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ACEP RESEARCH FORUM

October 26-29, 2020
Online at acep.org/sa

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MONDAY, OCTOBER 26, 2020

11:00 – 12:00 pm Central Time

State-of-the-Art I: Emergency Care Research Scientists and Skeptic Debate

Cheskes, C, Gordon, R, Hedayati, T, Lemkes, J, McCollum, D, Motov, S, Rezaie, S

12:30 – 1:00 pm Central Time

Public Health and Injury Prevention

19 Factors Associated With County-Level SARS-CoV-2 Testing Volume in Nine States
Reisner, N, Massachusetts General Hospital, Boston, MA

20 Screening for Substance Use in the Pediatric Emergency Department: Lowering Thresholds to Enhance Reach
Shekher-Kapoor, M, Northwell Health | Zucker School of Medicine at Hofstra/Northwell, New Hyde Park, NY

21 Monitoring the Incidence of Covid19 Using Syndromic Surveillance of Emergency Department Visits
Milyavsky, D, Morristown Medical Center, Morristown, NJ

22 Retention of knowledge about HIV/AIDS and HIV testing among adult emergency department patients: implications for HIV testing and prevention
Merchant, R, Brigham and Women's Hospital, Boston, MA

1:00 – 1:30 pm Central Time

Healthcare Policy/Health Care Services Research

23 Adverse events after emergency department discharge for conditions With high variability in hospital discharge rates
Baehr, A, Department of Emergency Medicine, University of Colorado School of Medicine, Aurora, CO

24 Urine Testing is Associated With an Increased Rate of Antibiotic Use in Emergency Department Patients at Risk of UTI Overdiagnosis
Childers, R, University of California San Diego, San Diego, CA

25 Factors Associated With Emergency Department Use Among Adults With Newly Diagnosed Cancer
Nguyen, D, UT Southwestern, Dallas, TX

26 Changes in Emergency Department Use Associated With Medicaid Expansions Under the Affordable Care Act
Shearer, E, Stanford School of Medicine, Stanford, CA

1:30 – 2:00 pm Central Time

Diagnostics

27 Correlation of Inflammatory Markers With Clinical Outcomes in Initial Cases of COVID-19 Admitted in the Bronx
Barrett, B, Montefiore Medical Center, Bronx, NY

28 Analytical Validation of A Novel Point-of-Care Coagulometer for DOAC and Heparin Testing
Bakhru, S, Perosphere Technologies Inc., Danbury, CT

29 Bedside point-of-care measurement of a novel biomarker sPLA2-IIA for prediction of sepsis: midpoint analysis
Yang, A, St. Luke's University Health Network, Bethlehem, PA

2:00 – 2:30 pm Central Time

Education

31 Development of a Mastery Learning Checklist and Minimal Passing Standard for Emergency Medicine Resident eFAST Training
McCauley, M, Northwestern Feinberg School of Medicine, Chicago, IL

32 Postgraduate training of emergency physicians working in academic Emergency Departments in the United States
Agarwal, K, University of Virginia, Charlottesville, VA

33 Stress Inoculation in Emergency Medicine Residents: Effects of a Mental Performance Tool on Stress Response During a Simulated Resuscitation
Henderson, T, Advocate Christ Medical Center, Oak Lawn, IL

34 A national survey of Research Associates Programs to Support Graduate Medical Education – *Carzon, J, St. Mary Mercy Hospital, Livonia, MI*

2:30 – 3:00 pm Central Time

Quality Improvement and Patient Safety

35 Evaluation of a Multidisciplinary Opioid Reduction Package in an Academic Medical Center's Emergency Department
Johnson, C, Nebraska Medicine, Omaha, NE

36 Pharmacist Driven Antibiotic Redosing in the Emergency Department
San Luis, V, Cedars-Sinai Medical Center, Los Angeles, CA

37 Impact of Census-Based Reassignment of Nursing Staff to Reduce Emergency Department Patient Wait Times, Lengths of Stay, and Boarding Times
Park, J, NewYork-Presbyterian Weill Cornell Medicine, Department of Emergency Medicine, New York City, NY

38 Phone a Pharmacist Friend: Telepharmacy Services at Freestanding Emergency Departments
Campbell, M, Cleveland Clinic, Cleveland, OH

3:00 – 3:30 pm Central Time

Infectious Diseases

39 Emergency Department Visits for Serious and Painful Conditions Markedly Decreased after the Arrival of Covid-19
Mekaeil, V, Morristown Medical Center, Morristown, NJ

40 Racial Disparity and Covid-19 Outcomes: An Emergency Department Study
Chan, S, Amita Health Resurrection Medical Center, Chicago, IL

41 Clinical Outcomes among COVID-19 Patients Taking Non-Steroidal Anti-Inflammatory Drugs
Perkins, S, University of Michigan Medical School, Ann Arbor, MI

42 Advanced Fibrosis Is Unlikely in The Majority of Patients from an Appalachian Emergency Department's Non-Targeted Hepatitis C Virus Screening
Moore, J, University of Kentucky, Lexington, KY

MONDAY, OCTOBER 26, 2020 —*cont'd*

3:30 – 4:30 pm Central Time

Plenary Session I: Pandemic Science

4 Impact of the SARS-CoV-2 pandemic on emergency department presentations in an integrated health system
Walker, L, Mayo Clinic, Rochester, MN

5 Burden of Out of Hospital Cardiac Arrest in New York City during the COVID-19 Pandemic
Redlener, M, NYC REMAC and Icahn School of Medicine at Mount Sinai, New York City, NY

6 Lung Ultrasound versus Chest Xray for the Diagnosis of COVID-19 Pneumonia
Mendez, K, Lewis Katz School of Medicine at Temple University, Philadelphia, PA

7 Failure rates during reuse of disposable N95 masks in clinical practice in the emergency department
Check, R, St. Luke's Hospital, Bethlehem, PA

8 Emergency Medicine Physician COVID-19 Readiness and Practices
Webb, A, University of Central Florida, Orlando, FL

9:00 – 9:30 pm Central Time

International/Global

43 Knowledge and Confidence in the Treatment of Emergent Conditions Among Graduating Medical Students Across Colombia
Moretti, K, Brown University, Providence, RI

44 Evaluating the Clinical Impact of a Novel Global Pediatric Emergency Medicine Curriculum on Asthma Outcomes in Belize
Kosoko, A, McGovern Medical School, The University of Texas Health Science Center at Houston, Houston, TX

45 Educational Outcomes of Nursing-Focused Triage and Shock Management Course in Rural Ugandan Hospital
Wolford, L, Medical University of South Carolina, Charleston, SC

46 Workplace Violence in the Chinese Emergency Department: A 2019 Prospective National Cross-Sectional Survey in Mainland China
Walline, J, FACEP, The Chinese University of Hong Kong, Hong Kong

9:30 – 10:00 pm Central Time

Trauma

47 Cool Running Water First Aid for Pediatric Burns: Recommendation Adherence & Clinical Outcomes. A Series of Cohort and Cross-sectional Studies
Griffin, B, Queensland University of Technology, South Brisbane, Australia

48 Educating and Empowering Inner-City High School Students in Bleeding Control
Okereke, M, Maimonides Medical Center, Brooklyn, NY

49 Organ Donation Potential in Cases of Fatal Gunshot Wounds to the Head: Tools for Timely Screening in the Emergency Department
Nordham, K, Tulane University School of Medicine, New Orleans, LA

50 Investigating the Benefits of Emergency Air Transportation for Trauma Victims
Poulos, M, Unity Health, Searcy, AR

10:00 – 10:30 pm Central Time

Telemedicine

51 Interactive Home Monitoring of ED Patients With Suspected or Confirmed COVID-19
Vinton, D, MBA, University of Virginia, Charlottesville, VA

52 Acceptance of Telemedicine Screening for COVID-19 Outside Usual Health System Catchment Area
Lyon, M, Medical College of Georgia at Augusta University, Augusta, GA

53 Emergency Clinician Perceptions of Electronic Personal Protective Equipment for Medical Screening Exams of COVID-19-Suspected Patients
Blatt, M, Vanderbilt University School of Medicine, Nashville, TN

54 From the COVID19 Epicenter: Using Telemedicine to Serve the Needs of the Geriatric Population
Truong, J, Columbia University Irving Medical Center, New York, NY

TUESDAY, OCTOBER 27, 2020

10:30 – 11:30 am

State-of-the-Art II: Emergency Medicine Care of the Future
Chang, B, Greenberg, M, Shulz, K

12:00 – 1:00 pm Central Time

EMF and Awards Showcase

55 EMF Assessing financial risk among uninsured patients seeking care in the emergency department
Scott, K, University of Michigan, Ann Arbor, MI

56 EMF An exploration of stress and resilience amongst emergency physicians: an interpretative phenomenological analysis –
Chang, Y, Chang Gung Memorial Hospital and Chang Gung University College of Medicine; Chang Gung Medical Education Research Centre (CG-MERC), Taipei, Taiwan

57 EMF X-Waiver training for resident physicians increases Emergency Department buprenorphine delivery: An Implementation Science Evaluation
Johnson, E, LAC+USC Medical Center, Department of Emergency Medicine, Los Angeles, CA

58 EMF National Trends and Outcomes of Sepsis Readmission: 2010 - 2017
Lippi, M, University of Colorado, School of Medicine, Aurora, CO

59 EMF Effects of CDHP Enrollment on ED Costs
Sabbatini, A, University of Washington, Seattle, WA

1:00 – 1:30 pm Central Time

Quality Improvement and Patient Safety

60 The value of an integrated sexual assault nurse examiner program at trauma centers: Comparing the quality of documentation
Eisaman, D, Department of Emergency Medicine, University of Pittsburgh, Pittsburgh, PA

61 Characteristics of Ectopic Pregnancies Presenting to an Urban Academic Emergency Department at a Tertiary Care Center for Obstetrics
Eisaman, D, Department of Emergency Medicine, University of Pittsburgh, Pittsburgh, PA

TUESDAY, OCTOBER 27, 2020 —*cont'd*

62 Utilizing BEFAST to Implement "Direct to CT" Stroke Algorithm at Triage Decreases Door to CT Perform Time in Emergency Department
Bahar, P, Lenox Hill Hospital, New York, NY

63 Incidence and Determinants of COVID-19 Emergency Department Revisits –
Chopra, Z, University of Michigan Medical School, Ann Arbor, MI

1:30 – 2:00 pm Central Time

Cardiovascular – Non ACS

64 Healthcare costs in direct-acting oral anticoagulant major bleeding treated With 4-factor prothrombin complex concentrate and other agents –
Singer, A, Stony Brook University School of Medicine, Stony Brook, NY

65 Characteristics and Outcomes of Left Ventricular Assist Device Patients Presenting to the Emergency Department
Finch, A, Mayo Clinic, Rochester, MN

66 Comparing conventional and high sensitivity troponin in predicting a major acute coronary event in chest pain patients With intact renal function
Mital, P, Department of Emergency Medicine at Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, Hempstead, NY

67 Clinical Outcomes of Oral Factor Xa-Inhibitor Associated Gastrointestinal Bleeds Treated With or Without 4F-PCC among US Medicare Patients
Williams, J, Texas Tech University Medical School HSC, Amarillo, TX

2:00 – 2:30 pm Central Time

Administration

68 Back Pain Patient Satisfaction Scores Did Not Change After Legislation Resulting in Opiate Prescription Decrease
Chronister, E, Morristown Medical Center, Morristown NJ

69 Four-year reimbursement trends to a single health system from local out-of-network health plans
Kreshak, A, University of California, San Diego, San Diego, CA

70 The Effect of Rapid COVID-19 Testing on Emergency Department Throughput
Supat, B, University of California, San Diego, San Diego, CA

71 COVID-19 Referral Patterns for Tent and Drive-Through Screening
Dominguez, L, The George Washington University, Medical Faculty Associates, Washington DC

2:30 – 3:00 pm Central Time

Toxicology

72 Post hoc analysis of the RCT comparing F(ab')2 to Fab antivenom: Control of venom-induced tissue injury in copperhead snakebite patients
Gerardo, C, Duke University, Durham, NC

73 Epidemiology of Pediatric Opioid Exposures Reported to the National Poison Data System
Rege, S, University of Virginia, Charlottesville, VA

359 Evaluation of Insulin Infusion Rates for the Treatment of Diabetic Ketoacidosis in the Emergency Department
Bass, M, University of Colorado Hospital, Aurora, CO

75 Acute Toxicity Associated With Cannabis Edibles Following Decriminalization of Marijuana in Michigan
Lewis, B, Spectrum Health - Michigan State University Emergency Medicine Residency Program, Grand Rapids, MI

3:00 – 4:00 pm Central Time

Plenary Session II: New and Noteworthy

9 Using Home-Based Community Paramedics to Reduce Emergency Department Utilization by High-Risk Elder Patients
Cozzi, N, Spectrum Health - Michigan State University Emergency Medicine Residency Program, Grand Rapids, MI

10 Efficacy and Safety of Ciraparantag in Reversing Apixaban and Rivaroxaban as Measured by Whole Blood Clotting Time in Healthy Adults
Ansell, J, Hofstra Northwell School of Medicine, Hempstead, NY

11 Identifying Race and Gender Based Discrepancies in Pain Management Practices in the Emergency Department
Kincade, B, Cleveland Clinic Akron General, Akron, OH

12 The Burden of Major Bleeds Among Atrial Fibrillation Patients Treated With Direct-acting Oral Anticoagulants in the United States
Fermann, G, University of Cincinnati, Cincinnati, OH

13 Transesophageal Echocardiography May Improve Cerebral Perfusion Compared to Transthoracic Echocardiography in Out of Hospital Cardiac Arrest
Chinn, E, Hennepin County Medical Center, Minneapolis, MN

9:00 – 9:30 pm Central Time

Pain Management

76 Understanding the Opioid-related Mortality in the United States using a National Real-time Database.
Rege, S, University of Virginia, Charlottesville, VA

77 Intra-articular Lidocaine versus Procedural Sedation for Anterior Shoulder Dislocations - *Koneri, N, Kendall Regional Medical Center, Miami, FL*

156 Use of A Risk Index to Predict Falls and Opioid Adverse Events in Opioid Naive Older Adults *Sheikh, S, University of Florida College of Medicine- Jacksonville, Jacksonville, FL*

79 Efficacy of the Ultrasound Guided Bilateral Erector Spinae Plane Block in Treating Traumatic Thoracic Pain
Lee, D, Hennepin County Medical Center, Minneapolis, MN

9:30 – 10:00 pm

Disaster Medicine/EMS

80 Los Angeles Fire Department Telemedicine Program: An Emergency Dispatch Center Based Pilot - *Abramson, T, Keck School of Medicine of USC/LAC+USC Medical Center, Los Angeles, CA*

81 Implementing a Telehealth System in Baja California, Mexico to address COVID-19 pandemic
Vera-Hernandez, C, Universidad Autonoma de Baja California - Facultad de Medicina y Psicologia, Tijuana, Mexico

TUESDAY, OCTOBER 27, 2020 —*cont'd*

82 Geographic Information System-Assisted Pediatric Surge Planning: Preparing Connecticut's Hospitals to Respond to a Significant Storm Event
Ghossein, N, Yale School of Public Health, New Haven, CT

83 EMF Out-of-Hospital Chest Pain Management in the United States
Scheidler, J, Wake Forest Baptist Health, Winston Salem, NC

WEDNESDAY, OCTOBER 28, 2020

9:00 – 11:00 am

Editor's Pearls – Tips to get your paper through Peer Review
Barrett, T, Blaivas, M, Cooper, R, Greenberg, M, Lagina, A

11:00 – 12:00 pm

State-of-the-Art III: The Value of Emergency Care
Burke, L, Lagina, A, Lin, M

12:00 – 12:30 pm Central Time

Healthcare Policy and Health Care Services Research

84 The Opioid Epidemic Meets the Coronavirus Pandemic: Rates of Emergency Department Visits for Opiate Use Disorder During Covid-19
Johnson, E, LAC+USC, Los Angeles, CA

85 Physician-Perceived Barriers to Treating Opiate Use Disorder in the Emergency Department
Logan, G, University of Central Florida, Orlando, FL

86 Hospitals Can't Do it Alone: Navigating Addiction Care and Treatment
Kapoor, S, Northwell Health | Zucker School of Medicine at Hofstra/Northwell, New Hyde Park, NY

87 Imbalance in U.S. Emergency Department Openings and Closures Over 18 Years of Increasing Demand for Emergency Care: 2001 to 2018 –
Camargo, C, Massachusetts General Hospital, Boston, MA

12:30 – 1:00 pm Central Time

Pediatrics

88 Risk of Serious Bacterial Infections Among Recently Immunized Young Febrile Infants in the General Emergency Setting
Sullivan, K, Naval Medical Center San Diego, San Diego, CA

89 Effect of Ketamine on Intracranial Pressure in Pediatric Patients Assessed by Transcranial Doppler Ultrasound: A Pilot Study
Christopher Stem, C, Division of Emergency Medicine, Department of Pediatrics, UPMC Children's Hospital of Pittsburgh, Pittsburgh, PA

90 Intranasal Ketamine for Acute Pain Management in Children: A Systematic Review and Meta-Analysis
Organick-Lee, J, Mayo Clinic, Rochester, MN

91 Where Have All the Children Gone? The Effects of Covid19 on Pediatric Emergency Department Visits
Rethi, S, Goryeb Children's Hospital / Morristown Medical Center, Morristown, NJ

1:00 – 1:30 pm Central Time

Geriatrics

92 Emergency Severity Index (ESI) and Older Adults: Should Age Be Incorporated into the Triage Algorithm?
Oliveira J. e Silva, L, Mayo Clinic, Rochester, MN

93 A Geriatric Assessment Program in the Emergency Department is Associated With Increased Discharge Rate and Decreased Hospital Length of Stay
Keene, S, Beaumont Health, Royal Oak, MI

94 Traumatic Intracranial Hemorrhage in Geriatric Patients on Warfarin, Direct Oral Anticoagulants, or No Anticoagulation: A Prospective Study
Alter, S, Florida Atlantic University, Boca Raton, FL

95 Use of Antipsychotic and Sedative Medications in Older Patients in the Emergency Department
Kennedy, M, Massachusetts General Hospital, Boston, MA

1:30 – 2:00 pm Central Time

Cardiovascular – ACS

96 Impact of Patient Age, Presentation Time and Complaint on Door to EKG and Door to Balloon Times for ST-Elevation Myocardial Infarctions
Fertel, B, Cleveland Clinic, Cleveland, OH

97 Evaluation of the Multifunction Cardiogram (MCG) for Low Risk Chest Pain Patients Presenting to the Emergency Department
Papa, L, Orlando Regional Medical Center, Orlando, FL

98 Rural Population at Risk of Delayed Percutaneous Coronary Intervention for ST-Elevation Myocardial Infarction in North Carolina
Messinger, M, Wake Forest School of Medicine, Winston-Salem, NC

99 Delta Troponin Does Not Predict A Major Cardiac Event in Patients With Renal Dysfunction
Mital, P, Department of Emergency Medicine at Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, Hempstead, NY

2:00 – 2:30 pm Central Time

Toxicology

100 Pilot Study of Methylene Blue as an Antidote for Amlodipine Poisoning in Mice
Meggs, W, Brody School of Medicine at East Carolina University, Greenville, NC

101 Thromboelastography Vs Conventional Coagulation Tests in Pit Viper Envenomation and Antivenom Response
Lopachin, T, Naval Medical Center Portsmouth, Portsmouth, VA

103 Impact of Stay-at-Home Orders on Reported Pediatric Poisonings During the COVID-19 Pandemic
Cates, A, Albert Einstein Healthcare Network, Philadelphia, PA

102 EMF Expected Versus Actual Concentrations of Ketamine and Propofol During Procedural Sedation in the Emergency Department
Goddard, K, University of Missouri Health Care, Columbia, MO

WEDNESDAY, OCTOBER 28, 2020 —*cont'd*

2:30 – 3:00 pm Central Time

Social Determinants of Health

104 Associations Between Neighborhood Disadvantage Measures and COVID-19 Case Clusters
Samuels-Kalow, M, Massachusetts General Hospital, Boston, MA

105 Studying the Impacts of To-Go Medications for Vulnerable Populations Discharged from the Emergency Department During the COVID-19 Pandemic
Ludy, S, Massachusetts General Hospital, Boston, MA

106 Social Disparities of One Year Cholecystectomy and Complication Rates, After Emergency Department Diagnosis of Symptomatic Cholelithiasis
Deckert, E, University of Nebraska Medical Center, Omaha, NE

107 Improving Transitions of Care for Patients Initiated on Buprenorphine from the Emergency Department
Fockele, C, University of Washington, Seattle, WA

3:00 – 4:00 pm Central Time

Plenary Session III: Practice Changing Research

14 Validation of a Prediction Rule for Adverse Cardiovascular Events from Drug Overdose
Manini, A, Icahn School of Medicine at Mount Sinai, New York, NY

15 The Efficacy of Skeletal Muscle Relaxants in Emergency Department Patients With Low Back Pain
Abril, L, Montefiore Medical Center / Albert Einstein College of Medicine, Bronx, NY

16 Adverse Interaction Medications Administered to Warfarin-Anticoagulated Patients in the Emergency Department
Ruiz, P, University of California, San Diego, San Diego, CA

17 A Randomized Study of Greater Occipital Nerve Block With Bupivacaine Versus Intravenous Metoclopramide for Acute Migraine
Friedman, B, Albert Einstein College of Medicine, Bronx, NY

74 Using an Observation Unit to Decrease Disparities in Opiate Medically Assisted Treatment Program Follow Up
Osborne, A, Emory University School of Medicine, Atlanta, GA

9:00 – 9:30 pm Central

Psychiatry/ Neurology

108 A Randomized, Placebo-Controlled Study of Metoclopramide + Diphenhydramine for Acute Post-Traumatic Headache
Friedman, B, Albert Einstein College of Medicine, Bronx, NY

109 Rapid Response EEG With Artificial Intelligence for Diagnosing Seizures and Highly Epileptiform Patterns in Emergency Medicine
Quinn, J, Stanford University, Stanford, CA

110 Reliability of Automated Interpretation of Computed Tomography Images in the Management of Acute Stroke: A Single-Center Analysis
Ford, L, A.T. Still University - Kirksville College of Osteopathic Medicine, Kirksville, MO

111 EMF Development of a Quality Measurement Framework for Acute Psychiatric Care
Im, D, Brigham and Women's Hospital, Boston, MA

9:30 – 10:00 pm Central Time

Trauma

112 Evaluation of MicroMend® Wound Closure Device in Repairing Skin Lacerations
Nizami, T, Department of Emergency Medicine, The Warren Alpert Medical School of Brown, University, Providence, RI

113 Bier Block Versus Sedation: A Comparison of Patient Characteristics and Emergency Department Metrics in Pediatric Forearm Reduction
Romero, CL, University of Mississippi, Jackson, MS

114 Effect of Clinical Decision Support on Head Computed Tomography for Children With Minor Head Trauma
Shan, J, Kaiser Permanente Division of Research, Oakland, CA

115 A Retrospective Review of the Clinical Significance of Knee Effusions on X-ray Imaging and the Relation to Occult Tibial Plateau Fractures
Anderson, A, University of Nebraska Medical Center, Omaha, NE

THURSDAY, OCTOBER 29TH 2020

10:00 am – 11:00 am Central Time

Brooks F. Bock Lecture and Abstract Session: Value Added by Research to Emergency Care
Keynote Speaker
Jeffrey Kline, MD, FACEP

2 Rightsizing Response: The Optimization of Critical Care Resources during COVID-19
Zebrowski, A, Icahn School of Medicine at Mount Sinai, New York, NY

3 Non-Specific ECG Findings in Patients With Low High Sensitivity Troponin Values are Not Associated With Significant 30-Day Adverse Outcomes
Alshaikh, L, Baylor College of Medicine, Houston, TX

1 EMF Hearing is Believing: A Qualitative Exploration of Trust and Credibility Judgements in Educational Podcasts
Riddell, J, Keck School of Medicine of the University of Southern California, Los Angeles, CA

11:00 – 11:30 am Central Time

Resuscitation / Critical Care

116 Associations of Emergency Department Sedation and Analgesia and Hospital Outcomes in Mechanically Ventilated Patients
Joshi, S, Renaissance School of Medicine at Stony Brook University, Stony Brook, NY

117 Update: Dantrolene Sodium Suspension (250 mg/5mL) in Patients With Exertional Heat Stroke
Greenberg, M, Eagle Pharmaceuticals, Woodcliff Lake, NJ

118 Delayed Emergency Department Fluid Resuscitation May Lead to Increased Mortality in Sepsis: A Call for an Optimal Fluid Resuscitation Interval
De Maio, V, University of North Carolina at Chapel Hill, Chapel Hill, NC

119 Factors Contributing to the Advancement of Women in Academic Emergency Medicine: A Multi-Institution Survey Study of Resident Physicians
Ferrel, M, University of Utah, Salt Lake City, UT

THURSDAY, OCTOBER 29TH 2020 —*cont'd*

11:30 – 12:00 pm Central Time

Ultrasound

120 Cardiopulmonary Ultrasound in Sepsis: A Pilot Study
Kuttab, H, University of Wisconsin-Madison, Madison, WI

121 Evaluation of a Novel Ultrasound Machine Learning Algorithm in Estimating Left Ventricular Ejection Fraction
Liu, R, Yale School of Medicine, New Haven, CT

122 Point of Care Ultrasound Reduces Time to Diagnosis and Treatment of Ruptured Ectopic Pregnancy
Urquhart, S, Spectrum Health Michigan State University College of Human Medicine, Grand, Rapids, MI

123 AI vs Expert - A Comparison of Rapid Visual IVC Collapsibility Assessment Between POCUS Experts and a Deep Learning Algorithm
Blaivas, M, St Francis Hospital, Columbus, GA

12:00 – 12:30 pm Central Time

Infectious Diseases

124 Impact of a Novel Telehealth Follow-up Protocol for At-Risk ED Patients Discharged With Presumptive or Confirmed COVID-19
Gaeta, T, NYP Brooklyn Methodist Hospital, Brooklyn, NY

125 Linkage Outcomes for HIV/HCV Co-infected and HCV Mono-Infected Patients Participating in an ED Screening Program
Cowan, E, Ichan School of Medicine at Mount Sinai, New York, NY

126 Efficacy of Omadacycline in the Treatment of Acute Bacterial Skin and Skin Structure Infections in Patients With Cellulitis or Abscesses
Rodriguez, M, Paratek Pharmaceuticals, King of Prussia, PA

127 Delayed Second Dose Antibiotics in Severe Sepsis and Septic Shock
Lykins, J, Virginia Commonwealth University Health System, Richmond, VA

12:30 – 1:00 pm Central Time

Disaster Medicine/ EMS

128 Operation Kick the King: A Non-Governmental Organization's Response to the United States Novel Corona Virus 2019 Pandemic
Bradley, K, Atrium Health, Charlotte, NC

129 The Safety of Rapid Triage in a Coronavirus Epicenter
Dauer, M, Icahn School of Medicine at Mount Sinai, New York, NY

130 A Snapshot of Volumes in the "Epicenter of the Epicenter" of the COVID-19 Pandemic
Feldman, N, Icahn SOM at Mount Sinai, New York, NY

131 A Novel Mobile Integrated Health program for COVID-19 Response
Dorner, S, Brigham & Women's Hospital, Boston, MA

1:00 – 1:30 pm Central Time

Healthcare Policy and Health Care Services Research

132 Provider and Administrator Perspectives on Reducing Patient Fear in the Emergency Department in Times of Heightened Immigration Enforcement
Ornelas, C, University of California, San Francisco School of Medicine, San Francisco, CA

133 The Value of Out-of-Hospital Hypoglycemia Treatment Without Transport Using the National Emergency Medical Services Information System (NEMSIS)
Kaufmann, M, St. Vincent Emergency Physicians, Indianapolis, IN

134 Patient and Hospital Characteristics Associated With Postpartum Emergency Department Visits: A Statewide Analysis
Zarrin, H, Icahn School of Medicine at Mount Sinai, New York, NY

135 Effects of Maryland's Health Enterprise Zones on Disparities in Emergency Department Returns
Chavez, S, Medstar/Georgetown University School of Medicine, Washington DC

1:30 – 2:00 pm Central time

Public Health and Injury Prevention

136 Emergency Medicine Physician Knowledge, Attitudes, and Barriers to Emergency Department Delivered Buprenorphine
Myles, M, Brown Emergency Medicine, Providence, RI

139 Characteristics of nonfatal opioid overdose in emergency department patients surviving to discharge or hospital admission
Sacco, D, NYP-Columbia University Medical Center, New York, NY

137 EMF Effectiveness of Emergency Department Screening on Hepatitis C Treatment and Cure *Jones, A, Tulane University, New Orleans, LA*

138 EMF ED Syphilis Screening Practices Before and After the Implementation of an Electronic Health Record-Based Best-Practice Alert
Ford, J, UC Davis Health System, Sacramento, CA

2:00 – 2:30 pm Central Time

Education

140 Recruitment "Red Flags": A thematic analysis of emergency medicine applicant experience
Weygandt, PL, Johns Hopkins, Baltimore, MD

141 Simulation Based Mastery Learning leads to superior outcomes for Ultrasound Guided IV insertion skills among Emergency Nurses
Sell, J, Northwestern University, Chicago, IL

143 Vitamin therapies for alcohol-related illnesses: can an intervention in the emergency department impact hospital-wide prescribing patterns?
Negaard, B, University of Iowa Hospitals and Clinics, Iowa City, IA

2:30 – 3:30

Medical Student and Resident Award Finals

3:30 – 4:30 pm

Prime Time Practice Changers: Highlights of Research Forum

Piktel, J, Gordon, RD Jr, Greenberg, M, Lagina, A

Available on-demand in the Virtual Poster Hall

144 An "Ultrasound-First" Protocol in Patients With Suspected Acute Diverticulitis is Associated With Reduction in Time and CT Utilization
Selame, L, Massachusetts General Hospital-Harvard Medical School, Boston, MA

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145 Physician Perceptions Impacting Snake Envenomation Treatment
Tupetz, A, Duke University, Durham, NC

146 Evaluating the Effectiveness of Providing New Primary Care Appointments Prior to Discharge from a Community Hospital Emergency Department
Pingree, A, Midwestern University, Downers Grove, IL

147 Impact of Direct Bedding on Length of Stay in the Emergency Department
Sukpraprut-Braaten, S, Unity Health, Searcy, AR

148 Acute Pulmonary Embolism Patients With Low Risk Stratification Scores but Concerning CTPE Findings
Schaeffer, W, University of Michigan, Ann Arbor, MI

149 Association of ACE-I and ARB Prescriptions With Mortality in Patients Admitted to the Hospital With COVID-19 in New York City
Barrett, B, Montefiore Medical Center, Bronx, NY

150 Differences in Weekly Geriatric Emergency Department Visits and Specialty Consultations
Cronin, A, University of California, San Diego, San Diego, CA

151 Analysis of Race and Gender Disparities in the Emergency Department
Schmeitzel, J, St. Luke's University Hospital, Bethlehem, PA

152 Correlation of Point of Care Lung Ultrasound and CT Scan Findings in Patients With COVID-19
Schulwolf, S, Massachusetts General Hospital, Boston, MA

153 Do Hydroxychloroquine, Disease-Modifying Antirheumatic Agents or Steroids, Serve to Prevent COVID-19 Infection?
Keyes, D, St Joseph Mercy Health System, Ann Arbor, MI

154 Virtual Telemedicine Training for Emergency Medicine Residents During the COVID-19 Pandemic
McNally, K, UCF, Orlando, FL

155 Using Point-of-Care Ultrasound to Predict Clinical Outcomes in Patients With COVID-19
Duggan, N, Massachusetts General Hospital, Boston, MA

157 Initial Outcomes of Universal HIV and HCV Screening in a High Volume Academic Emergency Department
Hsu, D, IU Health Methodist Hospital, Indianapolis, IN

158 Emergency Department Patients Presenting With Spontaneous Pneumomediastinum: A Retrospective Observational Cohort Study
Grass, E, Barnes Jewish Hospital, St Louis, MO

159 Successful Patient Navigation Through a Direct-to-Consumer Telemedicine Program
Hsu, H, Weill Cornell Medicine, New York, NY

160 Trends of Reported Marijuana Use in a Pediatric Emergency Department
DeMasi, L, Northwell Health, New Hyde Park, NY

161 Cardiopulmonary Ultrasound in Risk Stratification of Patients With Influenza
Schulwolf, S, Massachusetts General Hospital- Harvard Medical School, Boston, MA

162 Simulation Based Mastery Learning for Ultrasound Guided IV Insertion Skills among Emergency Nurses Improves IV Failure Rates and Performance
Amick, A, University of Washington, Seattle, WA

163 Implementation of a Telephonic-based Model to Continue to Address Substance Use as Part of Usual Care in Emergency Departments during COVID-19
Harrison, L, Northwell Health, New Hyde Park, NY

164 Emergency Medicine Resident Perceptions of a Novel Curriculum: Advanced Mental Performance in the Emergency Department (AMPED)
Aronson, M, Advocate Christ Medical Center, Oak Lawn, IL

165 Establishing an Oncology Observation Program to Improve ED Cancer Care and Decrease Hospital Admissions
Coyne, C, University of California San Diego, San Diego, CA

166 EMF Prospective Comparison of 3D Point of Care Ultrasound and CT Angiography for Carotid Stenosis
Drews, E, Duke University Hospital, Durham, NC

167 Changes in Patterns of Community Mortality During the SARS-CoV-2 Pandemic
Walker, W, Mayo Clinic, Rochester, MN

168 Insights on Ultrasound Training for Ultrasound Naive Flight Paramedics and Nurses
Kaplan, J, University of Pennsylvania, Philadelphia, PA

169 Emergency Department Utilization Trends during the COVID-19
Castillo, E, University of California, San Diego, San Diego, CA

170 Use of Transthoracic Ultrasound to Confirm Placement of Resuscitative Endovascular Balloon Occlusion of the Aorta in Medical Cardiac Arrest
Buckely, R, Yale School of Medicine, New Haven, CT

171 COVID-19 Symptoms among Emergency Department Patients and Implications for Screening
Castillo, E, University of California, San Diego, San Diego, CA

172 Influenza Reporting in an Academic Health System
Cronin, A, University of California, San Diego, San Diego, CA

173 Trauma Activations are Associated With Decreased Time to Diagnosis and Treatment of Intracerebral Hemorrhage When Compared to Trauma Evaluations
Nwizu, M, Cleveland Clinic Akron General, Akron, OH

174 Evaluation of Undifferentiated Dyspnea With Point of Care Ultrasound Performed by Primary Emergency Department Physician Compared to a Dedicated Emergency Department Ultrasound Team
Lam, V, Department of Emergency Medicine, University of Michigan, Ann Arbor, MI

175[TF] Design and Integration of an Emergency Medicine Focused Interpersonal Skills Simulation Curriculum
Kitamura, K, UCLA-Ronald Reagan Medical Center, Los Angeles, CA

176 Use of disposable pressure transducer With resuscitative endovascular balloon occlusion of the aorta in medical cardiac arrest
Buckley, R, Yale School of Medicine, New Haven, CT

177 Emergency Department Observation Unit Utilization for the Care of Patients With Left Ventricular Assist Devices
Tolia, V, University of California, San Diego, San Diego, CA

178 Pattern of Skin Infection Presentations in the Maritime Environment
Rutenberg, A, George Washington University School of Medicine and Health Sciences, Washington, DC

179 Ethnicity and Symptom Onset in the Emergency Department during the SARS-CoV-2 pandemic at the "Epicenter of the Epicenter"
Goodin, D, Icahn School of Medicine at Mount Sinai, New York, NY

180 Impact of the COVID19 pandemic on an ED-based universal opt-out HIV screening program in Atlanta, GA 2020
Yaffee, A, Emory University Department of Emergency Medicine, Atlanta, GA

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181[EMF] Prospective Evaluation of Novice-Acquired 3D Ultrasound for Identification of Upper Extremity Fractures
Mathews, A, Duke University School of Medicine, Durham, NC

182 Initial evaluation of a Palliative Care Screening tool in the Emergency Department
Tolia, V, University of California, San Diego, San Diego, CA

183 Raising the Bar on Treatment of Patients With Intellectual Disabilities in the Emergency Department
Tarr, M, Jacobi Medical Center, Astoria, NY

184[EMF] Low-Value Imaging for ED Patients With Consumer-Driven Health Plans
Sabbatini, A, University of Washington, Seattle, WA

185 Data-Driven Staffing Decisionmaking at an Emergency Department in Response to COVID-19
Tang, S, Southern Methodist University, Dallas, TX

186 Resident Views on the Educational Impact of Covid-19 At The Beginning And Two Months Into The Pandemic
O'Riordan, L, Morristown Medical Center, Morristown, NJ

187 Get Waivered Remote: comment analysis of an interactive digital educational course for physicians obtaining a DEA-X Waiver
Raber, J, Dr. Kiran C. Patel College of Allopathic Medicine, Nova Southeastern University, Fort Lauderdale, FL

188 Does Gender Bias impact Faculty Clinical Teaching Awards?
Barringer, K, Regions Hospital/Health Partners Institute of Medical Education, Eagan, MN

189 Get Waivered Remote: A Nationwide, Remote, and Interactive Educational Conference Designed in Response to COVID-19
Shayer, D, Massachusetts General Hospital, Boston, MA

190 Long-term Survival of Ultrasound Guided Peripheral Intravenous
Harrison, CN, Vanderbilt University School of Medicine, Nashville, TN

191 Characteristics of Patients Treated in the Emergency Department "Hallway Beds"
Ghassemi, M, George Washington University School of Medicine and Health Sciences, Washington, DC

192 Efficacy of a Novel Re-training of Ophthalmology Residents as Palliative Care Extenders in the Emergency Department during the COVID-19 Surge
Fleischer-Black, J, Icahn School of Medicine at Mount Sinai, New York, NY

193 Identification and misidentification of cases of ED diagnosis of acute pulmonary embolism on retrospective chart review
Greineder, C, University of Michigan, Ann Arbor, MI

194 Impact of Rapid Medical Evaluation on Patient Flow Through an Urban Emergency Department
Furmaga, J, UT Southwestern, Dallas, TX

195 Workload Measure (NASA-TLX) is Responsive to Staffing Changes in a High-Volume Emergency Department
McDonald, S, UT Southwestern, Dallas, TX

196 Comparing Response Times, Intensity of Care and Outcomes between Private versus Municipal Emergency Medical Services Systems
Muller, G, Henry Ford Wyandotte Hospital, Wyandotte, MI

197 The Use of High-Risk Medications in the Emergency Department and the Prevalent Delirium Within the First 24 Hours of Hospitalization
Lee, S, University of Iowa Carver College of Medicine, Iowa City, IA

