was 2 minutes for both tests.

Conclusions: Overall, this prospective observational study aimed to evaluate the potential benefits of POCT in the ED and contribute to the growing body of evidence supporting the use of POCT in critical care settings. By comparing the performance

and time taken for results retrieval between POCT and hospital lab testing, this study provides insights into the potential streamlining effect of using a POCT device in the ED.

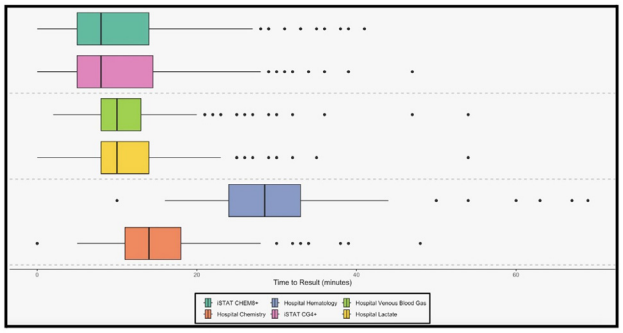


**Figure 1.** Box Plots Showing Time to Obtain Results for POCT Device & Hospital Lab Results After the First Blood Draw

No, authors do not have interests to disclose

## 404 Emergency Department Length of Stay, Patient Boarding, Door-to-Doctor Time, and Percent of Patients Left Without Completing Service to Evaluate if There Is Any Correlation Among These Metrics

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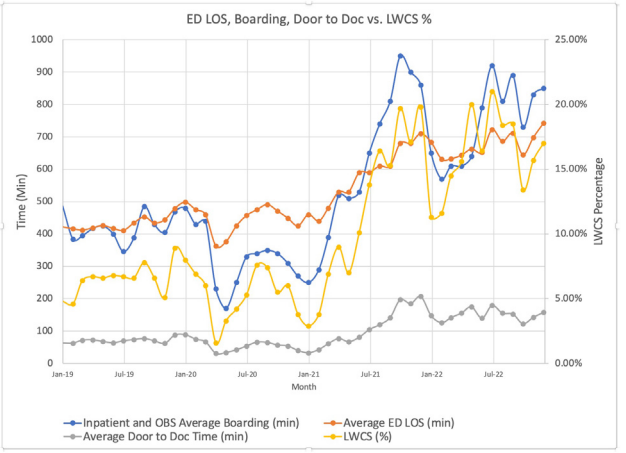
Background: There was a dramatic loss of ED volume during the early phase of the pandemic (March 2020 – September 2020). ED visit volumes remain below pre-pandemic levels yet our ED is struggling with increased overcrowding and patient boarding. We looked at these metrics to see if they correlate with each other. We believe objective data showing increased LOS and boarding serves as a justification for requests to hospital administration for more resources (physicians, nurses, technicians) despite reduced annual ED visit volume. The data also suggest that there may be lost revenue from patients who leave without completing service.

Objectives: Retrospective study evaluating Emergency Department (ED) length of stay (LOS), patient boarding, door to doctor time, and percent of patients left without completing service (LWCS) to evaluate if there is any correlation among these metrics.

Methods: Data was collected prospectively from Electronic Medical Records (EPIC) from January 2019 to December 2022. There is an Inflow Statistics Board Function in EMR which was used to obtain desired numbers during this period. We examined the following metrics – average Emergency Department Length of Stay (ED LOS), average Inpatient and Observation Boarding time, average Door to Doctor time – (in minutes), and LWCS as a percentage of ED volume. This study was evaluated by our hospital's IRB and deemed exempt and not human subject research.

Results: The total annual number of patients seen in our ED is slowly increasing from the intra-pandemic numbers. In 2019, pre-pandemic ED volume averaged 8285 patients per month. ED volume declined to 4200 patients per month in the early pandemic (April and May 2020). Overall volume for 2020 was 6568 patients per month. Monthly ED volume was7137 and 6577 in 2021 and 2022, respectively. Inpatient and Observation Boarding numbers more than doubled from 419 minutes in 2019 to 950 minutes in summer of 2021. Average ED LOS increased from 430 minutes in 2019 to 576 minutes in 2021, and to 676 minutes in 2022. Patient percentage of LWCS was closely correlated to LOS and Boarding time in minutes. The higher the LOS, the higher the percent of LWCS. LWCS in 2019, 2020, 2021, and 2022 was 6.47%, 5.70%, 11.82%, and 16.12%, respectively. Average boarding times from 2019 to 2022 were 419, 328, 617, and 742 minutes. The same correlation was found between LOS and Boarding time and Door to Doctor time – the longer LOS meant also increased time of Door to Doctor from approximately 60 minutes in 2019, 2020 and early 2021 to average of 180 minutes in late 2021 and 2022. The data is summarized in the chart below.

Conclusions: There is a direct correlation between an increase in LOS and Boarding time and the increase in percent of patients who LWCS. The same is true for LOS and Boarding time versus Door to Doc time. These statistics can be used by ED leadership to inform hospital administration of the increased need for more resources in the form of hiring additional medical staff. Increased Door to Doctor time also directly correlates with % of LWCS. Decreasing Boarding/LOS/Door to Doc times should decrease % of LWCS patients and thus will assist in capturing lost revenue. This extra revenue may offset the investments used for hiring additional staff.




No, authors do not have interests to disclose

## 405 Time to Antibiotics in Septic Shock: Associated Mortality and Opportunities to Improve Care

Reuter Q, Shure B, Lahn S, Lesh N/Summa Health, Akron, Ohio, US

Objectives: Sepsis is a leading cause for inpatient mortality in the US and worldwide. Time to antibiotics is arguably the single most important aspect of sepsis care, especially for patients with septic shock. The Surviving Sepsis Campaign recommends antibiotics be delivered within one hour of recognition in patients with septic shock. We sought to determine the proportion of patients with septic shock in our ED who receive antibiotics within one hour from time of initial hypotension or lactic acid resulting at $> 4$.

Methods: We analyzed two quarters of data (Q3 2021 and Q1 2022) of patients with confirmed septic shock in our ED with an annual visit total of 80,000 patients associated with a level 1 trauma center. Two physicians completed chart reviews of septic shock patients to determine time of initial hypotension (systolic $<90$ or MAP $<65$) or LA $> 4$ resulting and time of antibiotics administration. Primary outcomes were proportion of patients having antibiotics administered within one of hypotension or elevated LA and inpatient mortality. Secondary outcomes included whether a patient presented in shock or developed shock during ED course, whether delay in antibiotics was due to failure to place order or administer of antibiotics in timely manner, and the proportion of patients with 'undifferentiated hypotension,' ie no fever or clear initial history to suggest sepsis.

Results: Ninety patients were found to have septic shock in ED during the two quarters analyzed. Average age was 60 yo, 42 pts were female, 48 pts male. 38% (34/90) received antibiotics within one hour of shock while 62% (56/90) received antibiotics after one hour. Overall inpatient mortality was 32% (29/90). Mortality in the $<1$hr group was 21% (7/34) and mortality in the $>1$hr group was 39% (22/56). 44% (40/90) of patients presented in shock versus 56% (50/90) developed shock during their ED stay. 80% (32/40) of patients presenting in shock received their antibiotics after one hour. 95% (37/39) of patients with "undifferentiated shock" received their antibiotics after one hour. Of patients receiving antibiotics after one hour, 38% (21/56) had a time from shock to antibiotic order greater than one hour and 59% (33/56) had a time from antibiotic order to administration greater than one hour.

Conclusions: Time from shock to antibiotic administration greater than one hour was associated with increased inpatient mortality. Many of the delays were in patients presenting in shock as well as presenting with "undifferentiated shock," ie, the patient

had no fever or infectious complaint at time of initial presentation. Both delays in ordering and administering antibiotics contributed to prolonged antibiotic administration times.

No, authors do not have interests to disclose

## 406 National and Geographic Variation in Medicare Reimbursement Changes for Top Emergency Medicine Procedures From 2013 to 2023

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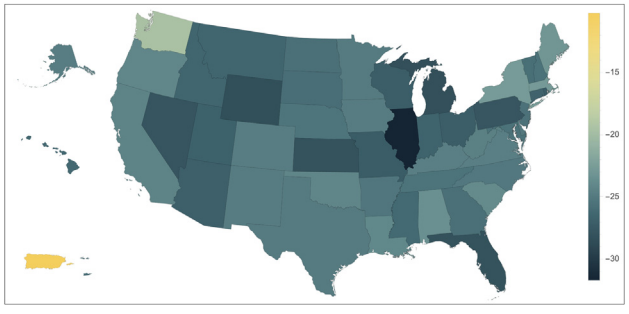
Objectives: This study investigated geographic variation in annual Medicare reimbursement changes for the highest-grossing emergency medicine procedures from 2013 to 2023.

Methods: The Physician Fee Schedule database of the Center for Medicare and Medicaid Services was utilized to establish state-by-state reimbursement rates for the highest-grossing emergency medicine Current Procedural Terminology (CPT) codes. To adjust physician reimbursement for inflation, the consumer price index was employed. Procedures were weighted based on gross revenue using the Physician & Other Practitioners by Provider and Service dataset filtered by emergency medicine for 2013 to 2020, and a total percent change was calculated for each state and territory.

Results: Between 2013 and 2023, the inflation-adjusted Medicare reimbursement for the highest-grossing emergency medical procedures for U.S. states and territories decreased, with a mean and median decline of 25.3% and 25.5%, respectively. Illinois (-31.7%), Wyoming (-28.4%), Michigan (-28.3%), and Kansas (-28.1%) recorded the greatest total decrease over the eleven years. Massachusetts (-22.7%), New York (-22.7%), Washington (-19.5%), and Puerto Rico (-10.2%) experienced the least modification during that span of time. Among the highest-grossing procedures, identified by their CPT codes, and their total percent change included debridement of subcutaneous tissue (11042, -25.37%), endovascular ablation therapy of incompetent extremity veins (36475,-40.88%), emergency endotracheal intubation procedure (31500, -0.38%), and intra-articular injection (20610, -23.41%).

Conclusions: This study highlights the drastic decline in Medicare reimbursement rates for emergency medical procedures and the notable disparities between states and territories over the past eleven years. Altering Medicare reimbursement policies could result in mid-level healthcare providers being substituted for physicians as a cost-saving measure, potentially leading to scope creep in the industry. Policymakers need to consider the implications of these trends and devise measures to rectify geographic inequities. The presented figure displays the total percent change categorized by state and territory, with corresponding shading indicating the percent change as labeled in the key.




No, authors do not have interests to disclose

## 407 Identifying Human Trafficking in the Hospital Via an Abuse Screening Tool

Weiss K, Harland K, Findlay S/University of Iowa Hospitals and Clinics, Iowa City, Iowa, US

Objectives: In 2021, the National Human Trafficking Hotline in the state of Iowa received reports of 86 cases of human trafficking (HT) exploitation among 161 individuals. Surveys of individuals exploited by HT have shown that between 68-88% were seen by healthcare providers during the period of their exploitation, and the majority were seen in urgent or emergent care settings. In an attempt to increase HT identification, a tertiary hospital in Iowa added three questions related to HT to their hospital-wide abuse screening tool. This project sought to estimate the frequency of suspected cases of HT among all patients who screened positive on the abuse screening tool and determine the efficacy of the three additional questions in the identification of those exploited by trafficking.

Methods: On April 1, 2021, three screening questions related to HT were added to an existing hospital-wide abuse screening tool which was administered by nurses to all inpatient and emergency department patients. The questions added to the screening tool include the following: "Are you currently being forced to engage in sexual activity," "Are you being abused or threatened in your work or home environment," and "Are you being forced to work." Data was collected between April 1, 2021, to February 28, 2023. Retrospective chart review was conducted, and statistics were collected via SAS on frequency, proportions, and means of demographic information of patients who screened positive on the abuse screening tool.

Results: During the project period, there were 1,154 encounters associated with 886 patients that had a positive screen on the abuse tool. Of those, 392 encounters involving 303 patients were positive on the HT questions and 23 patients had documentation highly concerning for HT exploitation. The documentation indicated that 15 individuals were exploited by sex trafficking, and for 8 individuals the trafficking type was unable to be determined. For the remaining 280 patients with a positive screen for the HT specific questions, documentation was either incomplete or too vague to determine if the patient was exploited by trafficking. Overall, 65/303 (21.4%) of patients screened positive only on the three additional HT questions. Five of those patients had documentation indicative of human trafficking.

Conclusions: The addition of three HT questions to the existing abuse tool resulted in an increase in the identification of individuals exploited by HT in this hospital setting. While many patients had positive screens on the original screening tool, approximately 21% of patients for which there was a positive screen for HT specific questions may not have been identified without the additional HT questions. This demonstrates the importance of comprehensive screening tools that include questions designed specifically to identify human trafficking.

Yes, authors have interests to disclose
Disclosure: EB Medicine Consultant
Consultant/Advisor
EB Medicine Consultant
Disclosure: University of Mississippi Medical Center
Lecturer/Speaker
University of Mississippi Medical Center
Disclosure: Iowa Attorney General
Lecturer/Speaker
Iowa Attorney General

## 408 Success of an Intervention to Reduce CT Utilization in Patients Being Evaluated for Potential Pulmonary Embolism

Reddy R, Miller A, Mackenzie R, Burmeister D, Kane K, Richardson D, Beauchamp G, Greenberg M, Weaver K/Lehigh Valley Hospital and Health Network; USF Morsani College of Medicine, Allentown, Pennsylvania, US

Objectives: According to data from the National Hospital Ambulatory Medical Care Survey, the use of computed tomography (CT) imaging has tripled in a 10 year period and the use of imaging in the emergency department (ED) has increased disproportionately to visits. We set out to determine if an intervention that included provider education and quarterly data feedback on an evidence based pulmonary embolism (PE) pathway coupled with a financial incentive for ordering clinicians was effective at decreasing the amount of CT chest scans ordered for patients with signs or symptoms of pulmonary embolism (PE).

Methods: As part of a departmental quality improvement initiative to provide evidence-based treatment to patients presenting with signs or symptoms of pulmonary embolism, a group of vested stakeholders agreed to a network wide pathway. The pathway was distributed to ED providers at 6 hospital sites in Northeast PA via email correspondence, discussions at grand rounds and electronic policy tech centralized location for reference. These sites cumulatively see an average annual census of 235,500 ED visits across sites. At baseline, 8.9% of CT's across

these sites were done to rule out PE. A group goal to decrease utilization by utilization of the pathway across all sites was set as a 2023 fiscal year quality improvement metric. Meeting the goal allowed providers to be eligible for 25% of their quality improvement financial bonus at the end of the year. Specifically, a threshold for the goal was set at a decrease use to 8.7%, the target was set at 8.5% and the maximum was set at 7.1% (the maximum represented a 20% decrease in CT utilization for pulmonary embolism across all sites). The vice-chair of clinical operations and practice management notified ED providers of their progress to the goal at quarterly intervals in the fiscal year.

Results: The department decreased the CT for PE utilization to 6.9% (N=653), meeting the maximum QI goal by the second quarter of the program. The providers were advised that they had met the goal and that by continuing to use the algorithm, they were providing the best possible care while reducing cost to the patients and potentially unnecessary tests. In January of the fiscal year utilization had increased to 7.6% (N=742). By the third quarter notification, utilization was at 7.1% and the message delivered included the importance of sustaining this goal and a 3 minute video presented by an ED Director and disseminated via an email sent by the department Vice- Chairs was sent as a refresher to the pathway. The following month the utilization was back at 6.9% (N=604). No cases of adverse events in this population related to lack of CT utilization were reported to the quality improvement team during the study.