199 False Positive or Acute Seroconversion? Examination of Patterns of Equivocal HIV Screening in the Emergency Department
Wilson, J, University of South Florida, Tampa, FL

200 Implementation of a COVID-19 Cohort Area resulted in no surface or air contamination in surrounding areas in one Academic Emergency Department
Barksdale, A, University of Nebraska Medical Center, Omaha, NE

201 Analysis of social determinants of health affecting patient outcomes during the SARS-CoV-2 (Covid-19) pandemic in Elmhurst, New York
Goodin, D, Icahn School of Medicine at Mount Sinai, New York, NY

202 Linking Emergency Department Patients at Risk for Human Immunodeficiency Virus to Pre-Exposure Prophylaxis
Mahal, JJ, Albert Einstein College of Medicine, Bronx, NY

203 Telemedicine Response to COVID-19 Surge in New York City: How Emergency Department Telemedicine Changed With the Curve
Greenwald, P, Weill Cornell Medicine, New York, NY

204 Website Usability Analysis of United States Emergency Medicine Residencies
Fundingsland, E, Rocky Vista University, Parker, CO

205 Utility of Non-Invasive Volume Assessment Methods to Predict Acute Blood Loss in Spontaneously Breathing Volunteers
Ozturan, I, Mersin Toros State Hospital, Mersin, Turkey

206 Urine Testing is Associated With an Increased Length of Stay in Discharged Emergency Department Patients
Liotta, B, University of California San Diego, San Diego, CA

207 Virtual Powers of Observation: A Telemedicine Pathway for the Suspected COVID-19 Patient
Heravian, A, Columbia university medical center, New York, NY

208 Sleep time and characteristics measured using Fitbit devices in emergency medicine residents
Rivard, L, St. Luke's University Health Network, Bethlehem, PA

209 Assessment of a novel emergency department based critical care consult service in an urban level-1 trauma center
Madden, L, Emory University, Atlanta, GA

210 Association of the Affordable Care Act provisions on young adult emergency department mental health visits in California (2005-2018)
Torres, A, Loma Linda University Health, Loma Linda, CA

211 Impact of X-Waiver Training on Resident Barriers and Biases Surrounding Buprenorphine Treatment for Opiate Use Disorder
Johnson, E, LAC+USC Medical Center, Department of Emergency Medicine, Los Angeles, CA

212 Do the Milestones Addressed by Faculty in Workplace-Based Narrative Assessments of Residents Differ by Sex?
Vazquez, A, Keck School of Medicine of the University of Southern California, Los Angeles, CA

213 Age Differences Among Persons With Positive COVID-19 Molecular Testing Later Testing Negative for Antibodies to SARS-CoV-2
Pepe, P, Dallas County Emergency Medical Services and Public Safety, Dallas, TX

214[TF] Advancing Communication Excellence at Stanford in Emergency Medicine Residency: A Curriculum for Interns
Alvarez, A, Stanford University, Palo Alto, CA

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215 Understanding and Improving Population Health from the Emergency Department through Medical-Legal Partnerships
Vongsachang, H, LAC+USC Medical Center, Los Angeles, CA

216 Defining quality in the emergency department care of long bone fractures in children: identifying parents and youth's priorities
Gaucher, N, CHU Sainte-Justine, Montreal, QC, Canada

217[EMF] Use of an Online Simulation Platform for Diagnostic Assessment of Entrustable Professional Activities during Transition to Residency
Peng, C, Stanford Emergency Department, Palo Alto, CA

218 Outcomes after Reversal of Anticoagulation after Intracerebral Hemorrhage
Hernandez, M, University of Central Florida, Orlando, FL

219 Successful Implementation of Universal Opt-Out Hepatitis C and Human Immunodeficiency Virus Screening in the Emergency Department
Cloessner, E, Medical University of South Carolina, Charleston, SC

220[TF] A didactic curriculum for the emergency medicine sub-internship, designed to be delivered by residents
Sigman, L, Oregon Health & Science University, Portland, OR

221[EMF] Development & Validation of a Text Rendering and Data Retrieval System for Extracting Clinical Information from Paper Medical Records
Wrenn, J, Vanderbilt University, Nashville, TN

222 Introducing the Emergency Department Consumer Assessment of Healthcare Providers and Systems Survey
Parast L, RAND, Santa monica, CA

223 Evaluation of Pneumonia Scores in Patients Hospitalized for COVID-19 Related Dyspnea
Ortiz, D, Baylor College of Medicine, Houston, TX

224 Prospective application of modified NEXUS criteria in geriatric fall patients: a prospective cohort
McMahon, K, St. Luke's Hospital, Bethlehem, PA

225 Impact of Anti-immigrant Political Climate on Latinx Families and Children's Utilization of Healthcare Services
Caballero, E, University of California-San Francisco, San Francisco, CA

226 Emergency Department Hyperoxia Exposure and Mortality
Gandee, Z, Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA

227 Impact of Active versus Passive Preoxygenation on Emergency Department Mortality in Kigali, Rwanda
Naganathan, S, Department of Emergency Medicine, Brown University Warren Alpert Medical School, Providence, RI

228 Epidemiologic differences in respiratory failure due to COVID-19 in a large suburban healthcare system
Kelly, R, Beaumont Hospital, Royal Oak, MI

229 Simulation-Based Mastery Learning for Ultrasound Guided IV Insertion improves CT contrast extravasation rates in the Emergency Department
Amick, A, University of Washington, Seattle, WA

230 Mortality Associated With Covid-19 Among ED Patients in Southeast Michigan
Miller, J, Henry Ford Hospital, Detroit, MI

231[EMF] Investigating Psychosocial Factors, Health Behaviors, and Diabetic Control in Emergency Department Patients
Flessel, A, Wayne State University School of Medicine, Detroit, MI

232 National Cost Savings, Length of Stay Reduction and Preventable Cancer from Expanded Use of Point-of-Care Ultrasound for Small Bowel Obstruction
Brower, C, Harvard Medical School, Boston, MA

233[TF] Making Antibiotics Stick
Dudas, R, Loma Linda University Medical Center, Loma Linda, CA

234 A Scoping Review of Current Social Emergency Medicine Research
Shah, S, Icahn School of Medicine at Mount Sinai, New York, NY

235 An Assessment of Healthcare Worker Safety during COVID-19
Firew, T, Columbia University Medical Center, New York, NY

236 Access to Covid-19 Testing by Homeless/Housing-Insecure Individuals in Northeast Ohio
Seballos, S, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, OH

237 Do Sex and Racial Disparities Exist in Door-to-Drug Time on the Administration of tPA?
David, J, Southside Hospital, Bay Shore, NY

238 Point-of-Care Ultrasound in Morbidity and Mortality Cases in Emergency Medicine
Duggan, N, Massachusetts General Hospital, Boston, MA

239 Development of a Unified National Trauma Center Database, 2018
Bedell, B, Massachusetts General Hospital, Boston, MA

240 Is Multidisciplinary Checklist Utilization Associated With Guideline Adherence or Mortality in Patients With Severe Sepsis?
Johns, C, University of Chicago, Chicago, IL

241[TF] Education Soundbites: A Longitudinal Clinical Teaching Curriculum for Emergency Medicine Faculty Educators
Mills, E, University of Michigan/St. Joseph Mercy Hospital, Ann Arbor, MI

242 The Impact of Hospital Resources on Secondary Overtriage: A Population-Based Analysis
Tillmann, B, Sunnybrook Health Science Centre, Toronto, ON, Canada

243 Spontaneous Coronary Artery Dissection in the Emergency Department: The Elusive Dissection
Johnson, A, UC San Diego, La Jolla, CA

244 Emergency Department Utilization by Older Homeless/Housing Insecure Patients With a History of Admission to Inpatient Psychiatry
Weleff, J, Cleveland Clinic, Cleveland, OH

245[TF] Interactive Online Lung Point of Care Ultrasound Course
Guttman, J, Emory University, Atlanta, GA

246 Sonographic Right Ventricular Dysfunction Predicts Acute Heart Failure Outcomes Independent of Current Emergency Department Risk Measures
Harrison, N, Wayne State University, Detroit, MI

247[TF] The EndoVaginal Ultrasound Module
Brown, J, UCSF, San Francisco, CA

248 Weight-Based Assessment of Sodium Supplements on Ultramarathon Performance
Burns, P, Stanford University School of Medicine, Palo Alto, CA

249 The Impact of an Electronic Medical Record Alert on Recognition and Referral of High-Risk Elders in the Emergency Department Setting
Meldon, S, Cleveland Clinic, Cleveland, OH

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250 Factors Associated With Need for Full Admission for Patients With Skin and Soft Tissue Infections in an Emergency Department Observation Unit
Simerlink, S, The Ohio State University College of Medicine, Columbus, OH

251 Peritonsillar Abscess Treatment Within Emergency Departments
Swendener, B, University of South Florida, Tampa, FL

252 A qualitative study of the experience of abuse by healthcare workers in the Emergency Department
Querin, L, UNC, Chapel Hill, NC

253 Investigating the Relationship Between 72-Hour Revisits to the Emergency Department and Initial Emergency Service Index Triage Levels
Gottlieb, D, Northwell health Long Island Jewish Medical Center, New Hyde Park, NY

254 Comparing 2017 Medicare Reimbursement of Emergency Physicians by Sex
Aragon Sierra, A, Mayo Clinic Alix School of Medicine, Scottsdale, AZ

255 Stethoscope Cleaning Practices and Knowledge Amongst Healthcare Providers
Kalra, S, University of South Alabama, Mobile, AL

256 Has the COVID-19 Pandemic Adversely Affected Measure of Burnout and Empathy in Emergency Medicine Residents?
Jacoby, J, Lehigh Valley Health Network, Bethlehem, PA

257 Are Stethoscopes and Infection Control Enemies?
Kalra, S, University of South Alabama, Mobile, AL

258 Detection of Delirium among Older Adults in the Emergency Department through the Utilization of 4AT
Saxena, S, Cleveland Clinic, Cleveland, OH

259 Correlation of Outpatient Laboratory Values With Acquired Immunodeficiency Syndrome-Defining Events in Older Emergency Department Patients
Mou, S, Weill Cornell Medicine Medical College, New York City, NY

260 Risk Factors for Mortality in Emergency Medicine Morbidity and Mortality Cases
Todd, B, Beaumont Health, Royal Oak, MI

261 Assessment of emergency department staff awareness of policy and expert opinion protocol regarding active shooter event.
Drone, E, UCF/HCA Greater Orlando Emergency Medicine Residency, Kissimmee, FL

262 Don't Let the Monitor Fool You: Pulse Check Variation Between Shockable and Non-Shockable Rhythms
Rahimi-Saber, A, The George Washington University Hospital, Washington, DC

263 Utilizing Telemedicine in a Novel Approach to COVID-19 Management and Patient Experience in the Emergency Department
Bains, J, Weill Cornell Medicine, New York, NY

264 Trends and Characteristics of Fentanyl Exposures Reported to the US Poison Centers
Rege, S, University of Virginia, Charlottesville, VA

265 Barriers and Facilitators of De-Implementing Chest X-Rays after Central Venous Catheter Insertion
Ablordeppey, E, Washington University St Louis, St Louis, MO

266 Perceptions of Target-Based Wait Times Between Emergency Department Providers in Australia and the United Kingdom
Rudolph, D, Johns Hopkins Hospital, Baltimore, MD

267[EMF] The impact of a novel, tailored firearm screening and intervention tool on patients' firearm storage safety practices
Schwimmer, H, Emory University, Atlanta, GA

268 Comparing Pediatric Head CT Rules Using Outcomes for Acute Lifesaving Intervention
Bezzerides, M, Vanderbilt University School of Medicine, Nashville, TN

269 E-cigarette Use, Attitudes, and Perceptions among Emergency Department Patients
Quenzer, F, UC San Diego, San Diego, CA

270 Changes in Treatment of Out-of-Hospital Cardiac Arrest during COVID-19 Outbreak in Japan
Numata, K, Tokyobay Medical Center, Urayasu-City, Japan

271[EMF] Advancing Emergency Department Chest Pain Risk Stratification With Monocyte Chemoattractant Protein-1 and High-Sensitivity Troponin
Ashburn, N, Wake Forest School of Medicine, Winston-Salem, NC

272[EMF] Using Monocyte Chemoattractant Protein-1 to Predict Adverse Cardiovascular Events Among Emergency Department Chest Pain Patients
Ashburn, N, Wake Forest School of Medicine, Winston-Salem, NC

273 Availability of Pediatric Emergency Care Coordinators in US Emergency Departments in 2018
Boggs, K, Massachusetts General Hospital, Boston, MA

274[TF] Doc in the Box Infectious Disease Card Game: Novel Interactive Method to Introduce Broad Topics in Infectious Disease
Yee, J, University of Utah, Salt Lake City, UT

275 Age and Educational Attainment Predicts Engagement in a MHealth Intervention Conducted at a Safety-net Emergency Department
Treacy-Abarca, S, University of California Los Angeles David Geffen School of Medicine, Los Angeles, CA

276 The Impact of the Medical Education Research Certificate at the Council of Residency Directors in Emergency Medicine Program on Career Development Through the Lens of Social Cognitive Career Theory
Jordan, J, Ronald Reagan UCLA, Los Angeles, CA

277 Age is the Only Factor that Affects Survival to Hospital Admission in Video-Reviewed Out-of-Hospital Cardiac Arrest Resuscitations
Brooks, J, George Washington University, Washington, DC

278 Identifying High Performer Residents in Emergency Medicine Training
Coughlin, R, Yale University School of Medicine, New Haven, CT

279 Quantifying Electronic Medical Record Utilization by Emergency Medicine Residents Using Event Log Data
Kim, J, Cook County Health, Chicago, IL

280 Boucebacks During the Covid-19 Pandemic
Perrotta, G, Henry Ford Hospital and Wayne State University, Detroit, MI

281 Epidemiological Analysis of E-Scooter Injuries among Patients Presenting to the Emergency Department
Douglass, K, George Washington University School of Medicine and Health Sciences, Washington, DC

282 A Comparison of In-Hospital Cardiac Arrests Between a United States and United Kingdom Hospital System
Powell, L, Virginia Commonwealth University School of Medicine, Richmond, VA

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283 Using Google Trends to Determine Perceived Viral Exposure During the Early Phase of the COVID-19 Pandemic in the United States
Pascual, K, George Washington University School of Medicine and Health Sciences, Washington, DC

284[EMF] Thromboelastography to Assess Coagulopathy and Glycocalyx Degradation in Sepsis
Tyler, P, Beth Israel Deaconess Medical Center, Boston, MA

285 Deployment of Artificial Intelligence for Radiographic Diagnosis of COVID-19 Pneumonia in the Emergency Department
Carlile, M, UC San Diego Health Department of Emergency Medicine, San Diego, CA

286 Firearm Injuries: Long-term Health Outcomes and Health Care Expenditures for Children
Pulcini, C, Children's Hospital of Philadelphia, Philadelphia, PA

287 Likelihood of COVID-19 Positive Test Results in Patients Who Present to the Emergency Department With Key COVID Chief Symptoms
Bartlett, B, Mayo Clinic Health System, Mankato, MN

288 Characteristics and Outcomes of Patients With Ventricular Assist Devices Presenting to a Pediatric Emergency Department
Pokrajac, N, Stanford University, Palo Alto, CA

289 Neutrophil to Lymphocyte Ratio and Platelet to Lymphocyte Ratio as Predictive Markers for Pulmonary Embolism
Singh, H, St. John's Riverside Hospital, Yonkers, NY

290 Rural Youth's Exposure to Firearm-Related Injury and Death and Their Attitudes Regarding Firearms
Wymore, C, University of Iowa Department of Emergency Medicine, Iowa City, IA

291 Firearm Presence and Storage in Rural Youth Homes
Hooyer, M, University of Iowa Carver College of Medicine, Iowa City, IA

292 Feasibility of Portable, Point of Care Magnetic Resonance Imaging in the Acute Emergency Department
Chiricolo, G, NYP Brooklyn Methodist Hospital, Brooklyn, NY

293 The Dangers of Off-Road Vehicles to Youths: Not Something to Kid Around About
Fjeld, A, University of Iowa Department of Emergency Medicine, Iowa City, IA

294 Validating an Emergency Department Frailty Assessment Tool
Guinn, T, University of Texas Southwestern, Dallas, TX

295 Roadway to Disaster: Adult All-Terrain Vehicle Crashes on Iowa Roads
Fjeld, A, University of Iowa Department of Emergency Medicine, Iowa City, IA

296 Development of an Artificial Intelligence Deep Learning Algorithm that Utilizes IVC Collapse to Predict Fluid Responsiveness
Blaivas, M, St. Francis Hospital, Columbus, GA

297 Emergency Nursing Workforce, Burnout, and Work Environments in the United States: A National Sample Survey Analysis
Castner, J, Journal of Emergency Nursing, Grand Island, NY

298 Impact of Presenting Vital Signs on Outcomes of Patients Hospitalized With Coronavirus
Juarez, JM, Mount Sinai Hospital, New York, NY

299 Pediatric Airway Procedures Skill Retention With Standard Simulation, the Peyton Method, or Self-Directed Learning
Jeanmonod, R, St. Luke's Hospital, Bethlehem, PA

300 Residents' Perceptions of Effective Features of Educational Podcasts
Riddell, J, Keck School of Medicine of the University of Southern California, Los Angeles, CA

301 Use of Transfer Learning to Improve External Validity of a Machine-Learning Algorithm to Predict Septic Shock in the Emergency Department
Wardi, G, University of California, San Diego, San Diego, CA

302 Biomarker Profiling for Obstructive Coronary Artery Disease: A PROMISE Substudy
Limkakeng, A, Duke University Medical Center, Durham, NC

303 Assessing Resident Communication With Faculty from Multiple Specialties in Pediatric Simulation Designed to Provide Multi-Source Feedback
Elliott, N, Lehigh Valley Health Network, Allentown, PA

304 The Effect of Weather on Orthopedic Injury Presentation to the Emergency Department
Houghton, R, University of Nebraska Medical Center, Omaha, NE

305[EMF] Effective Nutritional Analyses as a Predictive Utility For 30-Day Cardiac Recovery
Bawa, T, Wayne State University School of Medicine, Detroit, MI

306 CO-Oximetry in the Emergency Department
Cooper, JS, University of Nebraska Medical Center, Omaha, NE

307 Descriptive and Retrospective Analysis of a Triggering Tool Used to Identify Emergency Department Patients With Unmet Palliative Care Needs
Sharp, A, Mayo Clinic FL, Jacksonville Beach, FL

308 The Effect of Point of Care Ultrasound on Helicopter EMS Scene Times
Onotera, K, University of Manitoba, Winnipeg, MB, Canada

309 High Acuity Emergency Department Billing and its Association With Practice Rurality
Gettel, C, Yale School of Medicine, New Haven, CT

310 Defining a Pediatric Emergency Department: Comparing Characteristics Based on Commonly Used Criteria
Samuels-Kalow, M, Massachusetts General Hospital, Boston, MA

311 Lactate and Lactate Clearance to Predict Mortality in Pediatric Sepsis: A Systematic Review and Diagnostic Meta-Analysis
McDonald, C, Lincoln Medical Center, Bronx, NY

312 Effect of Race and Insurance Status on Outcomes of Pediatric Trauma
Irgens-Moller, N, Cohen Children's Medical Center, New Hyde Park, NY

313 Outcomes for Patients With Congestive Heart Failure and Chronic Kidney Disease Receiving Fluid Resuscitation for Severe Sepsis or Septic Shock
Wiczorek, M, Oakland University William Beaumont School of Medicine, Rochester Hills, MI

314 Prevalence of Asymptomatic Intraperitoneal Fluid in Children on Focused Assessment With Sonography in Trauma Ultrasound
Wynne, Z, Penn State College of Medicine, Hershey, PA

315 Emergency Medicine and Trauma Physician Awareness of Mental Health Resources during and after Natural and Human-Made Disasters
Sood, N, Penn State College of Medicine, Hershey, PA

316 Emergency Department Benchmarking Alliance Survey: Anatomy and Physiology of an Emergency Department Observation Unit
Wheatley, M, Emory University School of Medicine, Atlanta, GA

317 Barriers to Discharge in Geriatric Long Staying Inpatient and Emergency Department Admissions: A Descriptive Study
Kelsey Keverline, UNC Chapel Hill School of Medicine, Chapel Hill, NC

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318 Use of Telemedicine Physicians for Telephone Triage of Head Injury Patients
Wood, J, Mayo Clinic, Rochester, MN

319 Scientific Publications Trend of Emergency Departments of International Federation for Emergency Medicine Members, 2009 to 2018
Chou, H-H, Keelung Chang Gung Memorial Hospital, Keelung, Taiwan

320 Post Cardiac Arrest Care: Does Usual Care Comply With Guidelines and Impact Outcomes?
Amann, C, UC San Diego, San Diego, CA

321 Prevalence of SARS-CoV-2 Antibodies in Pediatric Healthcare Workers in Atlanta, Georgia
Morris, C, Emory University School of Medicine, Atlanta, GA

322 Hyperglycemia Management Prior to Admission in an Urban Emergency Department
Benbrahim, M, Boston Medical Center, Boston, MA

323 Selected Septic Patients Can Be Safely Discharged from the Emergency Department
Rahhal, G, Washington University is St. Louis School of Medicine, St. Louis, MO

324 Perceptions of Emergency Medicine Resident Efficiency after Speech Recognition Technology Implementation
Molins, C, AdventHealth Emergency Medicine Residency, Orlando, FL

325 Do Sterile Probe Covers Confer Less Infection Than an Alcohol Cleaned Probe? A Pilot Study
Brodak, D, UC San Diego, San Diego, CA

326 Does a Physician Developed Airway Equipment Tray Improve Physician Satisfaction and Speed of Intubation Preparation?
Thiessen, B, Good Samaritan Hospital Medical Center, West Islip, NY

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Brian Hurt	HHS | NIH | National Center for Advancing Translational Sciences (NCATS): UL1TR001442	Investigator
	NIH T32EB005970	Grant support
Gregory Jay	KitoTech Medical	Scientific Study/Trial
Xuan Jiang	Perosphere Technologies, Inc.	Employee, Stockholder
Austin Johnson	CERTUS	Employee, Other
George Joseph	Bausch Health US, LLC	Employee, Stockholder
Neeraja Kairam	NJ ACEP	Board Member/Officer/Trustee
Baharan Kamousi	Ceribell	Other
Suganya Karunakaran	Ceribell	Employee
Bory Kea	Ortho Clinical Diagnostics	Investigator, Scientific Study/Trial
	Siemens	Investigator, Scientific Study/Trial
Daniel Keyes	Emergency Physicians Medical Group	Employee, Investigator
	SRI International	Board Member/Officer/Trustee, Employee, Investigator, Scientific Study/Trial

Name	Company Name	Nature of Relationship
Vivek Khatri	Department of Surgery at the Uniformed Services University of the Health Sciences and the Walter Reed National Military Medical Center	Investigator
	Henry Jackson Foundation for the Advancement of Military Medicine, Inc.	Employee
Daniel Kim	Clarius Mobile Health	Consultant/Advisor
William Kraus	Abbott Laboratories	Grant support
Erin Larson	Mayo Clinic	Employee
Alexander Limkakeng	Abbott Laboratories	Grant support
	Astrazeneca	Grant support
	Bristol Meyers Squibb	Grant support
	Forest Devices	Grant support
	GE	Grant support
	Hospital Quality Foundation	Grant support
	Ischemia Care, LTD	Grant support
	Roche Diagnostics, Inc.	Grant support
	Siemens Healthcare Diagnostics	Grant support, Scientific Study/Trial
Jay Lin	Portola Pharmaceuticals	Consultant/Advisor
Michelle Lin	ALiEM	Other
Melissa Lingohr-Smith	Novosys Health	Employee
Rachel Liu	Butterfly Network	Consultant/Advisor
	Butterfly Network, Inc	Consultant/Advisor
	Caption Health	Consultant/Advisor
	Caption Health, Inc	Consultant/Advisor
	Philips Healthcare	Consultant/Advisor
	Phillips Network	Consultant/Advisor
Chris Longhurst	HHS | NIH | National Center for Advancing Translational Sciences (NCATS): UL1TR001442	Investigator
Belinda Lovelace	Portola Pharmaceuticals	Employee
Xiaohui Luo	Amag Pharmaceuticals	Employee
Charles Mahan	BMS/Pfizer	Consultant/Advisor
	Janssen Pharmaceuticals	Consultant/Advisor
	Portola Pharmaceuticals	Consultant/Advisor
Simon Mahler	Abbott Point of Care	Grant support, Scientific Study/Trial
	AHRQ	Grant support, Investigator, Scientific Study/Trial
	Amgen	Grant support
	Creavo Medical Technologies	Grant support, Investigator, Scientific Study/Trial
	Impathiq	Board Member/Officer/Trustee
	Impathiq Inc	Board Member/Officer/Trustee
	NHLBI	Grant support, Investigator, Scientific Study/Trial
	Ortho Clinical Diagnostics	Grant support, Investigator, Scientific Study/Trial
	PCORI	Grant support, Investigator, Scientific Study/Trial
	Roche Diagnostics	Grant support, Investigator, Scientific Study/Trial
Amy Manley	Paratek Pharmaceuticals, Inc.	Employee, Stockholder
James McCord	Siemens Healthcare Diagnostics	Consultant/Advisor, Scientific Study/Trial
Kelly McNeil-Posey	Portola Pharmaceuticals	Employee
Darla Meurer	Mayo Clinic	Employee
Chadwick Miller	Abbott Point of Care	Grant support
	Creavo Medical Technologies	Grant support
	NHLBI	Grant support
	Siemens	Grant support
Beth Mitchell	Eli Lilly and Company	Employee, Stockholder
James Moore	Gilead FOCUS	Grant support
Daryl Mootoo	Perosphere Technologies, Inc.	Employee, Stockholder
Milind Narurkar	Eagle Pharmaceuticals	Employee, Stockholder
David Nelson	Eli Lilly and Company	Employee
Shamim Nemati	Biomedical Advanced Research and Development Authority	Grant support
	Gordon and Betty Moore Foundation	Grant support
	National Institutes of Health	Grant support
Sara Nikravan	Butterfly Network, Inc	Consultant/Advisor
	Caption Health, Inc	Consultant/Advisor
	Philips Healthcare	Consultant/Advisor

Name	Company Name	Nature of Relationship
Richard Nowak	Siemens Healthcare Diagnostics	Consultant/Advisor, Scientific Study/Trial
Dardan Osmani	Perosphere Technologies, Inc.	Employee, Stockholder
Ronny Otero	Beaumont Health	Employee
Daniel Park	Caption Health, Inc	Consultant/Advisor
Josef Parvizi	Ceribell	Board Member/Officer/Trustee, Consultant/Advisor
W. Peacock	Salix Pharmaceuticals	Consultant/Advisor
William Peacock	Siemens Healthcare Diagnostics	Consultant/Advisor
Cynthia Peng	Quintomics	Other
Kaitlyn Periera	Gilead	Grant support
Carolyn Phillips	Caption Health, Inc.	Consultant/Advisor
Mark Piehl	410 Medical	Board Member/Officer/Trustee, Employee, Stockholder, Other
James Quinn	Ceribell	Consultant/Advisor
Jeffrey Riddell	Hippo Education	Honoraria
Mauricio Rodriguez	Paratek Pharmaceuticals, Inc.	Employee, Stockholder
Maria Rudis	Mayo Clinic	Employee
Elizabeth Samuels	Advance-CTR Mentored Research Award	Other
	Rhode Island Foundation	Grant support
Eric Savitsky	Sonosim	Board Member/Officer/Trustee
Seth Schobel	Department of Surgery at the Uniformed Services University of the Health Sciences and the Walter Reed National Military Medical Center	Investigator
	Henry Jackson Foundation for the Advancement of Military Medicine, Inc.	Employee
Svati Shah	Abbott Laboratories	Grant support
Nathan Shapiro	Baxter	Consultant/Advisor, Grant support
	Entegrion	Grant support
	National Institutes of Health	Grant support
Sarah Sims	Patient Insight	Employee, Other
Adam Singer	AstraZeneca	Lecturer/Speaker
	BMS	Lecturer/Speaker
	Janssen Pharmaceuticals	Lecturer/Speaker
	Pfizer	Lecturer/Speaker
	Portola Pharmaceuticals	Consultant/Advisor, Lecturer/Speaker
	Siemens Haelthcare Diagnostics	Scientific Study/Trial
	Siemens Healthcare Diagnostics	Scientific Study/Trial
Neal Slatkin	Bausch Health US, LLC	Employee, Stockholder
Anna Snavely	NHLBI	Grant support, Investigator
Hollie Stegemann	Mayo Clinic	Employee
Jason Stopyra	Abbott Point of Care	Grant support, Investigator, Scientific Study/Trial
	Roche Diagnostics	Grant support, Investigator, Scientific Study/Trial
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Kristen Syring	Eli Lilly and Company	Employee
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Gregory Volturo	Paratek Pharmaceuticals, Inc.	Consultant/Advisor
Deepak Voora	Abbott Laboratories	Grant support
Yongchen Wang	Perosphere Technologies, Inc.	Employee, Stockholder
Gabriel Wardi	General Electric	Consultant/Advisor
	Gordon and Betty Moore Foundation	Grant support
	Thermos-Fisher	Lecturer/Speaker
Robert Welch	Blue Cross Blue Shield Foundation of Michigan	Grant support
James Williams	Portola Pharmaceuticals	Consultant/Advisor, Lecturer/Speaker
Jason Wilson	Dsuvia	Consultant/Advisor, Honoraria
	Gilead	Consultant/Advisor, Grant support, Honoraria, Investigator, Lecturer/Speaker, Scientific Study/Trial
	Janssen	Consultant/Advisor, Honoraria, Investigator, Lecturer/Speaker
	Pfizer	Consultant/Advisor, Grant support, Honoraria, Investigator, Lecturer/Speaker, Scientific Study/Trial
	Portola	Consultant/Advisor, Grant support, Honoraria, Investigator, Lecturer/Speaker, Scientific Study/Trial

Name	Company Name	Nature of Relationship
Ambrose Wong	National Center for Advancing Translational Science (1 KL2 TR001862-01)	Grant support
	Robert E. Leet and Clara Guthrie Patterson Trust Mentored Research Award	Grant support
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Raymond Woo	Ceribell	Employee
Stefan Zappe	Perosphere Technologies, Inc.	Board Member/Officer/Trustee, Employee, Stockholder
Ilya Zhbannikov	Abbott Laboratories	Grant support
Kaitlin Ziadeh	Beaumont Health	Employee

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EMF

1 Hearing Is Believing: A Qualitative Exploration of Trust and Credibility Judgements in Educational Podcasts

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Study Objectives: Podcasts have become increasingly popular platforms for knowledge synthesis and translation. Trainees now report spending more time with podcasts than any other educational resource, including textbooks and journals. Though almost two thirds of residents report podcast listening changes their clinical practice, there is uncertainty over the quality and influence of podcasts. Given the broad use of podcasts among emergency medicine (EM) trainees, there is a need to better understand the processes by which they sort, interpret, and judge information as they learn. What is not known is how EM residents make credibility judgements about podcast content, how their judgements compare to the judgements of attending physicians, and how those credibility decisions relate to other learning modalities.

The objective was to explore the processes by which podcasts are weighed, valued, and judged relative to one another, and relative to other learning modalities.

Methods: We performed a multi-center qualitative thematic analysis based on a constructivist grounded theory approach by conducting 11 semi-structured interviews with resident and attending physicians from three North American teaching institutions from January 2020 to June 2020. Narrative transcripts were coded line-by-line using constant comparative analysis to organize transcripts into focused codes, key conceptual categories, and then major themes. Three authors met regularly during the analysis to develop the coding schema, resolve discrepancies, and discuss themes.

Results: We identified four broad themes related to credibility judgements and educational podcasts: trust in source, congruence of content, triangulation of references, and application context. Participants had a baseline level of trust in a podcast resource based on popularity, recommendations from colleagues, format, Web site, and speaker credentials. When listening to podcast content, participants' levels of scrutiny varied based on the type of material (core content vs. cutting-edge) and level of agreement of the content with their existing knowledge. When considering incongruent or cutting-edge information, participants triangulated the podcast content with their experience, understanding of physiology, content of other podcasts and online resources, reading the primary literature, and conversations with attending physicians. When applying information gleaned from podcasts, participants yielded to local practice contexts and, for residents, their attendings' judgments.

Conclusion: When listening to educational podcasts, resident and attending physicians made a series of complex credibility judgements that weighed trust in the source, congruence of the content, triangulation of references, and the context of application.

2 Rightsizing Response: The Optimization of Critical Care Resources during COVID-19

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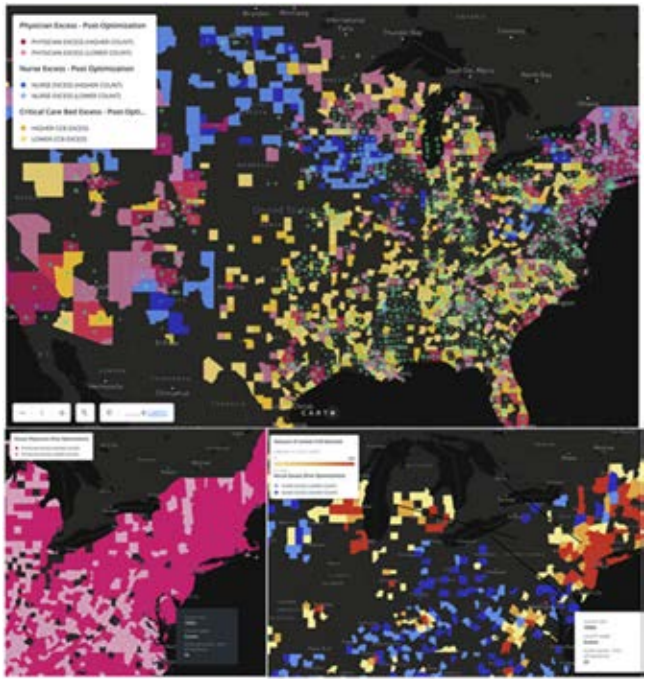
Study Objectives: As the number of COVID-19 patients increased across the US, health care systems required a variety of approaches to meet the demand for critical care resources. We sought to determine the ability of the existing health care system to meet these demands and explored the intersection of critical care bed (CCB) capacity and staffing availability in U.S. counties using two-week-ahead projections for April 13th, 2020.

Methods: A linear optimization model was developed and solved using the revised simplex method. The model aimed to minimize unmet demand for COVID-19 critical care through an optimal combination of (i) redistribution of nurses and physicians within each state (within 250 miles) and (ii) provision of additional CCB capacity and staff. Staffing ratios of 2 CCBs/nurse and 10 CCBs/physician were applied. Advanced practice practitioners (APPs) were used to "extend" physician coverage with each APP equal to 0.5 physicians. Staffing counts were estimated using American Hospital Association and Health Resources and Services Administration Data. To account for critical care training, 15% of RNs, 12% of NPs, 1.4% of PAs, and 50% of CRNAs were considered as available critical care trained staff. Intensivists (100%) and Medical and Surgical specialists (30%) were included with 45% of these available for hospital staffing. Case count projections were taken from the Columbia University models

(Shaman, 2020) and 70% of CCBs in each county were assumed to be occupied by non-COVID-19 patients. For each county, three potential constraints on increasing capacity were estimated: the number of nurses, the number of physicians (including APPs), and the number of CCBs. One or more constraints could be active at any time.

Results: Prior to optimization, 91% of counties were able to meet the demand for projected case counts. In contrast, 8.4% were limited by nursing resources, 0.09% by physicians, and 0.8% by the number of CCBs. After optimization, 16.9% of counties sent nurses to a different county(s) (median 6 nurses sent, IQR 13.75) compared with 5.5% counties receiving them (median 23, IQR 43.5). Fewer physicians were relocated (0.09% sent, median 1, IQR 1; 0.06% received, median 2.5, IQR 1.5) (Figure). Using baseline staffing ratios and availability, these redistributions led to a reduction in total unmet demand from 24,155 to 19,976. In order to fully meet demand across the US under these conditions, an additional 1,225 physicians, 41,939 nurses and 13,905 CCBs would have been needed.

Conclusion: This work shows that with the redeployment of resources even within state boundaries may provide relief to areas of need without causing strain in other locations. While validation with actual redeployment during the pandemic can improve estimates, these models can provide decision support to stakeholders by suggesting optimal reallocation or the ability of existing resources to support additional capacity.



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3 Non-specific ECG Findings in Patients with Low High-Sensitivity Troponin Values Are Not Associated With Significant 30-day Adverse Outcomes

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Study Objectives: Although some ED risk stratification tools (eg, HEART score) consider non-specific electrocardiogram (ECG) findings as an aid in disposition decisions, their clinical value in patients with an initially normal high-sensitivity troponin I (hsTnI) is unclear.

Our purpose was to determine if non-specific ECG changes are associated with 30-day major adverse cardiac events (MACE) in ED patients presenting with suspected acute coronary syndrome and who have a low initial hsTnI.

Methods: Using the prospective Siemens Atellica hsTnI FDA submission observational database, we evaluated the association between non-specific ECG changes (defined as left bundle branch block (LBBB), ST depression or T wave inversions) and 30-day MACE (death, myocardial infarction, heart failure, or percutaneous coronary intervention). Eligible patients presented to one of 28 US EDs with suspected acute coronary syndromes from April 2015 to April 2016, and had hsTnI obtained at 1, 3, and 6 hours after ED presentation. After excluding ST-elevation myocardial infarction and unstable ECG changes (VT, VF, tachyarrhythmias, or AV blocks), the association between non-specific changes on the initial ECG and the initial hsTnI (Siemen's Atellica, Siemens Healthineers, Inc, Malvern, PA) with 30 day MACE was determined by chi-square testing.

Results: Of 2667 enrolled, 1037 patients met the inclusion criteria and were included in the analysis. Mean age was 61 years (SD ±12), 55% were male, with 55% white and 40% African American. Median (IQR) time from symptom onset to presentation, and presentation to specimen collection was 87 (0, 216) and 147 (117, 178) minutes, respectively. The most common presenting symptom were chest pain (83%) and dyspnea (10%). ECG findings were T wave inversion or non-specific T changes, ST depression or non-specific ST changes, RBBB or early repolarization, or LBBB in 40, 15, 10, and 2%, respectively. MACE occurred in 118 (11.4%) patients, with ACS without MI (69 patients, 6.65%) and heart failure (24 patients, 2.3%) being most frequent. In patients with hs-cTnI <400 ng/L, there was no association between non-specific ECG changes and 30-day MACE (p=0.71). If the hs-cTnI was ≥400 ng/L there was an association with increased rates of 30-day MACE and nonspecific ECG findings (p=0.026).

Conclusion: In ED suspected ACS patients without STEMI or unstable ECG changes, and a hsTnI <400 ng/L, non-specific ECG findings have no association with 30-day adverse cardiac events. The use of non-specific ECG findings to affect disposition decisions should be reconsidered.

4 Impact of the SARS-CoV-2 Pandemic on Emergency Department Presentations in an Integrated Health System

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Study Objectives: We aimed to quantify the impact of the SARS-CoV-2 pandemic on emergency department (ED) volumes and patient presentations, and to evaluate changes in community mortality for the purpose of characterizing new patterns of emergency care utilization.

Methods: This is an observational cross-sectional study using electronic health records for ED visits in an integrated, multi-hospital system with academic and community practices across four states for visits between March 17 to April 21, 2019, and February 9 to April 21, 2020. We compared quantity and proportion of common and critical chief complaints and diagnoses, triage assessments, trauma activations, throughput, disposition, and hospital lengths-of-stay for selected diagnoses, and out-of-hospital deaths. Academic and community hospitals were evaluated separately and in combination for an overall picture of emergency department utilization.

Results: Compared to both the preceding four weeks (n=37,670), and the prior year (n=35,037), ED visits from March 17 to April 21, 2020 (n=18,646) decreased 49% and 53.2% respectively. The total numbers of patients diagnosed with myocardial infarctions (STEMI and Non-STEMI), stroke, appendicitis and cholecystitis all decreased by a similar percentage. While there were fewer visits for mental health (n=1104 in preceding weeks, n=1032 for year-prior, n=752 during pandemic), they made up a larger proportion of ED visits - 2.9% for both baselines and 4% during period of interest (p<.001 for both). Compared to both baselines, the percentages of traumas were similar; however, the absolute number of red (n= 35 during COVID; n=72, p<.001 peri-COVID; n=67, p=.002 pre-COVID) and yellow (p=.002 peri-COVID; p=.004 pre-COVID) declined overall, driven by a drop at academic centers by nearly 60% for red traumas and 50% for yellow. Mortality was considered a surrogate for delayed/deferred emergency care. Southern Minnesota Regional Medical Examiner's Office data showed an increase in natural deaths during the COVID period (n=250) versus pre-COVID (n=204) baseline (p=.037). Out-of-hospital mortality for natural (non-COVID-related) and non-natural deaths increased from 73 pre-COVID to 128 during the COVID period (p<.001). The significant increase in out-of-hospital mortality drives the overall mortality increase. There was an increase in deaths, driven by out-of-hospital mortality.

Conclusion: Fewer patients presenting with acute and time-sensitive diagnoses suggests that patients are deferring care, this may be further supported by an increase in out-of-hospital mortality as well as a lower number of patients presenting with complaints and diagnoses that would be expected to remain stable for a given population during the periods studied. Understanding which patients are deferring care

and why will allow us to develop outreach strategies and ensure that those in need of rapid assessment and treatment will continue to seek it, preventing downstream morbidity and mortality.

5 Burden of Out of Hospital Cardiac Arrest in New York City during the COVID-19 Pandemic

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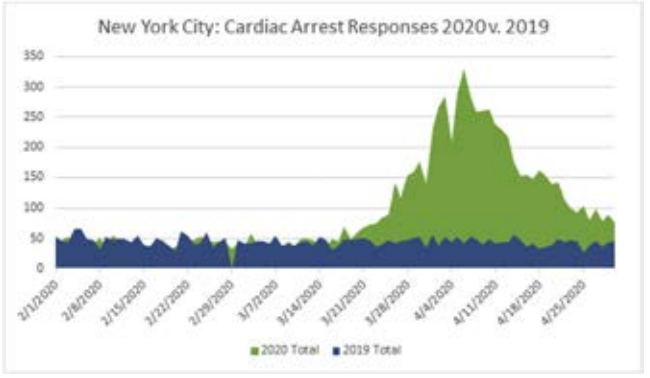
Study Objectives: As of June 10, 2020, there have been 17,300 confirmed and an additional 4,693 suspected COVID related-deaths in New York City (NYC). While much attention was given to the overwhelming burden on hospitals and skilled nursing facilities during the pandemic, it is less well known how the pandemic impacted EMS systems and rates of out-of-hospital cardiac arrest (OOHCA). The NYC Regional Emergency Medical Advisory Committee (REMAC) is responsible for oversight and quality in out-of-hospital care in NYC. This study's primary objective was to assess the burden of cardiac arrest in during the pandemic.

Methods: This observational study uses aggregate data from the New York City region collected through the National EMS Information System (NEMSIS). Daily counts of cardiac arrest incidents stratified by each of the five boroughs (geographical divisions) in NYC and by final disposition (eg, transported to the hospital or pronounced on scene) were obtained for the time periods of February 2020 through April 2020, and for the same time period in the final year. Descriptive statistics were used to describe and compare the daily counts of cardiac arrests and the proportion of patients pronounced in the field between the current year during the pandemic time period and the corresponding time period in 2019. This study was determined to be exempt by the Mount Sinai Institutional Review Board.

Results: In NYC during the COVID-19 pandemic, EMS experienced a 220% increase in cardiac arrest call responses in February - April, 2020 (8,837) compared to February - April, 2019 (4,022), peaking on April 6 at 330 cases in a single day. (See Figure 1). During this period, the Bronx experienced the highest rate of increase at 243% higher in 2020 compared to Queens (238% increase), Kings (231%), New York (184%) and Richmond (143%). For all of NYC, the rate of transport for OOHCA decreased during this time period from 37% in February-April 2019 to 16% in February-April 2020.

Conclusion: There was exponential growth of the rate of OOHCA during the initial phase of the pandemic in NYC and there was a sustained increase through the month April 2020. With a 220% increase in cases over the course of three months and over a 780% (42 to 330 cases) increase on the highest day of OOHCA, and in light of a concurrent burden on NYC hospitals, our EMS system experienced an unprecedented demand for critical care and resuscitation. Further studies are needed to better understand to what degree the increased in OOHCA was attributed to the disease itself, or due to delaying needed care for other conditions. In planning for future pandemics, strategic planning should include consideration of impacts on operations and capacity of the regional EMS system.



6 Lung Ultrasound versus Chest X-ray for the Diagnosis of COVID-19 Pneumonia

Gibbons RC, Mendez K, Magee M, Goett H, Murrett J, Genninger J, Tyner N, Zhao H, Gentile N, Costantino TG/Lewis Katz School of Medicine at Temple University, Philadelphia, PA

Study Objectives: The viral illness severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), more commonly known as coronavirus 2019 (COVID-19), has become a global pandemic infecting over 2 million individuals worldwide. Symptoms are often vague and physical exam findings have proven unreliable as indicators of infection. Therefore, diagnosis typically relies on imaging or nasopharyngeal swabs. The objective of this study was to compare point-of-care lung ultrasound (LUS) with chest x-ray (CXR) to determine which is the more accurate diagnostic imaging modality for diagnosing COVID-19 pneumonia.

Methods: This was a single-center, prospective, cohort study at an urban university hospital with >105,000 patient visits annually. Patients >18 years old, who presented to the emergency department (ED) with signs and symptoms of COVID-19, were eligible for enrollment. Each patient received a LUS, performed by an emergency medicine resident or emergency physician (EP), using a portable, handheld ultrasound and a portable AP CXR after the LUS was completed. High-risk patients or those with an abnormal imaging finding underwent a non-contrast-enhanced computed tomography (NCCT) as the diagnostic standard. The primary outcome was the sensitivity of LUS and of CXR at identifying COVID-19 pneumonia against NCCT as the reference standard. Using a power analysis of 80%, our sample size calculation of 98 patients was based on previous data demonstrating a 20% difference in sensitivities between LUS and CXR at diagnosing pneumonia. Data are presented as proportions with 95% confidence intervals (CIs). Data analysis included the chi-square and t tests.

Results: 143 consecutive patients with signs and symptoms of COVID-19 were approached and enrolled. 27 patients were considered low risk by the attending EP per ED guidelines, and 6 patients were admitted for alternate diagnoses without advanced imaging. 110 patients underwent LUS, CXR, and NCCT. 99 LUS and 73 CXRs were interpreted as positive. 81 NCCT were interpreted as positive providing a prevalence of COVID-19 pneumonia of 75% (95% CI 66.0-83.2) in our study population. Sensitivity of LUS was 97.6% (95% CI 91.6-99.7) vs 69.9% (95% CI 58.8-79.5) for CXR. Specificity was 33.3% (95% CI 16.5-54.0) for LUS and 44.4% (95% CI 25.5-64.7) for CXR. LUS positive and negative likelihood ratios were 1.46 (95% CI 1.12-1.92) and 0.0723 (95% CI 0.01-0.31), respectively vs 1.26 (95% CI 0.87-1.81) and 0.67 (95% CI 0.39-1.16) for CXR. PPV and NPV for LUS were 81.8% (95% CI 72.8-88.9) and 81.8% (95% CI 48.2-97.7) compared to 79.5% (95% CI 68.4-88.0) and 32.4% (95% CI 18.0-49.8) for CXR.

Conclusions: LUS was more sensitive than CXR at identifying COVID-19 pneumonia. LUS using a portable, handheld ultrasound can be a valuable triage screening modality for patients with suspected COVID-19 pneumonia in diverse clinical settings.

7 Failure Rates during Reuse of Disposable N95 Masks in Clinical Practice in the Emergency Department

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Study Objectives: The COVID-19 pandemic caused a worldwide shortage of personal protective equipment, specifically disposable N95 respirators, prompting health care entities to extend the use of these masks beyond their intended single-use manufacturer recommendation with a paucity of supporting research. We sought to explore the failure rate when reusing single-use N95 respirators through repeated fit testing in an emergency department (ED).

Methods: We performed a prospective cohort study of ED personnel ("subjects") required to use respirators at an academic, level one trauma center. All investigators performing fit testing reviewed OSHA qualitative fit test guidelines and training and were familiar with the testing protocol. All subjects had been previously fit tested and assigned an appropriately sized N95 mask by employee health per hospital protocol. Subjects who failed initial fit testing and those who declined to participate were excluded. Per study protocol, subjects were fit tested periodically throughout their

shifts and on multiple shifts over the 8-week study period. Data points collected included the age of the mask, subjective assessment of mask seal quality, and fit test results. The data was analyzed using Fisher's exact test, and odds ratios were calculated to determine the failure rate of disposable N95 masks following reuse. The study was approved by the Institutional Review Board.

Results: One hundred thirteen disposable N95 masks were evaluated. Twenty-eight masks were in their first day of use (3 failures), 29 were in their 2nd day of use (2 failures), 26 were in their 3rd day of use (9 failures), 11 were in their 4th day of use (5 failures) and 21 were in their 5th or greater day of use (10 failures). Categorizing the masks into those being used for 2 or fewer days versus those being used for 3 or more, the odds ratio for mask failure with an older mask was 7.1 (confidence interval 2.5-20, $p<0.0001$), with younger masks failing 9% of the time and older masks failing 41% of the time.

Conclusion: Disposable N95 masks have significant failure rates following reuse in clinical practice.

8 Emergency Physician COVID-19 Readiness and Practices

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Study Objectives: The purpose of this survey study was to assess the working environment of emergency physicians (EPs) early in the Corona Virus Disease 2019 (COVID-19) pandemic. Areas of interest included access to appropriate personal protective equipment (PPE), hospital policy, personal effects of the pandemic on EPs, and how the pandemic has changed their individual practices.

Methods: An anonymous Survey Monkey survey for all practicing EPs was released on an EPs social medial group in mid-April 2020. The survey consisted of 15 questions covering demographics, hospital policies and work environment, individual physician concerns and changes in practice and habits.

Results: 220 emergency physicians responded to the survey with 209 complete submissions.

Demographics: 41 of 50 states, Puerto Rico, and Canada had at least one response. Almost one-third have been in practice for either 5-9 years and 10-19 years post-residency each. More than half work in a community hospital (58%) and approximately one-third work at a tertiary or regional medical center. There was a wide spread in the number of ICU beds at their facility on a scale of 0-50 in increments of 10.

Hospital Policy: Although the vast majority report isolated COVID-19 areas and limited visitors, nearly 15% reported that their site did not have any current plans to create an isolated area. About half reported a hospital policy requiring N95 respirators in COVID-19 positive or suspected rooms although a quarter of those also included wearing N95 respirators in all patient rooms (N95s). Other common policies included universal masking and N95s for high risk or aerosolizing procedures only.

PPE: N95s and surgical masks were the most commonly provided PPE. 86% were concerned about short term shortages or were already facing shortages. More than half reported access to a powered air-purifying respirator (PAPR). N95s were the most likely to run out (82%) followed by gowns (60%) and surgical masks (42%). Most purchased at least one item of PPE (86%).

Individual Practices: Three-quarters report not self-quarantining at home, although almost all (98%) have added steps to reduce risk of bringing contaminants home. Removing shoes and work clothes prior to entering the home (86%) and immediately showering upon arriving home (88%) were the most common practices followed by showering and/or changing at the hospital (45%). Other responses included cleaning or separating personal work items, temporarily living in a separate location, or limiting contact with others in the household. The majority were concerned about transmitting COVID-19 to low and/or high-risk friends or family members (74% and 72%, respectively). Almost one-quarter were high risk and were concerned about becoming ill. More than half were concerned about the personal financial impact of the pandemic.

Conclusion: One month after COVID-19 was declared a pandemic by the World Health Organization and a national emergency by the United States we surveyed emergency physicians, COVID-related policy changes, supply chains, and personal effects. At that time most hospitals had enacted policies regarding PPE use, created isolated COVID areas, and limited visitors. Most EPs had concerns regarding immediate and short-term inadequate PPE supplies and have bought at least one PPE item to use at work. Very few emergency physicians reported no concerns regarding personal risks of contracting or transmitting COVID.

9 Using Home-Based Community Paramedics to Reduce Emergency Department Utilization by High-Risk Elder Patients

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Study Objectives: Using paramedics to evaluate and treat patients in the home setting could have wide-reaching implications for patient satisfaction, health management, cost of care and patient safety in many populations, including homebound older adults. Such programs combine a comprehensive geriatric assessment by a clinician during a home visit with referrals to community providers and health plan resources to address uncovered issues.

The objective was to determine the effect of a home-based community paramedicine program (HBPC) on hospital utilization by elderly patients with high acuity conditions. We sought to test the hypothesis that HBPC could significantly reduce transport to the emergency department (ED) compared to a conventional 911 system.

Methods: This was a retrospective cohort analysis of elderly patients (>65 years) who triggered emergency medical services (EMS) dispatch with urgent medical calls over a 6-month study period within the Grand Rapids metropolitan area. HBPC members were compared to non-members (control group) in terms of demographics, Charlson Comorbidity Index (CCI), presenting complaints, out-of-hospital inventions, transport to the emergency department (ED), length of hospital stay (LOS) and 12-month medical costs. Chi-squared and t-tests were used to compare the two study groups across key demographic and outcome variables.

Results: During the study period, there were 3,904 EMS calls from elderly patients with high acuity conditions. The average age was 79.4 + 9.7; 57.3% were female. A total of 969 calls (24.8%) were from HBPC members; 2935 (75.2%) were controls. The two study groups were comparable in terms of demographics, acuity level, CCI scores, and insurance plans. HBPC members had a significantly greater incidence of cardiopulmonary complaints (20.3% vs 13.5%), weakness/dehydration (20.1% vs 10.1%), and abdominal pain (7.5% vs 3.7%), but fewer complaints of trauma (2.8% vs 20.6%) and altered mental status (3.8% vs 7.0%). Overall, 15.0% of HBPC members were transported to the hospital compared to 73.0% of controls ($p<0.001$). The mean hospital admission rate in HBPC members transported to the hospital was 38.6% with a LOS of 4.7 days. Admission rates in control patients was 59.3% with a LOS of 6.2 days ($p<0.001$). In 2019 dollars, the HBPC program reduced the total cost of care to the average member by $3,292 annually.

Conclusion: Our home-based community paramedicine program was started as a solution for at-risk seniors who have difficulty navigating the health care system to get the care they need and maintaining their independence at home. These results suggest that the HBCP program significantly reduces health care costs while enabling most frail elders to avoid ED visits and prolonged hospitalization.

10 Efficacy and Safety of Ciraparantag in Reversing Apixaban and Rivaroxaban as Measured by Whole Blood Clotting Time in Healthy Adults

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Study Objectives: There is an unmet need for agents that can rapidly reverse the effects of the direct oral anticoagulants (DOACs) in emergency settings. Ciraparantag, an anticoagulant reversal agent with broad activity, binds directly to anticoagulant molecules including DOACs, enoxaparin and unfractionated heparin, without binding to endogenous coagulation factors or other plasma proteins. Ciraparantag has been shown to reverse anticoagulation in healthy volunteers treated with edoxaban and enoxaparin, as measured by whole blood clotting time (WBCT). Two Phase 2 studies evaluated the efficacy (measured by WBCT) and safety of ciraparantag for reversal of anticoagulation induced by apixaban or rivaroxaban in healthy adults.

Methods: Two randomized, placebo-controlled, dose-ranging studies were conducted in healthy subjects 50-75 years of age. In each study, subjects received anticoagulant (apixaban or rivaroxaban) until steady state. Study 1 subjects received apixaban 10 mg orally twice daily for 3.5 days. Study 2 subjects received rivaroxaban 20 mg orally once daily for 3 days. In both studies, subjects at steady-state anticoagulation were randomized 3:1 to a single IV dose of ciraparantag (Study 1: 30,

60, or 120 mg; Study 2: 30, 60, 120 or 180 mg) or placebo. Efficacy was based on manual WBCT at multiple timepoints over 24 hours. Subjects and technicians performing the WBCT testing were blinded to treatment.

Results: In Study 1, 49 subjects were randomized to receive study drug (36 ciraparantag, 13 placebo) and completed the study as planned. In Study 2, 64 subjects were randomized to receive study drug (48 ciraparantag, 16 placebo) and all but one subject (who had an unrelated adverse event) completed the study as planned. In both studies, ciraparantag demonstrated a rapid (within 15 minutes after infusion) and dose-dependent reversal of anticoagulation compared with placebo. In both studies, analysis of least squares mean WBCT values showed statistically significant differences between each ciraparantag group and placebo. Among subjects who were anticoagulated, reversal of WBCT to $\leq$10% of baseline within 1 hour post-dose and sustained through at least 5 hours was observed in 67%, 100%, 100% with escalating doses of apixaban, and 17% of placebo subjects; and in 58%, 75%, 67% and 100% with escalating dose of rivaroxaban and 13% of placebo subjects. Ciraparantag was well tolerated; the most common adverse events were mild, transient sensations of warmth (typically reported as hot flashes or flushing), which were dose related.

Conclusion: Ciraparantag, after a single IV dose, resulted in a dose-dependent reversal of the anticoagulant effect induced by steady-state dosing of apixaban or rivaroxaban in healthy subjects, as determined by manual WBCT testing. The effect was sustained through at least 5 hours after dosing, and ciraparantag was well tolerated.

11 Identifying Race and Sex-Based Discrepancies in Pain Management Practices in the Emergency Department

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Study Objectives: Pain management is important in the care of patients in the Emergency Department (ED). The clinical decision-making process, when it comes to prescribing medications, is complicated by the subjective nature of pain. Prior research has shown that minorities have not had their pain managed as aggressively as white patients. The objective of this study was to examine potential differences in pain management between white and non-white patients in a large health care system.

Methods: This study was a retrospective cohort study of all adult patients who presented to one of twenty EDs within the hospital system between January 2018 and December 2018 and were discharged from the ED with a diagnosis of undifferentiated abdominal pain. Patient reported pain was categorized as mild, moderate, and severe. Narcotic pain administration was evaluated. Covariates evaluated were race, sex, and insurance status. Categorical variables are described using frequencies and percentages and differences between groups were tested using Pearson chi-squared tests. Continuous variables are presented as mean and standard deviation and differences between groups were determined using t-tests.

Results: A total of 32,676 patients were included in the study. Narcotic administration was found to be twice as likely to be given to white patients with undifferentiated abdominal pain (22%) in comparison to non-white patients 12% ($p<0.0001$). In addition, this difference in pain management between white and non-white patients was prevalent for all pain scores: mild (9.92% v 3.48%), moderate (17% v13.9%), severe (28.62% v 21.64%) ($p<0.0001$). In addition, the study found that women (16.99%) were prescribed narcotics at a decreased rate when compared to their male (19.41%) counterparts for diagnosis of undifferentiated abdominal pain ($p<0.0001$).

Conclusions: Differences in pain management between white and non-white patients have been examined in previous studies. Our study is one of the largest evaluating differences in pain management and racial bias. We confirmed that race and sex-based differences exist in ED narcotic pain management. With these differences, additional studies should further investigate this discrepancy.

12 The Burden of Major Bleeds among Atrial Fibrillation Patients Treated With Direct-acting Oral Anticoagulants in the United States

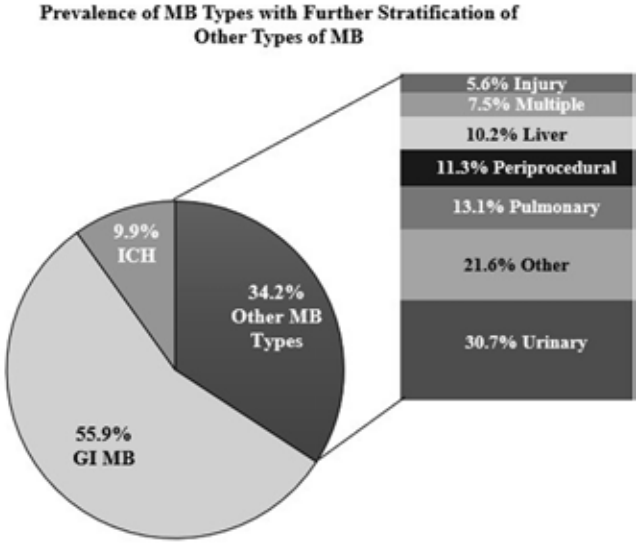
Fermann GJ, Lovelace B, McNeil-Posey K, Lingohr-Smith M, Lin J, Deitelzweig SB/University of Cincinnati, Cincinnati, OH; Portola Pharmaceuticals, South San Francisco, CA; Novosys Health, Green Brook, NJ; University of Queensland and Ochsner Clinical School, New Orleans, LA

Study objectives: Use of direct-acting oral anticoagulants (DOACs) to reduce stroke risk of patients with atrial fibrillation (AF) is becoming more widespread in the US. While efficacious for stroke risk reduction, patients have an increased risk for bleeding while taking DOACs. The objective of this study was to determine the extent of the health care burden of AF patients treated with DOACs who are hospitalized for a major bleed (MB) with stratification by the type of MB.

Methods: Adult patients treated with DOACs (rivaroxaban, apixaban, or edoxaban) who were hospitalized for a MB (Jan 1, 2015-Apr 30, 2018) were identified from claims in the MarketScan databases. The index date was defined as the first MB inpatient hospitalization. Patients were grouped into 3 study cohorts based on the type of MB: gastrointestinal (GI), intracranial hemorrhage (ICH), and other MB types. Health care resource utilization and costs were evaluated for index MB hospitalizations and during the 6-month period prior to the index event and a variable follow-up period (1-12 months). Costs were adjusted to 2019 United States Dollar and annualized.

Results: Of the AF patients treated with DOACs who had a hospitalization for an MB (N=7,577), 55.9% had a GI MB (N=4,236; mean age: 76.8 years; 48% female), 34.2% had other types of MB (N=2,588; mean age: 74.4 years; 39% female), and 9.9% had ICH (N=753; mean age: 77.9 years; 42% female) (Figure). For index MB hospitalizations, the mean length of stay was longest for patients with ICH at 6.8 days; patients with other types of MB spent a mean of 5.5 days in the hospital and those with GI MB spent a mean of 5.0 days ($p<0.001$); correspondingly, mean index hospitalization cost was also highest for ICH patients ($54,163), followed by those with other types of MB ($36,645) and those with GI MB ($26,901) ($p<0.001$). During the follow-up period, patients who had been hospitalized for ICH spent more days in the hospital for all causes than patients hospitalized for other types of MB or GI MB (12.7 vs. 7.4. vs. 7.1 days, respectively, $p<0.001$). Also, patients with ICH had the highest all-cause health care costs (inpatient + outpatient medical + outpatient pharmacy) during the follow-up period, followed by those with other types of MB, and those with GI MB: $95,879 vs. $86,909 vs. $76,131, respectively, per patient per year, $p<0.001$).

Conclusions: In this study of 7,577 AF patients who were treated with DOACs and hospitalized for an MB, hospitalization costs were high for all MB types; however, they were highest for ICH. The health care economic burden of patients hospitalized for an MB was not only present initially but extended into the time period following hospitalization. The findings of this study suggest that the initial management and follow-up care of patients with MB events is resource intensive, especially those who have ICH.



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13 Transesophageal Echocardiography May Improve Cerebral Perfusion Compared to Transthoracic Echocardiography in Out of Hospital Cardiac Arrest

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Study Objectives: Despite advances in care, only 10% of patients sustaining out of hospital cardiac arrest (OOHCA) have a good neurological outcome. Transesophageal echocardiography (TEE) is an emerging modality utilized by emergency physicians for the treatment of cardiac arrest, however there is a lack of evidence to support its broad implementation. Prior data suggests TEE decreases pulse check duration compared to transthoracic echocardiography (TTE). Shorter pulse check duration has been associated with increased survival rates. As such, TEE might improve patient-centered outcomes by minimizing decreases in coronary and cerebral perfusion pressure associated with prolonged cardiopulmonary resuscitation (CPR) interruptions. Meanwhile, change in regional cerebral perfusion (rSO2) has been shown to predict survival and cerebral performance category (CPC) at discharge, therefore functioning as a surrogate for a patient-centered outcome in OOHCA. In this exploratory retrospective study, we sought to test the difference in the change of rSO2 in the same patients who received CPR with both TTE and TEE.

Methods: We previously developed a prospective, observational, cardiac arrest registry and recorded regional cerebral tissue oximetry values (rSO2) during the course of the arrest. Data was collected from January 2017 to June 2018. During this time period, but unrelated to the conduct of this registry, our department transitioned from the use of TTE to TEE for the monitoring of ongoing cardiac arrest resuscitation. In this secondary analysis of this registry, all subjects presenting primarily to our department with OOHCA were included if they arrived receiving CPR and had 10 minutes or more of CPR. Patients were excluded if they were less than 18 years old, had missing rSO2 data, or did not have both TTE and TEE performed during ongoing CPR. The primary outcome was the difference in means of maximal percent rSO2 increase between TTE and TEE. The mean for TTE was calculated by dividing the maximum rSO2 during TTE use by the value at the beginning of the case. The mean for TEE was calculated by dividing the maximum rSO2 during TEE use by the value at the beginning of the case. As each patient served as their own control, a two-sided paired t-test was conducted with a $p<0.05$ considered significant.

Results: 170 patients with OOHCA were included in the registry and 73 had at least 10 minutes of CPR. One child and 58 patients with either missing rSO2 or TEE data were excluded, leaving fourteen patients in the analysis. The mean age was 62 and 86% were men. Six patients survived to admission and one survived to hospital discharge. Mean time from case start to TEE placement with image acquisition was 12 minutes (SD 5.8) with a range of 4-26 minutes. Prior to TEE placement (when a TTE was being used), the maximum rSO2 percent increase was 109% (SD 12%). The maximum rSO2 percent increase after TEE placement was 120% (SD 22%). TEE was marginally higher than TTE for percent increase in rSO2 with a difference of 10.85% (CI -1.75 - 23.45, p=0.086).

Conclusion: In this retrospective analysis of a cardiac arrest database, we found that using TEE during resuscitation may increase cerebral tissue perfusion as measured by percent increase in rSO2. These findings are limited by the study's retrospective nature, small sample size, variability of time between arrival to TEE image acquisition and insufficient data to assess patient-centered outcomes. Findings are hypothesis generating and warrant further study in a prospective observational manner.

14 Validation of a Prediction Rule for Adverse Cardiovascular Events from Drug Overdose

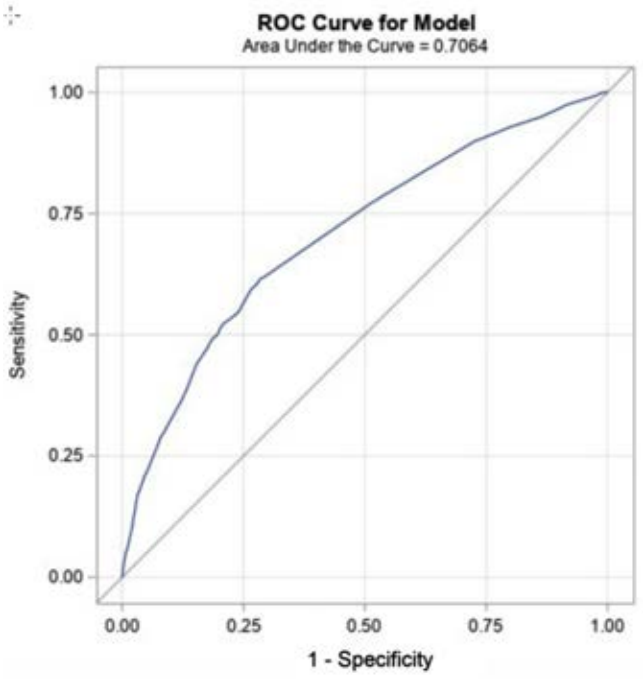
Manini AF, Brent J, Campleman S, Judge BS, Kao L, Loo G, Pizon AF, Ruha A, Wiegand T, Wax P, Toxicology Investigators Consortium (ToxIC) Study Group/Icahn School of Medicine at Mount Sinai, New York, NY; University of Colorado, School of Medicine, Aurora, CO; American College of Medical Toxicology, Phoenix, AZ; Spectrum Health, Grand Rapids, MI; Indiana University Health, Indianapolis, IN; Icahn School of Medicine at Mount Sinai, New York, NY; University of Pittsburgh Medical Center, Pittsburgh, PA; Banner Health, University Medical Center, Phoenix, AZ; University of Rochester Medical Center, Rochester, NY; University of Texas Southwestern Medical Center, Dallas, TX

Study Objectives: Adverse cardiovascular events (ACVE) complicate > 16% of hospitalizations for acute drug overdose. Previously a risk prediction rule was derived for risk assessment of in-hospital ACVE in acute drug overdose patients, with >97% negative predictive value (NPV). Our aim was to externally validate the ACVE rule.

Methods: This prospective cohort study was conducted over three years (2017-2019) using the Toxicology Investigators Consortium (ToxIC) at over 65 U.S. hospitals in 35 major cities nationwide. Adult (>18y) emergency department (ED) patients at participating institutions receiving bedside medical toxicology consultation for suspected acute drug overdose were screened for inclusion, and excluded for the following: non-drug overdose (eg, caustic), chronic toxicity, international sites, alternate diagnosis (according to the attending medical toxicologist), and missing data. The composite study outcome, ACVE, has previously been defined as any of the following: myocardial injury (elevated cardiac troponin I), shock (requiring vasopressors), ventricular dysrhythmia (VT/VF/TdP), or cardiac arrest (pulselessness requiring CPR). The risk prediction rule included any of these 3 factors: (1) any prior cardiac disease (CAD or CHF); (2) initial QTc $\geq$ 500ms; (3) initial serum bicarbonate $\leq$ 20 mmol/L. Sample size was predetermined in order to calculate NPV with 95% confidence interval (CI) widths <2%; we calculated the need to analyze 5,000 patients.

Results: There were 21,793 patients screened, of whom 13,874 were excluded (6499 pediatrics, 4658 non-drug overdose, 1976 chronic, 574 international, 118 alternate diagnosis, 46 non-ED, 3 missing data), leaving 7919 for analysis (mean age, 39.1 years; female, 50.3%; suicidal, 27.7%). ACVE occurred in 845 (10.7%, CI 10.0-11.4) patients (myocardial injury, 348; shock, 529; dysrhythmia, 81; cardiac arrests, 183), 14.0% of hospitalizations/admissions (622/4441, CI 13.0-15.1), and there were 131 deaths (1.7%, CI 1.4-2.0). The multivariable model adjusting for the previously derived risk factors, controlling for age, confirmed the following independent predictors of ACVE: QTc $\geq$500 msec (OR 2.6, $p<0.001$), bicarbonate $\leq$20 mmol/L (OR 3.3, $p<0.001$), and prior cardiac disease (OR 2.3, $p<0.001$). Prediction rule performance in 5500 patients with documentation of all 3 factors was the following: 61.4% sensitivity (CI 57.5-65.3), 78.8% specificity (CI 77.7-79.8), and 95.4% negative predictive value (CI 95.0-95.9). Prediction rule receiver operating curve performance is illustrated in the Figure. The presence of 2+ risk factors was 96.4% specific with an LR+ of 4.33 (CI 3.5-5.4) and 5.8-fold increased odds of ACVE ($p<0.001$).

Conclusion: We have externally validated the previously-derived risk prediction rule for ACVE, with all components of the rule remaining independently predictive of ACVE. The validation cohort had comparable ACVE incidence to previous reports. The rule performed with similar sensitivity and NPV to the derivation cohort. Clinical application of the rule to ED patients may aid intensive care unit triage and medical clearance. Implementation science studies are warranted for incorporation into clinical practice.



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15 The Efficacy of Skeletal Muscle Relaxants in Emergency Department Patients With Low Back Pain

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Study Objectives: Low back pain (LBP) causes 2.6 million visits to US emergency departments (ED) annually. These patients are often treated with skeletal muscle relaxants. The goal of this study was to determine the most efficacious skeletal muscle relaxant and whether medication efficacy was associated with age, sex, or baseline severity.

Methods: This was a planned analysis of data from four randomized placebo controlled studies of patients with acute, nontraumatic, nonradicular LBP conducted in the same setting. In all four studies, patients were enrolled during an ED visit and followed up by telephone 1 week later. The primary outcome was improvement in the Roland-Morris Disability Questionnaire (RMDQ) between ED discharge and the 1-week follow-up. The RMDQ is a 24-item questionnaire commonly used to measure LBP and related functional impairment on which 0 indicates no functional impairment and 24 indicates maximum impairment. A 5-point improvement on this scale is generally considered a clinically significant improvement. The analysis of the primary outcome consisted of comparisons of the change in RMDQ between baseline and 1 week follow-up among 8 groups: 1) placebo, 2) baclofen, 3) metaxalone, 4) tizanidine, 5) diazepam, 6) orphenadrine, 7) methocarbamol and 8) cyclobenzaprine. All patients were also treated with an NSAID. We performed an ANOVA to determine the statistical relevance of the between group differences. To determine the association of age, sex, and baseline severity with the primary outcome, we conducted a linear regression model, in which the relative improvement in RMDQ ((baseline RMDQ - RMDQ 1 week)/baseline RMDQ) was the dependent variable and medication, age, sex, and baseline RMDQ were the independent variables.

Results: A total of 889 patients were enrolled. Of these, 858 (96.5%) provided one-week outcome data. The mean improvement in RMDQ for each group was: 1) placebo: 10.5 (95% CI: 9.5-11.5), 2) baclofen: 10.6 (95% CI: 8.6-12.7), 3) metaxalone: 10.1 (95% CI: 8-12.3), 4) tizanidine: 11.2 (95% CI: 9.2-13.2), 5) diazepam: 11.2 (95% CI: 9-13.2), 6) orphenadrine: 9.5 (95% CI: 7.4-11.5), 7) methocarbamol: 8.1 (95% CI: 6.1-10.1), 8) cyclobenzaprine: 10.1 (95% CI: 9.6-10.8). The between-group differences achieved neither clinical nor statistical significance. Results were similar regardless of age and sex. Baseline RMDQ was associated with clinical improvement with a β coefficient of 0.10 ($p=0.03$), indicating that more severely impaired patients were more likely to improve.

Conclusion: Among ED patients with LBP who are treated with an NSAID, SMRs do not improve outcomes more than placebo. Neither age nor sex impacts these results. Worse baseline impairment was associated with greater improvement at one week follow-up.

16 Adverse Interaction Medications Administered to Warfarin-Anticoagulated Patients in the Emergency Department

Vilke GM, Castillo EM, Kreshak AA, Cronin AO, Ruiz PN/University of California San Diego, San Diego, CA

Study Objectives: As there are a large number of patients anticoagulated with warfarin who present to emergency departments (ED) for various medical complaints, there is an innate increased risk of numerous adverse drug-drug interactions (ADDI). This study sought to identify the rate at which potentially adversely interacting medications were administered to warfarin-anticoagulated patients during a given ED visit.

Methods: This was a multi-center retrospective chart review of the all adult visits to two EDs in San Diego County over a 48-month time period. All warfarin-anticoagulated adults administered any of the top 33 potentially adversely interacting medications during their ED visit were included. Descriptive statistics of demographic and clinical characteristics including the number of patients administered more than one interacting medication in the ED and the number of patients with a subsequent follow-up visit within the next 14 days are reported.

Results: In the study period, 2,587 warfarin-anticoagulated patients had 6,322 ED visits. Of those visits, 1,385 (21.9%) resulted in the administration of one of the top 33 potentially adversely interacting medications. Of those visits where one of the top 33 adversely interacting medications was administered, 119 (8.6%) had subsequent ED return visit within 14 days. The most commonly administered medications in the ED included aspirin (12.9%), ciprofloxacin (9.9%), trimethoprim/sulfamethoxazole (8.7%), ibuprofen (7.6%) and prednisone (7.6%). Of those given ciprofloxacin, trimethoprim/sulfamethoxazole and prednisone, 78%, 70% and 71% were sent home with a prescription with the same medication, respectively.

Conclusion: Warfarin-anticoagulated patients presenting to the ED are at increased risk of being administered or prescribed a potentially adversely interacting drug. Best practice alerts (BPA) may be a useful tool in mitigating this risk for the described patient population but further studies characterizing the extent of the risk or severity of adverse prescription reactions are needed while addressing the risk of BPA fatigue.

17 A Randomized Study of Greater Occipital Nerve Block With Bupivacaine versus Intravenous Metoclopramide for Acute Migraine

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Study Objectives: Greater occipital nerve blocks (GONB) are used increasingly to treat acute migraine. We conducted a randomized controlled trial to determine whether GONB was as effective as intravenous metoclopramide for acute migraine.