Conclusions: An intervention that included coordinated administrative provider education and continued data feedback on an evidence based pulmonary embolism pathway coupled with a financial incentive for clinicians was effective at decreasing the use of CT chest scans in patients with signs or symptoms of pulmonary embolism. Methods for sustaining the behavior change accomplished continue to be explored.

No, authors do not have interests to disclose

## 409 Saving Extended Focused Assessment With Sonography in Trauma Exams During Pediatric Traumas

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Objectives: The extended Focused Assessment with Sonography in Trauma (eFAST) exam is a tool for detecting abdominal free fluid and air in order to determine the next best step in caring for the pediatric trauma patient. Auditing eFAST exams provides feedback to ensure adequate ultrasound (US) image review and quality assurance for patient management in trauma resuscitations. In our pediatric emergency department (PED), a recent review identified that only 14% of the eFAST exams on pediatric trauma patients were saved by house staff and faculty to the server after US use. The aim of this project is to increase saving eFAST exams by house staff and faculty during pediatric traumas.

Methods: Pediatric traumas were reviewed to determine the number of eFAST exams completed based on documentation in the electronic medical record (EMR) between January 1, 2021—June 30, 2022. Inclusion criteria were pediatric level 1 and 2 traumas patients less than 15 years-old, as designated by the American College of Surgeons, with an eFAST exam in the EMR. Demographic data was used to determine if the eFAST exam images/clips were saved to the US server. An instructional video and survey to inquire about behavior on US use was sent to Pediatric Emergency Medicine (EM), EM, and Surgery house staff and faculty. A job instruction model (figure 1), describing the steps for saving eFAST exams, was attached to the trauma US machine. Feedback emails were sent at the first and 4-month marks. We expected pediatric trauma eFAST exams saved to the server to increase by 50% in 6 months.

Results: 31 physicians completed the survey: 12 from Pediatric EM, 17 from EM, and 2 from Surgery. 9 respondents (29%) claimed to always save eFAST exams, while the rest of the respondents chose sometimes (12, 38.7%), rarely (7, 22.6%), or never (3, 9.7%) to saving their images/clips. Barriers to saving images/clips included: not knowing how (2, 6.5%), lack of time (13, 41.9%), not remembering (9, 29%), and/or other (11, 35.5%). 83.9% respondents attested to having watched the instructional video. Post-survey chart review identified 34 traumas. Of the 32 eFAST exams performed and interpreted, 16 (50%) eFAST exams were saved to the US server. This is a 36% increase in the number of eFAST exams saved after 6 months post-survey.

Conclusions: The majority of eFAST images/clips during pediatric trauma resuscitations are not saved due to perceived lack of time, not remembering, and not knowing how to save. Incorporating education, reminders, and visual cues can increase saving of eFAST exams and thus improve the ability for quality assurance and feedback.


No, authors do not have interests to disclose

## EMF 410 Speaking the Same Language: Adapting Multilingual Approaches to a Clinical Social Needs Intervention

Brown R, Ortiz P, Berrigan L, Cullen D/CHOP, Philadelphia, Pennsylvania, US

Background: Health systems have signaled growing recognition that investment in patients' social needs is essential to fulfilling the promise of health for all families. However, programs and policies aimed at addressing social need cannot be successful if the evidence underpinning these initiatives omits the perspectives of marginalized patient populations, necessitating the emergence of standards for diversifying study participation. Linguistically diverse participants have been historically underrepresented in clinical research, and furthermore, there is a dearth of guidelines for conducting language inclusive social needs-focused research in the pediatric healthcare setting.

Objectives: The Socially Equitable Care by Understanding Resource Engagement (SECURE) Study, a mixed methods RCT aimed at understanding how best to facilitate family-level engagement with social resources from the pediatric healthcare setting, developed and adapted multilingual research approaches to increase engagement with linguistically diverse participants and to better understand the experiences and preferences of all patient populations who may benefit from social care.

Methods: SECURE implemented several multilingual research innovations to increase meaningful, rigorous inclusion of linguistically diverse perspectives in social care integration research including: 1) Develop materials with an eye toward translation, designing surveys and social assessments with simple jargon-free language;

2) Maximize use of emerging multilingual technology available within data management systems such as REDCap; 3) Allow patients to self-identify language preference rather than abstracting from the medical record to center patient-family autonomy; and 4) Hire staff that reflect the target population in terms of language spoken to enhance participant comfort and circumvent barriers to inclusion related to clinical flow.

Results: While data collection for SECURE is still underway, 10 percent (n=204) of SECURE participants completed all study procedures in a non-English language (Spanish, Arabic, Mandarin, Vietnamese, or Portuguese) compared to an average of 11 percent of patients who prefer a non-English language across the three clinical recruitment settings.

Conclusions: The proportionate representation of linguistically diverse caregivers in SECURE highlights the effectiveness of the study's tailored strategies to engage this population, and underscores the significant proportion of patient-families who would have otherwise been excluded from this policy-relevant research.

**Speaking the Same Language: Adapting Multilingual Approaches to a Clinical Social Needs Intervention**

Rachel Brown, MPH, Priscilla Ortiz, PhD, Lindsay Berrigan, MPH, Danielle Cullen, MD, MPH, MSHP

FIGURES:

**Table 1.** Non-English language preference among SECURE study participants compared to non-English language prevalence by study site

| | Emergency Department | | Primary Care 1 | | Primary Care 2 | |
|---|---|---|---|---|---|---|
| | Study Site N(%) | Recruited N(%) | Study Site N(%) | Recruited N(%) | Study Site N(%) | Recruited N(%) |
| Spanish | 3028 (2.9%) | 32 (4%) | 1782 (12.2%) | 116 (13.3%) | 1438 (9.5%) | 24 (6.1%) |
| Arabic | 466 (0.5%) | 2 (0.3%) | 106 (0.7%) | 6 (0.7%) | 17 (0.1%) | 0 (0.0%) |
| Mandarin | 270 (0.3%) | 6 (0.8%) | 55 (0.4%) | 5 (0.6%) | 13 (0.1%) | 0 (0.0%) |
| Vietnamese | 176 (0.2%) | 0 (0%) | 138 (1.0%) | 6 (0.7%) | N/A | N/A |
| Portuguese | 261 (0.3%) | 8 (1.0%) | N/A | N/A | N/A | N/A |

**Figure 1.** Image of language option self-selection menu from a SECURE survey, enabled through REDCap's Multi-Language Management feature


**Table 2.** Examples of participant feedback regarding the impact of multilingual approaches on study enrollment and access to social resources

| Theme | Representative Feedback |
|---|---|
| Ease of enrollment | A Spanish-speaking caregiver enrolling in the study expressed her appreciation that the study materials and resource map (CommunityResourceConnects.org) are translated into Spanish. She explained that she usually cannot participate in these types of programs because of the language barrier. She asked for extra Spanish resource map information cards to share with others and emphasized the need for this type of resource in her community. |
| | A bilingual (Mandarin) Research Assistant approached a family about the study in English, as language preference was not listed in the patient's medical record. The family explained that they preferred Mandarin and were noticeably relieved when they realized that the Research Assistant spoke Mandarin as well. Additionally, the family conveyed their appreciation for translated survey materials. |
| | Several caregivers communicated their appreciation for translated study materials (surveys, text messages, and social resources), even though they declined interpretation services during recruitment procedures, explaining that they are more comfortable reading and responding to questions in a non-English language. |
| Ability to access social resources | When contacted for resource navigation support, a Spanish-speaking participant was initially skeptical, telling the study Resource Navigator that she didn't want to "waste her time" because she did not expect there to be resources available in Spanish or for immigrants. The resource navigator let her know that there are many resources available specifically for these groups, as well as resources without eligibility requirements. After that message was relayed, the excitement was heard and felt throughout the rest of their conversation. The caregiver received resources for formula, diapers, and food in her neighborhood. |
| | A caregiver with limited English proficiency who was not enrolled in the study contacted the Resource Navigator as she heard from a friend that resources were available in non-English languages. Our Resource Navigator was able to provide her with the resource map in Spanish as well as text her various social need-specific resources in her preferred language. |

No, authors do not have interests to disclose

## 411 Emergency Department and Hospital Utilization After Emergency Department-Initiated Buprenorphine for Opioid Use Disorder

Patel M, Marshall D, Manteuffel J, Miller J, Krieger S, Rammal J-A, Loszewski C, Nassereddine H, Tuttle J, Almri Y/Henry Ford Hospital, Detroit, Michigan, US

Objectives: The opioid crisis in the United States is a public health emergency. Emergency department (ED)-initiated buprenorphine with referral to ongoing care is an effective method to treat patients with opioid use disorder (OUD). While ED-initiated buprenorphine has been shown to be cost-effective, there is a paucity of data examining ED and hospital utilization after ED-initiated buprenorphine with referral to ongoing care. Our objective was to quantify ED and hospital utilization before and after ED-initiation of buprenorphine and referral to ongoing care. We hypothesized that patients would use the ED and be hospitalized at a lower rate after receiving ED-initiated buprenorphine and referral to ongoing care.

Methods: We performed a retrospective chart review using health information exchange data of patients who were treated in our ED with buprenorphine beginning March 1, 2020 through December 31, 2021. Patients were included if there was documentation of referral to ongoing care after receiving ED-initiated buprenorphine. Patients were excluded if they received a home dose medication or were not referred to ongoing care. We quantified the number of ED visits and medical hospitalizations in the 1 year before and after the initial ED-initiated buprenorphine treatment visit. Analysis includes descriptive statistics and McNemar's test to compare the proportion of patients pre or post ED-initiated buprenorphine that had $\geq$1 ED visit.

Results: We identified 129 patients that were treated with ED-initiated buprenorphine and met the inclusion criteria. Total ED visits were reduced or zero in 76 (58.9%) of the patients after ED-initiated buprenorphine. Total hospitalizations were reduced or zero in 97 (75.2%) of the patients after ED-initiated buprenorphine. The odds ratio (OR) estimate of a patient having $\geq$1 ED visits following ED-initiated buprenorphine was lower (OR 0.57, 95% CI 0.26 – 1.16), though this did not meet

statistical significance (p=0.096). Similarly, the odds of a patient having ≥1 admission was lower (OR 0.70, 95% CI 0.34 – 1.38) but did not meet statistical significance (p=0.262).

Conclusions: In this retrospective chart review, the majority our patients visited the ED less and were admitted to hospital less after ED-initiated buprenorphine and referral to ongoing care. At this point in the data collection the study is underpowered to determine a significant difference. Further study is needed to quantify healthcare resource utilization after intervention with ED-initiated buprenorphine.

No, authors do not have interests to disclose

## 412 Massive Hemorrhage Protocol: Emergency Medicine Resident Education Intervention

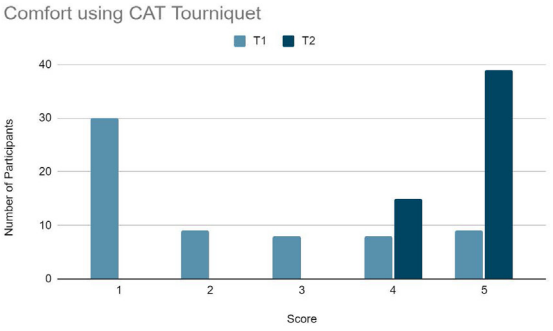
Haskins P, Welsh C, Loo G, Hoke R, Redlener M, Sondheim S/Mount Sinai Morningside; West, New York, New York, US

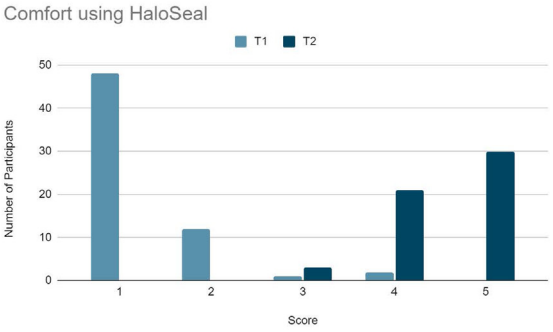
Objectives: Education and technical training of lay persons to respond to mass casualty events with potential for life-threatening hemorrhagic injuries have been well documented with regards to programs such as Stop the Bleed. There is a limited amount of data, however, regarding the training of hospital-based physicians, in the use of tourniquets and other devices used to control massive hemorrhage in the event of a mass casualty event such as an active shooter or a natural disaster. In an effort to assess the effectiveness of training hospital-based physicians in massive up hemorrhage control utilizing tourniquets a pilot study was performed with a group of emergency medicine resident physicians.

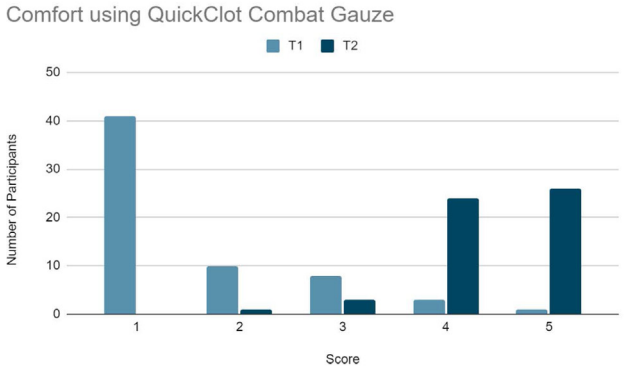
Methods: A one-hour training session was designed, conducted, and led by EMS and Disaster Preparedness faculty at a three-year, urban emergency medicine residency program comprising three sites, including one a level 2 Trauma Center. The session allowed for small-group based, hands-on training in the use of hemorrhage control protocols including the CAT tourniquet, QuickClot Combat Gauze, HaloSeal Occlusive Dressing, and needle decompression. Residents participating in the educational session completed a short survey of seven questions (Table 1) on comfort utilizing these different tools immediately before (t1) and after (t2) this training. 63 residents completed the survey at t1, and 54 residents completed the same survey at t2. A Mann-Whitney U Test was utilized to assess the impact of the intervention, both in aggregate and sub-divided by post-graduate year (PGY) class for each survey question (1, 2, 3).

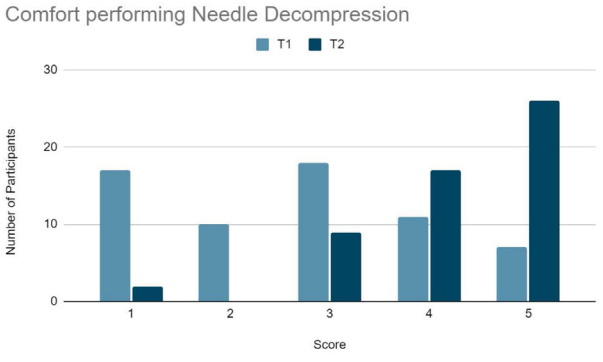
Results: In each analysis, both over the entire population of residents as well as when the Mann-Whitney U was run for each PGY class individually, there was an increase in performance of each of the hemorrhage interventions with statistical significance (p<0.005) (Table 2). Central tendencies are also reported (Figure 1).

Conclusions: The concept of a one-hour training session on mass hemorrhage control equipment significantly improved emergency medicine resident physician comfort with treating acute traumatic injuries. Given the success of the pilot study, an evaluation with proficiency followed by additional training and implementation of this protocol with other groups of hospital-based physicians could be of benefit and warrants further investigation.




No, authors do not have interests to disclose

# 413 Estimates of HIV Testing at Visits to United States Emergency Departments, 2014-2020

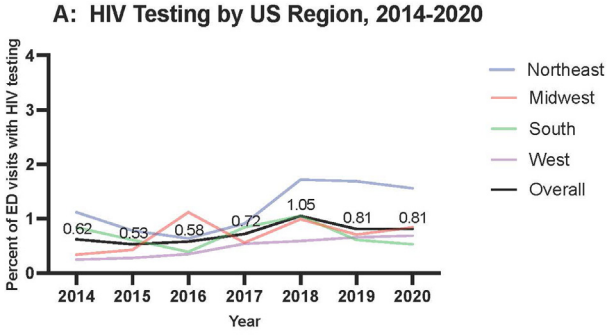
Clay C, Le Guen Y, Hoover K, Bennett C/New York University Grossman School of Medicine, New York, New York, US

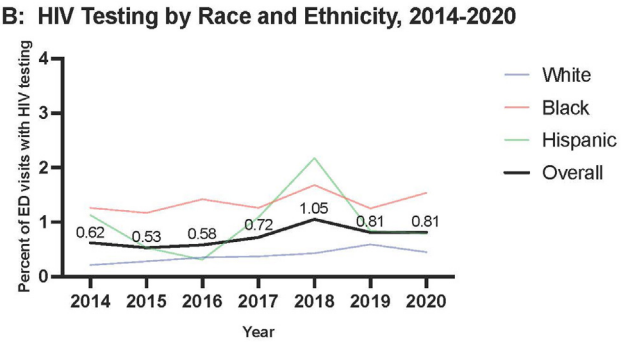
Objectives: Emergency department (ED)-based HIV testing rates are historically low, but recent testing trends surrounding the COVID-19 pandemic and launch of the Ending the HIV Epidemic (EHE) initiative are unknown. The objective of the study is to estimate recent trends in the proportion of ED visits that included HIV testing, stratified by region and populations known to be disproportionately impacted by HIV.

Methods: We performed a cross-sectional analysis of the National Hospital Ambulatory Medical Care Survey (NHAMCS), a weighted nationally representative survey of US EDs, from 2014 to 2016. We limited ED visits to those for patients ages 13-64 years old and excluded visits for persons with known HIV. Visit-level characteristics of interest included whether the visit represented a focused visit where testing would have been indicated (e.g., focused on a problem associated with HIV acquisition, such as sexually transmitted infections). Given EHE's focus on several rural Southern jurisdictions disproportionately affected by HIV, facility-level characteristics included US region and rural location using non-metropolitan statistical areas with lower population densities as a proxy for rural areas. Patient-level characteristics included visit-listed race and ethnicity given EHE's focus on populations disproportionately impacted by HIV.

Results: The proportion of ED visits that included HIV testing increased from 2014 (0.6%) to 2018 (1.1%) but was lower in 2019 (0.8%) and 2020 (0.8%). There were 95 million total ED visits in pre-pandemic 2019, which decreased to 87 million in 2020. Compared to other regions the South had the lowest rate of testing in both 2019 (0.6%) and 2020 (0.5%); testing rates in the non-metropolitan South remained ≤0.1% across all years. Testing rates for ED visits by persons who identified as Hispanic/Latino were highest in 2018 (2.2%) but sharply declined in 2019 (0.8%) and 2020 (0.8%). Testing rates for focused visits where HIV testing would have been indicated increased from 2019 (3.6%) to 2020 (5.1%).

Conclusions: After a modest increase in ED-based HIV testing since 2014, rates have decreased since 2018. However, despite 7.7 million fewer ED visits surrounding the COVID-19 pandemic, testing rates appear stable between 2019 and 2020. Overall, very few ED visits during our entire study period included an HIV test, including focused visits during which HIV testing would be indicated. Further, there were persistently low rates of HIV testing for populations prioritized in national efforts and during visits in rural jurisdictions in the South.




No, authors do not have interests to disclose

# 414 The Effect of Social Distancing Measures During the COVID-19 Pandemic on Opioid Overdose Presentation Rates

Aung P, Levy D, Klein L/Good Samaritan University Hospital, West Islip, New York, US

Objectives: The opioid epidemic has been, and remains, a significant challenge to the United States. Since its beginnings in the late 1990s to present, it has represented a large socioeconomic burden, costing billions annually in healthcare, lost productivity, and criminal justice involvement. The COVID-19 pandemic, along with social distancing mandates, made the challenge more difficult, limiting access to needed resources due to temporary closure of many outpatient services aimed at addressing the opioid epidemic. This study serves to highlight the importance of having adequate measures in place to tackle this issue should a similar stressor to healthcare systems arise in the future.

Methods: This was a multicenter retrospective chart review of four community hospital emergency departments within the Catholic Health Services network, located in Suffolk County, Long Island, New York. The electronic medical records (EPIC) used at the 4 hospitals were queried for chief complaints and final diagnoses of "overdose," with relation to "opioid," "fentanyl," "heroin," and "opiate" qualifiers. The time periods of March – June 2020 were examined to evaluate when social distancing mandates were at their strictest. Overdose presentation rates from March – June 2019, and March – June 2021 were examined to establish baselines pre- mandate, and post-mandate. A chi-squared analysis was used to compare the three groups with a Bonferroni correction made for multiple comparison.

Results: In the 12-month time frame examined, there were a total of 206,250 emergency department visits within the Catholic Health Services system. Of the 206,250 total visits, 78,483 patients were seen in 2019, 53,444 patients were seen in 2020, and 74,323 patients were seen in 2021. The overall number of opioid overdose related presentations stayed the same across the time periods with 130 seen in 2019, 130 seen in 2020, and 126 seen in 2021 but overall rates and rates per 1000 patients saw a rise in the 2020 period (Table 1). This was statistically significant when compared to the 2019 and 2021 periods with a p-value of 0.002264 and a chi- square statistic of 12.1816.

Conclusions: Opioid overdose presentation rates saw an overall increase although this can largely be attributed to a decrease in total patient volume for all other visits. In the event of a future pandemic that necessitates social distancing measures, good infrastructure to provide readily accessible medical and social support to this vulnerable population is paramount. This data is important to local health systems and may offer insight into additional strategies to explore to decompress hospitals and emergency departments.

| | March - June 2019 | March - June 2020 | March - June 2021 |
|---|---|---|---|
| Overall Emergency Department Volume | 78483 | 53444 | 74323 |
| Opioid Overdose Presentations | 130 | 130 | 126 |
| Overdose Rates Per 1000 Visit | 1.66 | 2.43 | 1.69 |

No, authors do not have interests to disclose

## 415 Assessing Missed Opportunities for Sexually Transmitted Infection Testing and Linkage to Prenatal Care During Emergency Department Visits in Early Pregnancy

Pierce N, Almirol E, Stanford K/University of Texas Health Science Center at Houston, Houston, Texas, US

Objectives: Inadequate prenatal care (PNC) has been linked to adverse pregnancy outcomes, including untreated sexually transmitted infections (STIs) that can lead to severe and sometimes fatal fetal complications. Many populations with reduced access to PNC may disproportionately utilize the emergency department (ED) for their care and are likely to have at least one ED visit during their pregnancy. ED visits in early pregnancy may represent a critical opportunity for STI screening and linkage to PNC in this vulnerable population, leading to improved pregnancy outcomes. Little is known, however, about the role of the ED visit in pregnancy care. The purpose of this study is to evaluate missed opportunities for prenatal STI testing and appropriate linkage to care for pregnant ED patients.

Methods: This is a retrospective review of all adult ED visits with positive pregnancy testing at a large, urban, tertiary care hospital from January through November 2018. Only patients who eventually delivered a live infant within the same medical center were included. Patients identified to be in their third trimester at time of first ED visit, found not pregnant on chart review, or who had any outcome other than a live birth (e.g. ectopic pregnancy, miscarriage, termination) were excluded from the study. Demographics, clinical information about the ED visit and any PNC, and information about STI testing and diagnosis during pregnancy were extracted from the electronic medical record.

Results: Of 1770 ED visits with positive pregnancy tests, 401 (22.7%) resulted in live births within the same medical center and were included in the study. Average gestational age at ED presentation was 9 (SD 4.5) weeks. The majority were non-Hispanic Black (94.1%) and used Medicaid (67.3%). Patients had an average of 1.8 (SD 1.2) ED visits during pregnancy. Of all patients, 204 (50.9%) reported no plan for OB care after their ED visit. Of these, 128 (70.7%) were provided referral information during the ED visit. At time of delivery, 382 patients (95.3%) reported any non-ED PNC visits. While 396 (98.7%) patients were tested for HIV and 391 (97.5%) for syphilis during their pregnancy, only 54 (13.5%) were tested for either of these during their ED visit. Similarly, while 299 (75.1%) patients were tested for gonorrhea or chlamydia during their pregnancy, only 92 (22.9%) were tested for these during their ED visit. Overall, 32 (8.0%) patients tested positive for gonorrhea or chlamydia, 15 (46.9%) of which were diagnosed in the ED. Only 5 (1.3%) tested positive for syphilis, of which 1 (0.3%) was diagnosed in the ED. There was only 1 new diagnosis of HIV during the study period.

Conclusions: This study demonstrates large gaps in STI testing and referral to OB care during the ED visit. More than half of patients testing positive for STIs were not tested during their ED visit, and almost a third of patients without an OB were not provided referrals to care. These findings highlight the importance of providing STI testing for pregnant patients in the ED and the need for more research into the optimal means of improving linkage to PNC from the ED.

No, authors do not have interests to disclose

# EMF

## 416 Emergency Department Utilization and Hospitalizations Associated With Flooding in the Continental United States: 2008-2017

Wettstein Z, Parrish C, Sabbatini A, Ranadive N, Rogers M, Seto E, Huang S, Hess J/ University of Washington School of Medicine, Seattle, Washington, US

Background: Floods affect more people than any other environmental hazard. Flooding in the US is increasing in frequency and intensity as climate change drives more frequent and severe precipitation and storm events. Flood costs, exclusive of health damages, exceed $1 billion annually. Despite their frequency, little is known about the burden and cost of injury and illness from flood exposure on a population level. Furthermore, limited data exist on social vulnerability factors that increase the likelihood of flood-related health impacts.

Objectives: 1) Quantify the change in hospital use associated with flood exposure from 2008-2017; 2) evaluate the degree to which social vulnerability factors predict flood-related morbidity; 3) measure the healthcare costs associated with healthcare utilization associated with flood exposure.

Methods: We are conducting a time-stratified, case-crossover analysis with conditional logistic regression of emergency department (ED) visits and hospital admissions (HA) associated with floods in the continental US (CONUS) from 2008 to 2017. For hazard identification, we are using the Multi-Sourced Flood Inventories (MFI) that combines data from direct observation, remote sensing, and model simulation to create a validated, composite dataset of floods in the CONUS that exceed the threshold of a 20-year return period. Healthcare utilization data are sourced from the Centers for Medicare and Medicaid Services (CMS) and include ED visits and HA for a range of conditions including exacerbations of cardiovascular and respiratory disease, orthopedic injuries, skin and soft tissue infections, gastrointestinal illness, and mental health complaints. Cost of healthcare encounters are included in the CMS data and will be compared across case- and control- periods. The case periods are defined as the two weeks following the start of a flood, while the two control periods used for comparison are the two weeks prior to the flood and the two weeks starting one month after the flood. The Centers for Disease Control and Prevention Social Vulnerability Index (SVI) will be used in a secondary analysis to evaluate the relationship between flood exposure, community social vulnerability factors, and healthcare utilization for a range of conditions.

Results and Conclusions are forthcoming as this is a work in progress. At the *Research Forum* we can provide detailed results regarding flood exposure during the study period and descriptive analyses of demographics and social vulnerability in exposed communities. We also hope to have preliminary results linking flood exposure with major categories of health impacts being studied.

No, authors do not have interests to disclose

## 417 Early Data From an Out-of-Hospital Whole Blood Transfusion Program for Trauma Patients

Zitek T, Coyle C, Pepe P, Stotsenburg M, Scheppke K, Antevy P, Giroux R, Farcy D/ Mount Sinai Medical Center, Miami Beach, Florida, US

Objectives: Only a few emergency medical services (EMS) systems in the United States currently use whole blood transfusions (WBTs). Given the increasing data supporting the use of WBTs, more EMS systems are likely to consider or begin WBT programs in the future. We recently implemented a prehospital WBT program for trauma patients in Palm Beach County, Florida. We sought to assess the outcomes and frequency of adverse events related to WBT of the initial cohort of patients who received prehospital WBT in our system.

Methods: This was a retrospective database review of the initial patients who received WBT in our EMS system in Palm Beach County. We started a prehospital WBT program for trauma patients on July 6, 2022. Our current indications for transfusion of low titer, leukoreduced O+ whole blood in the prehospital setting include traumatic injuries with systolic blood pressure $< 70$ mm Hg or systolic blood pressure $< 90$ mm Hg plus heart rate $> 110$ beats per minute. Patients may receive up to 2 units of whole blood. All patients who receive prehospital WBT are tracked in a database for quality assurance purposes. We abstracted the following data points from this database: demographic information, means of transport, vital signs, prehospital

therapies, and mortality. We also tracked the number of expired units of whole blood during the period of data collection. We analyzed our data with descriptive statistical measures.

Results: From July 6, 2022 through March 30, 2023, our system transported a total of 1437 trauma activation patients, with 41 (2.9%) receiving WBT. In total, 19 (46.3%) of these patients were transported by helicopter and 22 (53.7%) were transported by ground. The median age was 31 years (IQR: 25-58), and 35 (85.4%) of these patients were male. Of the 41 patients who received WBTs, 14 (34.1%) were pulseless prior to the WBT, and 27 (65.9%) still had vital signs before WBT. Among those who were pulseless prior to WBT, none are still alive compared to 81.4% who are still alive among those not initially in arrest. However, 2 patients who were initially pulseless regained vital signs after WBT. The overall mortality rate so far is 46.3%. No adverse events related to transfusion were identified following WBT administration in our series. The 41 patients who underwent WBT received a total of 43 units of whole blood while 30 units of whole blood reached expiration of the unit's shelf life prior to transfusion.

Conclusions: So far, in our EMS system, WBT has been used on about 2.9% of trauma activation transports, and no adverse events related to transfusion have been identified. Survival rates have been $>$ 80% for those initially with vital signs, but no patients who were initially pulseless have survived to hospital discharge so far. Additional data are needed to determine how to best utilize WBT in the prehospital setting while minimizing unused blood.

No, authors do not have interests to disclose

## 418 Pediatric Winter-Related Sports Injuries in the United States: An Analysis of 2012 to 2021

AlRemeithi R, Tran Q, Martinez S, Archibald M, Pourmand A/George Washington University School of Medicine and Health Sciences, Washington, DC

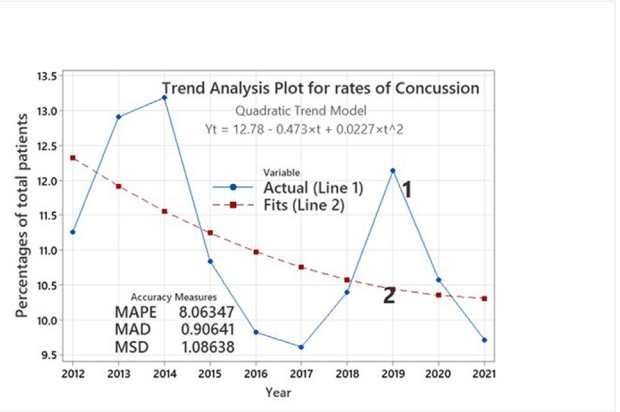
Background: With the growing popularity of winter-related sports and activities, higher risk of a wide range of injuries, from minor musculoskeletal complaints such as sprains to severe head injuries are observed. A significant group of participants in these activities are children who can be more susceptible to injuries during these activities.