Methods: This was a double-dummy, non-inferiority study conducted in two emergency departments (ED). Patients with acute migraine of moderate or severe intensity were randomized to receive bilateral GONB with each side administered bupivacaine 0.5%, 3mL, or metoclopramide 10mg IV, the putative standard of care. The primary outcome was improvement in pain on a 0-10 scale between time 0 and one hour later. To reject the null hypothesis that metoclopramide would be more efficacious in relieving pain, we required that the lower limit of the 95% CI for the difference in pain improvement between those randomized to GONB versus those randomized to metoclopramide be greater than -1.3, a validated minimum clinically important difference. Secondary outcomes included sustained headache relief, defined as achieving and maintaining for 48 hours a headache level of mild or none, and use of rescue medication in the ED.

Results: Over a 2.5 year study period, 1358 patients were screened for participation and 99 were randomized, 51 to GONB and 48 to metoclopramide. Baseline characteristics were comparable between the groups. Patients who received the GONB reported mean improvement of 5.0 (95% CI: 4.1, 5.8) while those who received metoclopramide reported a larger mean improvement of 6.1 (95% CI: 5.2, 6.9). The 95% CI for the between group difference of -1.1 was -2.3, 0.1. Sustained headache relief was reported by 11/51 (22%) GONB and 18/47 (38%) metoclopramide patients (95% CI for rounded difference of 17%: -1, 35%). Of the 51 GONB patients, 17 (33%) required rescue medication in the ED versus 8/48 (17%) metoclopramide patients (95% CI for rounded difference of 17%: 0, 33%). An adverse event was reported by 16/51 (31%) GONB patients and 18/48 (38%) metoclopramide patients (95% CI for (rounded) difference of 6%: -13, 25%).

Conclusion: GONB with bupivacaine was not as efficacious as IV metoclopramide for the first-line treatment of acute migraine in the ED.

18 Withdrawn

19 Factors Associated with County-Level SARS-CoV-2 Testing Volume in Nine States

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Study Objectives: Rigorous SARS-CoV-2 testing is an important public health measure as it leads not only to early identification and prevention of transmission, but also to optimization of emergency care and resource allocation. Yet, the US has experienced a significant burden of illness, with reports suggesting a disproportionate amount falling on racial/ethnic minorities. Despite the public health importance, little is known about the discrepancies in the testing rate by region and race/ethnicity. In this context, we investigated the differences in and factors associated with per capita testing volumes.

Methods: This is an analysis of population-based data of nine racially/ethnically and geographically diverse states (AL, AZ, DE, FL, IN, NV, OR, TN, TX). We analyzed county-level testing data reported by state health departments and sociodemographic data reported by the U.S. Census Bureau. All data are as of June 7, 2020. The outcome was the number of SARS-CoV-2 testing (PCR and/or serology) per 1,000 individuals at the county-level. To identify factors associated with outcome,

Table. Characteristics of Nine U.S. States

State	Number of Counties, n	Tests Per 1,000, Median (IQR)	Deaths Per 1,000, Median (IQR)	Household Income ($), mean (SD)	Non-Hispanic White (%), Median (IQR)	Non-Hispanic Black (%), Median (IQR)	Hispanic (%), Median (IQR)
Alabama	67	41 (35-54)	0.08 (0.02-0.21)	57,311 (11,084)	69.0 (53.4-80.5)	22.7 (11.1-42.6)	2.5 (1.6-3.9)
Arizona	15	46 (30-58)	0.07 (0.00-0.20)	62,191 (10,742)	54.1 (44.3-57.5)	1.2 (0.7-2.7)	29.9 (15.3-36.2)
Delaware	3	54 (51-78)	0.36 (0.34-0.48)	82,986 (9,856)	62.2 (60.2-68.6)	24.3 (18.3-24.4)	9.1 (8.1-9.4)
Florida	67	47 (41-55)	0.06 (0.03-0.13)	67,593 (14,754)	72.0 (60.2-77.3)	11.0 (8.2-17.7)	9.4 (5.7-19.1)
Indiana	92	31 (24-39)	0.12 (0.03-0.35)	67,588 (11,353)	93.5 (88.0-95.5)	1.0 (0.5-2.9)	2.9 (1.7-4.8)
Nevada	17	38 (19-63)	0.00 (0.00-0.05)	71,692 (13,030)	72.2 (65.6-79.1)	1.7 (0.6-2.5)	16.6 (12.5-24.2)
Oregon	36	30 (25-35)	0.00 (0.00-0.03)	67,558 (12,403)	84.6 (76.7-87.6)	0.6 (0.4-0.9)	8.6 (6.4-14.2)
Tennessee	95	46 (36-59)	0.00 (0.00-0.04)	60,840 (12,869)	90.1 (84.6-93.4)	3.4 (1.4-8.2)	2.6 (1.9-4.3)
Texas	254	15 (9-25)	0.00 (0.00-0.05)	68,689 (14,324)	58.8 (41.9-73.1)	3.6 (0.9-8.9)	26.6 (18.1-50.2)

we fit a multivariable Poisson regression model including states, county-level death rate, mean household income, and proportion of major races/ethnicities.

Results: We examined data from 646 counties from nine states. The median rate of SARS-CoV-2 testing per 1,000 individuals differed widely, ranging from 15 in Texas to 54 in Delaware (Table). The multivariable model identified factors significantly associated with the rate of testing—state, death rate per 1,000, % non-Hispanic white, % non-Hispanic black, and % Hispanic (all $P<0.05$). For example, compared to Texas, higher testing rates were observed in Delaware (rate ratio [RR], 2.47) and Tennessee (RR, 2.92). In contrast, the magnitude of race/ethnicity-outcome association was smaller—eg, RR of 0.96 per 10% increase in non-Hispanic black and 0.85 per 10% increase in Hispanic demographics.

Conclusions: There were significant between-state differences in the SARS-CoV-2 testing rate. Counties with a higher proportion of race/ethnicity minorities had significantly lower testing rates while their magnitude of association was relatively small. Our findings should facilitate further investigations into the reasons for discrepancies, which will, in turn, optimize prevention and treatment strategies against this public health emergency.

20 Screening for Substance Use in the Pediatric Emergency Department: Lowering Thresholds to Enhance Reach

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Study Objectives: Substance use is common among adolescents, with 80% of 12th graders reporting alcohol use and 21% reporting marijuana use. Adolescent Screening, Brief Intervention, and Referral to Treatment (SBIRT) utilizes the CRAFFT Screening tool to risk stratify substance use among adolescent patients. While the CRAFFT was initially validated for identifying a substance use disorder (SUD) in adolescent patients in an ambulatory setting, a study of CRAFFT in an emergency department (ED) setting found that a lower score was indicative of problematic use over a three-year follow up period. Our objective was adapt the CRAFFT tool to identify and address any substance use among adolescents in the ED, not just high-risk substance use.

Methods: A team-based adolescent SBIRT program was implemented in a Pediatric ED in January 2018. The CRAFFT screening tool was programmed into the electronic health record (EHR) for patients ages 12-17, and was completed at each visit by either the patient's primary nurse, physician, and/or advanced clinical provider. ED Team Members follow up with patients who screen positive, to provide brief interventions and referrals to treatment, as indicated by screening score and patient/family interest. A "Positive" CRAFFT is a score of 2+, which correlates to two "Yes" responses on Part B. A "Positive CRAFFT" has a sensitivity of 76% and specificity of 94% for identifying any substance problem according to DSM-IV criteria. For clinical workflow, we consider "Positive" if there is any "Yes" response in Part A, as opposed to standard practice of two "Yes" responses in Part B.

Results: From January 2018 to October 2019, 8,694 of 24,057 (36.1%) patients ages 12-17 were screened using the CRAFFT. 1,260 (14.4%) of patients screened responded "Yes" to at least one question in Part A. Of those, Part B questions were asked of 1,066 (84.6%) patients and 334 (26.5%) had at least two "Yes" responses. The substance use most frequently reported was marijuana (9% in 2018, 11% in 2019) followed by alcohol (8% in 2018, 7% in 2019). Based on the clinical protocol and patient identification, 377 brief interventions and 29 referrals to treatment were provided. Brief interventions and referrals were provided by both physicians and social workers, including at least 12 different individual health care professionals.

Conclusion: Utilizing a lower threshold for a "positive" screen identified four times (1,260 vs. 334) as many patients with moderate to high risk substance use for a further conversation with the clinical team, especially given that Part B were not asked of all patients with a "Yes" in Part A. One limitation is that the version of the CRAFFT programmed into the EHR does not specifically ask about vaping and may not have been sensitive enough to capture adolescent patients who are vaping THC or other substances. Next steps include updating to the CRAFFT version 2.1+N to better identify and address vaping, expand the program to the adolescent populations in 16 additional EDs, and expand the program to pediatric ambulatory practices.

21 Monitoring the Incidence of COVID-19 Using Syndromic Surveillance of Emergency Department Visits

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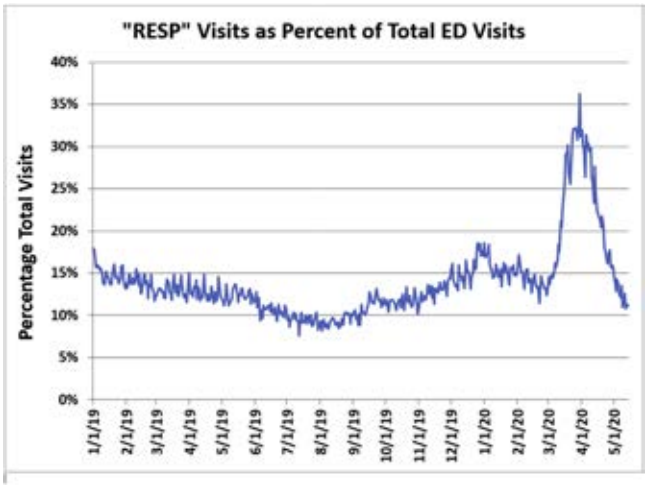
Study Objectives: COVID-19 was initially detected in Wuhan, China, and has since spread throughout the world. In the United States, Washington State was the first state affected but by March 2020, New York and New Jersey were the two states with the greatest number of cases. We had previously instituted an ongoing syndromic surveillance system (SSS) in 35 hospitals in New York and New Jersey. Our goal was to investigate whether monitoring the respiratory emergency department (ED) visits by syndromic surveillance could be used to follow the incidence of COVID-19 in our area.

Methods: This was a retrospective cohort of consecutive ED visits. It took place at 35 hospitals within 200 miles of New York City from January 1, 2019 through May 15, 2020.Protocol: We identified respiratory visits using a "RESP" syndrome filter for patients' chief complaints developed for the New York State Department of Public Health. We used the CUSUM28 Statistic to identify a "signal" day. We defined a "signal" day as the day when "RESP" daily visits exceeded the 28-day moving average plus 3 times the 28-day moving average standard deviation. We also plotted the percent of total ED visits that were "RESP" visits.

Results: The database contained 2,302,432 total ED visits of which 305,512 were "RESP" visits. The first signal day in 2020 occurred on March 10. The twenty-eight day moving average of "RESP" visits on March 10 and the number of "RESP" visits on March 10 were 658 and 953, respectively. The peak number of

"RESP" visits, 1252, occurred on March 30. See figure for percent of total ED visits for "RESP" visits.

Conclusion: In hospital EDs within 200 miles of New York City syndromic surveillance of ED respiratory visits showed a marked increase in the beginning of March and peaked at the end of March. This mirrored the pattern of COVID-19 cases in our area. Syndromic surveillance of ED respiratory visits may be useful in monitoring COVID-19 in other settings.



22 Retention of Knowledge About HIV/AIDS and HIV Testing among Adult Emergency Department Patients: Implications for HIV Testing and Prevention

Merchant RC, Marks SJ, Clark MA, Carey MP, Liu T/Brigham and Women's Hospital, Boston, MA; Brigham and Women's Hospital, Boston, MA; Brown University, Providence, RI

Study Objectives: Although education about acquired immunodeficiency syndrome (AIDS)/human immunodeficiency virus (HIV) and HIV testing usually is provided along with HIV testing, it is not known how well HIV-related knowledge is retained over time, and if the type of delivery method for HIV-related education and also if patients' health literacy affect retention. We sought to determine: (1) how well adult emergency department (ED) patients retain HIV-related knowledge over time, (2) whether retention is better when provided by a video or a content-matched pictorial brochure, and (3) whether patient health literacy moderates retention.

Methods: In a randomized, controlled trial at four geographically distinct EDs in the United States, 716 English-speaking and 657 Spanish-speaking adult patients undergoing HIV testing were stratified by primary language spoken (English or Spanish) and health literacy level (lower or higher). During an ED visit, patients were randomly assigned to one of two interventions: (a) a video regarding HIV/AIDS and HIV testing or (b) a content-matched pictorial brochure. Before and after receiving one of the two interventions and again every three months for one year, knowledge on these topics was assessed using a 25-item questionnaire. A multivariable repeated measures model assessed the effects of health literacy, language spoken, and information delivery mode on knowledge retention.

Results: Of the 1,373 participants (mean age 44 years-old, 63% female), 50% had lower health literacy and 27% had not previously been tested for HIV. Before the intervention, knowledge mean scores were 14.5, and scores at post-intervention, 3 months, 6 months, 9 months and 12 months were: 17.7, 17.8, 17.9, 17.9, and 17.9 out of a total score of 25. Knowledge mean scores were slightly higher in the pictorial brochure arm than the video arm at 3 months (Δ0.48, 95% CI: 0.07, 0.89) and at 9 months (Δ0.45, 95% CI: 0.04, 0.86), but were similar at 6 months (Δ0.33, 95% CI: -0.07, 0.72) and 12 months (Δ0.21, 95% CI: -0.21, 0.62) post-intervention. In the multivariable model, literacy level, language spoken, and intervention mode were not associated with knowledge retention over time.

Conclusion: Retention of HIV/AIDS and HIV testing knowledge was high in both the video and pictorial brochure arms. Both modes of information delivery were efficacious in maintaining knowledge retention, regardless of language spoken and health literacy level.

23 Adverse Events after Emergency Department Discharge for Conditions With High Variability in Hospital Discharge Rates

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Study Objectives: The Acute Unscheduled Care Model is an ACEP-proposed alternative payment model for emergency physicians that has been supported for implementation by the Center for Medicare and Medicaid Innovation and is under consideration by private insurers. This model aims to reduce avoidable admissions for conditions that have high variability in disposition decisions. Our study aims to describe existing variability in hospital-level discharge rates and determine whether higher discharge rates were associated with higher rates of adverse events (AEs) after hospital discharge.

Methods: We performed a retrospective cohort study of hospital-level AE rates after emergency department (ED) discharge for seven common conditions in adults that have previously been described as having high rates of variability in disposition decisions. We used 2017 all-payer ED and hospital data from the California Office of Statewide Health Planning and Development database for hospitals with at least 10,000 ED visits. We excluded visits that did not have record linkage numbers to allow AE tracking. We then labeled the first ED-discharge visit per person per condition as an index visit, indicated if there was at least 1 AE (ED revisit or hospital admission for the 7 conditions) within 30 days of each index, and then calculated the AE rates per condition per hospital. In a preliminary analysis, we compared AE rates for one of the conditions (UTI), for hospitals with discharge rates in the highest and lowest quartiles using a t-test.

Results: After exclusions, 271 hospitals were included. The variability of hospital-level discharge rates for each condition is displayed in Table 1. We included 1,223,266 index visits for the 7 conditions of interest. The overall AE rate was 8.2%. AE rates by condition were: skin and soft tissue infection 14.6%, COPD exacerbation 9.7%, UTI 8.5%, abdominal pain 7.5%, altered mental status 7.2%, chest pain 5.8%, and syncope 4.8%. For UTIs, we compared the mean AE rate (8%) for hospitals in the lowest quartile of discharge rates to the mean AE rate (9%) in the highest quartile and found no significant difference in AE rates (p=0.69).

Table 1. Hospital-level emergency department discharge rates for selected conditions (N=271 hospitals)

Condition	25th Percentile	Median	75th Percentile	Interquartile Range
COPD exacerbation	60%	69%	77%	17%
Syncope	85%	92%	96%	11%
UTI	84%	89%	93%	9%
Altered mental status	88%	94%	97%	9%
Skin and soft tissue infection	81%	86%	90%	9%
Chest pain	90%	96%	98%	8%
Abdominal pain	98%	99%	99%	1%

Conclusions: As proposed novel ED payment models aim to incentivize safe discharges, our analysis found differences in discharge rates for some but not all conditions that have previously been identified as having high variability in discharge rates. We found that AE rates after ED discharge differed by condition. Our preliminary finding that there was no difference in post-discharge AE rates at hospitals with relatively high and low discharge rates for UTIs does have important implications for the adoption of novel payment models. Our findings suggest that increased discharges may be able to be safely incentivized without resulting in higher rates of AEs after discharge, although further analyses will be needed in order to determine other drivers of post-discharge AEs.

24 Urine Testing Is Associated with an Increased Rate of Antibiotic Use in Emergency Department Patients at Risk of UTI Overdiagnosis

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Study Objectives: Despite United States Preventive Services Task Force guidelines that recommend against it, urine testing is often ordered in the ED as a screening test in the absence of urinary symptoms. This can contribute to the overdiagnosis of urinary tract infection (UTI). We hypothesize that ordering urine testing drives inappropriate antibiotic use. The object of this study is to investigate the association of urine testing with UTI antibiotic prescription in specific ED populations at an increased risk of overdiagnosis.

Methods: This was a multi-center retrospective cohort study of patients seen at two academic EDs: an urban safety-net hospital and a tertiary academic medical center. We included all adult discharged patients between 2015-2019. Patients were divided into the following four chief complaint groups: chest pain, vaginal bleeding in pregnancy, abdominal pain, and weakness/confusion in females > 65 years. Antibiotics listed as treatment options for UTI in the Sanford Antibiotic Guide, or those listed as alternatives by an ED Pharmacist, were our defined UTI antibiotics. Logistic regression analysis was used to adjust for age, sex, presence of fever, and presence of CT imaging when appropriate. Chief complaint groups and confounder variables were pre-specified.

Results: Association of urine testing with UTI antibiotic prescription rate in ED patients at risk of UTI overdiagnosis.

Conclusion: In this retrospective cohort study, urine testing was associated with an increased rate of antibiotic use in ED populations at risk of UTI overdiagnosis. This difference was statistically and clinically meaningful and was found in all prespecified patient groups examined. This finding may seem intuitive, but the rate of treatment was much higher than would be predicted by epidemiologic data and is consistent with our hypothesis that urine testing, not symptoms, is driving the diagnosis and treatment of UTI.

25 Factors Associated with Emergency Department Use among Adults with Newly Diagnosed Cancer

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Study Objectives: It is unknown whether emergency department (ED) use prior to cancer diagnosis is associated with ED use after cancer diagnosis. We modeled ED visits after a cancer diagnosis, comparing the association of a cancer patient's pre-diagnosis ED visit history to other known predictors of ED visits after cancer diagnosis (social determinants of health and cancer-related characteristics).

Methods: We linked adults (≥18 years) diagnosed with cancer between 2008-2018 from our university hospital cancer registry to a regional health information exchange of longitudinally linked ED encounters among hospitals across North Texas, excluding patients with non-melanoma skin cancers or leukemia. We used a multivariable negative binomial regression to model the number of ED visits in the first 6 months after an incident cancer diagnosis with the following prespecified predictors: ED visit history in the 6-12 months preceding cancer diagnosis, electronic health record proxy social determinants of health (race, language preference, insurance type, homelessness), and clinical cancer-related characteristics (cancer type, stage at diagnosis, initial treatment modalities).

Results: Among 25,562 patients (38% ≥65 years, 48% female, 41% non-White), 14% had a non-English language preference, <1% were homeless, and 18% had ≥1 ED visit in the 6-12 months prior to cancer diagnosis; 24% had advanced stage cancer at diagnosis, 43% underwent chemotherapy, and the most common diagnosis was breast cancer (13%). In our fully adjusted analysis, the strongest independent predictor of post-diagnosis ED visits was frequent (≥4) pre-diagnosis ED visits (adjusted incidence rate ratio [aIRR]: 3.90, 95% CI: 3.51-4.35) (Figure 1). Patients with 1-3 pre-diagnosis ED visits also had more post-diagnosis ED visits, though to a lesser extent (aIRR: 1.20, 95% CI: 1.15-1.24). Sociodemographic characteristics associated with greater post-diagnosis ED use included Hispanic (aIRR: 1.17, 95% CI: 1.11-1.23) and Black (aIRR: 1.25, 95% CI: 1.20-1.30) race, non-English language preference (aIRR: 1.09, 95% CI: 1.03-1.15), and homelessness (aIRR: 2.32, 95% CI: 1.49-3.49). Among the clinical covariates, we observed greater post-diagnosis ED use for lung cancer (aIRR: 1.16, 95% CI: 1.06-1.27), advanced stage cancer (aIRR: 1.30, 95% CI: 1.25-1.35), and treatment regimens including chemotherapy (aIRR: 1.35, 95% CI: 1.31-1.43). Breast cancer was associated with significantly less post-diagnosis ED use (aIRR: 0.85, 95% CI: 0.78-0.93).

Conclusion: We describe a new behavioral predictor of ED use after cancer diagnosis - frequent ED visits before cancer diagnosis - while confirming known risk factors such as minority race and language preference, homelessness, advanced staged cancer, and chemotherapy treatment. While sociodemographic and cancer-related factors are often beyond a patient's control, frequent pre-diagnosis ED use may represent a potentially modifiable behavior. Efforts to mitigate avoidable ED visits among this high-risk population should focus on patient perspectives and experiences with the health care system and investigate the reasons that underpin patient decisions to habitually seek ED care.

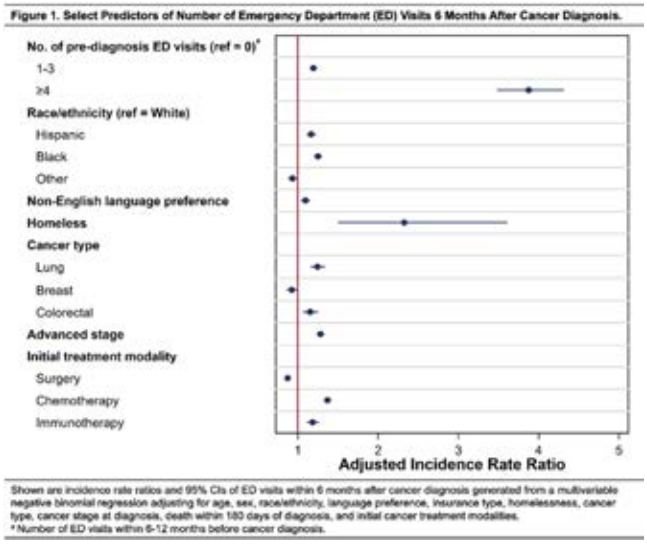

Figure 1. Select Predictors of Number of Emergency Department (ED) Visits 6 Months After Cancer Diagnosis.

Shown are incidence rate ratios and 95% CIs of ED visits within 6 months after cancer diagnosis generated from a multivariable negative binomial regression adjusting for age, sex, race/ethnicity, language preference, insurance type, homelessness, cancer type, cancer stage at diagnosis, death within 180 days of diagnosis, and initial cancer treatment modalities.
* Number of ED visits within 6-12 months before cancer diagnosis.

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Chief Complaint Group	Expected Rate of UTI Based on Epidemiologic Studies	Discharge UTI Antibiotic Prescription Rate UT Completed	Discharge UTI Antibiotic Prescription Rate No UT Completed	*OR of discharge UTI Abx (+UT numerator) (95% CI)	P-Value
Chest pain (n=16,191)	<0.01%	331/3146 (10.5%)	177/13045 (1.4%)	7.1 (5.8-8.6)	P< .001
Vaginal bleeding in pregnancy (n=2,162)	σ1.9-9.5%	223/1578 (14.1%)	3/584 (0.5%)	31.2 (9.9-97.7)	P < .001
Abdominal pain (n=26,817)	6.9-8.6%	3455/20253 (17.1%)	365/6564 (5.6%)	2.9 (2.6-3.2)	P< .001
Weakness, altered mental status, confusion, Female, > 65 yo (n=1161)	Not Clear	250/910 (27.4%)	8/251 (3.2%)	10.4 (5.1-21.4)	P < .001

UT=urine test*Adjusted for age, sex (except in pregnant patients), presence of fever, and presence of CT abdomen/pelvis (except in pregnant patients)σThis is the prevalence of asymptomatic bacteriuria, not necessarily UTI and not necessarily in patients with vaginal bleeding.

26 Changes in Emergency Department Use Associated with Medicaid Expansions Under the Affordable Care Act

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Study Objectives To determine whether changes in emergency department (ED) use associated with Medicaid expansions differ between states undergoing waiver and traditional expansions.

Methods: Cross-sectional difference-in-difference study to compare ED use between expansion and non-expansion states, and within expansion states, between traditional and waiver expansion states, in the four years prior to expansion (2010-2013) compared to the three years post-expansion (2014-2016). Among expansion states, the post-expansion period was defined based on each state's date of Medicaid expansion. Consistent with prior work, four states (New York, Delaware, Massachusetts, and Vermont) and the District of Columbia were excluded, as these states already offered Medicaid coverage similar to the expansion level prior to 2014. In addition, Pennsylvania and Rhode Island were excluded from analysis, as these states underwent both traditional and waiver expansions at different time points.

We use data from the National Health Interview Survey (NHIS), a nationally representative cross-sectional survey consisting of adults from all 50 states and the District of Columbia. Participants: 37,658 adults aged 19-65 with incomes <138% of the federal poverty level.

The main outcome measures were ED use within the last 12 months and ED use two times or more in the last 12 months.

Statistical Analysis: Multivariate regressions with interaction variables were used to calculate difference-in-difference estimates. Regressions were adjusted for several confounders available in the NHIS dataset, including age, sex, and family type, as well as for fixed effects at the state and interview year levels. A two-tailed t-test was used to determine if differences between coefficients in states undergoing traditional or waiver expansions were statistically significant, with significance set a priori at p=0.05. The NHIS complex survey design was taken into account by using Stata's survey commands, as well as by weighting according to sampling design. Standard errors were clustered at the state-level.

Results: Compared to non-expansion states, individuals in states across all expansion types were more likely to report any ED use in the previous year (2.8, p=0.05) and visiting an ED 2 times or more (2.0, p=0.05). Individuals in states undergoing traditional expansions were also more likely to report visiting an ED 2 times or more in the previous year (2.3, p=0.04) but were not more likely to report any ED use (1.7, p=0.25). Conversely, among individuals in waiver states, increase in any ED use approached significance (5.2, p=0.06), but use of EDs 2 times or more in the previous year did not statistically significantly increase (0.8, p=0.69). The differences between traditional and waiver states in ED use once and ED use 2 times or more in the previous 12 months did not meet significance (p=0.22 and p=0.50, respectively).

Conclusion: Three years post-expansion, there appears to be no difference between traditional and waiver expansion states in any ED use or more intensive ED use associated with Medicaid expansions under the Affordable Care Act. However, early evidence suggests states undergoing waiver expansions may be less effective at reducing any ED use, but more effective at reducing intensive ED use. Future studies should continue to examine these outcomes as these trends may evolve over time.

27 Correlation of Inflammatory Markers with Clinical Outcomes in Initial Cases of COVID-19 Admitted in the Bronx

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Study Objectives: For several weeks in March and April 2020, New York City was the global epicenter of the COVID-19 outbreak. Minority populations in the Bronx were disproportionately affected. Clinical practice changed significantly, with clinicians ordering many non-routine labs and inflammatory markers from the emergency department (ED) on patients with suspected COVID-19 in a frantic attempt to gain more information about the disease and the patient. The objective of this study is to assess the utility of these laboratory tests in predicting poor clinical outcomes.

Methods: This was a retrospective case series including all admissions of adult and pediatric patients >= 16 years with COVID-19 who presented to one of five EDs between March 9, 2020 and April 4, 2020 in the New York City borough of the Bronx. The population was largely Black and Hispanic. Included were 1,122 laboratory-confirmed cases of COVID-19, and 22 COVID-19-negative cases in which the clinical suspicion for false remained high. Laboratory confirmation of COVID-19 was performed with reverse-transcriptase polymerase chain reaction (RT-PCR) assays on nasopharyngeal swab specimens. The lab values analyzed were lactate dehydrogenase (LDH), white blood cell count (WBC), absolute lymphocyte count (ALC), D-dimer, ferritin, procalcitonin, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP). Clinical outcomes included death, ICU admission, and need for renal replacement therapy (RRT). Each variable was manually extracted from electronic health records. The first lab value within 48 hours of arrival to the ED was recorded. We determined inter-rater reliability for 10% of the data. We report Spearman's rho and p values for each variable and clinical outcomes. P <0.05 was considered statistically significant.

Results: The mean age of our patient population was 62.0 (SD 16.1). Thirty-two percent of patients self-reported Spanish/Hispanic/Latino ethnicity, 42% reported their race as Black or African-American, 9% reported their race as non-Hispanic white, 2% reported their race as Asian, and 13% reported their race as mixed or other. We observed the following statistically significant associations between the laboratory values and patient death, ICU admission, or need for RRT: procalcitonin (0.44 for death, 0.38 for ICU admission, 0.38 for RRT), CRP (0.29 for death, 0.29 for ICU admission, 0.15 for RRT), and D-dimer (0.28 for death, 0.15 for ICU admission, 0.12 for RRT). ALC and creatinine were also significantly correlated with outcomes. WBC was not consistently or meaningfully associated with outcomes. ESR and ferritin did not show significant correlation with outcomes. Inter-rater reliability was 96%.

Conclusion: Procalcitonin, CRP, and D-dimer are correlated with clinical outcomes like death, admission to the ICU, and the need for RRT. WBC, ESR and ferritin were not meaningfully associated with outcomes. If these tests are being ordered for their prognostic value, we suggest ED providers not order these latter tests routinely in patients with suspected COVID-19.

28 Analytical Validation of a Novel Point-of-Care Coagulometer for DOAC and Heparin Testing

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Study Objectives: While use of the direct oral anticoagulants (DOACs) and low molecular weight heparin do not currently require routine coagulation monitoring, this can be highly desirable in at-risk patients, including those suffering major trauma or requiring emergency surgery. However, a point-of-care (PoC) device for the rapid measurement of clotting times in these patients is currently not available. The current study characterizes the performance of Perosphere Technologies' PoC Coagulometer to DOAC- and enoxaparin-induced anticoagulation, as well as characterizes instrument precision, via a methods comparison to manual whole blood clotting time (mWBCT).

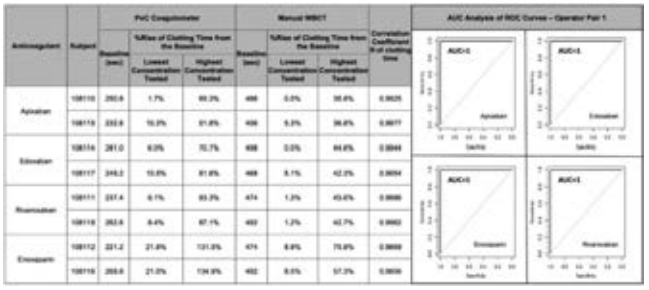
Methods: For each study, whole blood samples from healthy volunteers were spiked with either 0 (sham), 30, 75, 150, 300 and 400 (apixaban, edoxaban) or 450 (rivaroxaban) ng/mL of a DOAC, or 0 (sham), 1, 2, 3, 4, and 5 μg/mL for enoxaparin, in randomized order. A single concentration was tested per day, over 6 days, and samples were tested on 5 PoC Coagulometers and by 5 operators performing mWBCT, simultaneously, for comparison. To assess the agreement of PoC Coagulometer and Manual WBCT measurements, the percent rise of clotting time using Manual WBCT was dichotomized as: 1 when %Rise <=10%, and 0 when %Rise >10%. Each of the five PoC Coagulometers used in the study was randomly paired with one of the five operators for Manual WBCT. The ROC analysis was performed for each anticoagulant using percent rise of clotting time from PoC Coagulometer against the binary status categorized by manual WBCT's percent rise.

Results: Across all concentrations, the sensitivity of the PoC Coagulometer was significantly higher when compared to mWBCT, with absolute values of mWBCT measuring roughly twice those of the PoC Coagulometer. A strong linear correlation was observed for these methods, with R^2 values of nearly 1. For individual subjects, mean baseline clotting time, and % rise of clotting time relative to baseline at the lowest and highest anticoagulant concentrations tested for each subject, for both Perosphere Technologies' PoC Coagulometer and Manual WBCT measurements are compared in Figure 1. The sensitivity of the coagulometer proved to be roughly double that of manual WBCT across the range of concentrations tested. Similarly, the correlation coefficient of clotting time between the two methods for individual subjects yielded R >0.98, indicating a strong correlation between the two methods for individual subject for each anticoagulant.

For each individual anticoagulant, the AUC of the ROC curve for coagulometer-operator pairs yielded values of 1 or close to 1 (pair 1 data are shown in Figure 1). Similarly, the other four

coagulometer-operator pairs also yielded 1 or close-to-1 AUCs for each individual anticoagulant. These results indicated that the anticoagulant drug response determined by PoC WBCT agreed greatly with the anticoagulant drug response determined by manual WBCT.

Conclusion: These results suggest that this PoC Coagulometer could be an ideal measure to assess the pharmacodynamic effects of the DOACs, delivering results within minutes, requiring only a drop of fresh whole blood.



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sPLA2-IIA Detection of Sepsis, Bacterial Sepsis, and Bacteremia		Sensitivity	Specificity
sPLA2-IIA>20 cutoff	Sepsis	83.70%	38.10%
	Bacterial Sepsis	86.09%	34.67%
	Bacteremia	83.78%	21.16%
sPLA2-IIA>200 cutoff	Sepsis	29.89%	97.62%
	Bacterial Sepsis	35.10%	96.00%
	Bacteremia	59.46%	82.01%

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29 Bedside Point-of-Care Measurement of a Novel Biomarker SPLA2-IIA for Prediction of Sepsis: Midpoint Analysis

Yang A, Courie H, Peterson V, Thompson S, Hafycz J, Jeanmonod R, Rammohan G, Stankewicz H, Hackett D, Jeanmonod D/St. Luke's University Health Network, Bethlehem, PA

Study Objectives: Sepsis, the systemic response to infection, is a common but potentially life-threatening process that can be difficult to diagnose. In the emergency department (ED), various measures, such as systemic inflammatory response syndrome (SIRS) and q-SOFA criteria, lactate, and procalcitonin, help determine sepsis and whether its source is bacterial. However, there is currently no known marker that results in the ED to confirm diagnosis. While delaying antibiotics for bacterial sepsis results in worse outcomes, giving unnecessary antibiotics is also harmful, so rapid, accurate diagnosis is critical. Group II Secretory Phospholipase A2 (sPLA2-IIA) is a novel biomarker that has shown some promise in small studies as a tool to detect bacterial sepsis. Our objective was to determine if a point-of-care (POC) sPLA2-IIA assay can predict sepsis in patients meeting SIRS/q-SOFA criteria.

Methods: Adult, non-pregnant patients who met SIRS and/or q-SOFA criteria and received a sepsis workup in a single tertiary academic ED were enrolled from May 2019 to March 2020, when the study was temporarily suspended under IRB guidance to reduce COVID-19 exposure. Each time a lactate was drawn in the ED from an enrolled patient, a separate blood sample was collected simultaneously and run by a trained researcher on a POC machine to measure the sPLA2-IIA value. Patients who were subsequently admitted to the ICU had additional sPLA2-IIA values drawn with lactates. SPLA2-IIA data did not affect patient care, and the medical team was blinded to the results except when the researcher was also the primary physician for that patient in the ED. Our primary endpoints were whether sPLA2-IIA could predict sepsis, bacterial sepsis, and bacteremia. Secondary endpoints were ICU stay, hospital length of stay (LOS), in-hospital mortality, and 90-day mortality. Potential confounders noted included elevated troponin, pancreatitis, antibiotic use at time of ED presentation, immunosuppression, steroid use, and comorbid inflammatory conditions.

Results: 226 patients ages 18-101 (mean 66) were analyzed, composed of 184 patients with sepsis (ED impression correct 80.5%), 152 with bacterial sepsis (ED impression correct 70.8%), and 37 with bacteremia. See table for data on the ability of sPLA2-IIA to detect sepsis, bacterial sepsis, and bacteremia. All patients with sPLA2-IIA>201 had a final diagnosis of sepsis, and all patients with sPLA2-IIA>225 had a final diagnosis of bacterial sepsis. No significant difference was found after stratifying for potential confounders. sPLA2-IIA was not found to be predictive of ICU stay, hospital LOS, or mortality. Correlations between sPLA2-IIA and lactate ($r=0.2688$, $p<0.00001$) and between sPLA2-IIA and neutrophil-lymphocyte ratio ($r=0.2717$, $p=0.000035$) were poor. A moderate correlation was found between sPLA2-IIA and procalcitonin ($r=0.4418$, $p=0.00001$).

Conclusion: At midpoint analysis, sPLA2-IIA≤20 shows good sensitivity to rule out sepsis, bacterial sepsis, and bacteremia; sPLA2-IIA>200 shows excellent specificity to detect sepsis and bacterial sepsis.

30 Withdrawn

31 Development of a Mastery Learning Checklist and Minimal Passing Standard for Emergency Medicine Resident EFAST Training

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Study Objectives: By providing for individualized learning with standardized outcomes, Mastery Learning (ML) provides a sophisticated and feasible educational method within today's competency based residency training. ML has already been demonstrated to reduce complications and improve skill retention for multiple procedures. Yet, ML has not been adopted widely in Emergency Ultrasound (US). The objective of this multicenter educational research study, is to develop a robust mastery learning (ML) checklist for the requisite knowledge and skill of image acquisition, and then determine the needed minimal passing standard for independent performance of the Extended Focused Assessment with Sonography in Trauma (EFAST) by Emergency Medicine residents.

Methods: The authors created an initial EFAST ML checklist based on the published American College of Emergency Physicians (ACEP) Imaging Compendium. Next, the checklist underwent methodical revisions via two rounds of a modified delphi technique with ten fellowship trained ultrasound faculty experts at seven institutions. The final wording of the preliminary checklist was then tested during actual EFAST training. Lastly, a second panel of ten new experts at the same seven institutions established a minimal passing standard for an adequately trained EMR using the Mastery Angoff Standard Setting method.

Results: The first group of ten experts created an EFAST ML checklist that included twenty four distinct actions with completion marked as Yes/No utilizing a modified delphi technique. Each EFAST view requires that the trainee select the appropriate probe, properly adjust depth and gain to adequately visualize relevant anatomy, then verbally and physically identify relevant anatomy and potential spaces. The second group of ten new experts then set a minimal passing standard requiring that 94% of checklist items be completed in order for an Emergency Medicine Resident to be considered proficient in the EFAST image acquisition.