Objective: In this study, we aim to quantify and identify pediatric visits to the emergency departments associated with winter-related sports and activities.

Methods: We performed a 10-year review of injuries occurring in the pediatric population as a result of winter-related sports and activities, which includes snowboarding, snow skiing, snow boating, and snow tubing. Using the National Electronic Injury Surveillance System (NEISS), we queried $\leq$ 18 years old emergency department visits from January 2012 to December 2021 and collected information, including patient demographics, diagnosis, and disposition. A time series analysis of the most common injuries, most common injured body parts, and concussions were performed using best-fitting models, among linear, quadratic, exponential, and S-curve. Model selection was based on criteria that had the lowest values of mean absolute percentage error (MAPE), mean absolute deviation (MAD), and mean squared deviation (MSD).

Results: During the ten years, a total of 5,681 visits were reported. The mean age was 13.3 years, 67% of which were males, and 74.8% were white. The most common injuries were fractures, which constituted 37.7% (95% CI, 36-39%). Most common injured body part was head: 19.8% (95% CI, 18%-21%). Severe injuries included internal organ damage 4.2% (95% CI, 3.7%-4.7%), and concussions 11.3% (95% CI, 10.512.1%) of all injuries. Time series with trend analysis showed a decreased rate of concussions, but there was an upward trend for the rates of patients sustaining any fractures and internal organ damage throughout the study period. Regarding disposition, 6.4% of visits required either hospital admission, observation, or transfer.

Conclusions: Knowing the characteristics of winter-related sports and activities injuries is essential for emergency providers. Fractures were the most common type of injuries, and in terms of location most common injured body part was the head. To protect vulnerable children, the aim of future research should be focused on injury prevention in these types of activities.




No, authors do not have interests to disclose

## 419 Impact of Transfer Status on Testicular Torsion, a Retrospective Database Review

McConnell R, Swana H/University of Central Florida College of Medicine, Orlando, Florida, US

Objectives: Testicular Torsion is an emergent medical condition that requires prompt surgical treatment. Many emergency departments transfer patients to other hospitals for definitive care. There is conflicting evidence within the literature of whether patient transfer significantly affects overall outcomes.

Methods: A retrospective review of the Healthcare Cost and Utilization Project's National Inpatient Sample databases from 2017-2019 was performed. Patients diagnosed with testicular torsion and treated with either Orchiopexy or Orchiectomy were selected. Patients were grouped based on transfer status and either categorized as not transferred or as transferred from an acute care hospital. Odds ratio compared the frequency of orchiectomy and orchiopexy among patients that were transferred from acute care hospitals vs. patients that were not transferred; a p-value of 0.05 was considered significant.

Results: A total of 834 patients were identified. 129 were transferred from acute care hospitals for surgery and 705 were not transferred. Of the patients that were transferred, 72% (93/129) underwent orchiectomy. Of the patients that were not transferred, 53% (372/705) underwent orchiectomy. Patients treated with orchiectomy are 2.31 times more likely to have been transferred from an acute care hospital than patients treated with orchiopexy (odds ratio = 2.31, 95% CI: 1.53-3.49, P = 0.0001).

Conclusions: Patient transfer from acute care hospitals is associated with an increased rate of orchiectomy. Since testicular salvage is time dependent, this difference is likely explained by the delay in care associated with transferring patients from one hospital to another.

| | Orchiectomy | Orchiopexy | Total |
|---|---|---|---|
| **Transfer from Acute Care Hospital** | 93 | 36 | 129 |
| **No transfer** | 372 | 333 | 705 |
| **Total** | 465 | 369 | 834 |

No, authors do not have interests to disclose

EMF

## 420 Development of a Spanish Language Version of an Educational Tool for Surrogate Decision Makers of Comatose Survivors of Cardiac Arrest

Perman S, Martinez A, Shelton S, Ortiz C, Havranek E/CU Anschutz, Aurora, Colorado, US

Objectives: To develop a linguistically and culturally appropriate educational tool for surrogate decision makers of comatose survivors of out of hospital cardiac arrest that is intended to inform about post-cardiac arrest care, set expectations and assist in decision-making.

Methods: Using the Cultural and Linguistic Adaptation Framework, we iteratively adapted the tool into Spanish. The initial translation procedure was conducted by a professional service, who directly translated the English version into Spanish. The translated document was then independently reviewed sequentially by; 1. a nurse native Spanish speaker of Mexican descent; 2. a certified interpreter native Spanish speaker of Mexican descent; and 3. a physician expert in cardiac arrest care native Spanish speaker of Puerto Rican descent. The adapted Spanish version of the tool and the English version were presented to 12 community members via electronic format for review. Participant demographics were obtained, including age, gender, self-identified race/ethnicity, birth country was obtained. Via survey methodology, we queried if the adaptation was linguistically correct, acceptable, potentially useful, amount of information, and cultural relevance.

Results: Our iterative adaptation highlighted the importance of a thorough translation strategy involving multiple revisions of the professional translation for linguistic accuracy. Of our three independent reviewers, the professional interpreter with less health literacy was credited with the most linguistic revisions for readability. We required additional graphic design services to ensure the Spanish content was formatted appropriately. Twelve bilingual Latino community members reviewed the tool and provided notable feedback that will be used to further adapt the tool.

Conclusions: Transcreation of health education tools is necessary to ensure that tools translated into Spanish are both linguistically and culturally acceptable to the target community for which they are intended.

No, authors do not have interests to disclose

## 421 Regional Impacts on Digital Health Information Exchange During a Ransomware Attack

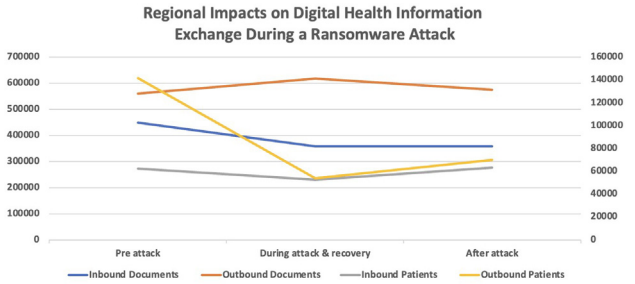
Dameff C, Kahl N, Kwan B, Castillo E, Killen J, Tully J, Chan T/University of California San Diego, San Diego, California, US

Objectives: Ransomware cyber-attacks on health care delivery organizations (HDOs), are increasing in sophistication, severity, and frequency. A significant advantage to the widespread adoption of electronic health records is the ability to share digital records among HDOs quickly via health information exchanges. To our knowledge no published data exists analyzing effects of ransomware on digital patient record sharing. The purpose of this study is to report associated regional impacts on the volume of electronic health information record exchange during a month-long ransomware attack on a neighboring HDO.

Methods: We performed a retrospective analysis of electronic patient records exchanged (Care Everywhere, EPIC Systems, Verona, WI) at a large two-hospital HDO in San Diego, California (not attacked with ransomware) adjacent to a separate multi-hospital HDO under a month-long ransomware attack. We compared the volume of records exchange as well as the total number of patients whose records were shared the 4 weeks before the attack (4/3/21-4/30/21) (pre), during the attack and recovery (5/1/21-4/28/21) (during), and after (5/29/21-6/25) (after). Inbound and outbound is defined as documents coming into or out of the HDO not under attack. Documents were defined as a solitary patient record (clinical note, laboratory or imaging result etc.). Patients were defined as distinct individuals wherein at least one record was exchanged.

Results: Total inbound documents were 448,398 the month before the attack; 358,980 during; and 358,155 after. Total outbound documents were 560,839 before; 617,143 during; and 574,620 after the ransomware attack. Inbound patients were 62,475 before; 52,466 during; and 63,364 after; and total outbound patient were 141,789 before; 53,816 during; and 69,923 after (Figure 1).

Conclusions: Ransomware attacks on hospitals are associated with regional changes in electronic health record sharing between HDOs. This study demonstrated reductions in total inbound and outbound records shared as well as inbound patients but showed an increase in total outpatient documents shared with outside HDOs. Some of these effects persisted past the attack.




Yes, authors have interests to disclose

Disclosure: NIH K Award Grant #K08 EB032477

Grant Support

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## 422 Understanding Reason for Refusal in MIGHTy Heart Study to Reduce Return Rates to the Emergency Department

Mantel R, Patel R, Blutinger E, Reading-Turchioe M, Shafran-Topaz L, Daniels B, Masterson-Creber R, Merchant R/Mount Sinai Hospital, New York, New York, US

Objectives: Mobile integrated health (MIH) is a facilitated telehealth intervention in which community paramedics perform a home evaluation after hospital discharge with the help of a virtual emergency medicine physician[1]. Few studies exist looking at patient perspectives, let alone adverse sentiment, towards MIH.2 The "Using Mobile Integrated Health and Telehealth to Support Transitions of Care among Heart Failure Patients" (MIGHTy Heart) study is a multisite, randomized controlled trial evaluating the potential for MIH to reduce hospital readmissions among 2,100 heart failure patients compared to a transition of care intervention (TOCC). We categorized patients' reasons for refusal to participate in MIGHTy Heart to explore patient preferences and possible resistance to this telehealth model to reduce return visits to the emergency department (ED).

Methods: Research coordinators (RCs) approached patients in the hospital who met study inclusion criteria (New York City resident, Heart failure, lack of cognitive deficits, no Left Ventricular Assist Device/transplant]. RCs introduced the study to the patient with a speech, pamphlet, and video. RCs then explained the process of randomization to MIH or TOCC, and the requirements for participation to the patients. For all patients who declined participation, RCs documented the reason for refusal in REDCap as either a structured field (selection from a pre-populated list) or free-text comment. Data from structured fields were exported and analyzed using basic descriptive statistics. The free-text comments were exported and thematically analyzed into six themes by two independent reviewers to ensure inter-rater reliability. Differences in categorization between reviewers were resolved through discussion.

Results: A total of 168 participants who refused to participate described they had sufficient care at home; among those, 22 stated they preferred to come to the ED for health care purposes.

Conclusions: Given that 13% of patients felt sufficiently cared for in an ED setting as opposed to their home setting who refused due to sufficient care felt that they would prefer to come to the ED, recruitment efforts should focus on further highlighting the value promoting the understanding of community paramedicine to patients weighing visits to the ED as a way to curb avoidable ED visits reduce readmission rates. Future studies could investigate ways to optimize methods of communication, care delivery, and follow-up, while using limited resources, for patients and resources that can help patients receive health care at home.

**Table 1.** Categorization of Reasons for Refusal of MIGHTy Heart Participation by Frequency and Percentage (n=810)

| Reason for Refusal | Source | n (%) |
|---|---|---|
| Not Interested/Comfortable in Participating in Research in General | Structured fields | 521 (64.3%) |
| Project Would Involve Too Much Work/FoHow-Up for Participants | Structured fields | 63 (7.8%) |
| Concerns about COVID-19 | Structured fields | 1 (0.1%) |
| Other | Structured fields | 225 (27.8%) |
| Feels Their Care Plan is Sufficient | Unstructured comments | 168 (33.9%) |
| Uninterested in Program Services | Unstructured comments | 98 (19.8%) |
| Other | Unstructured comments | 78 (15.8%) |
| Uninterested With Research | Unstructured comments | 76 (15.4%) |
| Inconvenient Timing | Unstructured comments | 52 (10.51%) |
| Does Not Want Paramedic in Home | Unstructured comments | 23 (4.65%) |

**Table 2.** Categorization of Reasons Why Patients "Feel Their Care Plan is Sufficient" of MIGHTy Heart Participation by Frequency and Percentage (n=168)

| Feels Their Care Plan is Sufficient | Unstructured comments | 168 (33.9%) |
|---|---|---|
| Prefers to Return to Hospital for Care | Unstructured comments | 22 (13%) |
| Other | Unstructured comments | 146 (87%) |

No, authors do not have interests to disclose

## 423 Implementation of Standardized Curriculum for Ultrasound-Guided Intravenous Access for Pediatric Residents

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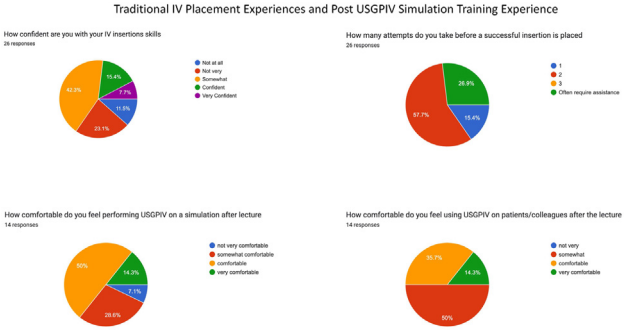
Background: Intravenous (IV) access is a fundamental aspect of medical management and achieving access in a timely manner is crucial for many individuals' outcomes. Obtaining IV access can be challenging in the pediatric population. Studies have shown that the use of ultrasound-guided peripheral IV (USGPIV) access in pediatric patients has decreased the overall time to access, and that clinicians can safely and effectively place USGPIV's through formal simulation-based training. However, there is scarcely published competency-based training curricula for USGPIV, and scarce formal education of USGPIV for pediatric residents.

Objectives: To implement ultrasound-guided peripheral intravenous (USGPIV) access training for pediatric residents during pediatric emergency medicine (PEM) rotations, which may potentially decrease the number of attempts to achieve access, improve timely fashion of IV placement, and decrease the outsourcing needed to achieve successful IV placement.

Methods: A standardized curriculum utilizing simulation-based training for ultrasound-guided IV access was created and implemented. Pediatric residents rotating through the emergency department completed an ultrasound-guided IV workshop during their rotation. The curriculum consisted of recorded videos and a live didactic skills session lead by PEM attendings and residents trained in USGPIV. Simulators were used for vessels. A standardized skills checklist was created to ensure residents met criteria for a successful IV placement.

Results: Prior to simulation training, 26 out of 36 pediatric residents took a likert scale survey showing: 42.3% of resident (the majority) felt only somewhat confident in their traditional IV placement skills, and 57.7% (the majority) felt they needed 2 attempts on average to place a successful IV. Additionally, 34.6% of individuals felt that up to 20% of traditional IV placements had to be escalated to other departments after failed placements. Post simulation training, 14 out of 36 residents took a Likert scale survey showing: 50% of the residents (the majority) felt comfortable using USGPIV on a simulation and only somewhat confident placing it on a person. 92.9% of residents were not very or only somewhat comfortable using an ultrasound machine vs post simulation where 50% felt comfortable-very comfortable. Since implementation, 86% of the program has been simulation trained to perform USGPIV. Of the 86% who have been trained, 100% have successfully placed an USGPIV on the simulators.

Conclusions: Prior to our training, most residents only felt somewhat confident in their traditional IV skills, needing multiple attempts for successful placement. Using standardized simulation-based training, 100% of residents trained in USGPIV achieved simulation IV access, and most individuals felt more comfortable in ultrasound and USGPIV on simulation. Outcomes maybe promising for the implementation of training practice with patients.




No, authors do not have interests to disclose

## 424 The Implementation and Evaluation of an E-Learning Program for Residents in an Irish Emergency Department

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Objectives: E-learning refers to technology-based learning where materials are delivered electronically to remote learners. The primary aim of this study was to design and roll out an e-learning program for junior emergency medicine (EM) residents. The secondary outcomes were to evaluate the program using the reaction (Level 1) and learning outcomes (Level 2) of Kirkpatrick's training evaluation model.

Methods: The e-learning program was developed using the Royal College of Emergency Medicine curriculum. Ten learning modules were developed covering topics such as cervical spine injury in trauma, toxicology, basic ECG interpretation and syncope assessment. The modules were uploaded to "Edmodo", a free, secure educational online platform. A convenience sample of all residents working in the emergency department during the study period (April 9, 2020 and completed by May 19, 2020) were recruited. The Kirkpatrick training evaluation model was designed to objectively measure the effectiveness of training. Kirkpatrick's level I evaluates the degree to which participants find the training favorable, engaging and relevant to their jobs. To that end, a questionnaire was developed for the participants to self-administer after completing each e-learning module. The questionnaire asked the doctors to rate the content and structure of the training and relevance to their jobs using a five-point Likert scale from strongly disagree to strongly agree. The last two questions on the questionnaire from a Level I aspect asked participants if they would recommend the program to others and their overall satisfaction with the information received. Kirkpatrick's level II determines the participant's learning outcomes and increase in knowledge. Firstly, the participants were asked in the questionnaire to rate their knowledge level before and after completing each e-learning program module on a five-point Likert scale. Secondly, the knowledge quiz further tested the participant's knowledge after the module. The scale scores for the knowledge level before and after completing each module were evaluated for significance of difference using the non-parametric Wilcoxon signed-rank test.

Results: Twenty-five of the twenty-six emergency medicine residents working in our emergency department participated in the e-learning program. There was a completion rate of 62% for the evaluation questionnaires. Regarding the Level I analysis, 88% of residents agreed or strongly agreed that they would recommend this program to others. 87% of residents agreed or strongly agreed that they were overall satisfied with the information received. There was a positive improvement in the doctors' self-reported level of knowledge before and after the e-learning program across the ten modules. There was a statistically significant increase in self- reported "very high" knowledge (11% pre-program vs. 25% post-program $p<0.05$). There was a completion rate of 79.5% for the knowledge quizzes. The mean overall knowledge score across the ten e-learning modules was 85.48% (standard deviation 20.01).

Conclusions: This study demonstrates the successful development of an e-learning program for emergency medicine residents in an Irish emergency department. Evaluation of the program with the Kirkpatrick model demonstrated high learner satisfaction and increase in knowledge. E-learning is a valuable tool to develop blended learning options for an emergency department.

No, authors do not have interests to disclose

## 425 WITHDRAWN

## 426 Categorization of Usage Patterns of an Emergency Department Telehealth Follow-up Program During the COVID-19 Pandemic

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Objectives: The education that is provided at the time of discharge from the ED is a pivotal moment in a patient's care. Multiple studies have shown that a large percentage of patients do not understand their discharge instructions. Additionally, many patients don't keep their follow-up appointments after discharge. Lack of understanding of the discharge instructions and lack of follow-up can lead to unscheduled return visits to the ED and increased hospital costs. A potential solution to help patients better understand their discharge instructions, and mitigate the lack of primary care follow-up and unscheduled return ED visits, is through the use of telehealth for ED follow-up. In 2019, several emergency departments in the Texas Health hospital system implemented an application-based telehealth follow-up service for ED patients called Hospital to Home (H2H). The program provides all patients who are discharged from the ED with a unique code that can be used with an online or phone application to allow patients to remotely ask a physician questions for 7 days after discharge. Our overarching questions were: In patients discharged from Texas Health emergency departments, how is the Hospital2Home app-based follow-up program utilized? How has this utilization changed when comparing years immediately pre- and post-the start of the COVID-19 pandemic?

Methods: A retrospective chart review was conducted to look at characteristics of the utilization of the H2H platform for patients that were at least 18 years old and seen in the emergency department at 18 different Texas Health facilities between the period at the beginning of the COVID-19 pandemic, defined as March 2020-March 2021, and the year directly preceding the pandemic, defined as January 2019-January 2020. Data that was collected included the age and gender of the patient, first-time or repeat H2H user, the reason for H2H usage, duration of active encounters, initial response time, number of images uploaded, number of messages sent by patients and providers, and secondary outcomes of usage including whether additional medications were prescribed and if the patient was advised to return to the ED.

Results: Data collection shows a significant increase in both first-time and repeat users of the H2H program for the first year of COVID compared to the year immediately prior. There was also a significant increase in patients sent for inpatient follow-up by their H2H provider. The data also shows a decrease in initial response times by physicians and an increase in patient engagement through messaging.

Conclusions: This project hopes to shift some of the past approaches that physician responsibility stops once a patient leaves the ED. Our data shows an increasing number of patients are willing to utilize H2H after discharge. Telehealth can serve as a resource for patients who still may have questions after their discharge and can't get in to see their primary care physicians in a timely manner. It also can let patients know when they should return to the ED for emergent complications. If implemented correctly, programs like Hospital2Home can benefit both patients and hospital systems as a whole.

No, authors do not have interests to disclose

## 427 All About Rhythm: The Implementation of an Unstable Cardiac Dysrhythmia Simulation Curriculum at a Rwandan Emergency Residency

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Objectives: Simulation has been established as a patient-safe tool for both training and assessment in medical education. In Rwanda, there is a general lack of Simulation-Based-Learning (SBL) and its efficacy in Lower Middle-Income Countries (LMIC) has been poorly investigated. The authors created a simulation curriculum based on common unstable cardiac dysrhythmias and assessed its efficacy in improving knowledge and confidence when implemented at an Emergency Medicine (EM) residency program in Kigali, Rwanda.

Methods: This educational project was delivered to medical trainees enrolled in the Emergency Medicine & Critical Care MMed program at University Teaching Hospital - Kigali (KUTH). The intervention was delivered at the KUTH Simulation Centre once weekly for a duration of four weeks in January/February 2022. Four simulation cases were prepared: a case of unstable bradycardia (UB), unstable wide-complex tachycardia (WCT), unstable narrow-complex tachycardia (NCT), and cardiac arrest (CA). A Knowledge, Attitudes and Practices (KAP) survey was provided to participants before and after each simulation scenario. Confidence was measured using a Likert scale out of 5.

Results: In total, there were 13 participants in the four simulated case scenarios: 7 were second-year trainees, and 6 were third-year trainees. UB had the greatest change in knowledge score, with an increase from 65.3% to 91.6% ($p < 0.01$). UB confidence scores also increased the most when compared to the other scenarios, from 3.75 to 4.6 out of 5.00 ($p < 0.01$). Specifically, confidence with the steps of transcutaneous pacing increased from 2.67 to 4.42 ($p < 0.01$). There was a clear trend to improvement in both knowledge and confidence pre- and post-simulation: for WCT, knowledge increased from 80% to 86.6%, confidence from 4.05 to 4.62; for CA, 68.4% to 75% and 4.26 to 4.51; and for NCT, knowledge increased from 87.6% to 95.4% and confidence 4.21 to 4.61.

Conclusions: This educational project involving the development and delivery of four simulation scenarios focused on unstable cardiac dysrhythmias lead to improvement of medical trainee knowledge and confidence at an Emergency Medicine & Critical Care MMed program in Rwanda. The scenario on unstable bradycardia saw a statistically significant improvement in knowledge and confidence as well as a statistically significant increase in knowledge related to transcutaneous pacing.

No, authors do not have interests to disclose

# EMF

## 428 The Impact of STIGMAs: Stigma Training In Graduate MedEd Addressing Substance Use

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Background: Opioid use affects a considerable proportion of patients and is associated with significant morbidity and mortality. Stigmatizing attitudes toward individuals with opioid use disorder (OUD) are prevalent among emergency medicine (EM) providers, and OUD is more highly stigmatized than other health conditions. Stigmatizing attitudes by health professionals towards patients with OUD negatively impact health outcomes. There is little precedent in graduate medical education addressing the topic of stigma toward individuals with OUD.

Objectives: We aimed to evaluate the feasibility and acceptability of a multi-modal, longitudinal, curricular innovation designed to reduce stigmatizing attitudes by EM residents toward patients with OUD. We adapted a validated stigma scale to measure the change in stigmatizing attitudes following the curricular intervention.

Methods: We developed and implemented a three-part curriculum, which was incorporated into the required residency didactics at an urban, three-year, university-based EM residency. Residents completed: 1) A novel, interactive case discussion, facilitated by an addiction expert with patient vignettes and discussion of stigma and its impact on patient care; 2) Pre-existing interactive online modules (Reducing Stigma Education Tools); 3) A novel simulation (SIM) session addressing stigmatizing provider behaviors directly, followed by debriefing. Participants completed a survey before and after the implementation of the three-part intervention. The survey instrument was adapted from the Opening Minds Stigma Scale for Healthcare Providers. Two sample t-tests were used for analysis.

Results: On a five-point Likert scale, learners were more likely (MD = 0.65, p=0.0109) to think that their residency offered sufficient training dedicated toward reducing stigma after the intervention. Learners were more likely (MD = 0.61, p=0.0476) to think treatment for OUD was as effective as treatment for other chronic diseases, and more likely (MD = 0.36, p=0.0121) to think that patients with OUD only have themselves to blame for their problem after the intervention. The other 23 domains assessing stigmatizing attitudes showed no significant difference in means after the intervention.

Conclusions: While learners felt our intervention filled a gap in their curriculum, there was minimal change in scores on a validated stigma scale. This may reflect limitations in the nature of our curriculum or the deep seeded nature of stigmatizing attitudes. Limitations include a relatively favorable pre-intervention survey score and a small, single-site sample size. Future work can benefit from identifying the barriers that prevent healthcare providers from having more favorable attitudes toward patients with OUD.

No, authors do not have interests to disclose

## 429 Interprofessional In Situ Simulation to Optimize Cardiac Arrest Management in an Emergency Department Observation Unit

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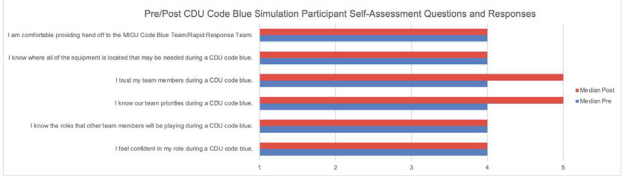
Background: Emergency department (ED) observation or clinical decision units (CDU) are common in many hospitals due to their ability to provide high-quality care, reduce length of stay as compared to other observation areas, and minimize hospital costs. While intended for clinically stable patients, it is essential that the interprofessional team is prepared to manage low-frequency events such as cardiac arrest, yet there is minimal literature on how to effectively train CDU teams.

Objectives: Prioritize tasks upon recognizing patient decompensation and cardiac arrest. Optimize CDU team member roles and interprofessional communication. Manage a critically ill patient using principles of ACLS. Create standard training curricula for staff primarily working in ED-adjacent clinical zones.

Methods: Stakeholders from nursing, physician, and Advanced Practice Provider (APP) leadership met to discuss CDU Code Blue quality topics and team goals, from which learning objectives and a simulation case were drafted. After a pre-brief, nurses, techs, and APPs participated in the high-fidelity simulation followed by a team debrief. Participants completed a 6-question pre and post self-assessment via QR code along with three program evaluation questions.

Results: 25 team members participated in 6 in situ CDU simulations. On the pre-assessment, participants were asked about confidence in their role during a Code Blue, roles of team members, team priorities, trust in team members, equipment location, and comfort in providing hand-off. Participants rated each from 1 (strongly disagree) to 5 (strongly agree). On the pre-assessment, participants had a median of 4 across all categories. On the post-assessment, team priorities and trust in team members increased to 5. In the program evaluation, participants found the experience valuable, particularly the debrief, and were eager for additional practice, with the majority requesting a simulation session every other month.

Conclusions: We implemented a team-based Code Blue simulation in an ED observation unit. Our results suggest that team members started the simulation with confidence in cardiac arrest management, but participation increased their understanding of team priorities and trust in team members. This simulation and debrief session could help improve team performance during high-stakes, low-frequency events by ensuring a shared mental model of priorities and trust in teammates to fulfill a given role, thereby facilitating the completion of tasks. Participant evaluation of the program was overwhelmingly positive. This was a well-received team-based educational tool that may improve the coordination of cardiac arrest care in the CDU.




No, authors do not have interests to disclose

# EMF

## 430 Bridging the Gap: Interactive Virtual Training for Ultrasound Image Acquisition Skills Is Not Inferior to In-person Training

Duran-Gehring P, Gomez RV, Cox T, Clare D, Medina ME, Ghali S, Segarra-Salcedo A, Crisp A, Gottlieb M/University of Florida College of Medicine- Jacksonville, Jacksonville, Florida, US

Objectives: Clinical ultrasound (US) is a complex technical skill that entails cognitive reasoning while also employing psychomotor skills to acquire the images suitable for medical decision-making. It is traditionally taught via small group hands-on sessions with an instructor correcting the learner's hand and transducer position at the bedside, which can be difficult in cases of social distancing or in rural and global health settings. While virtual training has been utilized for teaching image interpretation, there are limited data on its efficacy for teaching the psychomotor component. Our study sought to assess whether a novel interactive virtual training program was non-inferior to the traditional in-person training to teach image acquisition skills.

Methods: This randomized, crossover study compared traditional, in-person hands-on training with a novel virtual, interactive skill session among fourth-year medical students. All students on their emergency medicine clerkship were eligible with no exclusion criteria. Students completed a pre-course survey to gauge previous US experience, including previous training and number of US exams previously performed, which was utilized to stratify group randomization. Both groups received asynchronous didactic education on two US exams, FAST and DVT US, followed by a technical skills lab. Group A underwent the traditional hands-on FAST training session with a faculty member correcting hand position at the bedside, followed by a virtual skills session on DVT US utilizing online video conferencing software to demonstrate and correct positioning via virtual instruction. Group B received their FAST training virtually and DVT training in-person. Students were then encouraged to scan independently during the rotation. A standardized assessment tool was used at week 1 and 4 of the rotation to assess US exam performance, and scores were compared using a linear mixed-effects model. Students also completed a post-course survey to determine their US attitudes and confidence with the program.

Results: Thirty-three students were enrolled and 3 withdrew due to illness during the rotation, leaving 30 students in the study (12 in Group A, 18 in Group B). There was no statistically significant difference in scores between in-person vs virtual training for initial recall at week 1 ($p=0.368$) or delayed recall at week 4 ($p=0.952$), nor a significant difference ($p=0.765$) between the average test scores among groups when accounting for the test given (FAST vs. DVT) and the week tested (Week 1 vs. Week 4). Students performed 152 independent US examinations after training. Learners displayed increased confidence (4.25/5 from 2.03/5) and scored the rotation overall 4.75/5, despite an 82% preference for the in-person training experience.

Conclusions: Despite student training preference, virtual US training was demonstrated to be non-inferior to traditional in-person training as assessed using a standardized assessment tool at an initial and delayed time. Students also demonstrated increased confidence with US performance regardless of assigned group. Although, this study was limited to medical students at a single institution across two US exams, these findings could inform future research and the application of US training to austere and resource-limited environments.