Conclusion: Utilizing best practices in ML, we created a rigorous expert consensus EFAST Checklist and minimal passing standard. Although local practice may vary, starting with the published ACEP US imaging compendium, then refining with ten experts at seven institutions, we believe that our EFAST checklist adequately reflects current performance standards. The next steps for our educational research network are to determine interobserver reliability, utilize the EFAST checklist as both a pre and post-assessment within a ML curriculum, and compare performance on the EFAST checklist versus completion of traditional set number benchmarks. When rigorously developed and validated, ML may supplement and ultimately even replace traditional set number procedure benchmarks for each application within Emergency Ultrasound.

32 Postgraduate Training of Emergency Physicians Working in Academic Emergency Departments in the United States

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Study Objective: We aimed to assess the postgraduate medical training of academic emergency medicine (EM) physicians in the United States and to compare the training backgrounds of faculty working at emergency departments (EDs) with three and four year EM residency programs. Prior studies of the training of academic emergency physicians have focused on particular types of physicians and relied on self-report.

Methods: We assessed the residency and fellowship training of emergency physicians working at all active Accreditation Council for Graduate Medical Education approved EM residency programs. We reviewed information reported on programs' Web sites and supplemented this with review of Doximity, LinkedIn, and direct communication with residency program coordinators. We calculated descriptive statistics and performed univariate analyses.

Results: Of the 7,590 EM academic physicians identified, residency and fellowship training data were obtained for 7,435 (98%). Nearly one third (2,454, 33%; 95% CI: 31-35%) of academic emergency physicians completed training beyond their emergency medicine residency, with 2,006 (83%; 95% CI: 80-83%) completing a fellowship and 419 (17%; 95% CI: 13-21%) completing an additional residency. The most common fellowships completed were ultrasound (19%; 95% CI: 16-23%), EMS (13%; 95% CI: 9-16%), toxicology (13%; 95% CI: 9-16%), and critical care (10%; 95% CI: 6-14%). 2,237 academic faculty (30%; 95% CI: 28-32%) completed only a three year residency emergency residency, and most of these physicians had >10 years of post-training experience (72%; 95% CI: 70-74%) and worked at three year residency programs (87%; 95% CI: 85-89%). Nearly half of physicians at four year residency programs only completed a four year residency programs (44%; 95% CI: 41-47%) and one quarter completed four years of residency training followed by a fellowship (22%; 95% CI: 18-26%). Over one third (36%; 95% CI: 34-37%) of academic physicians trained at the same program where they currently worked, 56% (95% CI: 54-57%) trained in the same state, and 65% (95% CI: 64-66%) trained in the same region. Nearly a fifth of academic faculty physicians also completed another graduate degree (18%; 95% CI: 16-20%). The most common graduate degrees were MPH (41%; 95% CI: 37-45%), MS (35%; 95% CI: 31-38%), MBA (18%; 95% CI: 14-23%), and PhD (12%; 95% CI: 6-17%).

Conclusions: In this comprehensive study of academic EDs, one third of emergency physicians completed post-residency training, most commonly an ultrasound fellowship. At academic EDs with four-year residency programs, most physicians had completed training at a four-year program with or without a fellowship. Less than one third of academic physicians completed three years of residency training without a fellowship, and they most frequently worked at three year programs and had >10 years of post-training experience.

33 Stress Inoculation in Emergency Medicine Residents: Effects of a Mental Performance Tool on Stress Response during a Simulated Resuscitation

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Study Objectives: Acute stress impairs physician decision-making and clinical performance in resuscitations. Stress inoculation, a multi-step cognitive-behavioral approach, modulates stress response in high-performance fields. This study assessed: 1) the effects of implementing a stress inoculation program on emergency medicine (EM) resident stress response in simulated resuscitations; 2) EM resident perceptions of this program.

Methods: This was a randomized, prospective, educational intervention trial of EM PGY-2 residents at 7 residencies. The intervention group received a 20-minute didactic one month prior to the study assessment, which discussed effects of acute stress on performance and introduced the "Breath, Talk, See, Focus" (BTSF) mental performance tool. The assessment was conducted at "Simtastic," a case-based simulation evaluation of Chicago PGY2 EM residents. Thirty minutes prior to the study case, the intervention group received a 10-minute review of the BTSF tool. Subjective stress response was measured using the STAI-6, a validated psychological scale evaluating cognitive and somatic stress response. Scores were obtained during the Simtastic orientation period and after completing the simulated resuscitation. Objective stress response was measured using wearable monitors which calculated heart rate (HR) and heart rate variability (HRV). These data were acquired during the Simtastic orientation and the simulated resuscitation. Subjects completed surveys at enrollment and after the simulation case evaluating perceptions of the importance of stress inoculation training.

Results: Sixty-one of 87 eligible residents participated (intervention: 25; control: 36). The mean change in pre- and post-case STAI-6 scores were not significantly different between groups (-1.7 vs 0.4, p=0.38). There were no significant differences in mean HRV between groups (-3.8 vs -3.8 ms, p=0.58) (Table 1). There were no significant differences in responses between groups on the Pre-Intervention Survey. On the Post-Intervention Survey, however, in response to the question, "How relevant is the topic of stress inoculation to the resident physician?" 91% of the intervention group responded "very relevant" compared to 26% of the control group (p <0.01). In response to the question "How important is it to include education about stress inoculation topics in residency training?" 75% of the intervention group responded "very important" compared to 28% of the control group (p <0.01).

Conclusion: This evaluation of a stress inoculation intervention demonstrated that residents value this training, but no significant differences in subjective or objective measures of stress response were demonstrated using this technique in a simulated resuscitation. Future investigations with longitudinal interventions are warranted.

Comparisons of STAI-6 scores & biometric data

	Intervention	Control	p value
Pre-case STAI-6	41.33 ±10.54	40.19 ±6.62	0.13
Post-case STAI-6	39.6 ±9.73	40.56 ±5.88	0.83
Change in STAI-6	-1.7 ±3.3	0.4 ±6.6	0.38
Baseline HRV (ms)	54.52 ±8.45	54.56 ±9.02	0.94
Change in HRV (ms)	-3.8 ±8.7	-3.8 ±10	0.58
Baseline HR (BPM)	82.7 ±10.23	87.24 ±11.07	0.11
Change in max HR (BPM)	17.9 ±29.4	1.8 ±48.3	0.29

ms = milliseconds; BPM = beats per minute; all numbers are presented as mean ± SD

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34 A National Survey of Research Associates Programs to Support Graduate Medical Education

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Study Objectives: Residencies must engage in scholarly activity and publish research. Many US institutions have developed research associate programs (RAPs), where university students are trained to provide research support, and lower barriers to clinical research. Student associates gain clinical and research experience, enhancing their applications to professional schools. No previous survey has been conducted to describe these programs. The main objective was to enumerate the characteristics of research associate programs with a nationwide survey with a very high response rate.

Methods: Research associate programs were identified through Medline, university course databases, and comprehensive online search. A survey was made available from 8/1/2014 to 6/1/2020 and administered to respective program leaders. Questions assessed included RAP longevity, leadership, funding, types of research, required hours per week, university affiliations, and selection process. The survey was performed online or by telephone interview. Results were analyzed using descriptive statistics.

Results: A total of 48 RAPs were identified. 41 of the 48 RAPs responded (85.4%) with an average of 24 students, median of 20 and range of 5-58 students. Most RAPs were less than one year in length, but with many variations. Associates worked on local investigator-initiated projects (80.5%) and retrospective chart reviews (63.4%). 97.6% consented patients for research. Other activities included data abstraction, protocol development, abstract writing, manuscript preparation, and quality improvement. Most were based in the university setting in which students received college credit (56.1%). Most RAPs are based exclusively in Emergency Medicine (EM) (70.7%), but

others were in the acute care surgery department (7.0%), critical care (2.4%), pediatrics (4.8%), and cardiology (2.4%). 68.3% of RAPs were led by a non-physician Research Coordinator while others were led by a physician director (63.4%) or a physician co-director (19.5%). RAPs were funded by a variety of sources including research grants (36.6%), physician groups (22%), hospital (29.3%), and the affiliate university (24.4%). Training typically included patient confidentiality (Health Insurance Portability and Accountability Act), research ethics, and the process of informed consent. Almost all RAPs performed prospective research (85.4%). 95.6% of programs reported that they are seen as favorable or very favorable at their institution.

Conclusion: In a nationwide survey with high response rate, student research associates programs are found to be a growing presence in EM residencies across the US. Often led or co-led by a physician director, students generally receive training to enroll patients into research. They are typically 10 months in duration. Most programs are seen favorably at their institution.

35 Evaluation of a Multidisciplinary Opioid Reduction Package in an Academic Medical Center's Emergency Department

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Study Objectives: Pain management is a common chief complaint among emergency department (ED) visits. In an attempt to decrease the ED discharge opioid prescribing rates, a multidisciplinary opioid reduction package was implemented that included: modification of the electronic medical record preset discharge prescription options, inclusion of a morphine milliequivalent per day (MME) calculator on discharge prescriptions, provider report cards for opioid prescribing habits, provider education, nursing education targeted on pain score documentation, and provision of non-opioid alternative pocket cards. The objective of this study was to determine the impact of a multidisciplinary-driven initiative on decreasing ED discharge opioid prescribing rates.

Methods: This prospective cohort with a retrospective chart review included patients ≥19 years of age discharged from an academic medical center's ED after implementation of the opioid reduction package from October 1, 2019 through February 29, 2020 as compared to the control group of patients who presented to the ED prior to the opioid reduction package from April 15, 2019 through September 15, 2019. The primary outcome was ED opioid prescribing rates after implementation of an opioid reduction package. Secondary outcomes included: ED discharge opioid prescribing rates, MME per day upon discharge, percentage of patients receiving "high risk" opioid prescriptions at discharge (≥50 MME per day), classifying opioid prescriptions, opioids received in the ED and at discharge, and non-opioids received in the ED and at discharge.

Results: A total of 42,836 encounters were analyzed over the study period with 21,687 encounters occurring in the pre-group and 21,149 encounters occurring in the post-group. The ED discharge opioid prescribing rate decreased from 12.2% in the pre-group to 11.5% in the post-group (95% CI 1.01 to 1.12, p=0.027). The average discharge MME per day decreased from 31.7 in the pre-group to 28.8 in the post-group (95% CI -3.25 to -2.55, p<0.001). The percentage of patients who received "high risk" opioid prescriptions decreased from 9.9% in the pre-group to 4.8% in the post-group (95% CI 1.74 to 2.69, p<0.001). The ED discharge non-opioid prescribing rate increased from 14.8% in the pre-group to 20.9% in the post-group (95% CI 0.63 to 0.69, p<0.001).

Conclusion: Implementation of a multidisciplinary opioid reduction package may decrease ED discharge opioid prescribing rates, MME per day on discharge, and percentage of patients receiving "high risk" opioid prescriptions at discharge.

36 Pharmacist Driven Antibiotic Redosing in the Emergency Department

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Study Objectives: With hospital mortality approaching 50%, sepsis continues to be a major challenge. Although timely antibiotic initiation has been associated with improved patient outcomes, limited data exists on the impact of delays in subsequent antibiotic doses. The objective of this study is to determine if an expanded emergency medicine (EM) pharmacist scope of practice reduces the frequency of major delays, defined as the first to second dose time of ≥25% of the recommended dosing interval, in subsequent antibiotic dosing.

Methods: A pre-post, quasi-experimental study, conducted in the emergency department (ED) at a single-center tertiary academic medical center after the implementation of an expanded EM pharmacist scope of practice between November 2019 to March 2020. Inclusion criteria: adult patients given an initial antibiotic dose in the emergency department (ED) for a diagnosis of sepsis or pneumonia, or with the presence of one of the following high-risk criteria: temperature <36°C or >38°C, white blood cell count <4,000/mm3 or >12,000/mm3, systolic blood pressure <100 mmHg, heart rate >90 beats/minute, respiratory rate >20 breaths/minute, lactate >2 mmol/L, or abnormal chest x-ray. Patients were excluded if they did not receive initial antibiotics in the ED, antibiotics were discontinued after the initial dose, expired prior to antibiotic redosing, refused care, or were admitted directly to hospice/palliative care. Subsequent antibiotic doses were reordered by pharmacists under the study protocol for up to 24-hours after the initial order. The control group consisted of retrospective chart review of cases from the previous year.

Results: Of 181 total participants enrolled, major delays in subsequent antibiotic administration were identified in 13% of the treatment group with the expanded pharmacist scope, and 48% in the control group (p <0.00001). Among the major delays, the treatment group had a significant decrease in the amount of 6-hour (13% vs 39%, p= 0.002) and 8-hour interval antibiotics (8% vs 60%, p=0.00003). A statistically significant lower incidence of in-hospital mortality was observed in the treatment group (3% vs 11%, p=0.02). While patients were boarded in the ED, 97% of cases in the treatment group received their subsequent dose, compared to 65% in the control group (<0.00001). There were no differences identified in hospital length of stay, intensive care unit (ICU) admits, ICU-free time, vasopressor usage or mechanical ventilation requirement.

Conclusion: Expanding EM pharmacist scope of practice led to a significant reduction in the frequency of major delays in subsequent antibiotic administration and was associated with a decreased incidence of hospital mortality. An EM pharmacist scope of practice can reduce the frequency of major delays of second dose antibiotics and improve the management of septic patients boarded in the ED.

Primary Endpoint	Treatment (n = 117)	Control (n = 64)	P Value
Major delays – n (%)	15 (13)	31 (48)	<0.00001
Secondary Endpoints			
Frequency of delays – n (%)			
6-hour interval	11/82 (13)	13/33 (39)	0.002
8-hour interval	3/36 (8)	12/20 (60)	0.00003
12-hour interval	1/22 (5)	6/31 (19)	0.12
Subsequent dose given in ED – n (%)	101/104 (97)	20/31 (65)	<0.00001
Hospital LOS, median – hr. (IQR)	139.5 (84-230)	131.7 (74-228)	0.69
Total ICU admits – n (%)	14 (12)	10 (16)	0.49
Vasopressor requirement – n (%)	8 (6)	4 (6)	0.88
Ventilation requirement – n (%)	6 (5)	4 (6)	0.75
In-hospital mortality – n (%)	3 (3)	7 (11)	0.02

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37 Impact of Census-Based Reassignment of Nursing Staff to Reduce Emergency Department Patient Wait Times, Lengths of Stay, and Boarding Times

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Study Objectives: The Centers for Medicare & Medicaid Services (CMS) have traditionally utilized the emergency department (ED) metrics to gauge operational performance. CMS has identified timeliness and efficiency as core attributions for the ED, specifically length of stay (LOS) and boarding time. Prolonged times reduce the quality of care and can lead to increased inpatient length of stay and poor clinical outcomes. Furthermore, lengthy LOS has been associated with decreased patient satisfaction. Prior literature reports that higher staffing levels may result in earlier discharges and improved metrics. However, financial barriers may prevent hospitals from hiring more staff. Given the current allocation of staffing, we hypothesize that our novel queueing algorithm can reduce metrics times without increasing staffing.

Methods: The intervention was based on a novel fluid queueing model, which quantifies the impact of the assignment of available ED and ED Inpatient (EDIN) nursing staff to the different areas of an urban quaternary ED at the beginning of each shift. The algorithm accounts for two stages of care (in-treatment and boarding) and two types of nursing providers, ED and EDIN nurses, and is based on the current number of patients at each ED area at the beginning of the shift, boarding times, fraction of admitted patients, average treatment times, and the time-dependent arrival rates with the goal to minimize nurse idleness. The study

involved two 2-week periods; the period before the intervention (Off Period), March 5, 2018, to March 18, 2018, and the period after the intervention (On Period), March 19, 2018, to April 3, 2018. The data contains operational level information (times stamps for arrival, first treatment, discharge, change to admit status as well as assigned area and disposition) and patient-level demographic and medical information (age, sex, race and ethnicity, insurance type, ESI level, and Elixhauser score). We measured the impact of the intervention on patient waiting times, evaluation to disposition decision, evaluation to discharge, and boarding times for admitted patients.

Results: Our data consists of 2383 Off Period and 2617 On Period patient visits, stratified by ED disposition. In both groups, "evaluation to discharge", "disposition decision to admission," and "ED arrival to discharge from ED", the On Period was associated with statistically significant reductions in these time metrics. On the other hand, "ED arrival to evaluation" and "evaluation to disposition" demonstrated no statistical difference.

Conclusion: Our novel fluid queueing model demonstrated improvements in ED metrics without showing a clinically significant increase in "ED arrival to evaluation time." The algorithm had successfully shown that operationally based metrics can improve without increasing nurse staffing.

Table.

	Admitted Patients			Discharged Patients		
	Off Period (n = 720)	**On Period (n = 765)**	**p-value**	**Off Period (n = 1586)**	**On Period (n = 1755)**	**p-value**
Characteristics						
Age	63.907 (18.818)	64.442 (18.507)	0.581	49.070 (18.614)	50.901 (19.334)	0.005
ESI	3.00 [2.00-3.00]	3.00 [2.00-3.00]	0.508	3.00 [3.00-4.00]	3.00 [3.00-4.00]	0.015
Elixhauser	4.00 [2.00-7.00]	4.00 [2.00-7.00]	0.574	1.00 [0.00-2.00]	1.00 [0.00-3.00]	0.005
Sex (M)	364 (50.6%)	377 (49.3%)	0.623	676 (42.6%)	741 (42.2%)	0.815
Race			0.587			0.438
White	384 (53.3%)	409 (53.5%)		712 (44.9%)	781 (44.5%)	
Black	110 (15.3%)	125 (16.3%)		261 (16.5%)	323 (18.4%)	
Asian	37 (5.1%)	37 (4.8%)		71 (4.5%)	88 (5.0%)	
Pacific Islander	8 (1.1%)	4 (0.5%)		20 (1.3%)	22 (1.3%)	
Other	99 (13.8%)	117 (15.3%)		272 (17.2%)	301 (17.2%)	
Unknown	82 (11.4%)	73 (9.5%)		250 (15.8%)	240 (13.7%)	
Ethnicity			0.397			0.249
Hispanic/Latino	90 (12.5%)	88 (11.5%)		229 (14.4%)	267 (15.2%)	
Not Hispanic/Latino	353 (49.0%)	402 (52.5%)		631 (39.8%)	735 (41.9%)	
Unknown	277(38.5%)	275 (35.9%)		726 (45.8%)	753 (42.9%)	
Insurance			0.146			0.005
Private	146 (20.3%)	134 (17.5%)		767 (48.4%)	767 (43.7%)	
Medicaid	119 (16.5%)	105 (13.7%)		395 (24.9%)	433 (24.7%)	
Medicare	365 (50.7%)	406 (53.1%)		320 (20.2%)	441 (25.1%)	
Self-Pay	9 (1.2%)	15 (2.0%)		104 (6.6%)	114 (6.5%)	
Unknown	81 (11.2%)	105 (13.7%)		0 (0.0%)	0 (0.0%)	
Operational Metrics						
Waiting Time (min)						
ED arrival to Eval	17.162 (21.140)	19.086 (26.865)	0.127	15.719 (20.885)	16.888 (24.572)	0.141
Treatment Time (hrs)						
Eval to Disposition	5.064 (3.328)	5.214 (3.819)	0.423			
Eval to Discharge	21.700 (16.494)	19.158 (13.092)	<0.001	6.360 (15.023)	5.282 (3.449)	0.004
Boarding Time (hrs)						
Dispo to Admit	16.717 (15.712)	14.069 (12.283)	<0.001			
Total LOS (hrs)						
ED Arrival to DC	22.010 (16.539)	19.468 (13.147)	0.001	6.619 (15.007)	5.552 (3.486)	0.004

Mean (standard deviation) or median [interquartile range] of the outcome measures during the OFF and ON periods.

38 Phone a Pharmacist Friend: Telepharmacy Services at Freestanding Emergency Departments

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Study Objectives: The purpose of this report was to describe clinical interventions provided remotely via telepharmacy to freestanding emergency departments (FSEDs) by emergency medicine (EM) pharmacists. The primary objective was to describe pharmacist interventions provided as part of telepharmacy

services. Secondary objectives were to categorize drug therapy recommendations based on therapeutic class of medication, determine the proportion of drug therapy recommendations associated with Institute for Safe Medical Practices (ISMP) high-alert medications, and assess the clinical significance of drug therapy recommendations.

Methods: This was a retrospective chart review conducted in three freestanding emergency departments that are part of a large health system. EM pharmacists provide on-site support at a tertiary care center ED as well as remote clinical coverage for the three FSEDs. Pharmacist interventions for FSED patients documented between 1/1/2017 and 12/31/2018 were eligible for inclusion. All eligible pharmacist documentation was abstracted from the health system EMR (Epic®) for further analysis by trained reviewers. Reviewers excluded documentation related to non-direct patient care, administrative activities, and educational activities and organized interventions into common themes (Table 1). Data was analyzed descriptively and proportions with 95% confidence intervals are reported. A random sample of interventions was reviewed by two independent reviewers using a previously published scale in order to assess clinical significance of interventions (severity of the medication error avoided by pharmacist intervention and the value of the service). A weighted Kappa statistic was calculated to assess inter-rater reliability.

Results: A total of 4313 pharmacist interventions met inclusion criteria. Classification of interventions is summarized in Table 1. Of 1664 drug therapy recommendations, a total of 1424 were linked to a therapeutic class of medications. For these 1424 drug therapy recommendations, the most frequently implicated therapeutic classes were antimicrobial agents (n=732; 51.4%), vaccines (n=168; 11.8%), cardiovascular agents (n=90; 6.3%), and analgesics (n=86; 6%). 11% of recommendations were associated with Institute for Safe Medical Practices (ISMP) high-alert medications. The most common high-alert medication categories were antithrombotic agents (n=51; 32.5%), insulin (34; 21.7%), and opioids (20; 12.7%). In assessing the clinical significance of interventions, 19.2% were rated as significant errors that were intercepted by pharmacists by both reviewers with moderate inter-rater reliability (κ=0.55; SE 0.09). For the value of service assessment, 59% of interventions were rated as significant by both reviewers but inter-rater reliability was only fair (κ=0.22; SE 0.05).

Conclusion: Emergency medicine pharmacists documented several types of interventions with approximately 20% of drug therapy recommendations associated with prevention of significant medication errors. Provision of remote telepharmacy services at freestanding emergency departments may represent a novel approach to help optimize patient care and safety.

Table 1. Classification of Pharmacist Interventions

Type of Intervention	Number	Percent (95% CI†)
Drug Therapy Recommendation	1664	38.6 (37.1-40.0)
Adherence to Hospital Drug Therapy Monitoring Policies	969	22.5 (21.2-23.7)
Telephone Correspondence for ED Culture Callbacks	770	17.9 (16.7-19.0)
Medication Order Clarification	534	12.4 (11.4-13.4)
Allergy / Adverse Drug Reaction Documentation	178	4.1 (3.6-4.8)
Drug Information	108	2.5 (2.1-3)
Formulary Adherence and Therapeutic Interchanges	90	2.1 (1.7-2.6)
Total	**4313**	**100%**

†Indicates 95% confidence interval

39 Emergency Department Visits for Serious and Painful Conditions Markedly Decreased after the Arrival of COVID-19

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Study Objectives: Our syndromic surveillance system of patient chief complaints from 35 emergency departments (EDs) in the New York City area showed a marked rise in respiratory disorders after March 10, 2020 as Covid19 arrived in our region. Shortly thereafter, total emergency department (ED) visits markedly decreased. Our goal was to determine whether ED visits also decreased for serious and painful conditions for which patients in most other circumstances would certainly have sought emergency care.

Methods: We used a retrospective cohort. The setting was EDs of 28 hospitals within 150 miles of New York City. Hospitals were teaching or non-teaching and rural, suburban or urban. Annual ED volumes were from 12,000 to 122,000.

Our population was consecutive patients seen by ED physicians between January 1 and April 30 in 2019 and 2020. We chose to compare monthly visits in 2020 to 2019 for total visits and visits for serious and painful conditions. We arbitrarily chose some serious and painful conditions: congestive heart failure (CHF), appendicitis, myocardial infarction (MI), transient ischemic attack (TIA), stroke (CVA), renal colic, and back pain. We then chose the visits using ICD-10 codes. We computed the changes in monthly visits from 2019 to 2020. We used chi-square to test for statistical significance. Using the Bonferroni correction for multiple comparisons, we set alpha at 0.002.

Results: The database contained 956,116 visits. In January and February 2020 (corrected for length of February in 2020) there was little change in total visits from 2019 [January + 7%, February +1%]. Total ED visits decreased after COVID-19 appeared in our region. In March and April 2020 compared to March and April 2019, ED visits dropped by 16% and 50% respectively. Compared to 2020, visits for serious conditions also decreased. In March and April, CHF decreased 22% and 66%, respectively. For appendicitis these values were 24 and 33%; for MI, 25% and 41%; for TIA, 36% and 62%; and for CVA, 40% and 46%. We also evaluated the decrease in visits for painful conditions. Renal colic visits decreased by 40% and 46% and back pain visits decreased by 49% and 81%. All p-values for comparisons were statistically significant, $p < 0.0005$.

Conclusion: In March and April 2020, there was a decrease in ED visits after Covid-19 arrived in our area. This was also associated with a marked decrease in visits for both serious as well as painful conditions, suggesting that many patients with these conditions did not seek medical care. We suspect this is due to reluctance to come to the ED because of recommendations for quarantine and fear of being exposed to the virus.

40 Racial Disparity and Covid-19 Outcomes: An Emergency Department Study

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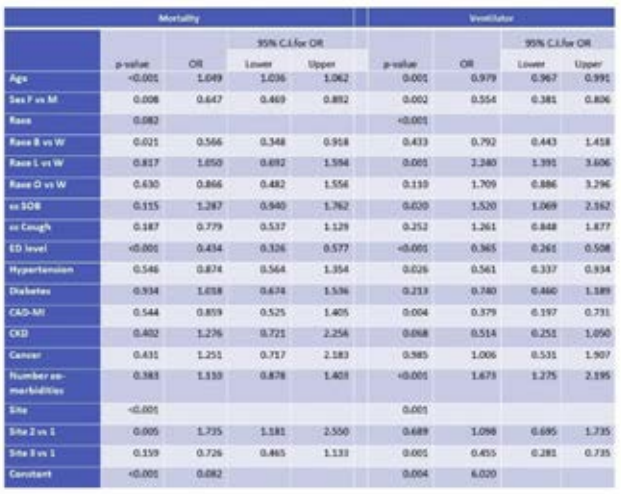
Study Objectives: The effects of COVID-19 on racial groups is still emerging, however a recent report from the Centers for Disease Control and Prevention (CDC) suggests that there may be a disproportionate rate of severity of disease presentation in racial and ethnic minority groups. Health differences have been attributed to economic and social conditions that are more prevalent for racial minorities. These conditions can cause isolation from resources necessary to combat the outbreak. We suspect that these factors that may contribute to increased Covid-19 exposures, that lead to a greater rate of infection and increased risk of severe disease in minority groups

Methods: Data collected from three ED, all sites of an emergency medicine residency. Included are patients with SAR-CoV-2 testing done in the ED. Excluded were patients less than 18, pregnancy, and missing data. Race was categorized into White-Caucasian (W), African-American (B), Latinx (L), and others including multi-racial (O). COVID co-morbidities were defined as hypertension, diabetes, chronic obstructive pulmonary disease or asthma, sleep apnea, congestive heart failure, coronary artery disease, end-stage renal disease, diabetic kidney disease, liver disease, venous thrombosis, cancer, HIV, and immune-compromised. 5% of patients' select variables were manually re-abstracted with a Kappa of 100%. Significance (alpha=0.05) was tested using Student-t, ANOVA, and Chi-squared as appropriate. Logistic regression was used to determine the independent effect of race on outcomes.

Results: 5489 cases met inclusion/exclusion criteria. SAR-CoV-2 was detected in 1849 (33.7%). Tested racial diversity was 37.9% W, 20.0% B, 33.5% L, and 8.6% O. There was significant racial disparity in the positivity rate (W: 25.0%, B: 31.9%, L: 43.8%, O: 36.7%; p<.001). Hospitalized were 1112 (60.1%) positive patients with mean age of 67.7, 42.4% female, acuity 2.49 (1-5, 1 worst), and racial diversity W: 36.8%, B: 19.3%, L: 35.9%, O: 8.0%. As of 6-5-2020, there were 265 deaths (23.8%) and 180 placed on ventilators (16.2%) with a combined mortality morbidity (MM) of 359 (32.3%). Age (p<0.001), acuity (p<0.001), co-morbidities (p=0.003), and race (p<0.001) were all significantly associated with mortality. On logistic regression, age (OR=1.049; p<0.001), sex (OR=0.647; p=0.008), and acuity (OR=0.434; P<0.001) were significant predictors of mortality. There were significant mortality differences among races (B v W, OR=0.566; p=0.021, L v W, OR=1.050; p=0.817, O v W, OR=0.866; p=0.630). Significant racial differences were also found for ventilator need (B v W, OR=0.792; p=0.433, L v W, OR=2.24; p=0.001, O v W, OR=1.71; p=0.110). Co-morbidities were not significant when controlled for age and other confounders.

Conclusion: Our findings showed minority groups were more likely to have a positive COVID-19 test. Latinx patients were more than twice as likely to require intubation compared to white patients. Age, Sex, Triage Acuity Level, and non-White Race were significantly associated with mortality. This data suggests non-White patients are more likely to contract and suffer from Covid-19. These findings show minority groups have a greater need for ventilators and other resources associated with severe Covid-19. In the event of resource shortages, they should be directed to minority communities.



	Mortality				Ventilator			
			95% C.I.for OR				95% C.I.for OR	
	p-value	OR	Lower	Upper	p-value	OR	Lower	Upper
Age	<0.001	1.049	1.036	1.062	0.001	0.979	0.967	0.991
Sex F vs M	0.008	0.647	0.469	0.892	0.002	0.554	0.381	0.806
Race	0.082				<0.001			
Race B vs W	0.021	0.566	0.348	0.918	0.433	0.792	0.443	1.418
Race L vs W	0.817	1.050	0.692	1.594	0.001	2.240	1.391	3.606
Race O vs W	0.630	0.866	0.482	1.556	0.110	1.709	0.886	3.296
ex SOB	0.115	1.287	0.940	1.762	0.020	1.520	1.069	2.162
ex Cough	0.187	0.779	0.537	1.129	0.252	1.261	0.848	1.877
ED level	<0.001	0.434	0.326	0.577	<0.001	0.365	0.261	0.508
Hypertension	0.546	0.874	0.564	1.354	0.026	0.561	0.337	0.934
Diabetes	0.934	1.018	0.674	1.536	0.213	0.740	0.460	1.189
CAD-MI	0.544	0.859	0.525	1.405	0.004	0.379	0.197	0.731
CKD	0.402	1.276	0.721	2.256	0.068	0.514	0.251	1.050
Cancer	0.431	1.251	0.717	2.183	0.985	1.006	0.531	1.907
Number co-morbidities	0.383	1.133	0.878	1.461	<0.001	1.673	1.275	2.195
Site	<0.001				0.001			
Site 2 vs 1	0.005	1.735	1.181	2.550	0.689	1.098	0.695	1.735
Site 3 vs 1	0.159	0.726	0.465	1.133	0.001	0.455	0.281	0.735
Constant	<0.001	0.082			0.004	6.020		

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41 Clinical Outcomes among COVID-19 Patients Taking Non-Steroidal Anti-Inflammatory Drugs

Perkins SJ, Holmes AR, Nelson JR, Hirschl JR, Chopra Z, Medlin R, Fung C, Korley FK/University of Michigan Medical School, Ann Arbor, MI

Study Objectives: Concerns over the use of non-steroidal anti-inflammatory drugs (NSAIDs) for the management of fever and myalgia in COVID-19 patients were raised after four cases of critical illness in young, otherwise healthy patients who took NSAIDS were observed in France. France's health minister subsequently made a recommendation to use acetaminophen in lieu of ibuprofen. However, the association between NSAID use and outcomes in COVID-19 illness has not been adequately studied. The objective of this study is to determine whether an association exists between prior NSAID use and COVID-19 illness severity.

Methods: We performed a single-center retrospective cohort study of consecutive adult patients diagnosed in the emergency department (ED) with PCR confirmed SARS-Cov-2 infection. NSAID use was ascertained based on a review of the medication list found in patients' electronic medical records. Our primary outcome was critical COVID-19 illness, defined as a composite of death, respiratory failure requiring intubation, and shock requiring vasopressors, occurring within 28 days of ED presentation. We modeled the association between NSAID use and our primary outcome using logistic regression, and adjusting for hypertension, diabetes, asthma, chronic obstructive pulmonary disease (COPD), other chronic lung disease, obstructive sleep apnea, immunocompromised status, angiotensin converting enzyme inhibitor (ACE-I) or aldosterone receptor blocker (ARB) use, anticoagulation use, and immunosuppressant use.

Results: Among the 422 patients studied, 88 (21%) were on NSAIDS prior to acquiring COVID-19 and a total of 89 patients (21%) developed critical COVID-19 illness within 28 days of ED presentation. Among those using NSAIDs, 18 (20%) developed critical illness. Of the 11 predictor variables examined, hypertension (odds ratio = 1.04 (95% CI: 0.38 - 1.71)), diabetes (0.97 (95% CI: 0.42 - 1.52)), and chronic lung disease (1.20 (0.20 - 2.20)) were significantly associated with increased risk of critical COVID-19 illness (Table 1). NSAID use was not found to be an independent predictor of critical COVID-19 illness (odds ratio = 0.05 (95% CI; -0.57 - 0.73).

Conclusion: To our knowledge, this is the first study of the association between NSAID use and critical COVID-19 illness. Our results demonstrate that NSAID use does not significantly increase the risk of critical COVID-19 illness. This study is limited by lack of prospective ascertainment of NSAID use. Prospective evaluation of evaluate outcomes among COVID-19 patients with NSAID use is warranted.

Predicting adverse outcomes among patients with COVID-19 using past medical and medication history

	Estimated Effect Size on Adverse Outcome (95% CI)	p
Past Medical History		
Hypertension	1.04 (0.38 - 1.71)	0.0021*
Diabetes	0.97 (0.42 - 1.52)	0.0005*
Asthma	-0.15 (-0.82 - 0.53)	0.6655
COPD	-0.04 (-0.84 - 0.76)	0.9199
Chronic Lung Disease	1.20 (0.20 - 2.20)	0.0185*
Obstructive Sleep Apnea	0.09 (-0.58 - 0.75)	0.7984
Immunocompromised	0.42 (-0.48 - 1.32)	0.3577
Medications		
ACE-I or ARB	-0.31 (-0.90 - 0.29)	0.3158
Anticoagulation	0.31 (-0.25 - 0.88)	0.2804
Immunosuppressant	-0.38 (-1.48 - 0.72)	0.5009
NSAID	0.08 (-0.57 - 0.73)	0.8182

*$p<0.05$

42 Advanced Fibrosis Is Unlikely in the Majority of Patients from an Appalachian Emergency Department's Non-Targeted Hepatitis C Virus Screening

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Study Objectives: We have previously demonstrated a high prevalence of Hepatitis C Virus (HCV), particularly among young, publicly insured patients, reflecting the escalating syndemic of opioid injection and HCV transmission. We aim to describe the degree of hepatic fibrosis among patients with evidence of HCV infection identified from an adult academic emergency department (ED) non-targeted HCV screening program.

Methods: The study was a retrospective cohort analysis of ED systematic, non-targeted, opt-out HCV testing outcomes from July 2018 through January 2019. To assess the degree of liver disease as evidenced by fibrosis, Fibrosis-4 (FIB4) and aspartate transaminase to platelet ratio (APRI) scores were calculated from available AST, ALT and Platelet lab values pulled from the electronic medical record, collected on the same day as the initial ED visit. The absence or presence of advanced fibrosis or cirrhosis was determined using validated cut-offs: FIB4 < 1.45, APRI < 1; FIB4 > 3.25, APRI > 2 respectively.

Results: As previously reported there were 21,359 unique adult visitors during the time period studied. Of these, 16,700 individuals were verbally engaged and did not opt out of testing. A total of 11,635 individuals received HCV Ab testing with 1,459 patients (12.5%) having reactive results. Newly identified information shows that 1,241 (85%) of these patients had concomitant labs as part of routine ED care sufficient to calculate a FIB4 and APRI score. Data indicate that advanced fibrosis or cirrhosis was not likely in the majority of patients (FIB4 56%, 707/1241 patients; APRI 72.6%, 901/1241 patients). Those with available FIB4 and APRI were more likely to be born after 1965 (857/1241 patients, 69.1%), of whom 90.9% (779) had government insurance or were uninsured (Medicaid 85.6%, 667 patients; Medicare 8.5%, 66 patients; Uninsured 5.9%, 46 patients). Of these, advanced fibrosis or cirrhosis was not likely in the

majority of patients : medicaid (FIB4 64.9%, 433/667 patients; APRI 67.2%, 462/667 patients), medicare (FIB4 57.6%, 38/66 patents; APRI 71% 47/66 patients), uninsured (FIB4 69.6%, 32/46 patients; APRI 71.7%, 33/46 patients).

Conclusion: ED non-targeted, opt-out testing identified a high prevalence of HCV infection among adult visitors in whom the majority do not have evidence of advanced fibrosis or cirrhosis. The majority of those patients were young and insured. For a curable disease that carries severe morbidity and mortality, along with known financial costs of inaction, our program has demonstrated that the ED may be a prime location to identify and treat viremic HCV patients.

43 Knowledge and Confidence in the Treatment of Emergent Conditions among Graduating Medical Students Across Colombia

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Study Objectives: In Colombia, graduating medical students may be selected to complete a compulsory year of social service in the health care system. Consequently, many new physicians are responsible for providing emergency care, often without dedicated training in emergency medicine (EM). The World Health Organization (WHO) Basic Emergency Care course (BEC) has been used to train frontline providers in Africa and set to pilot in South America to fill this need. We describe baseline knowledge and confidence in the management of critical illnesses, across medical schools in Colombia prior to BEC implementation.

Methods: A quantitative, cross-sectional electronic survey of was developed and administered to graduating medical students at 36 medical schools across Colombia. Demographics and history of previous training information was collected. Knowledge was assessed via 15 multiple-choice questions (MCQs) assessing knowledge taught in the BEC: initial stabilization, trauma, dyspnea, shock and altered mental status. An MCQ score of greater than or equal to 75% was defined as passing. Confidence was assessed via 13 questions using 100 mm visual analog scale. Logistic regression was performed to examine associations between previous EM training with confidence and knowledge.

Results: The survey was sent to 2,306 Colombian graduating medical students across Colombia with a response rate of 379 (16.4%). Women comprised 63.5% of the sample; 74.7% were 19-24 years old. The mean knowledge and confidence scores were 69% (95% CI 67.5 - 70.4) and 59.8 mm (95% CI 58.1-61.5), respectively. Knowledge was lowest for initial stabilization and trauma (54.1% and 54.6%) and highest for altered mental status (88%). When compared to those without a previous emergency care course, the odds of passing the knowledge test were 4.0 times greater (95% CI 1.7-9.3) for those completing 1 to 3 previous courses and 8.3 times greater (95% CI 3.6-19.3) for those completing greater than 3 courses. Confidence also increased as the number of courses increased (50.3 mm, 60.1 mm, 63.5 mm, $p<0.001$).

Conclusion: Knowledge and confidence in the management of emergent conditions was found to be low among senior medical students surveyed in Colombia, but was positively associated with the number of previously completed training courses in emergency care. Results suggest that the WHO BEC course could be a useful training intervention to standardize medical education in Colombia.

44 Evaluating the Clinical Impact of a Novel Global Pediatric Emergency Medicine Curriculum on Asthma Outcomes in Belize

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Study Objectives: Respiratory-related complaints are the most common cause for pediatric visits to the Accident & Emergency (A&E) department at Karl Heusner Memorial Hospital (KHMHA) in Belize. An educational module on pediatric respiratory emergencies was delivered to emergency health care providers at KHMHA as the first of a six-module curriculum on pediatric emergency care. In addition, a pediatric asthma protocol utilizing Pediatric Respiratory Assessment Measure (PRAM) score-based interventions was integrated into A&E workflow. This study assesses the clinical impact of the curriculum on management of pediatric asthma emergencies at KHMHA in Belize City, Belize.

Methods: A retrospective chart review of pediatric visits to the KHMHA A&E between 2015-2018 was conducted. Patients between 2 to 16 years old with an asthma-related diagnosis were selected for further review. Charts were randomly selected from the pre-intervention (T0: 2015) study period, and all available charts (T1-T3: three 3-month periods between 2016-2018) were selected from other study periods for review. Clinical outcomes were analyzed for physicians who had completed training and physicians who had not completed training. Primary outcomes included time to albuterol use and time to steroid use. Secondary outcomes included utilization of PRAM score, A&E length of stay, return visit within 7 days, and hospital admission rates. Kaplan-Meier survival analysis and Cox proportional hazard regression were utilized for analysis of primary outcomes.

Results: There were a total of 11,775 pediatric visits over the study period. Of those, 969 (8%) had an asthma related diagnosis. 393 patients met inclusion criteria, however 110 (28%) were excluded due to missing data for a total of 283 patients in the final analysis. The patients in all groups were similar in sex, race, and clinical vital signs. The time to albuterol was significantly faster in the trained physician group compared to pre-intervention practices (median 0 min; IQR 0-0; $p=<0.01$; aHR 1.99. 95% CI: 1.06-3.72) and the untrained physician group (median 17.5 min; IQR 5-30; $p=0.03$). Time to steroid use, however, was not significantly different (median 125 minutes; IQR 35-190; aHR: 1.204, 95% CI 0.23-6.24). PRAM-score utilization significantly increased among trained physicians (T3 37.8%, T4 24.2%, $p=<0.01$) and untrained physicians (T3 55.6%, T4 24.3%); however there was no significant difference between groups (T3 $p=0.45$, T4 $p=0.98$). The untrained physician group was more likely to utilize chest x-rays (56.8% vs 23.2%, $p = <0.01$) and admit patients (35.1% vs 8.5%, $p=<0.01$). The trained physician group had higher rates of return visits within 7 days (9.5% vs 0%) and shorter A&E length of stay (median 3 hrs vs 4.6 hrs) but this did not reach significance ($p=0.06$).

Conclusions: The pediatric respiratory emergencies curriculum had a positive clinical impact as evidenced by earlier albuterol administration, increased PRAM score utilization and decreased chest x-ray and admission rates as well as trends to a shorter LOS. However, there was no improvement in time to steroids. While the reason for this discordance is unclear, the curriculum could be modified in the future to include reinforcement of key treatment guidelines. The success of this curriculum provides an educational opportunity to improve asthma management in low to middle income countries around the world.

45 Educational Outcomes of Nursing-Focused Triage and Shock Management Course in Rural Ugandan Hospital

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Study Objectives: Emergency conditions constitute a large proportion of the global burden of disease and have higher morbidity and mortality in low- and middle-income countries. With education of health care providers in triage and basic emergency care for the critically ill, a large proportion of death and disability can be prevented. In this study we explore the pedagogic design of an educational curriculum to train nurses in rural Uganda in the triage and management of shock and evaluate its effectiveness using pre- and post-training assessments.

Methods: Investigators, including a physician with extensive experience working at the Masindi Kitara Medical Center (MKMC) in Uganda, created an educational curriculum by adapting elements from the World Health Organization Basic Emergency Care course, the South African Triage System and curricula from the AFEM. A 4-day training was given to 60 health care personnel from local private and public hospitals at MKMC in January 2020. Training included didactic, small-group and simulation-based education. Participants completed anonymous pre- and post-training surveys and pre- and post-knowledge-based-tests. A comparison of pre- and post-knowledge-based-test scores was performed using chi-squared tests. Qualitative analysis of survey results was performed by two independent investigators to ensure

agreement and nominal pre- and post-survey responses were compared using chi-squared tests.

Results: Forty-seven health care providers completed the pre-assessment and 48 completed post-assessments. The percent of providers who felt very confident with triage strategies and shock increased significantly following training as shown in table 1. On the knowledge-based post-test there was a 10.1% increase in correct responses after completion of the course ($p<0.0001$). Learners identified discussion-based, small-group learning and hands-on activities as the most effective teaching strategies in this setting, despite an acknowledgement that their previous formal education involved more traditional didactic modalities. Areas for improvement identified included providing more printed handouts, shorter presentation times with more group activities and providing additional and more frequent trainings.

Conclusion: In this analysis of the effectiveness of a curriculum for teaching nursing-focused basics of triage and shock management, the course delivered statistically significant improvements in both education and comfort levels based on a pre- and post-analysis. Limitations included the anonymity of the assessments which prevented pre- and post-assessment analysis at the individual level. The insights gained into successful teaching modalities and potential improvements can serve to benefit the development of future educational programs in similar settings.

	Pre-assessment	Post-assessment	P-value
Knowledge test percent correct	58% (545/940)	68.1% (654/960)	<0.0001
Percent who reported feeling very confident managing shock	62.2% (28/45)	95.7% 45/47)	<0.0001
Percent who reported feeling very confident triaging a sick patient	73.3% (33/45)	97.9 (46/47)	0.001

Table 1: Participant knowledge and confidence before and after completing training based on pre- and post-assessment analysis

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46 Workplace Violence in the Chinese Emergency Department: a 2019 Prospective National Cross Sectional Survey in Mainland China

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Study Objectives: Workplace violence in emergency departments (EDs) is a worldwide problem. Although recent episodes of physical and verbal assault in EDs in the People's Republic of China have spurred legislative changes, new data specific to emergency physicians and nurses remains elusive. This prospective study sought to document and explore emergency medicine provider experiences with workplace physical and verbal assault in mainland China, and identify any associations with sex, professional role, seniority, or practice location.

Methods: This prospective survey was conducted on April 12-14, 2019 at a national emergency medicine conference in Beijing, China. Clinically active emergency physician and nursing attendees (aged > 18) were recruited to complete an online survey using REDCap for data collection. SPSS was used for descriptive statistics and chi-squared analysis.

Results: 737 completed surveys were collected from a total of 2,990 attendees (24.6%). 423 (57.6%) respondents identified as male. 31 province-level divisions of the People's Republic of China were represented. 617 (83.7%) of respondents were physicians and 120 (16.3%) were nurses. 621 (88.2%) worked outside of Beijing, 571 (78.2%) worked in the same province they were born and 482 (67.5%) worked in the same hospital they did clinical training. 178 (25.2%) of respondents reported being physically beaten by a patient or family member. 699 (95.4%) reported being verbally attacked. Male respondents were significantly more likely to report physical violence (35.4% vs. 11.9%, $p<0.001$). Physicians were more likely than nurses to report physical violence (27.3% vs. 14.3%, $p=0.002$). Those working outside of Beijing were more likely to both report physical violence (26.7% vs. 14.5%, $p=0.016$) and to see medical disturbances at work (72.8% vs. 49.4%, $p<0.001$). Those who had traveled internationally were less likely to experience physical violence (18.2% vs. 29.3%, $p=0.002$). There were no other significant sex, professional role, seniority, or practice location associations with these factors.

Conclusion: A significant minority of ED providers reported physical violence (25.2%) and nearly all reported verbal assault (95.4%). Despite increasing recognition in mainland China that workplace violence in EDs is a significant issue as well as recent legislation aimed at reducing its occurrence, physical violence and verbal assault remain quite common. Male physicians working outside of Beijing who had not traveled internationally were all factors significantly associated with experiencing physical violence.

47 Cool Running Water First Aid for Pediatric Burns: Recommendation Adherence & Clinical Outcomes in a Series of Cohort and Cross-sectional Studies

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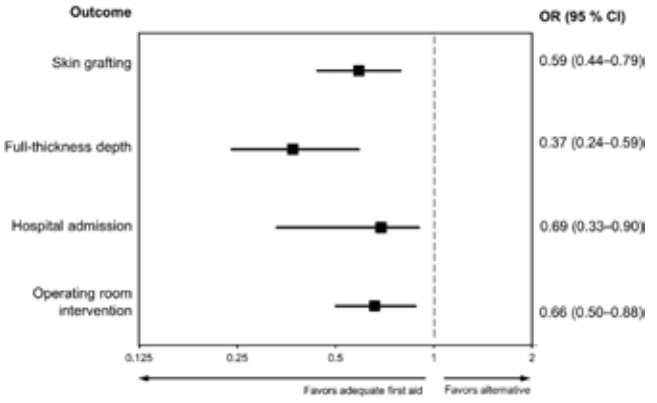
Study Objectives: Best-practice burns first aid in Australia is currently defined as 20 minutes of cool running water (CRW) within three hours of injury. This research aimed to evaluate the clinical outcomes associated with applying this intervention and how well it is adhered to by both civilians and health care professionals, from first responders through to tertiary hospital emergency clinicians.

Methods: These cohort studies utilized a prospectively collected registry of patients managed at an Australian tertiary children's hospital. Multivariate logistic and Cox regression models were used to evaluate the relationship between first aid and patient outcomes (eg, skin grafting requirements, time to re-epithelialization, wound depth, hospital admission, length of stay, and operating room interventions). Further descriptive and logistic regression analyses were conducted to examine differences in adequacy between the groups in age, ethnicity, location and socioeconomic status, among others.

Results: In our patient outcome cohort, 1780/2495 (71.3%) received adequate first aid. These patients experienced decreased odds of skin grafting (OR 0.6, 95% CI 0.4 to 0.8). Among ungrafted wounds, those cooled with any water were 1.3 (1.1-1.5) times more likely to achieve re-epithelialization per day post-injury. Healing times were significantly faster with adequate running water in burns requiring >9 days to re-epithelialize (HR 1.2, 1.0 to 1.3). Adequate first aid was further associated with reductions in full-thickness depth (OR 0.4, 0.2 to 0.6), hospital admission (OR 0.7, 0.5 to 0.9) and theater operations (OR 0.7, 0.5 to 0.9), but not hospital length of stay (HR 0.9, 0.7 to 1.2, $p=0.48$, Figure 1). Overall, 31.3% of children received adequate CRW from caregivers. Factors associated with caregiver inadequacy of CRW included very young age and early adolescence ($p<0.001$), rural location ($P = 0.045$), and low socioeconomic status ($P = 0.030$). Paramedics and general practitioners provided adequate cooling to 184/735 (25.0%) and 52/215 (24.2%) of their patients, respectively. Local general hospitals provided adequate CRW to 1019/1809 (56.3%) patients.

Conclusion: Burn severity and clinical outcomes improves with the provision of cool running water, however deficiencies remain in the cooling of pediatric burns patients at all levels of initial management. Although adequate first aid delivery was poor across all demographics, it was significantly worse in children aged 0-2, adolescents aged 15-16, those living rurally, and the socioeconomically disadvantaged. There is a need in the health care community for improved education regarding the parameters and clinical benefits of cool running water first aid.



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48 Educating and Empowering Inner-City High School Students in Bleeding Control

Okereke MC, Rizkalla C, Fruchter E, Zerzan J, Pallos V, Seegers M, Qureshi M, Model L, Ramsey G, Jenkins M/Maimonides Medical Center, Brooklyn, NY

Study Objectives: Unintentional bleeding is the leading cause of death in the population of those 1 to 44 years of age in the United States. Stop the Bleed™ campaign is a nationwide course that teaches the public to ensure their own safety, call 911, find the bleeding injury and compress. Although the national campaign for Stop the Bleed training course was inspired by active shooter events, it can be extended to scenarios such as motor vehicle accidents and small-scale penetrating and gunshot wounds. Extending the audience to actively involve inner city high school students in a violence-stricken neighborhood is crucial. We hypothesized that students would have an increase in their comfort level, willingness and preparedness to intervene after taking part in the Stop the Bleed course.

The objective was to evaluate the comfort level, willingness and preparedness of inner-city high school students' pre and post Stop the Bleed training course.

Methods: This was a prospective interventional study to evaluate the direct impact of the Stop the Bleed training course on inner-city high school students' comfort level, willingness and preparedness in bleeding control. This was a pilot study in one inner-city high school in Brooklyn, New York. Students were given an optional bleeding control course with pre and post surveys. 286 students were recruited from their physical education or health education class to take part in a 50-minute bleeding control training course. Mean age is 15.7 years old. Students were separated into groups of 20-25; taught by 2-3 Emergency Medicine providers certified as Stop the Bleed instructors. Each course included 2-3 skills station for placing a tourniquet, wound packing and pressure control.

Results: Prior to the course, only 30.6% were somewhat likely and 13.17% were very likely to help an injured person that was bleeding. After the course, 52.27% of respondents were somewhat likely and 20.83% of respondents were very likely to help a bleeding person, even if no bleeding control kit was available to them. Post intervention, there were significant improvements in comfort level, willingness and preparedness of bleeding control training participants. Using the McNemar test, it was shown that high school students were more likely to help an injured person that is bleeding (family, friend or stranger), more comfortable and prepared in helping an injured person that is bleeding and less worried about causing harm to an injured person that is bleeding, all with p values <0.0001.

Conclusions: Teaching the Stop the Bleed course to high school students from a community stricken with high levels of violence resulted in an increase in comfort, willingness and preparedness to be involved with bleeding control to save a life. This study can potentially impact clinical practice for paramedics and emergency medicine providers by decreasing blood loss and helping to save a life while empowering the youth.

49 Organ Donation Potential in Cases of Fatal Gunshot Wounds to the Head: Tools for Timely Screening in the Emergency Department

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Study Objectives: Gunshot wounds to the head (GSWH) have a high mortality rate and account for over a third of deaths due to head injury. Here we hypothesize that out-of-hospital vital signs may be useful tools in preliminary identification of organ donation potential when a patient presents to the ED with a fatal GSWH.

Methods: Retrospective analysis was performed on data from an urban level 1 trauma center's trauma database. All adult patients with out-of-hospital vital signs on-scene who presented to the ED before expiring due to a fatal GSWH between 1/1/2012 and 12/31/2018 were included. Characteristics of organ donors vs non-donors were analyzed, including injury severity score/abbreviated injury scale-head (ISS/AIS), on-scene Glasgow Coma Score (GCS), on-scene systolic blood pressure (SBP), on-scene respiratory rate (RR), and location of death. For non-normally distributed data, differences between groups were assessed with Wilcoxon Rank Sum Test. Differences for categorical variables were assessed using either Pearson's chi-squared test or Fisher's Exact Test. Significance noted when $p < 0.05$.

Results: Of 208 subjects meeting inclusion criteria, organ donation requests were made in 36 (17.3%) cases and 22 (10.6%) patients donated organs. Neither mean ISS nor AIS-head differed significantly between donors and non-donors (ISS: 4.5 vs 4.7 p=0.3761. AIS-head: 33.7 vs 27.3 p=0.0647) (Table 1). Donors had significantly higher mean on-scene GCS (5.1 vs 3.9 p=0.0016), SBP (129.3 vs 82.1 p=0.0028) and RR (20.5 vs 10.7 p=0.0001) than non-donors (Fig. 1A, B, C). While there was no significant difference in mean GCS at the ED (3.6 vs 3.5 p=0.4093), donors had a significantly larger decrease in mean GCS vs non-donors (-1.4 vs -0.6 p=0.0018) between on-scene and hospital assessment (Fig 1A). At the ED, donors had significantly higher mean SBP than non-donors (114.1 vs 82.7 p=0.0323) (Fig 1B). More donors than non-donors died in the ICU (90.9% vs 45.7%); 9.1% of donors and 45.7% of non-donors died in the OR; no donor died in the ED compared to 52.2% of non-donors; one non-donor (0.5%) died on the floor. Differences in location of death were significant ($p < 0.0001$) (Table 1).

Conclusion: Out-of-hospital GCS, SBP, and RR values were all significantly higher in donors than non-donors. Donors also had significantly higher mean SBP at the ED and a larger decline in GCS between on-scene and the ED compared to non-donors. Nearly half of the study group, all non-donors, died in the ED. Out-of-hospital vitals and status changes en route to the ED may be of use in early identification of potential donors, allowing timely referral to organ procurement agencies, increasing donor opportunity and organ donation. No extra time or resources would be required to collect these metrics, as they are already assessed during emergent resuscitation and management of patients. Timely identification of donor potential may allow fatally wounded patients who expire in the ED the chance to become donors.

	Donors (n=22)	Non-donors (n=186)	p-value
Age (years)	31.8 + 11.4 (29)	36.5 + 17.2 (31)	0.4888
Male (%)	86.4	89.3	0.7175
Injury Severity Score	33.4 + 17.6 (29)	27.3 + 7.8 (25)	**0.0647**
Abbreviated Injury Scale-Head	4.5 + 1.0 (5)	4.7 + 0.8 (5)	0.3761
Location of Death (%)			
ED	0	52.2	**<0.0001**
OR	9.1	1.6	
ICU	90.9	45.7	
Floor	0	0.5	

Table 1. Study group characteristics. Continuous variables are described as: mean + SD (median).

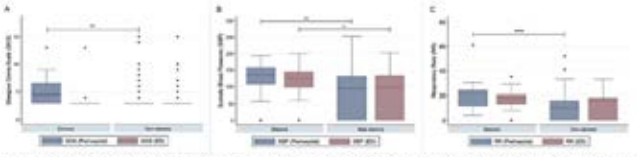

Figure 1. Prehospital and ED vitals grouped by donors and non-donors. A: Glasgow Coma Score. B: Systolic Blood Pressure. C: Respiratory Rate. * P ≤ 0.05, ** P ≤ 0.01, **** P≤ 0.0001.

50 Investigating the Benefits of Emergency Air Transportation for Trauma Victims

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Study Objectives: Trauma continues to be the leading cause of death in the United States in persons under the age of 45. Arkansas is unique in that it has a trauma registry and call system to help direct Emergency Medical Services (EMS). Helicopter transport (air EMS) of trauma cases decreases mortality compared to ground ambulance transport (ground EMS).

Methods: This is a retrospective cohort study. Data was extracted from the Arkansas Trauma Registry from January 2017 to March 2018. The study is about trauma patients who arrive to an emergency department in Arkansas. Logistic regression analyses were performed to determine if the mode of transportation is associated with a higher odds of mortality.

Results: There were 16,093 trauma cases included in this study. Of the 16,093 cases, 14,033 (87.2%) cases arrived in he ED by ground EMS and 2,060 (12.8%) cases arrived in the ED by air EMS. The average Glasgow Coma Score (GCS) upon the ED arrival is 14 (±2.97) and the Injury Severity Score (ISS) is 9.11 (±8.24). Air EMS decreases the mortality risk by 1.80 times compared to the ground EMS (95% CI= 1.39 to 2.34; $p<0.0001$), after adjusting for age, sex, ISS, GCS, and type of injury. There is no evidence to show that air EMS increases likelihood to transfer to higher acuity care facilities when compared to ground EMS (p=0.572).

Conclusion: Air EMS significantly decreases risk of mortality when compared to ground EMS. The likelihood to transfer to a higher acuity care hospital is similar if the trauma cases are transferred by air or ground EMS.

51 Interactive Home Monitoring of ED Patients with Suspected or Confirmed COVID-19

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Study Objectives: Remote in-home monitoring technology has become an increasingly important means to conserve hospital and emergency department (ED) capacity while providing observation and care for high-risk patients with milder symptoms during the COVID-19 pandemic. We aimed to evaluate the safety of introducing an Interactive Home Monitoring program (IHM) for high-risk patients discharged from the emergency department (ED) with suspected or confirmed COVID-19 who without remote monitoring would have required admission to the hospital.

Methods: We assessed the clinical outcome of ED patients with suspected or confirmed COVID-19 who had a risk factors for severe disease and were discharged from the ED with IHM. Patients were identified for enrollment in the IHM program if they had suspected or confirmed COVID-19 and had risk factors for severe illness from COVID-19 as defined by the Centers for Disease Control and Prevention (CDC) guidelines. Eligible ED patients were required to be hemodynamically stable with no new oxygen requirement, but assessed by an ED attending physician as needing hospital admission. Patients who met criteria were enrolled in the IHM program prior to ED discharge and were provided with equipment including a blood pressure cuff, pulse oximeter, thermometer, iPad, instructions on how to use the equipment, and 24 hour technical assistance hotline. At home patients were remotely managed by trained Advanced Practitioner Providers who addressed vital sign changes and escalated care needs when appropriate. The clinical course of IHM patients including return ED visits, hospital admissions, and hospital course were followed for 30 days following ED discharge.

Results: A total of 52 ED patients were enrolled in the IHM program from 4/15/20 to 5/30/20. 7 patients required a return visit to the ED (13%; 95% CI) with 6 patients requiring admission to the hospital (12%, CI 95%). All 6 admitted patients (100%) were admitted a floor bed with a mean length-of-stay of 3.3 days (s = 1.7 days). The most common reason for admission was hypoxia (50%) or dehydration (50%). No IHM patient required intubation, non-invasive positive pressure ventilation, or respiratory support beyond 2-4 liters of supplemental oxygen. The one patient who presented to the ED but did not require admission was diagnosed with non-COVID related chest pain. No mortalities occurred during the study period nor were there any documented adverse outcomes noted for patients discharged home on IHM.

Conclusion: In this initial review to assess the safety of introducing IHM for high-risk ED patients with confirmed or suspected COVID, we found that patients without a new oxygen requirement and stable vital signs could be discharged home with remote monitoring without increasing the risk for adverse clinical outcomes. Additionally, the introduction of the IHM program reduced hospital admissions for this patient population, decreased potential hospital exposures, and conserved critical inpatient beds for unstable patients requiring onsite medical care.

52 Acceptance of Telemedicine Screening for COVID-19 Outside Usual Health System Catchment Area

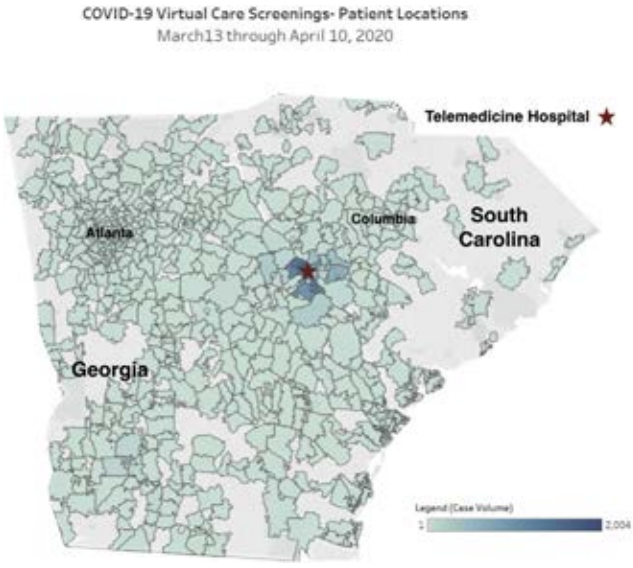
Lyon M, Kuchinski A, Coule P, Gibson R/Medical College of Georgia at Augusta University, Augusta, GA

Study Objectives: In order to prevent spread of an infectious disease such as COVID-19 widespread testing is needed. However, few communities, particularly in states with large rural and medically underserved populations, have the infrastructure or expertise to start such a testing program especially within a short period of time. Further a standardized approach to screening for the appropriateness of COVID-19 testing is critical to not overwhelming hospital and state resources. Telemedicine offers a method which can standardize screening without limitations of catchment area, county and state borders. Our objective was to evaluate the utilization of a telemedicine screening program by patients outside the usual catchment area of a health care system.

Methods: This was a prospective observational study measuring the outcomes of a telemedicine based COVID-19 screening program. The telemedicine health system consists of a single tertiary care hospital on the border of 2 states. The telemedicine screening program was free to the citizens of Georgia and South Carolina. Demographic and location data was collected in the telemedicine app utilized for the telemedicine contacts. Usual catchment area of the telemedicine health system is defined from population health data using patient county of residence.

Results: From March 13, 2020 until June 10, 2020, 24,510 telemedicine visits have been completed with 20,165 (82%) from Georgia and 4345 (18%) from South Carolina. 2649 (10.4%) were less than 20 years of age, 3577 (14.6%) were older than 60 years of age and 211 (0.8%) were older than 80 years of age. 15,280 (62%) were male and 9,355 (38%) female. 15,550 (63.4%) of the telemedicine visits were from citizens of the surrounding 4 counties (catchment area) with the remainder (8,960) spread across Georgia and South Carolina. 15,441 (63%) were sent for COVID-19 testing. Correlation of telemedicine visit from rural counties will be added.

Conclusion: The rapid development and deployment of a statewide COVID-19 screening program is feasible. Citizens will utilize a telemedicine platform outside their home geographic area for screening services unavailable locally. Geographic borders and traditional hospital catchment areas are less significant when utilizing telemedicine allowing for health care to be delivered to rural and health care-poor communities.



53 Emergency Clinician Perceptions of Electronic Personal Protective Equipment for Medical Screening Exams of COVID-19-Suspected Patients

Blatt MI, Miller NM, Ward MJ, Unertl KM, Novak LL, Turer RW/Vanderbilt University School of Medicine, Nashville, TN; Vanderbilt University Medical Center, Nashville, TN

Study Objectives: The novel coronavirus (SARS-CoV-2) pandemic placed unprecedented strain on the supply of personal protective equipment (PPE) in health care settings, particularly the emergency department (ED). Innovative strategies were needed for PPE conservation. Our ED deployed electronic PPE (ePPE) - a telehealth approach to conduct medical screening exams (MSEs) of COVID-19-suspected patients. As part of our plan to scale this intervention, we sought to evaluate provider perceptions of ePPE-based MSEs.

Methods: We conducted a qualitative analysis at Vanderbilt University Medical Center in Nashville, TN. Emergency clinicians were identified through use of structured ePPE documentation elements in the EHR. Patients who received ePPE-based MSEs included English-speaking adults with fever or respiratory symptoms (inclusion criteria: age < 50; SpO2 > 94%; RR < 20; HR < 110; no cardiovascular, respiratory, or immunosuppressive history). We invited providers to participate in semi-structured video interviews (Zoom, San Jose, CA). A Likert scale between 1 [Not at all effective] and 5 [Extremely effective] was used to gauge perceived ePPE effectiveness. We recorded and transcribed interviews, subsequently extracting then encoding notable excerpts using Dedoose (SocioCultural Research Consultants, Los Angeles, CA). Thematic analysis was performed using

intervention characteristics from the Consolidated Framework for Implementation Research (CFIR): intervention source, evidence strength and quality, relative advantage, adaptability, trialability, complexity, design quality and packaging, and cost.

Results: We identified 18 clinicians who documented ePPE use. On review, 2 never used ePPE and 5 only supervised other clinicians who used ePPE. Of the remaining 11, we interviewed 7 attending physicians and 1 physician assistant between 5/15/20 and 6/5/20. Providers gave ePPE a mean effectiveness score of 4.2 (SD 0.53). Identified advantages included improved patient and provider safety, PPE conservation, and improved patient-provider communication. The primary perceived limitation was inability to auscultate the lungs. While noting the risk of missed alternate diagnoses (eg, heart failure), providers asserted that video-based history-taking and respiratory exam sufficed for low-acuity patients and that auscultation's absence was unlikely to change management. Beyond MSEs, providers used ePPE for patient reassessment and counseling, as well as to facilitate supervision. Many emphasized ePPE's flexibility: "If I do pick up on a few things...I can always, sort of, abandon [ePPE] and go in and do my exam." Barriers to use included potential for negative patient perceptions, poor audio quality, difficulty incorporating an interpreter, and workflow challenges related to staff coordination. Clinicians revealed that many ePPE encounters were not fully documented, suggesting ePPE use may be underrepresented in this study.

Conclusion: In this trial implementation of ePPE, we found that ED clinicians perceived ePPE as an effective and useful technique for MSEs of COVID-19-suspected patients. The benefits largely outweighed the disadvantages, particularly in the low-acuity population. Our study may have been limited by early adoption from clinicians favorable to such technology, and future work should examine perceptions among clinicians with varying degrees of technology comfort.

54 From the COVID-19 Epicenter: Using Telemedicine to Serve the Needs of the Geriatric Population

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Study Objectives: The COVID-19 pandemic is responsible for over 400,000 deaths worldwide with New York City (NYC) as the epicenter of the pandemic in the United States. Geriatric patients were at especially high risk. As of June 2020, the New York City cumulative death rate by age: > 75 years was 1535/100 K population, while for 45-64 years it was 187/100 K population. Telemedicine (TH) was used as a tool to shift non-emergent care from overburdened emergency departments and to provide routine and urgent health care to the community who were directed to self-isolate and often fearful of seeking care during the pandemic. While offering the ability to reach many patients, remote health care options presented unique challenges due to technology requirements, visual, hearing, cognitive and often language limitations in our diverse multilingual geriatric community. Our study's goal was to evaluate the use of remote health care during the COVID-19 pandemic in NYC at our institution. We compared the frequency of geriatric use during the flu season with a similar interval during the pandemic.

Methods: We conducted a retrospective chart review of patients 65 and older who were evaluated remotely by a ED provider on a telemedicine platform that was accessible on a desktop or mobile phone (TH) during the local pandemic surge: from 3/1 to 4/30 2020 at a hospital in northern Manhattan/NYC. Chart extraction methods were developed and performed by 5 emergency physicians. Categories and characteristics were defined in advance and included demographics, technical limitations, referral to ED, and death occurring during the time of the chart review.

Results: During the pandemic study period a total of 140 charts were extracted. The mean age was 73. Overall, 20% of patients in the cohort were advised to seek emergent care. Same day emergent care referral occurred in 12% (65-75yrs), 36% in (76-85 yrs) and 61% (>85 yrs). We found significant growth in use of TH from pre-pandemic (12/1 to 1/23/2019), 7 patients >65 years utilized the TH platform while during the pandemic (3/1 - 4/23/2020), 130 patients over the age of 65 utilized TH to access health care.

Conclusion: Geriatric Telemedicine showed an exponential growth during the pandemic. TH program efforts to promote its use to redirect patients away from the ED were successful. Given the rate of same day emergent referrals there was a variable level of acuity that reinforces the need to have telehealth providers that are trained in triage and emergency medicine with a knowledge of local resource availability.

EMF 55 Assessing Financial Risk among Uninsured Patients Seeking Care in the Emergency Department

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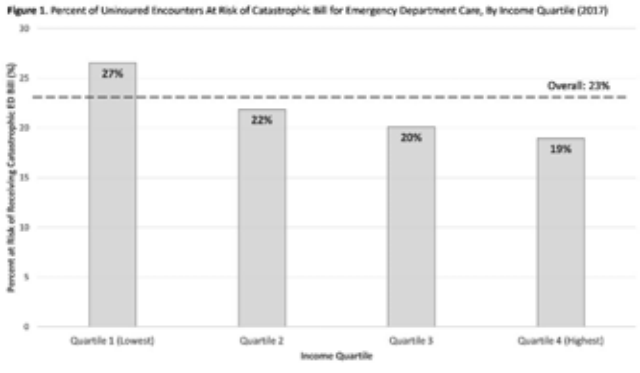
Study Objectives: Patients who lack insurance are uniquely reliant on the emergency department (ED) as a safety-net for vital care. Though the number of uninsured Americans initially declined after the Affordable Care Act (ACA) was enacted, the uninsured rate has been on the rise since 2017. Financial risk protection for patients is critically important as nearly two-thirds of bankruptcies are attributable to medical bills, a problem that is likely to worsen as health care costs continue to increase. However, the degree to which ED bills contribute to financial strain among uninsured patients is currently unknown. To address this gap, we aim to conduct the first-known national analysis to estimate and characterize the risk of economic hardship due to ED bills among uninsured patients.

Methods: The primary data source is the Nationwide Emergency Department Sample, which is the largest publicly-available, all-payer database that captures a nationally-representative sample of U.S. hospital-based ED visits from 2006 to 2017. We obtained each encounter's insurance status, age, sex, primary diagnosis, zip code income quartile, source file (treat-and-release ED visits versus those hospitalized through the ED), and charge for ED services. The analytic sample was limited to uninsured, treat-and-release ED visits in 2017. Each encounter's household income was estimated using zip code income quartile data as has been done in prior studies. Following prior work, a catastrophic health expenditure (CHE) was defined as health expenses (ie, the listed ED charge) that exceeded 10% of projected household income. We calculated the percentage of uninsured treat-and-release ED encounters that met criteria for receiving a CHE bill and characterized this risk by income quartile.

Results: In 2017, there were an estimated 144.8 million ED visits. Of all ED visits, 86% were treat-and-release encounters with 13% being uninsured among this group. Among the uninsured treat-and-release ED encounters, 51% were male, mean age was 34 years, and the median ED charge was $2090 (mean = $3853, range: $100-$551442). A plurality fell into the lowest income quartile (43%), while 11% were categorized in the highest income quartile. An estimated 23% of all uninsured treat-and-release ED encounters met criteria for receiving a CHE bill, which translates to a weighted estimate of over 3.58 million (95% CI, 3.57 million - 3.59 million) ED encounters in 2017. This at-risk group's median ED charge was $8710 (mean = $11,476). Those with the lowest income had the highest risk for receiving a CHE bill for ED care (Figure 1).

Conclusion: Using a conservative estimate for assessing financial hardship among uninsured ED patients, these findings suggest that nearly 1 in 4 uninsured visits were at risk of receiving a financially catastrophic bill for ED care in 2017. This equates to approximately 3.6 million treat-and-release ED encounters that year. Examining these trends over time will be important in light of historic declines in employment and dynamic changes in insurance coverage that disproportionately burden low-income patients.



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EMF 56 An Exploration of Stress and Resilience Amongst Emergency Physicians: An Interpretative Phenomenological Analysis

Chang Y, Xiao X, Nkambule N/Chang Gung Memorial Hospital and Chang Gung University College of Medicine; Chang Gung Medical Education Research Centre (CG-MERC), Taipei, Taiwan; Chang Gung Memorial Hospital, Linkou; Chang Gung Medical Education Research Center (CG-MERC), Taoyuan, Taiwan

Study Objectives: Medical education research has demonstrated the long-term and detrimental impact of stress on health care professionals. Amongst emergency physicians (EPs), the inimical effects of stress have been associated with burnout, poor job satisfaction and attrition. Our research sought to explore the experience and perceptions of stress and resilience amongst EPs to better understand what it means for EPs to encounter and respond to stress.

Methods: A qualitative research design was used to explore how EPs perceive work-related stress and resilience. Data derives from five focus group discussions (81 - 111 minutes) that took place across three hospitals; 35 EPs participated. EPs shared perceptions of work-related stress and stress management by recounting personal experiences. Interpretative phenomenological analysis - which draws from hermeneutics, phenomenology and idiography - was deployed to analyze the data because it centers the subjective experiences of participants. An inductive approach to uncover emerging themes was utilized.

Results: Preliminary findings suggest the following superordinate themes followed by subthemes. Working under uncertainty with subthemes: uncontrollable environment, immediate demands and litigation. Informal benchmarks with subthemes, personal evaluation, peer-to-peer comparison and clinician who can teach and research. Lack of recognition with subthemes: sociocultural context, inappropriate patient expectations, and institutional conflict. Responding to stress with the subthemes, community, meaningful personal life and cognitive strategies. Our research demonstrates that meeting and failing informal benchmarks impacts EPs', of varying levels of experience, self-esteem, which effects their sense of stress. The findings also demonstrate a source of stress that is typically overlooked: the impact of poor public and institutional understanding of medical specialty.

Conclusion: Understanding how EPs' interpret and manage stress provides important insight for existing stress research. These finding also impact the development of initiatives or department wide policy changes aimed at stress management. Stress and resiliency are not fixed concepts. Interrogating perceptions of stress and resilience amongst EPs offers a better understanding of the type of challenges that EPs face. Finally, this exploration has important implications on how wellness and stress reduction curriculum might be developed.

EMF 57 X-Waiver Training for Resident Physicians Increases Emergency Department Buprenorphine Delivery: An Implementation Science Evaluation

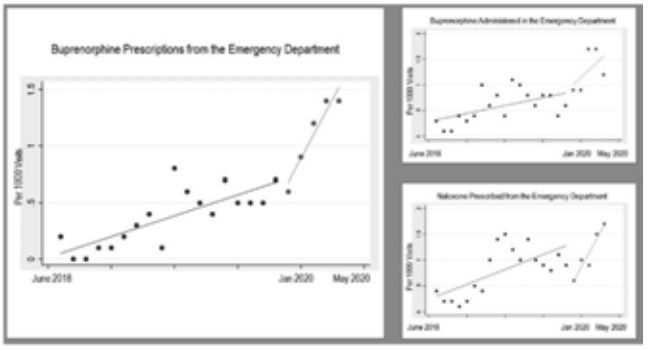
Johnson E, Lam C, Bluthenthal R, Trotsky-Sirr R, Schneberk T/Los Angeles County + USC Medical Center, Department of Emergency Medicine, Los Angeles, CA; Keck School of Medicine of the University of Southern California, Los Angeles, CA; Keck Medical School of the University of Southern California, Los Angeles, CA

Study Objectives: Despite a growing awareness of the opiate epidemic, access to comprehensive care for opiate use disorder (OUD) remains a challenge. Buprenorphine administration in acute opioid withdrawal can lead to improved outcomes for patients with OUD, increased follow up with addiction treatment, reduced illicit drug use and lower medical system costs for drug related ED visits. Emergency providers may serve to provide an induction to medication-assisted therapy (MAT), decreasing the risk of use after discharge, and referring patients to outpatient MAT providers. However, across the spectrum of practice, there continue to be barriers to utilization of buprenorphine, including fears of precipitating withdrawal, fears of diversion or overdose, and beliefs that additional licenses are needed to offer treatment. Residents in training have been shown to carry forward practices learned in residency; thus, targeting educational interventions to these emerging physicians has the potential to affect downstream practice patterns and improve patient care.