No, authors do not have interests to disclose

## 431 COVID-19 and Rates of Psychiatric and Substance-Related Pediatric Emergency Department Visits

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Objectives: Significant attention has been brought to the effects of the COVID-19 pandemic on both mental health-related and substance abuse emergency department visits in both adults and children. However, there is a paucity of data examining visits for acute intoxication and substance use disorders during this time period. Stressors unique to children and a breakdown of mental health and SUD treatment infrastructure during the pandemic may be just as likely to increase the rates of SUD-related visits as those for mental health. In this study

we sought to describe rates of SUD-related visits for pediatric patients in a regional health system.

Methods: This was a multi-center retrospective study examining rates of SUD-related visits for children. Data was included from six hospitals; none of the study hospitals are dedicated children's hospitals and all are community-based hospital settings. Children less than 18 years of age were included. Using the electronic medical record we identified ED encounters with chief complaints or diagnoses that indicate a SUD-related visit, including those visits for alcohol or drug intoxication, SUD treatment, withdrawal, or substance-related agitation. We also identified ED encounters for psychiatric-related visits based on chief complaints and ED diagnoses to see if our health system followed similar trends seen nationally during this time period. Among these encounters, we also identified those related to suicide and those that required inpatient psychiatric hospitalization. We examined the period of March 2019-2020 to establish a baseline, then separated visits from March 2020-2021, March 2021-2022, and March 2022-2023. A full year was utilized for each comparison group to account for seasonal trends in SUD related visits. Comparisons were made across group years using a chi-squared test for proportions with a Bonferroni correction made for multiple comparisons.

Results: In this four-year period there were 105,194 pediatric emergency visits in this health system, of which 2410 (2.3%) were related to SUD or psychiatric related complaints. Median age of patients was 16 years old. Table 1 demonstrates rates of SUD and psychiatric encounters as well as those for suicide, and those that required inpatient admission. Notably rates of SUD visits increased from 2019 to 2020 from 0.9% to 1.6% (difference 0.7%, 95% confidence interval 0.4-0.8%) but decreased in 2021(0.9%) and 2022 (0.7%).

Conclusions: SUD visits increased during the year 2020, in the height of the pandemic, following trends seen in psychiatric related visits nationally. SUD visit rates have since returned to pre-pandemic rates in this health system.

Results:

| | 2019-2020 | 2020-2021 | 2021-2022 | 2022-2023 |
|---|---|---|---|---|
| Overall Pediatric Volume | 29,814 | 14,955 | 28,457 | 31,968 |
| Overall SUD/psychiatric Visits | 574 (2.0%) | 508 (3.4%) | 696 (2.4%) | 632 (2.0%) |
| SUD Visits | 275 (0.9%) | 233 (1.6%) | 279 (0.9%) | 227 (0.7%) |
| Psychiatric Visits | 390 (1.3%) | 356 (2.3%) | 506 (1.7%) | 475 (1.5%) |
| Encounters for Suicide | 133 (0.4%) | 163 (1.1%) | 214 (0.8%) | 186 (0.6%) |
| Psychiatric Admissions | 68 (0.2%) | 65 (0.4%) | 84 (0.3%) | 80 (0.2%) |

No, authors do not have interests to disclose

## 432 The Use of a Psychiatric Overflow Unit in a Large Urban Community Hospital to Improve Patient Outcomes

Aslani-Amoli B, Marwaha A, Stepanova M, Rhine S, Howell J, Gaibi T/INOVA Fairfax Medical Campus, Fairfax, Virginia, US

Objectives: Recent trends in increased and unprecedented volumes in emergency departments (EDs) around the country, particularly around mental health, have created the need create innovative ways to meet this growing dilemma.

Methods: In order to meet this need, our ED, which is located in a multiethnic large urban area with a patient volume of over 130,000 adult and pediatric visits a year, established a 5-bed psychiatric overflow unit (POU) which was built into the physical plant of the ED, using the same triage and disposition pathways, but staffed with behavioral health nurses. The POU became operational in January of 2022. To determine the clinical utility and safety of the POU, we conducted our study from October 1, 2021 – May 31, 2022. We defined clinical utility as the ED length of stay (LOS) and patient safety as the use of medication for agitation and/or aggressive behavior. Our working hypothesis was that patients in the POU would have an equivalent or shorter ED LOS and require fewer medications that patients cared for in the main ED.

Results: There was a total of 919 patients included in our study (POU= 302, main ED= 617). We found no difference in the Emergency Severity Index (ESI) levels between units. Based on our findings, patients in the POU received fewer rescue medications (n=31, 10.3%) compared to the main ED (n=88, 14.3%) however this difference was not statistically significant (P= 0.090). The overall ED LOS was significantly longer among POU patients (1058.7 ± 736.5 minutes) compared to the main ED (884.6 ± 824.6), (P= <.0001) which was driven by discharged patients in the POU having a significantly longer ED LOS than the main ED (819.9 ± 779.8 vs.486.4 ± 577.3, P=<.0001)]. We were underpowered to discern a significant difference in medication use since our use of medicine in the ED is relatively.

Conclusions: This unit has been an effective addition to the ED as we deal with the increasing demands of the mental health crisis for the ED behavioral health patient population.

No, authors do not have interests to disclose

## 433 A Cross Sectional Observational Study of Peripheral Nerve Size Versus Optic Nerve Sheath Diameter in Patients With Normal Intracranial Pressure

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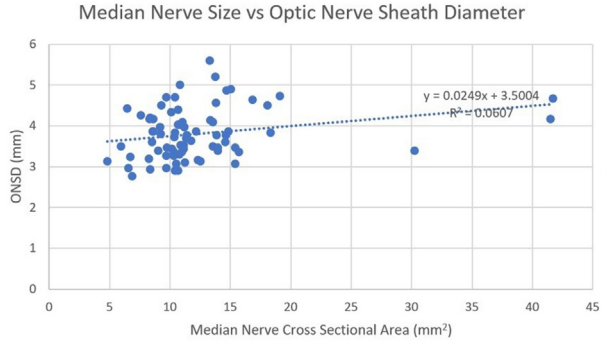
Objectives: Ultrasound has been routinely used to measure optic nerve sheath diameter (ONSD) in the emergency department, at high altitude clinics, and in neurology clinics to evaluate for increased intracranial pressure (ICP). The ONSD cut-offs for increased ICP remains contentious, and their utility is limited in emergent settings due to variation in patients' baseline ONSD. Therefore, developing a proxy measurement to predict patients' baseline ONSD would be a useful tool. The purpose of this study was to evaluate whether peripheral nerve size varied significantly with ONSD in patients with normal ICP.

Methods: Portable ultrasound machines were used by three medical students over the winter of 2020- 2021 to measure the median nerve, ulnar nerve, sciatic nerve, and ONSD in 75 adults at a single hospital. Exclusion criteria included patient-reported history of traumatic brain injury, idiopathic intracranial hypertension, nerve demyelinating disorders, ocular trauma, or hemorrhagic cerebral vascular accident. Basic demographic data were also collected. The mean estimated cross sectional area (CSA) of the selected peripheral nerves were compared to patient ONSD via simple linear regression analyses.

Results: Median nerve CSA was found to vary significantly with ONSD ($y = 0.0249x + 3.5004$, $R2=0.0607$, $p=0.0330$). Ulnar and sciatic nerves were subjectively poor candidates for this study due to difficulties with standardized patient positioning and probe placement, and their CSAs did not vary significantly with ONSD.

Conclusions: In a sample of patients with subjectively normal intracranial pressure, median nerve size varied significantly with optic nerve sheath diameter. This measurement could be used to develop a method for predicting baseline ONSD in an emergent setting for a more accurate evaluation of the increase in sheath diameter with increased ICP, although the model developed would only be applicable to patients whose baseline ONSD was greater than 3.5mm, which constituted 63% of participants in this study.




No, authors do not have interests to disclose

# 434 WITHDRAWN

# 435 Identification of Suppurative Flexor Tenosynovitis by Emergency Medicine Residents Utilizing Ultrasound

Baydoun J, Nezam A, Chen E, Navarro L, Phan MT/Kirk Kerkorian School of Medicine at UNLV; Las Vegas, Nevada, US

Objectives: Suppurative Flexor tenosynovitis (FTS) is a rare condition affecting 2.5 to 9.5% of hand infections and can result in significant morbidity and mortality. Management options include non-operative versus open flexor sheath irrigation and debridement. While there is no definitive gold standard for diagnosis, it has been diagnosed clinically using Kanavel's 4 cardinal signs. Bedside ultrasound is widely used in the emergency department for diagnostic and procedural purposes. The objective of this study was to assess the accuracy of ultrasound performed by EM residents in diagnosing FTS.

Methods: Setting: Urban, academic ED. Design: Prospective, observational cohort study. Training: EM residents participated in a 2-hour hands-on training session reviewing hand anatomy and the mechanics of performing a hand ultrasound (US). Residents demonstrated their ability to visualize the flexor tendon of the finger in both transverse (TV) and longitudinal (Long) views and correctly obtain doppler signaling with a linear probe. Inclusion criteria: adult patients with ED diagnosis of suspected finger/hand cellulitis or FTS. Exclusion criteria: pregnant, in custody, inability to complete treatment. Written, informed consent was obtained. Prior to performing US, residents documented demographic information, including Kanavel's signs, and determined whether they believe the presentation was consistent with FTS on a standardized data collection tool. US images of the affected finger and contralateral finger in the TV and long. views along with doppler were obtained and digitally stored. To determine concern for FTS based on ultrasound, residents evaluated the images for peritendon fluid as well as secondary findings of tendon sheath thickness and vascularity. US faculty, blinded to resident readings assessed the images for findings consistent with FTS as well. The primary outcome was the diagnostic test characteristics of the resident US as compared to the gold standard FTS diagnosed by MRI or by hand surgeon consultant. Secondary outcome is level of agreement between resident and US faculty image review.

Results: A total of 21 patients were enrolled between October 2022 to April 2023. Residents correctly identified FTS in 2/5 (40%; 95% CI=11.6, 77.1) patients and correctly identified 12/16 (75%; 95% CI= 50.0, 90.3) patients who were negative for FTS. The sensitivity and specificity of resident tendon sheath ultrasound was (40%; 95% CI=11.6, 77.1) and 75%. The positive predictive value and negative predictive value was 33.3% (95% CI= 9.3, 70.4) and 80% (95% CI: 54.1, 93.7). Diagnostic test characteristics are shown in the table.

Conclusions: On the basis of this interim analysis, ultrasound has a high negative predictive value for FTS. We believe, however, further enrollment and research with a larger sample size is required to determine the efficacy of emergency department bedside ultrasound in the diagnosis of FTS.

| N=21 | % | 95%CI |
|---|---|---|
| Sensitivity | 40 | 11.6, 77.1 |
| Specificity | 75 | 50.0, 90.3 |
| PPV | 33.3 | 9.3, 70.4 |
| NPV | 80 | 54.1,93.7 |
| LR + | 1.6 | |
| LR - | 0.8 | |

No, authors do not have interests to disclose

# 436 WITHDRAWN

EMF

# 437 Emergency Department Weight Management and Exercise Prescription Program (ED-WEPP) for Older Veterans With Knee Pain: A Pilot Feasibility Trial

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Objectives: Musculoskeletal pain comprises one of every five visits by older patients to Veterans Affairs emergency departments (EDs). Weight management and exercise are first line treatments for chronic knee pain secondary to osteoarthritis, the most common form of arthritis. Both ED patients and providers are open to using these interventions for non-traumatic knee pain. However, studies of prescribing these non-pharmacological treatments from the ED are limited.

Methods: This is a single arm pilot trial in an urban VA ED to determine feasibility of an ED Weight management and Exercise Prescription Program (ED-WEPP). The study is designed to provide ED referrals (the intervention) to existing VA weight management (MOVE!) and exercise (Gerofit) programs in addition to usual ED care for older Veterans presenting to the ED with non-traumatic knee pain. Eligible Veterans aged $\geq$ 65 years (goal, n=30) are approached during the ED visit by a research assistant (RA) Monday-Friday from 8 am – 4 pm to enroll in the study. The RA places the consults at the time of enrollment and notifies the ED provider. Participants receive a follow up phone call from the RA one week later to confirm scheduling with MOVE! and Gerofit. Study feasibility and metrics include study participation and enrollment into the existing VA programs. Pain and physical function are assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC).

Results: We describe preliminary results from the first seven participants enrolled in the study. During the study period, 33 individuals with knee pain were screened, 23 were excluded (most commonly for acute injury/gout, previous participation in MOVE!, non-VA primary care, and oxygen dependence), and three declined. For study participation, 7 (70%) of eligible participants participated. For enrollment into the existing VA programs, 3 (43%) participants completed at least one visit each with MOVE! and Gerofit at the time of this analysis. Baseline data were entered into the study database on the day of the ED visit for all 7 (100%) of participants, and 5 (71%) participants completed a 1-week post-ED visit telephone call. All participants were male (100%), and the majority were White (57.1%) with a mean (SD) age of 71.0 (4.3) years. Baseline WOMAC pain and function scores were 6.7 (5.2) and 27.4 (14.9), respectively. Barriers to implementation included limited recruitment hours for the RA.

Conclusions: Older Veterans are interested in participating in non-pharmacological treatment options for knee pain when prescribed from the ED. Preliminary data suggest that ED-WEPP is feasible, though additional consideration should be given to broadening inclusion criteria and use of a research assistant vs ED staff.

No, authors do not have interests to disclose

# 438 Involuntary Sedation of Patients in the Emergency Department for Mental Health Crises: A Retrospective Cohort Study

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Objectives: In the emergency department (ED) it is standard practice to obtain accurate medical assessments and maintain the safety of patients and ED staff. However, we do not know how common this practice is and what factors are associated with the use of involuntary sedation. The purpose of this study was to obtain baseline data on the use of involuntary sedation in our health system's EDs.

Methods: Retrospective chart review of adolescents and adults who presented to the ED for mental health care between 2020-2021. Patients who received both a psychiatry consultation and involuntary sedation were included. Data variables included demographics, sedatives given, medical diagnoses, mental health diagnoses,

substance use, ED length of stay, and ED disposition. The primary outcome was repeated involuntary sedation. Secondary outcomes were use of a seclusion room, use of hospital security team, and sedative type.

Results: Involuntary sedation was used in 18.8% of the mental health patients screened for study inclusion. A cohort of 334 participants met study inclusion criteria. They had an average age of 35.5 ± 13.5 years (range 15-85) and were 58.4% men, 40.1% women, and 1.2% transgender. The majority (90.0%, n=299) had prior mental health diagnoses, with the most common being substance use disorder (38.9%, n=130), bipolar disorder (34.1%, n=114), depressive disorder (29.0%, n=97), schizophrenia (24.3%, n=81) and other disorders (49.1%, n=164). Two thirds (65.9%, n=220) had current substance use and 41.9% (n=142) reported current use with a chemical associated with aggression (alcohol, cocaine, or methamphetamines). Half of the cohort were brought into the ED by police (54.5%, n=181) and 73.1% (n=244) had hospital security involved during their ED stay. On univariate analysis, current substance use with cocaine, methamphetamines, or alcohol was associated with a decreased odds of repeated involuntary sedation (univariate OR 0.52) and prior mental health diagnosis and non-white race were associated with increased odds of repeated sedation. In the multivariable regression, the effect of race was more significant.

Conclusions: Involuntary sedation was used in 1 in 6 patients in the ED for mental health care and almost a third of those who were sedated once were repeatedly sedated. Regression analysis is concerning for potential differences in use by race. Evidence-based interventions to reduce the need for involuntary sedation in the ED should be developed.

**Table 1:** Univariate analysis of factors associated with repeated involuntary sedation for mental health patients in the ED

| Predictor variable | OR | 95% CI | p value |
|---|---|---|---|
| Current substance abuse with cocaine, methamphetamines or alcohol | 0.52 | 0.32-0.85 | 0.01 |
| Prior mental health diagnosis | 2.14 | 0.85-5.38 | 0.10 |
| Brought in by police | 0.74 | 0.46-1.18 | 0.21 |
| Age (years) | 1.01 | 0.99-1.03 | 0.32 |
| **Gender** | | | |
| Male (reference) | | | |
| Female | 0.83 | 0.51-1.33 | 0.44 |
| Transgender | 2.01 | 0.27-14.63 | 0.49 |
| **Race** | | | |
| White (reference) | | | |
| Black/African American | 1.57 | 0.94-2.59 | 0.79 |
| Other/multiracial | 2.18 | 1.08-4.69 | 0.29 |
| **Ethnicity** | | | |
| Non-Hispanic (reference) | | | |
| Hispanic | 2.18 | 0.43-11.00 | 0.34 |

No, authors do not have interests to disclose

## 439 Point-of-Care Ultrasound in Traumatic Cardiac Arrest: Perspectives and Experiences of Emergency Physicians and Trauma Surgeons

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Objectives: Patients presenting in traumatic cardiac arrest (TCA) require a high stakes decision making process. Point-of-care ultrasound (POCUS) as a tool, has the potential to reduce cognitive workload and further direct patient care, however, the utility of this technology needs to be critically analyzed. The aim of this study was to explore the perspectives held by physicians with differing POCUS experience and training in the trauma setting. Additionally, this study explored the level of confidence reported by physicians from different specialties and varying training experiences, related to the utilization of POCUS in the management of patients experiencing TCA.

Methods: A Likert-scale survey was designed and administered to all emergency medicine and trauma surgery residents/fellows/faculty affiliated within an urban academic Level 1 trauma center. The objective was to evaluate demographics, confidence levels regarding different aspects of POCUS use, and perceived utility of POCUS in TCA. Participation was voluntary. Descriptive statistics and comparative statistics were used to analyze mean/median differences. Relational statistics were used to analyze relational strength of outcomes. Inter-item reliability was used to assess internal consistency of data.

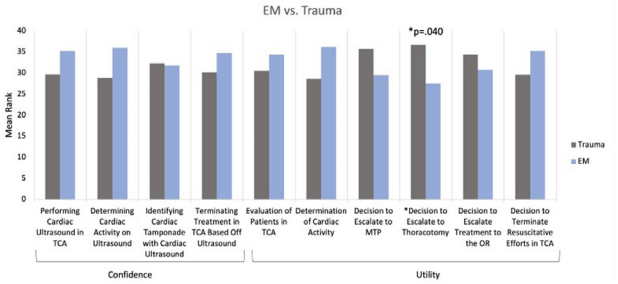
Results: There was a statistically significant difference in reported ultrasound training experience between emergency physicians and trauma surgeons, with emergency medicine participants reporting more structured training. Emergency physicians reported less utility in the use of POCUS in the decision to escalate care to thoracotomy in TCA. There was a correlation among trauma surgeons between age and confidence in their use of POCUS. There was also an overall correlation between the amount of ultrasound training described and reported confidence. There is no difference between specialties in perception of POCUS utility in TCA, except in the decision to perform ED thoracotomy.

Conclusions: More POCUS training positively correlates with physician confidence in the use of ultrasound in TCA patient management for both groups. Physicians from both specialties reported similar perspectives regarding the use of POCUS in TCA but do not share the same level of confidence. An increase in structured POCUS training for trauma surgeons may increase confidence in the use of POCUS for the management of patients with TCA.

- There was a statistically significant correlation between age and confidence level with POCUS in trauma surgery (r=0.582, p=0.001*), but not EM (r=0.145, p=0.454).
- In both specialties there was a significant correlation between ultrasound training and overall confidence (r=0.309, p=0.012*).

| Measure | Specialty | N | Mean (SD) | Cohen's *d* | Sig (p) |
|---|---|---|---|---|---|
| Formal Ultrasound Training | Trauma | 31 | 2.0 (1.1) | 0.7 | **0.007*** |
| | EM | 33 | 2.7 (0.9) | | |
| Mean Confidence | Trauma | 31 | 3.9 (0.9) | 0.4 | 0.114 |
| | EM | 33 | 4.2 (0.6) | | |
| Mean Usefulness | Trauma | 31 | 3.7 (0.8) | 0.0 | 0.801 |
| | EM | 33 | 3.7 (0.7) | | |

- Emergency medicine physicians reported significantly more POCUS training than trauma surgeons (p=0.007*) with a medium effect size (Cohen's *d*=0.7). No difference in confidence using POCUS or perceived POCUS utility in TCA.




Comparison of emergency medicine physicians and trauma surgeons on confidence and utility of POCUS.

No, authors do not have interests to disclose

## 440 Peer Review and Second Victim Syndrome

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Objectives: Second victim syndrome (SVS) refers to the syndrome that health care workers may experience when they are involved in unforeseen adverse clinical events, which manifest in psychological, cognitive, and/or physical reactions that have a negative personal impact. Unforeseen adverse events, such as clinical cases with poor outcomes are often subject to formal review. At our institution, the Peer Review (PR) process involves retrospective review with constructive feedback by colleagues of cases involving possible safety concerns, adverse events, and near misses.

Studies have shown that providers who are identified as second victims have a higher risk of being involved in a subsequent event. While this has been well defined in the literature, the direct prevalence among physicians that have undergone the PR process has not yet been defined. If it is recognized that providers involved in PR cases have a greater prevalence of SVS signs/symptoms, then support resources can be implemented to address a previously unrecognized need of the health care provider.

Methods: We utilized an anonymous, voluntary, online survey to assess emergency providers feelings of SVS. The study population included: attending physicians, advanced practice providers, and resident physicians. The survey questions were derived from the validated second victim experience and support tool (SVEST) and outcomes were measured using a 5 point Likert scale. The multiple-choice responses were compared across responses where the case went to PR, and where the case did not. The comparison was completed using the Mann-Whitney U Test. Participants were instructed to recall a previous case that had a patient safety concern or medical error and affected them significantly. Within the particular context of their recalled case, they were asked to indicate how much they agree with statements which pertain to SVS signs/symptoms.

Results: The study was sent out to 132 participants within the adult and pediatric emergency departments and 18 responses were obtained (14% response rate), with 50% having gone through a PR process. Based on our survey results, providers who have had cases go to PR experienced more significant changes in their feelings of restfulness after sleep, appetite, confidence in their abilities to manage similar disease states or presentations, and feelings of needing to take a mental health day. They also had an increased sense that leadership has found ways for the department to learn from such cases as well as provided help to the providers themselves.

Conclusions: Our survey results demonstrated a correlation between the PR process and development of signs/symptoms of SVS. This may signify that those clinicians with cases in PR may be at higher risk for future patient safety event(s)/ medical error(s), burnout, increased costs, and days missed. While the study is still in progress, further research is needed to determine the best practices to provide departmental learning and support to providers who have gone through the PR process.

No, authors do not have interests to disclose

## 441 The Preparedness of Schools to Manage Emergencies and Disasters Affecting Students: A National Survey

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Background: School nurses often provide care for students with medical or traumatic emergencies and coordinate care during disasters.

Objectives: The objective of this study is to determine the current state of preparedness in schools based on National Association of School Nurses (NASN) and American Academy of Pediatrics (AAP) guidelines.

Methods: An electronic questionnaire was distributed to a select number of NASN members during the 2021-2022 school year. The questionnaire focused on (1) preparedness based on national guidelines, (2) training of school nurses, and (3) availability of medications/equipment.

Results: Analysis was performed on 994 questionnaires (50% response rate). The majority of responders worked in a suburban setting (47%) and in the Northeast (28%). The most common reported emergencies included general illness, shortness of breath, acute headache, extremity sprain/strain, psychiatric/behavioral health, and seizure. 68.1% of responders reported having a Medical Emergency Response Plan (MERP), while 12.4% were unaware if a MERP existed. 54.2% of responders practiced their MERP at least yearly, 50% had developed relationships with local prehospital care, 67% had a communication network linking the entire school campus, 63% had a MERP specific to children with special needs, and 34% had a MERP specific to cardiac emergencies. 66.6% of responders reported having a response plan specific to mass casualty events (17.1% responders were unaware of this plan), 58.6% coordinated disaster drills with local prehospital care, 81.5% had specific plans for evacuation, 83.4% had specific plans for "lockdown", 78.4% had locked doors at all entrances, and 18.1% had armed security guards on campus. In terms of training, 91.5% of responders were trained in cardiopulmonary resuscitation, 79% were trained in Stop the Bleed, 98% were trained to use a self- injectable epinephrine device, and 88.7% were trained in the recognition of concussions. Responders have the following medications/equipment immediately available: self-inflating resuscitation device (33%), oxygen source (10%), albuterol inhalers with spacers (39%), epinephrine pen (77%), automated external defibrillator (97%), bleeding control kits (84%), and naloxone (40%).

Conclusions: Based on our national sample of school nurses, we have identified strengths and areas for improvement in school emergency and disaster preparedness. There is drastic improvement in the reported presence of AEDs as compared to 2005 data (97% vs 32% in 2005). The access of and administration of epinephrine devices is a relative strength of school nurse preparation. A relatively low percentage of nurses (40%) have naloxone access in accordance with NASN recommendations.

No, authors do not have interests to disclose

## 442 Early Administration of Ondansetron in the Pediatric Emergency Department

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Objectives: Ondansetron is a commonly used antiemetic in the pediatric emergency department (PED). The time to administration of ondansetron may influence length of stay (LOS) in the PED, as well as patient disposition. It is hypothesized that an increase in time to administration (TTA) of ondansetron would increase length of stay (LOS) in the PED. Secondarily, TTA may also increase the likelihood of an admission disposition.

Methods: A retrospective chart review was performed of all visits to the PED between January 1st and December 31st, 2019, with complaints of nausea or vomiting, during which the patient was treated with ondansetron. A random sampling of 254 patients were analyzed. The primary outcome variable was assessed with multiple linear regression. The secondary outcome, hospital admission, was examined with multiple logistic regression.

Results: Analyzed patients were primarily male (51.6%) and predominately of Caucasian (40.6%) and African American (40.6%) race. The median age at the PED visit was four years of age. TTA in the PED ranged from 6 to 510 minutes with a median of 61 minutes. Significant predictors of LOS in the PED were TTA ($p < .001$), administration of intravenous fluids ($p < .001$), and requiring more than one dose of ondansetron ($p = .031$). These factors accounted for 40% of the variation in PED LOS. Hospital admission was also associated with TTA ($p = .026$), as well as ondansetron dose ($p = .018$) and method of ondansetron administration (i.e., oral or IV) ($p < .001$). The accuracy of this logistic model, also known as the area under the curve (AUC), was 0.73 which results in a fair prediction model. The odds of a hospital stay increased by 2.6 for every increase of 10 minutes in time to ondansetron administration. The IV method of receiving Zofran yielded an odds ratio of 8.4 for a hospital stay and the odds of a hospital stay increased by 1.7 for every increase in 2 mg of dose received.

Conclusions: These preliminary results are suggestive of a significant influence of TTA of ondansetron on LOS and disposition in the PED. These results support the importance of decreasing the time to receive ondansetron in the ED as it relates to LOS and hospital admission. Further prospective analyses are warranted to further confirm these findings. Additional results are pending.

No, authors do not have interests to disclose

## 443 First Implementation of WHO's Basic Emergency Care Training Course in Ethiopia

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Objectives: In Ethiopia, there are great unmet needs in basic emergency training. The World Health Organization developed the training course Basic Emergency Care to assist in unmet needs of essential health training in low to middle income countries. The Federal Ministry of Health in Ethiopia has prioritized the urgency of this unmet need by implementing the BEC course. The objective of this study is to monitor and evaluate this first implementation BEC in Ethiopia.

Methods: The World Health Organization's Basic Emergency Care training course was used to train instructors and end users. A cascade model was used to have 3 primary instructors train 23 secondary instructors, who would then train 196 tertiary instructors, who would ultimately train thousands of end participants. Progress was measured by using pre and post assessment scores.

Results: A total of 219 instructors from all regions of Ethiopia completed both pre and post assessments. Of the secondary instructors, the average pre score was 89%, and the average post score was 92%, with a final pass rate of 91%. Of the tertiary instructors, the average pre score was 64%, and the average post score was 76%. The final pass rate increased from 37% to 80%, which showed a change of +43%. Strategic recommendations for future training includes adjusting subject material to be more

specific to country needs, as well as incorporating more time and resources for practical skills training.

Conclusions: The BEC training was successfully introduced in Ethiopia in a streamlined and effective manner. With considerations of certain modifications, future trainings with BEC should be continued for maintenance of foundational emergency care training in Ethiopia.

No, authors do not have interests to disclose

## EMF 444 Metagenomic Analysis of Bacterial Species Detected in Urine From Older Adult Emergency Department Patients With Suspected UTI

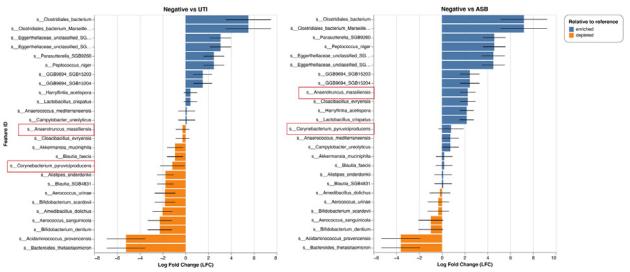
Bradley E, Ward D, Stanksky C, Fontes T, Bucci V, McCormick B, Potter L, Daou M, Haran J/UMass Chan Medical School, Worcester, Massachusetts, US

Objectives: Urinalysis (UA) is often ordered as part of work up of older adults (age > 65) for vague complaints such as generalized weakness or altered mental status. Many of these patients will have testing that appears positive for urinary tract infection (UTI) and may even grow organisms with pathogenic potential, but do not benefit from treatment with antibiotics. This is due to a high rate of asymptomatic bacteriuria (ASB) in this population. We sought to determine if there was a measurable difference in the bacterial populations in the urine, also known as the urinary microbiome, among older adult patients ED based on signs and symptoms of UTI and results of urinalysis.

Methods: We conducted a prospective cohort study of a convenience sample of 250 older adults that had urinalysis for suspected UTI performed within the ED. History of treatment for UTI, prior GU procedures (catheterization ect), and current urinary symptoms by patient interview. Medical history, signs of UTI (fever, flank tenderness, etc), urine culture results, were collected from the Electronic Medical Record. Results of urinalysis were considered consistent with ASB or UTI if there was the presence of pyuria or positive nitrates. Patients were categorized as UTI if they had signs and symptoms of UTI based currently accepted guidelines and a positive UA, ASB if UA was positive but the patient did not have clear signs and symptoms of UTI, indeterminate, or negative if the UA was not positive and the patient had a clear alternative diagnosis. The same urine sample that had automated urinalysis and culture performed were then obtained from the clinical lab, microbial DNA was extracted and analyzed by high-throughput DNA sequencing. Microbial populations were analyzed from sequencing results using available microbiome analysis software packages (metaphlan, Qiime2).