Methods: LAC+USC is an urban, tertiary care facility with a large emergency medicine residency. We conducted X-waiver training for all emergency residents, which concluded in January of 2020. We examined the number of residents who obtained their X-waiver following the training and changes in patient care including the number of patients dosed with buprenorphine in the ED for withdrawal, buprenorphine prescriptions, and naloxone prescriptions. Given nationwide changes in volume of patients seen in the ED during the coronavirus pandemic, the denominator used for these comparisons was per 1,000 ED patient visits.

Results: Prior to the X-waiver training, there were three X-waivered residents in the department. 54 residents completed X-waiver training, and as of March 2020, 17 residents were X-waivered. We saw marked increases in buprenorphine treatment and prescribing after the X-waiver intervention (see figure 1). These increases in treatment observed for OUD patients persisted while adjusting for ED volumes.

Conclusion: The X-waiver training effectively and markedly improved rates of buprenorphine and naloxone delivery to patients with OUD. As the opiate epidemic continues to smolder, it will continue to be important to guide resident practice to comprehensive care for OUD. This intervention provides a quantitative roadmap of MAT adoption for programs who provide X-waiver programming for residents.



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EMF 58 National Trends and Outcomes of Sepsis Readmission: 2010 - 2017

Lippi M, Ginde A/University of Colorado, School of Medicine, Aurora, CO

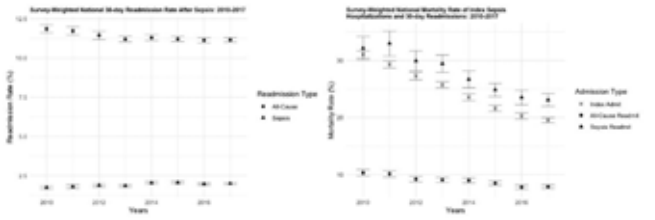
Study Objectives: In the United States, approximately 1.7 million patients are admitted with sepsis annually; however, there has been minimal investigation of the rates or outcomes after readmission. The objective of this study was to estimate the temporal trends in the national readmission rate and readmission mortality after an index hospitalization for sepsis.

Methods: This was a retrospective observational study of sepsis-related hospitalizations and readmission hospitalizations using the Nationwide Readmissions Database (NRD) between 2010 and 2017. In this study, we defined sepsis as visits having an explicit ICD-9 or ICD-10 code for severe sepsis or septic shock. An index hospitalization was defined as the first admission within a year with sepsis. An all-cause readmission was defined as the first admission for any reason within 30 days of discharge from an index admission with sepsis. A sepsis readmission was defined as the first readmission with sepsis within 30 days of discharge from an index admission with sepsis. All other admissions or readmissions were excluded. We calculated national estimates using survey weights in the NRD and the Survey Package in R. Primary outcomes were survey-weighted temporal trends in the rate of readmission and rate of mortality in all-cause and sepsis readmissions. We used joinpoint analysis to determine whether there had been significant changes in temporal trends. To determine the significance of temporal trends, we performed quasibinomial linear regression in the Survey Package in R, adjusted for age and sex.

Results: We measured 1,743,024 index observations of sepsis, representing 3,488,176 survey-weighted index admissions between 2010 and 2017. There were 222,014 all-cause and 39,606 sepsis readmissions, which represented 445,552 all-cause and 76,334 sepsis survey-weighted readmissions. Nationally, all-cause readmissions increased from 11.2% (95% Confidence Interval [CI] 11.0% to 11.3%) to 11.9% (CI 11.6% to 12.1%), and sepsis readmission increased from 1.8% (CI 1.7% to 1.9%) to 2.0% (CI 1.9% to 2.1%). Index admission mortality decreased from 31.0% (CI 30.4% to 31.7) to 19.5% (CI 19.1% to 20.0%). All-cause readmission mortality decreased from 10.3% (CI 9.7% to 10.9%) to 7.9% (CI 7.5% to 8.2%), and sepsis readmission mortality decreased from 32.1% (CI 30.1% to 34.2%) to 23.1% (CI

22.0% to 24.2%). All temporal trends were linear and showed significant temporal trends by linear regression, adjusted for age and sex ($p<0.001$).

Conclusion: As sepsis survival has increased, we observed a modest increase in all-cause readmissions and sepsis readmissions; however, this association is not necessarily causal. Consistent with prior literature, overall sepsis mortality has decreased. This is the first study to demonstrate that sepsis mortality has been decreasing in both index and readmission hospitalizations; although, mortality was higher in sepsis readmissions. Additionally, this is the first study to observe a decrease in mortality in all-cause readmission after sepsis. Further investigation is needed to establish whether readmissions are preventable and whether readmitted patients need to be managed differently to prevent the higher rates of mortality.



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EMF 59 Effects of Consumer Driven Health Plans Enrollment on Emergency Department Costs

Sabbatini AK, Basu A, Hall M/University of Washington, Seattle, WA; University of Washington, Seattle, WA

Study Objectives: In the past decade, Consumer Driven Health Plans (CDHP) have rapidly expanded among commercial payers as a method of cost-containment. Enrollment in CDHPs have been shown to reduce health care spending by 5-24%, however, CDHP beneficiaries are also more likely to skip or delay essential care due to of cost. To date, the consequences of CDHP proliferation on acute and emergent care remain largely unexamined. The goal of this study was to determine the effects of CDHP enrollment on the costs of emergency care.

Methods: This was a retrospective study of commercially insured adults with ED visits between 2013-2016 in the Truven MarketScan database. We utilized a difference-in-differences (DID) study design to compare changes in total and out-of-pocket costs for a 30-day episode of ED care among beneficiaries who were enrolled in a traditional insurance plan (eg, PPO, HMO) in 2013-2014 who then switched to a CDHP in 2015-2016 versus a control group of patients who remained in a traditional plan throughout the duration of 4-year period. Beneficiaries from the CDHP group were matched to those in the control group using propensity scores. Total costs included both the insurer and patient portion of reimbursements and were estimated by aggregating payments for all claims beginning with the date of the index ED visit and extending 30-days. Costs were adjusted for inflation using the Consumer Price Index for Medical Care and are reported in 2016 $USD. DID models adjusted for age, sex, Elixhauser comorbidities, health care use in the 1-year prior to the index ED visit, and disposition from the ED. Year and state fixed-effects were additionally included in the model to control for time trends and differences in CDHP market share across states.

Results: In the CDHP cohort, mean total costs for a 30-day episode of ED care increased from $9,807 in baseline period to $10,642 after switching plan types (relative increase of 8.5%). Among those who remained in traditional insurance, mean total costs increased from $9170 to $10,136 (relative increase of 10.5%), reflecting an unadjusted difference of -$131. After propensity matching, the difference in cost growth between CDHP and control groups was $206 (95% CI -$500 to $912), which was not statistically significantly different. Additionally, no difference between the treatment groups in component costs for index ED visit or 30-day post-discharge period were observed. Not surprisingly, out-of-pocket costs were significantly greater for those who enrolled in a CDHP, growing from $976 to $1603 (64.2% relative increase) versus $764 to $783 (2.5% relative increase) for those remaining in traditional insurance. After propensity matching, there remained a significant and substantial difference in 30-day out-of-pocket costs of $589 (95% CI 555 to 623).

Conclusion: CDHP enrollment does not lower costs during an ED visit or in a 30-day episode of care. Given that prior studies have shown that CDHP enrollment reduces ED utilization, and in particular visits for low-severity conditions, our results suggest that cost-savings associated with CDHPs occur predominantly by disincentivizing patients to use the ED. Once a patient makes the decision to visit the ED, however, they have little control of their total costs of care but may experience nearly double the out-of-pocket costs.

60 The Value of an Integrated Sexual Assault Nurse Examiner Program at Trauma Centers: Comparing the Quality of Documentation

Eisaman D, Geyer S, Women's Emergency Care Research Group, McFarland JM, Fleming C, Suyama J, Women's Emergency Care Research Group/Department of Emergency Medicine, University of Pittsburgh, Pittsburgh, PA

Study Objectives: To determine whether an integrated sexual assault nurse examiner (SANE) program at a trauma center improves quality of documentation and forensic evidence collection.

Methods: This is a retrospective case review of patients seen at two Level I Trauma Centers, one with an integrated SANE program, and the other without who required forensic evidence collection after a traumatic sexual assault. This case series, from January 1, 2013 to December 31, 2017, included patients who had injuries requiring trauma center activation and radiological imaging. For the purposes of our study, an integrated SANE program utilizes certified nurse examiners who require ongoing training and feedback of performed exams from a QA perspective. Each sexual assault case was reviewed for 44 separate elements for documentation by two separate blinded sexual assault nurse examiners with experience in case review for quality. The training of the nurse involved as well as the timeliness of initiation of the exam was also reviewed.

Results: A total of 29 cases met inclusion criteria, 21 cases at the site with an integrated SANE program and 8 cases at the site without an integrated program. At both sites, all exams were performed by Adult SANEs (SANE-A). Each site had several different examiners during the study period. The number of documented errors at the site with an integrated SANE program was 3.24 (1-6.5 SD 1.44) per sexual assault case. The site without an integrated SANE program had an error rate of 8.94 (6.5-15.5 SD 3.04) per case. By comparison of means, this is significant to p value <.001. All cases had at least one error by at least one reviewer. Errors were found in approximately 85% of the reviewed categories with an interobserver kappa of .657 with a 88.5% agreement rate. About a third of documentation errors related to chain of custody (9.8%), photography of injuries (15.3%) and patient discharge and follow up information (4.2%). There was no significant difference in time for initiation of care between the two sites, mean of 58 minutes vs 59.1 minutes with a median 28 minutes and 22 minutes respectively. The initiation of forensic exams was delayed three cases were due to inability of the patient to give consent, the extent of injuries, or patient indecisiveness on forensic collection.

Conclusion: Patients seen in the Trauma Center with an integrated sexual assault evaluation program had forensic documentation with fewer errors compared to the Trauma Center without an integrated program. Both programs had similar timeliness of care and initial training for the nurses performing the documentation, but the site without a quality assurance had more documentation errors. An integrated SANE program appears to allow for significantly improved quality of documentation in patients with significant traumatic injuries due to a sexual assault, potentially enhancing the efficacy of future legal proceedings.

61 Characteristics of Ectopic Pregnancies Presenting to an Urban Academic Emergency Department at a Tertiary Care Center for Obstetrics

Eisaman D, Brown N, Geyer S, Suyama J/Women's Emergency Care Research Group/Department of Emergency Medicine, University of Pittsburgh, Pittsburgh, PA; School of Health Sciences, Chatham University, Pittsburgh, PA

Study Objectives: To identify the clinical utility of Beta Human Chorionic Gonadotropin levels and the overall rate of medical treatment failure, hemodynamic instability, and emergent surgery for ectopic pregnancies in the ED.

Methods: An interim analysis of a retrospective case review of patients seen in an urban academic Emergency Department specializing in obstetrical care from January 1,

2015 to December 31, 2017 with the diagnosis of ectopic pregnancy. Data from the chart was extracted for multiple variables including presentation, treatment, adverse outcomes and rates of rupture.

Results: In this cohort, 367 unique ectopic pregnancies were identified. 23.7% of these patients initially presented with evidence of rupture on pelvic ultrasound. Additionally, 16.2% showed evidence of hemodynamic instability (Heart rate>100, SBP<90 or evidence of significant blood loss). 18.5% (n-113) of patients who received single-dose methotrexate failed medical management and required surgical intervention. For patients who received multi-dose methotrexate, 45.1% (n-29) failed medical management. Ultimately, 53.4% of patients required operative management of their ectopic pregnancy. Although the mean Beta Human Chorionic Gonadotropin (ß-HCG) level at initial presentation was 6515 mlU/ml (SD 16291 mlU/ml) with a median of 1274 mlU/ml, 51.7% of ectopic pregnancies presented with ß-HCG levels less than the standard discriminatory zone of 1500 mlU/ml. Additionally, 40% of the patients who presented with evidence of ectopic rupture had ß-HCG levels less than 1500mlU/ml. When comparing the size of the ectopic pregnancy (based on maximum dimension) to ß-HCG levels, this comparison failed to show any correlation between the size of the ectopic pregnancy and the ß-HCG level. Furthermore, detection of ectopic pregnancies by ultrasound was also independent of ß-HCG levels.

Conclusion: ß-HCG levels do not correlate with the presence or size of an ectopic pregnancy. This further supports the need to perform appropriate diagnostic imaging regardless of ß-HCG level in patients with suspicion for ectopic pregnancy. Almost a fifth of patients present with evidence of hemodynamic instability, and approximately one quarter of patients presented with a ruptured ectopic pregnancy requiring emergent operative management. Close follow-up is essential for medically treated ectopic pregnancies as many patients will require surgical intervention for definitive management. Ultimately, more than 50% of patients still require an operative procedure to definitively manage their ectopic pregnancy.

62 Utilizing BEFAST to Implement "Direct to CT" Stroke Algorithm at Triage Decreases Door to CT Perform Time in Emergency Department

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Study Objectives: In early 2019, the American Heart Association released "Target Stroke: Phase III" which set a primary goal to achieve door-to-needle times within 60 minutes in 85 percent or more of acute ischemic stroke patients treated with IV thrombolytics. Obtaining a Head Computed Tomography (CT) Scan is the rate limiting step in the process of administering IV thrombolytics in the emergency department (ED). Emergency Medical Services (EMS) pre-notification "Direct to CT" (DCT) is one of several interventions recommended as a best practice to streamline this process. However, DCT protocols existed only for 9% of our ED stroke population whom arrived via EMS pre-notification. A new Triage DCT algorithm was implemented May 15, 2019 to address this treatment gap. Triage DCT leverages nursing use of the Balance-Eyes-Face-Arms-Speech-Time (BEFAST) scale to identify stroke patients at triage. This study retrospectively evaluates reductions from Triage DCT in (i) door to CT performed and (ii) door to Tissue Plasminogen Activator (tPA) administered.

Methods: This study occurred from May 15, 2019 to December 31, 2019 in a tertiary, urban ED with 50,000 visits/year. Prior to implementation, all ED nurses were educated during daily in-person briefs on the use of the BEFAST scale to identify potential stroke patients and initiate DCT at triage. Mock drills were simulated to prepare staff. All ED patients who activated a stroke code and had stroke symptoms onset prior to their arrival were sampled for retrospective chart review. Patients less than 18 years old or who declined interventions were excluded. All data was recorded in a secure database and included time stamps of a patient's arrival, Head CT performed, and tPA administered, in addition to their mode of arrival and final disposition. A two - tail T-test was used to determine significance in reductions between (i) Triage DCT (ii) EMS DCT and (iii) No DCT (baseline). A 2-sided alpha level of less than 0.05 was considered statistically significant.

Results: Of 609 patients, 54 (8.9%) were EMS DCT and 151 (24.7%) were Triage DCT. Baseline mean door to CT performed was 26 minutes compared to 6 ($p = 0.000$) for EMS DCT and 10 ($p = 0.000$) for Triage DCT. Of 609 patients, 30 (4.9%) received tPA. 11 (36.6%) were EMS DCT and three (10%) were Triage DCT. Baseline mean door to tPA administered was 59 minutes compared to 34 ($p = 0.035$) for EMS DCT and 71 ($p = 0.727$) for Triage DCT.

Conclusion: Triage DCT reduced mean door to CT performed ($p=0.000$) as significantly as EMS DCT. A comparable mean door to tPA administered reduction was not seen. It is possible a larger sample size would support such a difference.

63 Incidence and Determinants of COVID-19 Emergency Department Revisits

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Study Objectives: Emergency department (ED) revisits are associated with significant resource utilization. Accordingly, revisits serve as an important quality measure for emergency care. In recent times, EDs have been challenged by critical resource constraints in the setting of the COVID-19 pandemic. When appropriate, medically stable COVID-19 patients are discharged home rather than admitted for further care. However, the natural history of COVID-19 is not well understood and patients may quickly progress to requiring medical attention. To our knowledge, ED revisits have not been previously characterized in the setting of COVID-19. We aim to quantify the incidence of, as well as determine risk factors for, ED revisits for COVID-19 patients.

Methods: We conducted retrospective study of 323 reverse-transcription polymerase chain reaction-confirmed COVID-19 patients who presented to a single academic tertiary-care institution from March 15 to April 15 of 2020. Demographic and clinical information was abstracted from the electronic medical record. Predictor variables (age, history of hypertension, diabetes, asthma, chronic obstructive pulmonary disease, current tobacco or marijuana use) were selected based on current knowledge of risk factors for severe COVID-19 illness. All return visits to the ED within 28 days of index ED presentation were classified as revisits. Multivariable logistic regression models were used to identify independent demographic and clinical risk factors for ED revisits. We also performed exploratory univariable analyses of a subset of 179 patients who had measured serum biomarkers (absolute neutrophil count (ANC), alanine aminotransferase (ALT), ferritin, C-reactive protein, D-dimer, lactate dehydrogenase (LDH)) in order to identify potential biochemical risk factors for ED revisits.

Results: Of the 323 patients studied, 98 were discharged from the ED during their index visit and 225 were admitted to the hospital. Among those discharged, 25/98 (25.5%) returned within 28 days of index ED presentation. Median time to revisit was 3 days (interquartile range (IQR): 2 to 7). Among those admitted during their index visit (median hospital length of stay: 6 days), 26/225 (11.6%) returned within 28 days of index ED presentation. Median time to revisit for this group was 14.5 days (IQR: 5 to 22). Cumulative incidence of ED revisits was 15.8% (95% CI: 12.2 to 20.2). Patients with and without ED revisits were similar across demographic and clinical variables examined, with the exceptions of tobacco or marijuana use and history of COPD. Both tobacco or marijuana use (odds ratio (OR): 2.9, 95% CI: 1.1 to 7.6) and history of COPD (OR: 3.1, 95% CI: 1.1 to 8.8) were found to be independent risk factors for ED revisits. In our exploratory analysis of patients with biomarker data, ANC (OR: 0.808, 95% CI: 0.689 to 0.948), ALT (OR: 0.973, 95% CI: 0.953 to 0.993), and LDH (OR: 0.996, 95% CI: 0.992 to 0.999) were found to be associated with ED revisits.

Conclusion: The incidence of ED revisits in our COVID-19 cohort was 15.8% (95% CI: 12.2 to 20.2). Risk factors for revisits included current tobacco or marijuana use and history of COPD. Preliminary study suggests the utility of serum biomarker data in helping to stratify revisit risk. In future analysis we will determine the reasons for ED revisits as well as develop a model for identifying those at risk for ED revisits.

64 Health Care Costs in Direct-acting Oral Anticoagulant Major Bleeding Treated with 4-factor Prothrombin Complex Concentrate and Other Agents

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Study Objectives: Major bleeding events in the presence of direct-acting oral anticoagulants (DOAC) are associated with poor prognosis and a substantial clinical burden. Real-world data comparing economic outcomes associated with 4-factor prothrombin complex concentrate (4F-PCC) and related hemostatic agents is sparse.

This study aimed to compare health care resource use and inpatient costs among patients with DOAC-related bleeding treated with 4F-PCC and other agents (non-PCC treated).

Methods: This retrospective observational study utilized a multi-source real-world database (IQVIA) capturing outpatient, prescription, and hospital claims to identify adult patients with >1 inpatient hospitalization claim(s) for a major bleed between April 1, 2016 and April 30, 2018 and DOAC (apixaban, rivaroxaban, edoxaban) prescription within 90 days prior to the index hospitalization. Economic outcomes were compared between patients who received 4F-PCC and those who received other agents (fresh frozen plasma, plasma cryoprecipitates, packed red blood cells, tranexamic acid, factor VIII inhibitor bypassing activity, recombinant factor VIIa, vitamin K, platelets) or transfusion during the major bleed hospitalization. To adjust for baseline differences, the 4F-PCC cohort was 1:1 propensity score matched (PSM) with the non-PCC treated cohort, stratified by bleed type (gastrointestinal, intracranial, other). McNemar's test and the Wilcoxon signed-rank test were used to compare economic outcomes related to inpatient costs for the index hospitalization between the cohorts.

Results: 617 4F-PCC patients (mean age = 75 years, 50.4% females) and 3,072 non-PCC treated patients (mean age = 71 years, 49% female) were identified. PSM yielded 421 matched pairs for 4F-PCC and non-PCC treated cohorts. The cohorts were balanced in terms of age, sex, region, payer type, Charlson Comorbidity Index (CCI) score and other comorbidities of interest (All P >0.5). In both cohorts, 26.1% (n=110 matches) had intracranial hemorrhage, 37.5% (n=158 matches) had gastrointestinal bleeds, and 36.3% (n=153 matches) had other bleeds. Concomitant medication use was high, with 67.5% of 4F-PCC patients and 65.3% of non-4F-PCC patients being treated with more than one hemostatic agent. Total inpatient health care costs for the index hospitalization were high across the two cohorts (Table; median total inpatient costs: $43,406 for 4F-PCC and $43,743 for non-4F-PCC, p=0.858).

Conclusion: Health care costs for DOAC-related major bleed hospitalizations were substantial, and similar for patients treated with 4F-PCC and non-4F-PCC. Further research is needed to understand the clinical outcomes and cost-effectiveness associated with use of 4F-PCC in DOAC-related major bleeds.

Table. Median health care costs for patients with DOAC bleeds treated with 4F-PCC and other agents

Costs Per Major Bleed Hospitalization	4F-PCC, Median (IQR)	Non-4F-PCC treated, Median (IQR)	P value
	N = 421	N=421	
Total Inpatient Costs	$43,406 ($55,520)	$43,743 ($73,134)	0.858
Cost per Hospital Day	$7,006 ($5,404)	$6,311 ($5,725)	0.055

65 Characteristics and Outcomes of Left Ventricular Assist Device Patients Presenting to the Emergency Department

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Study Objectives: Left Ventricular Assist Devices (LVADs) are increasingly common among heart failure patients. The unique physiology presents a challenge to the emergency provider in making treatment and disposition decisions. Despite the increasing prevalence of LVADs, there remains a dearth of literature describing emergency department (ED) visits among this population. Our study objective was to describe clinical characteristics and outcomes among patients with implanted LVAD devices presenting to the ED.

Methods: We conducted an observational cohort study of adult patients presenting to two quaternary care EDs (Mayo Clinic, Jacksonville, FL and Mayo Clinic, Rochester, MN) from January 1, 2013 to December 31, 2017 who were known to have a LVAD. We collected information on patient demographics, chief complaint, history, medications, ED studies, disposition and patient outcomes. Data were summarized with descriptive statistics.

Results: During the study period, 329 ED visits among 116 unique patients met inclusion criteria. The median age was 64 years. In 168 (51%) encounters, the reason for implantation was bridge to transplant, while 158 (48%) were implanted as destination therapy. There were 22 (6.7%) visits among patients whose LVAD was implanted elsewhere. The most common complaints were dyspnea (21.0%), bleeding (18.5%), and chest pain (10.6%). Visits directly related to the LVAD were rare (9.4%), though visits in which the LVAD was a contributing factor (eg, anticoagulation and bleeding) were common (61.3%). AICD discharge was reported in 9% of visits. Discharge from the ED occurred in 50.8%, and 5.2% required ICU admission. Among all patients, 35.4% returned to the ED within one month. Destination therapy patients were 49.7% less likely to return to the ED within 30 days compared to bridge to transplant patients (OR = 0.503, 95% CI: 0.30 - 0.85, p = .010). The LVAD was replaced in 7 cases (2.1%). There was one death in the ED, and among admitted patients, 15.9% died in the hospital.

Conclusion: In this multi-center, cohort study of ED visits among patients with an LVAD, we found that dyspnea, bleeding, and chest pain were the most common complaints. Visits directly related to the LVAD were uncommon. Half of patients were discharged to home, and return visits to the ED were more common among bridge to transplant patients.

66 Comparing Conventional and High Sensitivity Troponin in Predicting a Major Acute Coronary Event in Chest Pain Patients with Intact Renal Function

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Study Objectives: This study determined whether high sensitivity troponin outperformed its predecessor in predicting a major adverse coronary event (MACE) in intact kidney function patients.

Methods: This retrospective cohort study of ED patients diagnosed with chest pain, angina, unstable angina, or myocardial infarction (ICD-10 codes R07, I20, I21) was conducted from January 1 to November 27, 2018 at a tertiary care academic ED center (annual volume 95,000). Inclusion criteria was intact renal function (eGFR > 60 ml/min/1.72m2). The Roche® 4th generation conventional troponin (cTnT) was used until June 12 with a negative troponin defined as <0.06ng/mL and positive as ≥0.06ng/mL. Then, the Roche® 5th generation high sensitivity troponin (hsTnT) was used with a negative troponin defined as ≤14ng/L and a positive as ≥52ng/L. All patients were then reviewed for a MACE, defined as cardiac-related mortality, need for a coronary stent or bypass graft, or clinically diagnosed myocardial infarction type 1 or 2 within 6 weeks of initial ED visit.

Results: 6360 ED chest pain patient records were reviewed. 5063 had normal renal function. Of these, 2,655 patients (51±15 years, 56% female) had conventional troponin drawn, of which 147 patients had a MACE (prevalence = 5.5%) (see Table). 53 patients had a positive cTnT, of which 44 patients developed a MACE (PPV = 83.0%). The remaining 2,602 patients had negative cTnT, of which 103 patients developed a MACE (NPV = 96%). The positive likelihood ratio (+LR) of an elevated cTnT detecting a MACE was very high at 83 (95% CI 42, 168). The negative likelihood ratio (-LR) of a negative cTnT excluding a MACE was moderate at 0.70 (95% CI 0.63, 0.78). 2174 patients (49±15 years, 59% female) had a positive or negative high sensitivity troponin, of which 99 patients had a MACE (prevalence = 4.6%). 77 patients had a positive hsTnT of which 51 developed a MACE (PPV = 66.2%). Of the 2097 patients with a negative hsTnT, 48 developed a MACE (NPV = 97.7%). The +LR of a positive hsTnT detecting a MACE was significant at 41 (95% CI 41, 63) but lower than that of cTnT. The -LR of a negative hsTnT excluding a MACE was more significant at 0.49 (95% CI 0.40, 0.60) than that of a negative cTnT.

Conclusion: In patients with normal renal function, a negative high sensitivity troponin is more likely than conventional troponin to exclude a MACE event. However, this comes at a slight cost, as a positive high sensitivity troponin has a lesser chance to detect MACE than a positive conventional troponin.

Intact Renal ED CP Pts	# Pts	Sens	Spec	PPV (95% CI)	NPV (95% CI)	+LR [95% CI]	-LR [95% CI]
cTnT	2655	29.9%	99.6%	83.0% (81.5-84.5%)	96.0% (95.2-96.8%)	83 [42, 168]	0.70 [0.63, 0.78]
hsTnT	2174	51.5%	98.7%	66.2% (64.3-68.1%)	97.7% (97.1-98.3%)	41 [27, 63]	0.49 [0.40, 0.60]

67 Clinical Outcomes of Oral Factor Xa-Inhibitor Associated Gastrointestinal Bleeds Treated with or without 4F-PCC among US Medicare Patients

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Study Objectives: Prior to the availability of a specific oral factor Xa (fXa) inhibitor reversal agent, off-label replacement agents including 4-factor prothrombin complex concentrates (4F-PCC) were used to treat life-threatening hemorrhage including gastrointestinal (GI) bleeds. We compared outcomes of US Medicare patients hospitalized for oral fXa-inhibitor associated GI bleeds treated with or without 4F-PCC.

Methods: We utilized a 20% random sample of Medicare fee-for-service beneficiaries who had Part A and D (medication) coverage. We included adult ($\geq$ 18 years) patients experiencing their first hospitalization (index event) for major GI bleeding identified via ICD9/10 codes, between 10/2013 and 9/2017. Serious GI bleeds were defined by ICD9/10 codes developed based on the Cunningham and Joos et al. algorithms. Inclusion criteria were continuous medical and prescription coverage and a claim for apixaban, edoxaban, or rivaroxaban during the 6-months prior to the index event. Patients were divided into two cohorts based on treatment with or without 4F-PCC during the index GI bleed hospitalization. Fresh frozen plasma, cryoprecipitates, packed red blood cells, activated PCC, recombinant factor VIIa, desmopressin acetate, tranexamic acid and vitamin K administration were allowed in either cohort. Use of more than one agent in either group was defined as concomitant therapy. Endpoints included the 1) intensive care unit (ICU) treatment, 2) total hospital length of stay, 3) discharge disposition and 4) 30-day readmission.

Results: Among 8,169 patients hospitalized for GI bleeding, 62 (0.75%) patients were treated with 4F-PCC. Mean age was 78.4 years and 58.8% were female. Because of the low numbers the two groups could not be propensity matched. Overall in-hospital mortality was 1.7%. Concomitant therapy was 56.5% 4F-PCC-treated vs. 45.3% non-4F-PCC patients. Incidence of ICU was 71.0% 4F-PCC vs 39.4% non-4F-PCC patients. Median (Interquartile range) hospital stay was 6 (4, 10) for 4F-PCC vs 5 (4, 6) days non-4F-PCC patients. Discharge disposition home was 45.2% for 4F-PCC vs 57.8% non-4F-PCC patients. All-cause readmission at 30 days was 18.0% for 4F-PCC vs 18.8% non-4F-PCC patients (Table 1).

Conclusion: In a large descriptive analysis of hospitalized Medicare patients with oral fXa-inhibitor associated major GI bleeds, those treated with 4F-PCC had higher concomitant medication use, longer LOS, and lower frequency of discharge to home. Whether this is a result of off-label use of 4F-PCC or other variables in these complex patients is uncertain and deserves further study.

Table 1. Characteristics of US Medicare patients hospitalized for oral fXai-associated GI bleeds

	All (N=8,169)	4F-PCC Treated (N=62)	Non-4F-PCC Treated (N=8,107)
Indication for fXa inhibitors (%)			
Atrial fibrillation	75.8	79.0	75.8
Deep vein thrombosis/ venous thromboembolism	24.0	25.8	24.0
Any concomitant medication (%)	45.4	56.5	45.3
Packed RBCs (%)	43.8	53.2	43.7
Characteristics of index hospitalization			
Length of stay in days (Median; interquartile range)	5.0 (4.0-6.0)	6.0 (4.0-10.0)	5.0 (4.0-6.0)
Index hospitalization as ICU (%)	39.7	71.0	39.4
Discharge status (%)			
Home	57.7	45.2	57.8
Discharge to a location other than home (including in-hospital death)*	42.3	54.8	42.2

*Data on in-hospital death alone was not reported by treatment cohort in order to comply with the Centers for Medicare and Medicaid Services' Cell Size Suppression Policy

68 Back Pain Patient Satisfaction Scores Did Not Change after Legislation Resulting in Opiate Prescription Decrease

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Study Objectives: In response to the opiate crisis, New Jersey (NJ) enacted legislation in February 2017 that required physicians, when prescribing opiates, to look up patients' previous opiate prescription history, counsel safe opiate use and document all this in the emergency department (ED) chart. We previously found ED opiate prescriptions markedly decreased by 62% in the ten months after the legislation. We hypothesized that the decrease in ED opiate prescriptions would lead to a drop in ED back pain patient satisfaction scores.

Methods: Retrospective multihospital cohort of ED visits. The setting was 16 NJ urban and suburban EDs with annual visits from 21,000 to 99,000. Consecutive patients seen by ED physicians from 1/1/2016 to 8/31/2018. Using ICD 10 codes, we identified back pain patients. For patient satisfaction, we used the results of a mailed survey (Press Ganey Associates). Although the return rate on this survey is low, the survey is widely used nationally to judge performance in the ED. We computed and plotted the average ED physician patient satisfaction scores for each month over the time period of the study. A priori we chose to calculate the average satisfaction score for the 12 months before and the 12 months after February 2017 (See Table). We also calculated the linear regression coefficient of the plot for the entire period (1/1/2016 to 8/31/2018).

Results: Of the 3,888,502 visits in the database, 112,296 were for back pain and of these 1523 surveys were returned. There was no change in the average ED physician patient satisfaction scores for the 12 months before and after February 2017 (average

score = 84 for both periods). The linear regression coefficient of the plot for the entire period 1/1/2016 to 8/31/2018 was R squared = 0.0004 (p = 0.91).

Conclusion: Contrary to our hypothesis, there was no change in ED back pain patient satisfaction scores after legislation, despite a marked decrease in ED opiate prescriptions.

12 months before and 12 months after February 2017

Back pain					
Year and month of service	Visits	Avg Satisfaction Score	Avg Doc Score	# of Responses	
201602	3,330	85.3	85.6	60	1
201603	3,444	82.9	84.8	38	1
201604	3,489	82.3	80.0	53	1
201605	3,503	81.9	82.7	44	1
201606	3,475	85.1	82.7	46	1
201607	3,576	88.3	88.3	66	1
201608	3,533	82.7	82.0	44	1
201609	3,532	86.9	87.7	42	1
201610	3,621	84.3	83.8	66	1
201611	3,180	87.6	85.4	41	1
201612	3,465	84.1	83.2	57	1
201701	3,604	81.4	81.4	41	1
averages		84.4	84.0	49.8	12
201703	3,420	86.3	86.7	58	1
201704	3,610	79.8	78.4	45	1
201705	3,862	79.4	78.0	56	1
201706	3,721	84.6	85.5	46	1
201707	3,709	85.2	84.2	40	1
201708	3,820	91.1	92.1	40	1
201709	3,476	87.3	86.6	50	1
201710	3,730	88.5	88.3	54	1
201711	3,471	85.5	86.6	43	1
201712	3,256	82.8	80.7	47	1
201801	3,663	85.0	83.6	38	1
201802	3,184	81.4	78.1	44	1
averages		84.8	84.1	46.8	12

69 Four-year Reimbursement Trends to a Single Health System from Local Out-of-Network Health Plans

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Study Objectives: Network-based delivery of health care has been developed to provide high-quality, cost-efficient, coordinated care. With the increasing development of organized, network-based and value-based care, emphasis is given to delivering care at patient's in-network facilities. When care is obtained out-of-network (OON), reimbursement to the OON facility may vary. The purpose of this study was to determine the trends in reimbursement rates to our health system for OON patients admitted at our facilities.

Methods: This was a retrospective descriptive study performed between January 2013 and December 2017 at a tertiary care, referral University hospital. Included were: 1) patients identified in our electronic health record (EHR) who were admitted for >1 day at one of our two acute care University hospitals which were considered out-of-network (OON) facilities by the patients' primary health network, and 2) patients whose health system network was any one of three specific, non-governmental, large health care systems in our region. Excluded were patients who were not insured through one of these three health care networks. We identified the reimbursement rates from the OON health systems to our institution for the included patients' admission. We trended reimbursement rates to our institution from the OON health systems for those patients who were not repatriated to one of their networks' acute care hospitals and remained at our institution for the duration of their admission and for those re-patriated to their network's acute care hospital regardless of length of stay. Descriptive statistics are reported.

Results: A total of 6297 OON admitted patients were identified in our EHR. The distribution of these OON patients among the three local health systems was as follows: 56.6% network A, 33% network B and 10.4% network C. Of these OON patients, 5173 patients (82.2%) were not repatriated and remained at our institution for the duration of their hospitalization. 1124 patients (17.9%) were repatriated back to their in-network facilities. Overall, for those OON patients not repatriated, there was a decrease in reimbursement rates to our institution from 45.1% in 2013 to 40.7% in 2017 with a median annual decrease of 4.4%. Among those OON patients re-patriated, there was a decrease in reimbursement rates from 44.4% in 2013 to 33.2% in 2017 with a median annual decrease of 3.2%. Reimbursement to our institution for non-repatriated patients trended downward for all three health systems. Reimbursement for re-patriated patients trended downward for two of the health systems (A and C) and upward for the third (B).

Conclusion: Reimbursement to our institution as an OON provider to patients belonging to other local health system networks is decreasing. These reimbursement trends may reflect the increasing importance of organized, value-based care networks. This study was limited in that this was a single, tertiary care, referral health system's data and may not be generalizable to other health systems.

70 The Effect of Rapid COVID-19 Testing on Emergency Department Throughput

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Study Objectives: Emergency departments (ED) across the world continue to grapple with the COVID-19 pandemic. One growing concern is the ability to rapidly diagnose those infected with the SARS-CoV-2 virus. While rapid assays have proven beneficial in such contexts as strep pharyngitis and influenza, it is unclear whether the recent rapid COVID-19 assays will prove beneficial to ED flow. The purpose of this study is to assess the effect of a rapid COVID-19 assay on patient flow through two academic emergency department sites.

Methods: This was a retrospective, multi-facility study conducted between March 10, 2020 and May 9, 2020 at two university hospital EDs that are part of one health system. A rapid COVID-19 assay became available in our health system on April 10, 2020. Included were ED patients of all ages undergoing COVID-19 testing who were considered persons under investigation (PUI). PUIs tested between March 10, 2020 and April 9, 2020 via PCR testing served as the control group. Those tested between April 10, 2020 and May 9, 2020 via the rapid assay comprised the intervention group. Differences in length of stay (LOS) were analyzed between the two groups using T tests and multivariate regression.

Results: A total of 9,929 ED patient encounters occurred during the study period, and 3,137 PUIs underwent COVID-19 testing. Average age was 50 years. Fifty-six percent were male. 1,339 PUIs (42.7%) were tested with the PCR test during the control period. 1,798 PUIs (57.3%) were tested with the rapid assay during the intervention period. In the control group, 788 PUIs were discharged and 493 PUIs were admitted. In the intervention group, 512 PUIs were discharged and 1,129 PUIs were admitted. Mean length of stay (LOS) was 341 minutes and 489 minutes for PUI seen in the control period and in the intervention period, respectively (p<.001). When parsed by disposition, differences in mean LOS remained significant for those who were discharged (p<.001), but not for those who were admitted (p=0.35). After controlling for severity index, disposition, and demographic factors, testing with the rapid assay during the intervention period remained associated with an increased length of stay of approximately 95 minutes (95% CI 72-118, p<.001).

Conclusion: The use of a rapid COVID-19 assay did not improve patient throughput in our ED and was associated with a longer LOS, especially among those discharged from the ED. Additional testing is needed to determine the utility of the rapid COVID-19 test among an ED population.

71 COVID-19 Referral Patterns for Tent and Drive-Through Screening

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Study Objectives: In fewer than 6 months, the SARS-CoV-2 virus (COVID-19) has been responsible for over 100,000 American deaths. The creation of novel COVID-19 screening sites such as walk-up medical tents and drive-through testing sites may improve our ability to rapidly screen large numbers of people without overwhelming traditional medical sites such as clinics or hospitals. How these novel screening sites are used by patients, providers, and the community is still unknown. Our objective was to investigate why, and how patients were being referred for screening.