Results: We recruited 250 older adults, 132 had signs, symptoms, and UA results consistent with UTI, 76 had UA results that appeared positive, but did not have signs and symptoms of UTI and were classified as ASB, 32 were indeterminate (some UA findings consistent with UTI such as the presence of leukesterase or blood) and 10 had negative UA findings and clear alternative causes of symptoms and were included as negative controls.

Conclusions: When examining the community-level, beta-diversity (difference between communities) did not vary between ASB vs UTI (pairwise PERMANOVA on Bray-Curtis distance $p = 0.939$), but was different between negative UA and ASB, UTI, or indeterminate samples ($p = 0.012$, $p = 0.007$, and $p = 0.024$ respectively). There was also significant differences in Shannon alpha diversity (measure of community richness) in the negative UA samples compared to ASB or UTI samples (Mann- Whitney U test $p=0.004$ and $p = 0.0364$ respectively), but not between ASB and UTI ($p = 0.52$). Species-level differences between groups were also examined using the "ANalysis of COMposition of microbiomes with Bias Correction" or ancombc test using negative UA as a reference. A similar pattern was noted across ASB and UTI groups. Two species that varied across the ASB and UTI groups, both likely commensals that were higher abundance in the ASB group (Figure 2). We have planned future analysis including examining gene-content between the groups presented here, and analyzing the data using machine-learning based classifier algorithms to determine what microbiome and clinical features are predictive of UTI vs ASB.




No, authors do not have interests to disclose

## 445 Presenting Features of Brain Tumors Diagnosed in Emergency Department Patients

Garcia R, Buchalter J, Isayeva A, McCabe A/Trinity College Dublin, Dublin, IE

Objectives: The primary objective was to determine the constellations of presenting clinical features of adults diagnosed with brain tumors in an Irish emergency department (ED).

Methods: A retrospective chart review was conducted of all patients who were identified with a new brain tumor on computed tomography over a three-year period (2019-2021). All patients who were diagnosed with a new brain tumor based on computed tomography (CT) imaging requested by emergency medicine clinicians during an attendance to our emergency department between January 1, 2019 and December 13, 2021 were included. Patients with a known brain tumor were excluded from the study.

Results: 162,753 patients presented to our emergency department between January 1, 2019 and the December 13, 2021. Fifty-five patients met the inclusion criteria for the study. The study cohort was 40% male (22 males) and 60% female patients (32 women) with a mean age 55.96 years (range 24 to 93 years). Twenty-one cases (38.2%) in the study pertained to new malignant tumors (twenty cases pertained to gliomas and there was one case of Langerhans cell histiocytosis). 21 cases (38.2%) of newly diagnosed brain metastases, of which 10 cases pertained to cases with a previously unknown primary malignancy. Thirteen cases pertained to benign brain tumors (23.6%). The commonest presenting symptoms were headache in 20 patients (36.4%) followed by altered mental status in 14 patients (25.5%). Twenty-eight (49.1%) of patients presented with reported onset of symptoms within 24 hours of ED presentation. Patients who had neurological signs (OR 3.0, 95% CI 0.8 to 11.3) and those presenting with a seizure (OR 2.8, 95% CI 0.3 to 25) were more likely to have a malignant tumor. 28 (50.9%) of patients in the cohort have died to date. The majority of patients, thirty-seven (67.3%), were assessed to have a radiological diagnosis of tumor on their first presentation to their emergency department. Thirteen patients (23.6%) presented on one previous attendance prior to detection. Four patients (7.3%) presented twice and one (1.8%) patient presented three times prior detection.

Conclusions: Brain tumors are rare. Emergency medicine clinicians require vigilance and a high index of suspicion based on the history and physical examination which must be confirmed with appropriate imaging.

No, authors do not have interests to disclose

## 446 Screening for Bullying in the Pediatric Emergency Department: Possibilities for Intervention

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Background: Bullying among children is a serious public health problem. Providing the pediatric emergency department (PED) with screening tools could help to identify children at risk of experiencing bullying. The American Academy of Pediatrics (AAP) recommends inquiring about bullying of children as young as age 6 years. It is important to identify both victims and bullies to prevent serious outcomes including suicide or interpersonal peer violence. We performed screening for bullying in the PED to identify possible areas of intervention.

Objectives: This study assesses the feasibility of implementation of bullying screening tool in the pediatric emergency department.

Methods: We used a cross-sectional study design for this pilot study. We administered bullying screening questionnaires to children presenting to the emergency department with behavioral symptoms. This occurred in a PED of an inner-city hospital. The inclusion criteria were children between 5-18 years of age, presenting with psycho- somatic symptoms. We excluded children who were aggressive, requiring immediate stabilization. First, the research team determined eligibility and obtained verbal consent from their parents for participation. The research team then administered bullying screening tools that the child was asked to complete. A separate questionnaire was administered to their parents. We also assessed the feasibility of implementing these tools in the emergency department setting. Statistical software STATA 17.0 was used for analysis.

Results: Overall, there were 202 parent-child pairs that were surveyed. Results of the child survey showed that 13% experienced bullying in some form, while only 5% of parents reported their child had been bullied in the last 6-12 months by fellow peers in a school setting. Among the child respondents, 20% told someone about their bullying. Only three children admitted to being a bully while 22% stated they had witnessed some form of bullying. In response to the bullying, 12 parents (6%) reported instances of bullying to school authorities. Eight of these 12 parents (4%) stated there was an improvement following efforts to resolve the bullying. Fifty-seven percent of parents believed their child would tell someone if they were instigating the bullying. When asked if their child felt safe in school, 13% of parents reported their child felt unsafe. Among children, 21% reported feeling unsafe in school. Four parents (2%) reported their child might hurt themselves to cope with bullying. Most of the parents reported they did not believe their child would retaliate in response to bullying, while seven parents (4%) believed their child would retaliate by confronting the bully. In contrast, the results of the child survey demonstrated there was a considerable risk of retaliation against a bully with 13% of children reporting they would try to hurt the bully.

Conclusions: The responses to bullying differed between parents and their children. Parents tended to under-identify when their own children were victims of bullying and a significant number of parents and children both reported feeling unsafe in school. However, there are still many children who do not tell adults when they encounter bullying, which instead can be captured through screening tools utilized in acute care settings that often select for risky behaviors. PED physicians can play an important role in identifying children who experience bullying or instigate bullying.

**Table 1. Summary of responses from the child questionnaire about their bullying experiences (N=202)**

| | | N or Mean | % or SD |
|---|---|---|---|
| **Average age** | | 11.4 years | 3.5 |
| **Gender** | Female | 88 | 44 |
| | Male | 114 | 56 |
| **Has anyone at school bullied you recently?** | No | 176 | 87 |
| | Yes | 26 | 13 |
| **Did you ever bully someone at school?** | No | 193 | 96 |
| | Yes | 3 | 1 |
| **Have you ever witnessed bullying?** | No | 151 | 75 |
| | Yes | 45 | 22 |
| **Have you ever reported experiencing bullying to anyone?** | No | 12 | 6 |
| | Yes | 41 | 20 |
| **Did things get better after telling someone?** | No | 4 | 1 |
| | Yes | 37 | 18 |
| **Do you feel safe at school?** | No | 42 | 21 |
| | Yes | 160 | 79 |
| **Do you ever think about hurting the person who was bullying you?** | No | 169 | 84 |
| | Yes | 27 | 13 |
| **Do you think you would ever hurt yourself?** | No | 193 | 96 |
| | Yes | 2 | 1 |

**Table 2. Summary of responses from the parent questionnaire about their child's bullying experiences (N=202)**

| | | N or Mean | % or SD |
|---|---|---|---|
| **Average age of child** | | 11.4 years | 3.5 |
| **Gender of child** | Female | 88 | 44 |
| | Male | 114 | 56 |
| **Could your child's presenting medical issue be related to bullying?** | No | 197 | 98 |
| | Yes | 5 | 2 |
| **Has your child been bullied in the last 6-12 months?** | No | 191 | 95 |
| | Yes | 11 | 5 |
| **Where was he or she bullied?** | School | 11 | 5 |
| **Has your child bullied someone in the last 6-12 months?** | No | 201 | 100 |
| | Yes | 1 | 0.5 |
| **Has your child witnessed another child being bullied in the last 6-12 months?** | No | 187 | 93 |
| | Yes | 15 | 7 |
| **If you answered yes to any of the above, what actions did you or your child take?** | Reported to school authorities | 12 | 6 |
| | Discussed situation with child | 1 | 0.5 |
| **Did you notice an improvement after reporting?** | No | 3 | 1 |
| | Yes | 8 | 4 |
| **If your child has instigated the bullying, would he or she tell anyone?** | No | 86 | 43 |
| | Yes | 116 | 57 |
| **If your child witnessed someone experiencing bullied, would he or she tell anyone?** | No | 89 | 44 |
| | Yes | 113 | 56 |
| **Does your child feel safe at school?** | No | 26 | 13 |
| | Yes | 176 | 87 |
| **If your child was bullied, do you think he or she would try to hurt the bully?** | No | 195 | 97 |
| | Yes | 7 | 3 |
| **Do you think your child would ever hurt himself or herself?** | No | 198 | 98 |
| | Yes | 4 | 2 |

No, authors do not have interests to disclose

## 447 The Evaluation of Pediatric Appendiceal Ultrasound Performed at a Community Hospital

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Background: Acute appendicitis is the most common surgical condition in children. Ultrasound is usually the initial diagnostic test performed. However, the appendix is often not visualized; this non-diagnostic evaluation may delay the diagnosis and disposition. We reviewed the diagnostic evaluation of appendicitis of children at a community hospital.

Objectives: To assess the diagnostic accuracy of ultrasound in the evaluation of appendicitis at a community hospital.

Methods: This is a retrospective review of the diagnostic evaluation of children presenting to a community hospital between July, 2019 and December, 2021, in whom appendicitis was the working diagnosis. Ultrasound results were classified into negative, positive or non-diagnostic. CT scan was considered a gold standard test for the diagnosis of appendicitis. We compared ultrasound results with the CT scan findings. We also reviewed age, sex, weight and BMI of children. Using SPSS 28, univariate and bivariate analysis was performed on both categorical and scaled data.

Results: We identified 552 children with appendicitis suspicion from whom ultrasound images of appendix were obtained. Ultrasound was positive for appendicitis in 82 (14.9%), negative in 385 (69.7%) and appendix was not visualized in 85 (15.4%). CT scans were obtained in 118 children; where 40 (33.9%) were positive; 78 (66.1%) were negative. Of the 552 patients, 96 had both ultrasound and CT scan demonstrating either positive or negative for appendicitis. There was 81/96 (84.4%) concordance rate between ultrasound and CT scan results [OR 25.9 (95% CI-8.3-

80.7; P<.001)] (Table 1). An analysis of patients with non-diagnostic ultrasound and positive or negative CT scan was performed. 16/24 (67%) were negative. There were no statistical differences for age, sex, BMI and weight between patients with non-diagnostic ultrasound and patients with diagnostic ultrasound (P >.05). Patients who had discordant ultrasound and CT scan findings vs. concordant ultrasound and CT scan findings were older 13.1 vs. 11.9 years (P=.032); weight > 57.7 kg vs. <50.7 kg (P=.026) but their BMI and sex were not significantly different.

Conclusions: When appendix ultrasound was read as either positive or negative, there was a highly significant agreement with CT scan results. This was seen particularly with younger children who have lower body weight. This study suggests that pediatric appendiceal ultrasound can be used as a stand-alone procedure in the workup for appendicitis.

**Table: Performance of Ultrasound in the Evaluation of Appendicitis at a Community Hospital**

| | | CT Scan | | |
|---|---|---|---|---|
| | | **Positive** | **Negative** | **Total** |
| **Ultrasound** | **Positive** | 25 (26%) | 6 (6.4%) | 31(33.3%) |
| | **Negative** | 9 (9.4%) | 56 (58.3%) | 65 (67.7%) |

No, authors do not have interests to disclose

## 448 Accuracy of Pediatric Interventricular Septal Thickness Measurement Obtained via Point-of-Care Ultrasound: A Prospective Study

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Background: Hypertrophic cardiomyopathy (HCM) is a genetic, life-threatening cardiovascular disease that often goes unidentified in pediatric patients. It is the most common genetic cardiovascular condition with estimated prevalence of 0.2% which is 10 to 50 fold greater than other genetic cardiovascular diseases, such as Brugada and long QT syndrome [1, 2]. Patients with HCM are often asymptomatic and neither history or physical exam are reliable to detect the disease. The only reliable method to diagnose HCM is with echocardiography to look at interventricular septal thickness [3]. Emerging literature has shown that cardiac point-of-care ultrasound (POCUS) performed by pediatric emergency physicians is as effective and accurate compared to cardiac echocardiography performed by pediatric cardiologists [4].

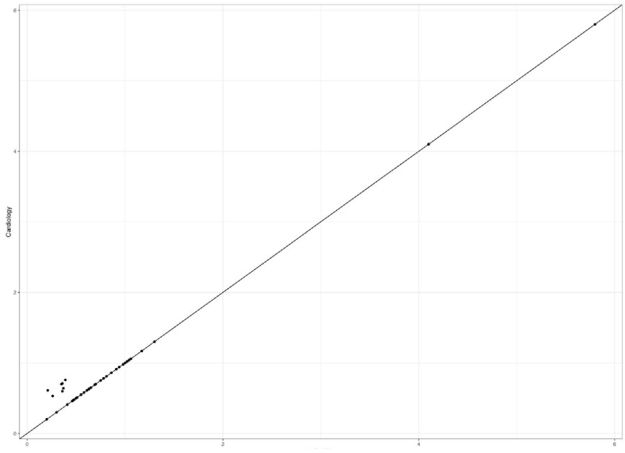
Objectives: The objective of the study was to determine the diagnostic accuracy of POCUS performed by pediatric emergency physicians in measuring the interventricular septum end diastole (IVSd) thickness in the pediatric emergency department (PED).

Methods: We conducted a prospective, single center, observational, diagnostic accuracy study to examine the diagnostic accuracy of POCUS in measuring IVSd thickness in pediatric patients. All children ages 2-21 years who presented to the PED with symptoms that prompted a cardiac POCUS, such as chest pain, dyspnea, or unexplained tachycardia, were included. Cardiac POCUS findings were interpreted by a pediatric emergency physician at the bedside and retrospectively by a pediatric cardiologist after deidentification of the images to determine accuracy. Diagnostic concordance of the measurement obtained by the pediatric emergency physician and cardiologist were assessed.

Results: Forty-eight patients were enrolled. Median patient age was 13.4 years. There was excellent diagnostic agreement on the measurement of the IVSd thickness between pediatric emergency physicians and the pediatric cardiologist (81.25% of cases; 39/48). Disagreement was seen in 18.75% of the cases (9/48). The mean error of disagreement was -0.32, with a 95% confidence interval of -0.37 to -0.28. Overall, the mean error of both agreement and disagreement was -0.046, with 95% CI of -0.08 to -.01 and p-value of 0.008.

Conclusions: POCUS performed by pediatric emergency physicians is an accurate tool for the measurements of pediatric IVSd with an excellent diagnostic agreement with a pediatric cardiologist. Additional larger prospective studies are needed to assess the accuracy of POCUS measurements of IVSd.

Figure 1. Prediction of the IVSd thickness measured by pediatric emergency physicians versus cardiology with one-to-one line overlaid, showing minimal disagreement.




No, authors do not have interests to disclose