Methods: We evaluated the referral patterns for a single COVID-19 walk-up medical tent and a single drive-through testing site established one-block from an urban academic tertiary-care hospital between March 2020 and June 2020. Data was gathered as to why and how the patient was referred. Reasons for referral included being immunocompromised or having an immunocompromising comorbidity (such as diabetes), requirement by an employer, asymptomatic patients exposed within the last 7-14 days, age greater than 65, health care workers, and other. Data on how the patients were referred, included telehealth visits with real-time audio-visual, telephone calls, or in-person office visits was also gathered. Data was abstracted from standardized collection forms and checked for accuracy by two reviewers. Descriptive analytics were used to describe the cohort.

Results: Of the 767 patients who presented for screening, 39.5% were referred for being immunocompromised or having an immunocompromising comorbidity. Employer requirements constituted 30.8% of referrals. Asymptomatic patients with positive exposures in the last 7-14 days made up 13.4% of referrals. Age greater than 65 and health care workers constituted 11.6% and 9.8% of referrals respectively. The remaining 8.2% were referred for "other" reasons. When examining how the referrals were made, 58.7% came from tele-health visits with real-time audio-visual. Telephone visits constituted 35.8% of referrals, and in-person office visits made up the remaining 5.5%.

Conclusion: As expected, the vast majority of screening referrals came from patients who were immunocompromised or had immunocompromising comorbidities. Remarkably, 30.8% of referrals were made based on (non-health care) employer requirements. This may be explained by the prolonged stay-at-home orders governing the DMV area (DC, Maryland and Virginia). Many patients may have been essential workers, required by their jobs to undergo screening. This study could not confirm who the employers were, or if the screening requirements were scientific. Regardless, the role of employers in generating demand for screening services must be noted. When examining how referrals were made, 94.5% stemmed from real-time audio-visual telehealth appointments (58.7%) or telephone appointments (35.8%). It has been noted that telehealth has the potential to improve access and equity. The role of telehealth in a pandemic seems vital in delivering care directly to our most medically and socio-economically vulnerable. Furthermore, tele-health may be critical in expanding access to essential workers in a time of crisis.

72 Post Hoc Analysis of the RCT Comparing F(ab')$_2$to Fab Antivenom: Control of Venom-induced Tissue Injury in Copperhead Snakebite Patients

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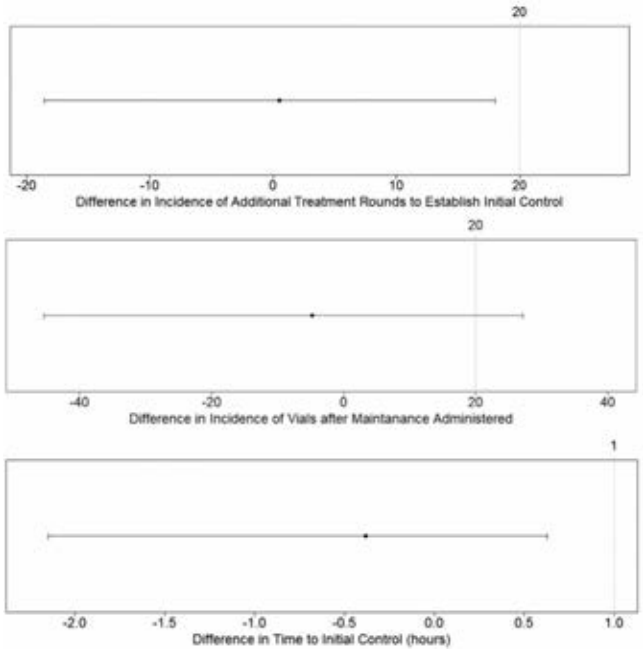
Background: Fab antivenom (FabAV) halts progression of venom-induced tissue injury and improves recovery in copperhead snakebite. It is unknown if F(ab')$_2$ does as well. A prior study comparing F(ab')$_2$AV with FabAV included copperhead snakebite patients and made assessments of the initial and maintenance control of the envenomation syndrome. In copperhead snakebite, these assessments primarily evaluate the control of tissue injury. The objective of this study is to compare control of tissue injury in copperhead snakebite patients treated with F(ab')$_2$ versus Fab antivenom.

Methods: We performed a post hoc analysis of the copperhead envenomated patients in a prospective, multicenter, blinded, randomized, controlled trial (RCT) comparing F(ab')$_2$AV to FabAV approved by the Institutional Review Board at each site and registered at ClinicalTrials.gov, #00636116. In this analysis, only patients with copperhead snakebite as determined by the investigator and with clinical signs of envenomation were evaluated. Patients were randomized to one of three arms with the initial control and maintenance study drugs as follows: 1) F(ab')$_2$/placebo 2) F(ab')$_2$/F(ab')$_2$ 3) Fab/Fab. The primary outcome of this analysis is the number of repeat doses required to obtain initial control. Additional outcomes include the time from antivenom administration to initial control and the number of patients requiring additional doses after maintenance. Control of the envenomation syndrome was evaluated after start of antivenom, after each dose, and on days 5, 8, and 15. We performed a non-inferiority analysis of the combined F(ab')$_2$AV group with the FabAV group assuming a meaningful difference in the proportion of patients receiving repeat initial control doses or unscheduled post maintenance doses of 20%, and a meaningful difference in time to initial control of >1 hr.

Results: Of the 121 enrolled patients in the original trial, 21 (13 F(ab')$_2$AV, 8 FabAV) had definitive copperhead envenomation. Mean age was 43.9 (SD 21.4) years with a male predominance of 86%. Baseline snakebite severity score and time to antivenom were similar between F(ab')$_2$AV and FabAV groups. One (8%) F(ab')$_2$AV and 2 (25%) FabAV patients required repeat initial dosing, difference = 17%, 95% CI (-18, 57). One (8%) F(ab')$_2$AV and 1(13%) FabAV patients required additional doses after maintenance, difference = 5% ,95% CI (-27, 45). Median time to initial control was 2.7 IQR (2.0, 9.3) hours and 3.5 IQR (2.0, 7.4) for F(ab')$_2$AV and FabAV respectively, difference - 0.7 hours, 95% CI (-0.9, 2.6). Repeat initial dosing and time to initial control met the post hoc non-inferiority assumptions, whereas additional doses after maintenance did not. See figure.

Conclusions: A rigorous RCT comparing F(ab')$_2$ and Fab antivenom was performed and included a small subgroup of copperhead snakebite patients. A meaningful difference was determined in a post hoc manner and this exploratory analysis indicated that the available measures of the control of tissue injury were not statistically different between the two groups. Further work is required to verify these findings.

Figure: Comparison of F(ab')$_2$ with Fab antivenom.



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73 Epidemiology of Pediatric Opioid Exposures Reported to the National Poison Data System

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Study Objectives: Pediatric accidental exposures present a significant public health challenge and can result in serious complications, with approximately 60% of calls received by poison centers (PCs) in 2017 attributed to children. There were 4,235 fatalities among patients aged 15-24 years as a result of a drug-related overdose in 2015 with more than half of these involving opioids. The aim of this study was to evaluate pediatric opioid exposures reported to the United States Poison Centers (PCs).

Methods: Pediatric exposures, defined per National Poison Data System (NPDS) specifications as individuals aged $\leq$ 19 years, to opioids were identified. Serious medical outcomes (SMO) were defined as cases that resulted in moderate or major outcomes as well as deaths. Descriptive statistics were used to analyze the characteristics of pediatric exposures. Poisson regression models were used to evaluate the trends in the number and rates of exposures. Risk markers for SMO were highlighted using multivariable logistic regression models.

Results: There were 101,201 pediatric opioid exposures reported to the PCs during the study, with 21% of the cases demonstrating SMO. The proportion of patients under 5 years of age was significantly lower in exposures with SMO (21.9% vs 78.1%). The proportion of SMO during the study period increased from 15.2% to 21.1%. Demographically, the exposures with SMO occurred more frequently in males (54.1% vs 45.3%). The proportion of suspected suicides (46% vs 21.6%) and intentional abuse (20.4% vs 5.8%) was higher among exposures with SMO, primarily driven by the teenage population. More than 80% of the cases less than 5 years of age resulted from accidental exposure to opioids. Single substance exposures were more common in exposures without SMO (53.5% vs 42.7%). Multiple opioids were reported in 7.5% of SMO exposures and 2.8% of exposures without SMO. The most common site of exposure in both groups was residence and hydrocodone and oxycodone were the most commonly reported opioid exposures. Children between 6 and 19 years of age had a 35% higher risk of such outcomes (AOR: 1.35, 95% CI: 1.27 - 1.44) (Reference: 0 - 5 years). Similarly, males had a significantly higher risk of SMO compared to females (AOR: 1.19, 95% CI: 1.14 - 1.23). SMO were 4 times more likely in cases of intentional abuse (AOR: 4.78, 95% CI: 4.47 - 5.13). Serious outcomes were also significantly associated with exposure to multiple substances (AOR: 2.18, 95% CI: 2.10 - 2.27).

Conclusion: Our study noted an increase in the proportion of serious medical outcomes among pediatric opioid exposures, which highlights the need for greater attention to managing prescriptions and increasing patient awareness regarding the safe storage and adverse effects of these medications. The reasons for exposure varied among different pediatric age groups. Several factors independently increased the risk of serious medical outcomes in this patient population.

74 Using an Observation Unit to Decrease Disparities in Opiate Medically Assisted Treatment Program Follow Up

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Study Objectives: The opioid use disorder epidemic has increased dramatically in the last two decades. Medication-assisted therapy (MAT) for opioid use is a well-established tool for addressing the opioid epidemic. Despite the proven success there are small studies suggesting that black patients and women are less likely to receive medically assisted treatment during opiate rehabilitation. Even with the rise of emergency department-initiated medically assisted treatment programs (MATP) for opiate dependency, little research exists investigating sex or race differences in enrollment to them. Emergency Department Observation Units (EDOUs) are ideally protocol driven patient care areas where decisions can be made about whether to admit a patient or discharge to home. For patients with opioid use disorder, there may be a confounding ingestion which would complicate withdrawal and thus necessitate an inpatient admission. This decision, made in concert with a toxicologist, can be combined with a warm handoff (invitation to clinic and initiation).

Aim: to determine the rate of follow up in a MATP with an EDOU providing a 'warm-handoff' and also to determine if there is variance in race and sex from the visits to this EDOU and MATP follow up.

Out hypothesis was that patients placed in the EDOU using a 'warm-handoff' mechanism in concert with toxicology would have an attrition rate to the MAOT clinic less than 50% and have insignificant race and sex variance in MATP follow up.

Methods: We retrospectively collected data on patients placed in a protocol driven EDOU from the emergency department, over 22 months (January 2018 and October 2019). While in the EDOU, patients were evaluated for co-ingestants, evaluated by a toxicologist who assessed their level of withdrawal and used this information to initiate suboxone therapy and arrange follow up in the toxicology administered medication-assisted therapy clinic. The association between sex, race, and clinic follow-up was evaluated using a logistic regression which included the main effects of sex and race, and the two-way interaction.

Results: There were a total of 101 uses of the EDOU suboxone protocol during the study period of which 88 were unique cases and included full outcome data. 34 patients (38.6%) identified as White and 59 (67.0%) identified as Male. The median age was 39 (IQR: 30 - 54) and the median COWS score was 10.5 (IQR: 6 - 14). Of these 39 (44.3%) followed up in our MATP. Neither sex (OR = 1.0, 95% CI: 0.99 - 1.01), race (OR = 0.22, 95% CI: 0.04 - 1.33), nor the interactions between these factors (OR = 3.46, 95% CI: 0.43 - 27.6) were significant.

Conclusion: Although the numbers are small, this single center study suggests that using an EDOU and standardizing the pathway to MAT may help eliminate disparities that have been described in larger populations in systems without a 'warm-handoff' mechanism. Further epidemiologic studies to understand this population and prospective studies are needed on the issue to best describe the role of the EDOU in this epidemic.

75 Acute Toxicity Associated With Cannabis Edibles Following Decriminalization of Marijuana in Michigan

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Study Objectives: The state law to legalize recreational use of marihuana in Michigan went into effect in December 2018. Increased availability and use of cannabis in Michigan have led to an increase in emergency department (ED) visits associated with all forms of the drug.

We describe the clinical effects and toxicity associated with ingestion of food products containing Delta-9-tetrahydrocannabinol (THC), during the early legalization period of recreational cannabis in Michigan.

Methods: This was a retrospective cohort analysis of consecutive patients diagnosed with toxicity related to edible cannabis (food products, beverages). Patients were seen at seven EDs over an 18-month study period (Nov 2018-April 2020). Affiliated institutions included three rural medical centers, three university-affiliated hospitals and a children's tertiary care facility. Data collected included demographics, out-of-hospital care, product ingested, dose form, coingestants, and clinical findings. Descriptive statistics (mean, SD) and frequency tables were used to describe the key quantitative and qualitative variables. A second investigator performed a blinded critical review of a random sample of 10% of the programs to determine reliability using kappa statistics.

Results: During the study period, 578 patients were evaluated for THC toxicity; 94 visits (16.2%) were attributable to edible cannabis. The most common ingestions were brownies and cookies (51.1%), followed by candy (22.3%), beverages (10.6%), cannabis resin (9.6%) and joints (6.4%). The average age was 35.4 + 14.8 (range, 1 to 82 years). Ten patients (10.6%) were > 64 years and 5 (5.3%) were children < 12 years of age. The frequency of visits attributable to inhaled and edible cannabis increased each month throughout the study period. Visits attributable to inhaled cannabis were more likely to be for cannabinoid hyperemesis syndrome (30.8%) and visits attributable to edible cannabis were due to altered mental status (52.1%), psychiatric symptoms (20.2%), cardiovascular symptoms (10.6%), neurologic symptoms (8.5%) and gastrointestinal (8.5%). Fifteen (16.0%) patients arrived by EMS with seven requiring out-of-hospital treatment (naloxone, oxygen). Polysubstance use was reported in histories and/or drug screens of only 7 (7.7%) of patients, with the most common substances being ethanol and opiates. Five patients were hospitalized due to pneumonia (2), delirium (2), and status epilepticus (1). Five children were referred to protective services for unintentional exposures. Interrater reliability of the data abstraction was excellent, with a median kappa statistic of 0.86.

Conclusions: In this community-based study, ED visits attributable to food products containing THC have increased following legalization of marijuana. The majority of patients presented with altered mental status, followed by psychiatric and cardiovascular complaints. Unintentional exposures in children were rare, surprisingly 10% of patients were elderly.

76 Understanding the Opioid-related Mortality in the United States Using a National Real-time Database

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Study Objectives: Opioid-related deaths are one of the leading causes of accidental deaths in the United States with 70,237 fatalities in 2017 and the age-adjusted rate of drug overdose deaths increasing by 16% each year between 2014 and 2017. This study aims to characterize the opioid-related mortality reported to U.S. poison centers (PCs).

Methods: A retrospective study was conducted using The National Poison Data System (NPDS), querying it for all human exposures to opioids between 2011 and 2018. The demographic and clinical characteristics of exposures were descriptively assessed. Temporal trends in the frequency of opioid reports were evaluated by using a generalized linear mixed model with a Poisson distribution. Independent predictors of opioid mortality were studied using logistic regression. Adjusted odds ratios (AOR) and the corresponding 95% confidence intervals (95% CI) were reported.

Results: There were a total of 604,183 opioid exposure calls made to the PCs during the study period. The frequency of opioid exposures decreased by 28.9% (95% CI: -29.6%, -28.1%; $p<0.001$), and the rate of opioid exposures decreased by 21.2% (95% CI: -24.7%, -16.9%; $p<0.001$). There were 7,246 deaths in our study sample (1.2%). Among opioid-related deaths, there was a greater proportion of cases demonstrating poly substance exposures (80.7% vs 48.7%), including multiple opioids (24.9% vs 7.4%) as compared to non-fatal exposures. Cases between ages 30 and 39 years (19.9% vs 15.3%) and males (55.4% vs 44.5%) were more common in the exposures that resulted in deaths. Intentional abuse accounted for approximately half of the opioid related deaths. Hydrocodone exposures were most frequently observed. The risk of opioid-related death was the highest in cases between 50 and 59 years of age (Ref: 20 – 29 years) (AOR: 2.53, 95% CI: 2.34 – 2.75). Conversely, cases under 6 years of age (AOR: 0.46, 95% CI: 0.35 – 0.60) were 54% less likely to have a fatal opioid exposure. Males were 16% more likely than females to have a fatal overdose (AOR: 1.16, 95% CI: 1.10 – 1.22). Poly-substance exposures significantly increased the risk of mortality with the odds of death increasing 10-fold in cases exposed to 4 or more substances. Other important predictors of an opioid-related death were intentional abuse (Ref: Unintentional exposure) (AOR: 4.92, 95% CI: 4.58 – 5.28) and parenteral route of administration (Ref: Ingestion) (AOR: 3.52, 95% CI: 3.18 – 3.90).

Conclusions: Analysis of PC data indicated that several demographic and clinical factors increased the risk of a fatal overdose. The fatality risk was higher among intentional reasons for exposures and occurred in older age groups. Continued surveillance of opioid-related adverse events is key to highlight changes in the patterns of such adverse events while also ensuring the implementation of timely and tailored responses.

77 Intra-articular Lidocaine versus Procedural Sedation for Anterior Shoulder Dislocations

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Study Objectives: Shoulder dislocations are the most common dislocations presenting to emergency departments (EDs). Due to the large groups of muscles involved, shoulder dislocation reductions are difficult to achieve for the provider if the patient's pain is not adequately controlled. There are several ways of providing anesthesia for shoulder dislocation reductions, and two of the most common are intra-articular lidocaine (IAL) injections and procedural sedation. Prior studies have found that the use of IAL is safer and results in a shorter ED length of stay (LOS) as compared to procedural sedation, but those studies used sedative medications that have fallen out of favor. The purpose of this study was to compare IAL to procedural sedation with propofol or etomidate for closed reduction of anterior shoulder dislocations.

Methods: This was a single center, open label, randomized controlled trial. ED patients from 18 to 70 years old who had an anterior shoulder dislocation without an associated fracture (other than a Hill-Sachs) were eligible for enrollment. Consenting patients were randomized to either procedural sedation (with provider's choice of propofol or etomidate) or IAL. The dose of procedural sedation medication was per provider discretion. The initial study protocol stated that patients randomized to the IAL group would receive 20mL of 1% lidocaine into the glenohumeral joint, but due to a shortage of 1% lidocaine, injections with 10mL of 2% lidocaine were also allowed. The primary outcome measure was ED LOS. Secondarily the number of attempts required for successful reduction and patient satisfaction were compared between groups.

Results: In total, 43 patients were enrolled with 23 randomized to the IAL group and 20 to the procedural sedation group. Three patients randomized to the IAL group ended up getting procedural sedation after failed attempts at reduction. In those randomized to the IAL group, the mean ED LOS was 133 minutes as compared to 124 minutes for the procedural sedation group. The difference of 9 minutes (95% CI -22 to 41) was not statistically significant ($p = 0.54$). Patients in the IAL group had a higher mean number of reduction attempts at 1.9 as compared to 1.2 in the procedural sedation group (difference 0.7 [95% CI 0.2 to 1.2]). The mean patient satisfaction scores were similar at 9.7 and 9.8 for the IAL and procedural sedation groups, respectively (difference 0.1 [95% CI -0.3 to 0.4]).

Conclusion: Although this study was underpowered to detect small differences, there was no statistically significant difference in mean ED LOS or patient satisfaction for patients who received IAL for their shoulder dislocation reduction as compared to those who received procedural sedation. Patients randomized into the procedural sedation group required less number of attempts for successful reduction compared to those randomized into the IAL group.

78 Withdrawn

79 Efficacy of the Ultrasound Guided Bilateral Erector Spinae Plane Block in Treating Traumatic Thoracic Pain

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Study Objectives: Patients presenting to the emergency department (ED) with traumatic thoracic injuries are often in severe pain and are at high risk of developing respiratory complications secondary to decreased tidal volumes and opioid administration. The erector spinae plane block (ESPB) is a regional anesthesia technique previously described for perioperative and chronic pain. Our objective is to describe the novel use and efficacy of the bilateral ultrasound guided ESPB (and associated catheter placement) performed by emergency physicians for the treatment of acute traumatic thoracic pain.

Methods: We performed a retrospective case series review of nine patients presenting to the ED in a five-month period between July and November 2019. All presented with bilateral thoracic trauma and had bilateral ESPBs placed by emergency physicians with simultaneous placement of catheters for continuous regional analgesia. We reviewed the medical record for each patient including data regarding opioid use, subjective pain scores and complications of the procedure. Opioid use was standardized by converting all opioids given to a patient (excluding those given for procedures such as catheterization) into the morphine milligram equivalent (MME). Mann-Whitney testing was used to compare the MME per day (MMED) used by patients with the ESPB catheter in place and days without the catheter.

Results: The average age of patients was 62.8 years of age including five males and four females. Six patients had trauma from falls or motor vehicle collisions and three had injuries from chest compressions. All patients had at least two rib fractures on each thoracic side with a mean total of 10.4 rib fractures per patient. All patients received an initial bolus of ropivacaine and a subsequent infusion ranging from 10 to 14 milliliters per hour. The average duration of the catheters was 6.9 days. The median MMED without the ESPB catheter was 47.0 mg/day (IQR 26.7-100) compared to 18.5 mg/day (IQR 5-41.1) with the catheter ($p = 0.056$). All patients had decreased opioid use with catheter placement except one patient who did not receive any opioids at all. All patients reported subjective improvement in pain with catheter placement. No complications such as infection, hemorrhage, pneumothorax, or local anesthetic toxicity were found.

Conclusion: The bilateral ultrasound guided ESPB is an effective treatment for acute traumatic thoracic pain and can be performed safely by emergency physicians.

80 Los Angeles Fire Department Telemedicine Program: An Emergency Dispatch Center Based Pilot

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Study Objectives: The Los Angeles Fire Department (LAFD) has experienced an unprecedented growth in 911 calls for emergency medical services (EMS), including a disproportionate growth among low-acuity 911-callers. Managing these low-acuity calls is even more critical in the era of COVID-19 (CV19) where EMS over-utilization puts both EMS providers and patients at risk. The LAFD Telemedicine Program (LTP) integrates advanced providers (AP) (nurse practitioners, physician assistants, and emergency physicians) into the Los Angeles Tiered Dispatch System. 911 callers between the ages of 2 and 64 years old with low-acuity complaints and no priority symptoms are transferred from the emergency medical dispatcher to the AP. Through a telemedicine platform, the AP can perform an assessment and release the patient without dispatching field emergency resources or dispatch the appropriate EMS field resource or a taxi to transport the patient to an emergency department (ED) or alternative destination. The objective of this pilot study is to describe the initial experiences of this novel program.

Methods: This is a 2-month retrospective review from April 6 to May 31, 2020 of electronic medical records for 911-calls that were referred to LTP. Additionally, all patients who received care through LTP were contacted within 24 hours via phone to evaluate the need to access further emergency care through 911 or an ED and to assess their overall satisfaction. The primary outcome is the disposition of patients who were triaged to the LTP. Secondary outcomes include the need for further emergency care, and patient satisfaction. Descriptive statistics are used.

Results: During its first 2 months of service, the LTP attended 159 patients, of whom 49 (30.8%) were treated via telemedicine alone and no resources were dispatched ("No Send"); 9 (5.6%) were sent for further care via taxi; and 101 (63.4%) were dispatched and evaluated by EMS providers on scene. Of these 159 patients, 94 (59.1%) completed a brief phone survey. No patients reported accessing further emergency care through 911 or an ED after their LTP encounter. Overall, the mean satisfaction score of care provided by the LAFD was 9.3 out of 10. As a result of LTP intervention, 58 LAFD field resources remained available for the next time-critical call, >100 sets of PPE were preserved, and countless potential CV19 exposures were avoided.

Conclusion: Preliminary data suggests that dispatch-initiated telemedicine with a "No Send" option can be safely integrated into EMS systems to preserve emergency resources, reduce exposure of field medical providers, and provide quality care for low-acuity calls. Further, larger studies are needed to evaluate safety and efficacy.

81 Implementing a Telehealth System in Baja California, Mexico to Address COVID-19 Pandemic

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Study Objectives: This paper describes the development and deployment of a rapid response emergency telemedicine system to address the coronavirus pandemic in the State of Baja California, Mexico by coordinating government agencies, private technology companies, public universities, a private academic center and volunteer resources to deliver an enhanced level of care. Government and industry have well-established procedures supported by resources to respond to disasters, whether natural or man-made. Disasters, however widespread, typically have circumferential boundaries within which responses are managed. However, the novel coronavirus, COVID-19, is a public health care emergency with no defined boundaries for which established government and private response structures are inadequate and soon overwhelmed, especially in existing health care underserved areas.

Methods: The Faculty of Medicine and Psychology (FMP) of the Autonomous University of Baja California (UABC), in coordination with the Secretary of Health of the State of Baja California and the Control, Command, Communication and Computing Center (C4) emergency operations center of the State Government, launched the Telehealth System COVID-19 to provide advice, remote consultation, quarantine follow-up and triage of respiratory diseases to the general population of the entire State of Baja California. Professors and students of medicine, psychology, emergency medical technicians and other related disciplines provide care direction. Fifty-seven medical interns in social service and one-hundred and sixty medical interns of the FMP and more than 1,000 volunteers registered in the Voluntary Health Assistance Network have been assigned to the 24 hours a day COVID-19 response team. The calls received at 911 emergency number were directed to the Telehealth System, were recorded, and monitored to ensure quality control. The Telmedx mobile phone-based telemedicine platform with encrypted audio and video (provided free of charge) is used by doctors and other health professionals to provide medical advice remotely upon request. Additionally, an EMS Track system is being used to track and dispatch ambulances for COVID-19 patients. This system was designed in collaboration between the FMP, the University of California, San Diego, and the Tijuana Technological Institute. Follow-up of quarantine patients is through a Web platform provided and serviced by the Tijuana Technological Institute.

Results: In the period between April 1 and May 31, 2020, the Telehealth System has received 5,040 calls channeled from the 911 emergency system, from which 1,220 ambulances have been dispatched. The MPSS, MIP and phycologist volunteers made 11,824 follow-up calls for patients in quarantine, giving medical or psychological orientation. All of this has accumulated 6,252 hours of labor, 16,864 calls and estimated economical savings of $3,820,000 Mexican pesos.

Conclusion: The Telehealth System COVID-19 has demonstrated an unparalleled level of care to the citizens of Baja California in response to the coronavirus pandemic. A superior telehealth response system was rapidly created and deployed utilizing government, academic, private sector, and volunteer resources.

82 Geographic Information System-Assisted Pediatric Surge Planning: Preparing Connecticut's Hospitals to Respond to a Significant Storm Event

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Study Objectives: Disaster planning is one of the core roles for hospital leadership and public health bodies. As a result of climate change, there is increased urgency to prepare health care facilities to manage the care of patients during large storms. We hypothesize that planners can use Geographic Information Systems Mapping (GIS) to identify priority areas for emergency planning, model hurricane patterns within Connecticut (CT) and assess the impact on hospital accessibility, catchment area and pediatric surge.

Methods: We mapped in GIS the 28 Connecticut (CT) acute care hospitals, roads, and the inundation layer of a Category (Cat) 4 Hurricane striking CT. Using pediatric data from the 2017 5-Year American Community Survey, which subset the CT population into 833 individual census tracts, alongside the cost distance and allocation tools in the ArcGIS Pro software, we calculated the pre- and post-flood catchment areas and maximum pediatric surge potential for the hospitals during a Cat 4 hurricane. A breakeven analysis for each hospital's estimated storm-related pediatric surge was determined using the respective facility's annually-averaged inpatient bed utilization data, reported to the state. The Center for Disease Control and Prevention's Social Vulnerability Index (SVI), along with estimates of total affected children, were used to identify high vulnerability priority areas for emergency planning.

Results: During a Cat 4 hurricane, the potential surge to individual hospitals ranged from 0 to 15,215 children. Relative to pre-flood, post-flood catchment numbers decrease for 5 hospitals whilst increasing for 7 hospitals, ranging from -1,535 to +2,135, respectively. Using SVI with GIS, 17 tracts with 521 children/tract on average were identified as high priority areas. Each of these tracts were characterized by >30% poverty, >85 % minority status and >30% without vehicle access. All 17 priority tracks were identified within New Haven and Bridgeport. Statewide, if 0.41% (0.33%,0.52%) of children living in areas impacted by a Cat 4 hurricane are admitted to hospitals, CT's acute care pediatric capacity (statewide aggregate) will be overwhelmed. In the range of 0.1-2% surge of affected children, no more than 7 of the 28 CT hospitals can provide pediatric beds to the estimated pediatric patient surge.

Conclusion: Our findings indicate the potential surge in pediatric patients exceeds the staffed bed capacity of CT's acute care hospitals during a Cat 4 hurricane. The interplay between geospatial data with health and demographic data provides an important means to ensure health systems are prepared to respond to emergencies. The information from this study, and the general methodology, can aid emergency planners to better prepare for a pediatric focused emergency and allow them to generate and improve contingency plans to manage such a surge.

EMF

83 Out-of-Hospital Chest Pain Management in the United States

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Study Objectives: Acute chest pain accounts for 20% of emergency medical services (EMS) calls annually. However, data describing out-of-hospital chest pain management by paramedics across the US are limited. This study seeks to describe the US chest pain population seen by EMS, examine out-of-hospital treatment, and evaluate differences between rural and urban settings.

Methods: A national out-of-hospital data registry maintained by ESO Solutions (Austin, TX) for all 911 emergent responses was queried for adult patients with an impression of chest pain from January 1, 2015 to January 1, 2018. Registry data included patient demographics, vital signs, and treatments. This included whether the patient was administered aspirin, nitroglycerin, a vasopressor agent, or required intubation. Patients were classified as hemodynamically unstable as defined by symptomatic hypotension (systolic blood pressure < 90mm Hg), tachycardia (heart rate >120), bradycardia (heart rate <40), or hypoxemia (<90% pulse-oximetry on room air or normal home oxygen flow rate). Patient encounters were also delineated based on encounter zip code matched by ESO Solutions to census tract data from the United States Census Bureau's 2010 census to characterize each encounter as either rural or urban. Descriptive statistics were utilized to analyze the population.

Results: During the study period, there were 510,641 encounters that met the inclusion criteria. The median age was 62 (IQR 50-75) and 50.7% were female (258,870/510,461). Rural cases comprised 9.6% (49,036/510,461) of the cohort with 87.6% urban (447,283/510,461). A total of 2.8% (14,082/510,461) were hemodynamically unstable. Medication administration was reported on 63.4% (323,692/510,461) of the sample. Among those documented to have received a medication, 77.6% (n=251,075/323,692) received aspirin, 60.8% (n=196,810/323,692) received nitroglycerin, and 0.10% (n=311/323,692) received a vasopressor medication. Out-of-hospital intubation was performed in 0.08% of encounters. The majority of cases were coded as emergent priority in 93.2% (475,995/510,461) while 5.8% were coded as non-emergent (29,443/510,461).

Conclusion: Hemodynamic instability was rare in this large cohort of US EMS patients with acute chest pain. Aspirin and nitroglycerin were administered to most patients, but use was lower than expected based on guidelines and protocols. The majority of encounters in this United States cohort were in urban environments. These data suggest that there is room for improvement in adherence to out-of-hospital chest pain management protocols.

84 The Opioid Epidemic Meets the Coronavirus Pandemic: Rates of Emergency Department Visits for Opiate Use Disorder during COVID-19

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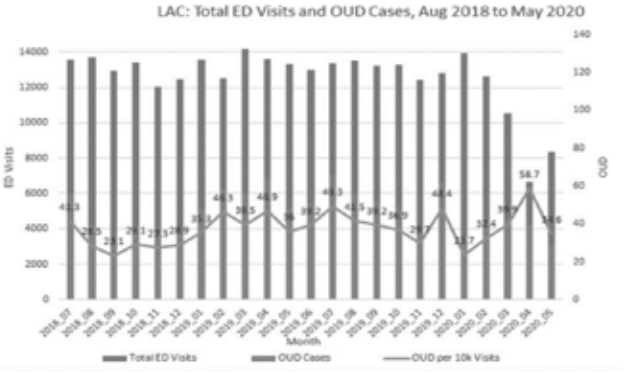
Study Objectives: There is growing evidence that medication assisted therapy (MAT) which includes buprenorphine can lead to improved outcomes for patients with opiate use disorder (OUD), increased follow up with addiction treatment programs, as well as reduced illicit drug use and medical system costs for drug related emergency department (ED) visits. Emergency providers may serve to provide an induction to MAT and referrals to outpatient MAT providers. However, there continue to be barriers to utilization of buprenorphine from the ED including fears of precipitating withdrawal, fears of diversion or overdose, and beliefs that additional licenses are needed to offer treatment. The novel coronavirus epidemic threatens to pose even greater barriers to treatment access. EDs continue to serve patients throughout this crisis and may provide a critical role in continuing to link patients to MAT and provide care to patients with OUD.

Methods: Our institution had planned to study the impact of an X-waiver training program for residents in our large, urban residency program. Closures during the coronavirus decreased patient volumes for many health care settings, especially outpatient clinics where much of MAT is delivered. We hypothesized that the "safer at home" order would have minimal impact on the percentage of patients presenting with OUD related complaints, as this would be coupled with less access to community resources that had previously provided support. We considered OUD-related ED visits as those which included any of the following: visits with a discharge diagnosis related to OUD, patients administered buprenorphine or naloxone while in the ED, and visits where a prescription for buprenorphine or naloxone was given on discharge. We analyzed these visit rates compared with all ED visits per month.

Results: The number of ED visits in January 2020 and February 2020 were 13,933 and 12,639 with rates of OUD-related visits 24 and 32 per 10,000, respectively. Social distancing guidelines were announced in Los Angeles on March 11, and stay at home orders began March 19, 2020. In April and May, there were 6,649 and 8,385 ED visits, however, rates of OUD-related visits were 59 and 35 per 10,000.

Conclusion: Restrictive requirements on MAT dispensation already limits access to office-based treatment; during the coronavirus, the closure of clinics and other ancillary services to support persons with OUD threaten those most at risk of relapse. The COVID-19 pandemic and the changes in response to it have exacerbated disparities for marginalized populations. In order to combat these disparities, we need to recognize and bolster the systems of care serving these patient groups. Our ED continued to see steady rates of OUD-related visits, reinforcing the importance of continuing efforts to provide MAT from our social safety net. ED MAT programming represents an important portal to care, especially as a stop gap when other access points are destabilized.



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85 Physician-perceived Barriers to Treating Opiate Use Disorder in the Emergency Department

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Study Objectives: The emergency department (ED) is increasingly becoming the starting point to propel opiate use disorder (OUD) patients into appropriate medication assisted treatment (MAT) programs. And while the practicality and success of utilizing the ED to initiate MAT has been demonstrated, large scale buy-in to this model is lacking. We aimed to assess physicians' perceptions of barriers to starting MAT in the ED, views of the utility of MAT, and abilities to link OUD patients to MAT programs in their respective communities. We also wanted to assess differences in opinions between residents and attendings to identify potential teaching points to enhance resident education.

Methods: This was a cross-sectional study of emergency physicians affiliated with a residency program via a self-administered online survey. Questions consisted of either multiple-choice or yes/no answers to assess perceptions of barriers to starting OUD patients on MAT. Respondents included physicians with a range of years in emergency medicine practice that was self-disclosed. For our purposes, a facility capable of MAT was one that could provide at minimum buprenorphine/naloxone (Suboxone®) treatment. Statistics were performed by JMP software with a two-tailed Z-test of proportions.

Results: A total of 98 physicians responded to the survey with 33% female and 55% resident physicians. An overwhelming majority, 80% of respondents would be

interested in starting OUD patients on MAT, such as buprenorphine/naloxone (Suboxone®), and 94% either "agreed" or "strongly agreed" that MAT was helpful for OUD patients to overcome addiction but only 53% had knowledge of the X-waiver (mandated training to prescribe buprenorphine/naloxone [Suboxone®] long-term) and 32% knew of an outpatient community facility capable of continuing buprenorphine/naloxone (Suboxone®) management. When dividing responses by level of training, residents were more eager to start OUD patients on MAT (71% vs 52%, p=0.04) than attendings but were less familiar with what the X-waiver is (38% vs 73%, p=0.001), where community outpatient MAT facilities are (21% vs 43%, p=0.02), or having ever referred OUD patients to MAT programs in their individual practice (7% vs 30%, p=0.003). There were no differences between residents and attendings in perception of utility of MAT for OUD patients (96% vs 90%, p=0.27) or perception of condoning continued opiate use by prescribing naloxone (Narcan®) to discharged OUD patients from the ED (14% vs 15%, p=0.85).

Conclusion: Support for MAT is high among all levels of emergency physicians but knowledge of community resources and required training (like the X-waiver) to prescribe certain forms of MAT remains a barrier. Among resident physicians compared to attending physicians, the knowledge gap of community MAT facilities and the practice of referring OUD patients for MAT is widened, demonstrating clear areas to bolster residency training.

86 Hospitals Can't Do It Alone: Navigating Addiction Care and Treatment

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Study Objectives: Hospitals support communities in times of crisis, however the current prevalence of substance use (SU) issues have put a strain on traditional clinical settings. Patients who are identified as engaging in high-risk substance use face a systematic absence of comprehensive discharge planning and connection to specialized care navigation. In the U.S. in 2018, only 10.2% of people with a substance use disorder received treatment. Our objective was to develop a specialized external navigation framework for substance use.

Methods: Project Connect (PC) is a collaboration between a large health care delivery system and a community-based organization. PC was built on top of our Screening, Brief Intervention, and Referral to Treatment (SBIRT) Program in two large emergency departments (EDs). PC staff were on-boarded as health system volunteers and trained on SBIRT, health system policies, and procedures. SBIRT Health Coaches identified patients who would benefit from external care navigation for substance use and called PC staff to engage with the patient. We enrolled 298 patients from April 2018 to August 2019. PC staff completed a baseline intake, and structured engagement at 7/30/60/90/120 days. Support provided for patients and families included referrals to the most appropriate services regardless of affiliation (neutrality), connection to transportation, assistance with insurance, and continued conversations to maintain motivation and hope. We used REDCap for shared data collection between the two organizations.

Results: 200 (68%) patients were successfully handed off to PC staff for a baseline intake and external care navigation. Of patients reached at each time point, 53% were engaged in treatment for their substance use at baseline, 65% at 30 days, 60% at 60 days, 53% at 90 days, and 71% at 120 days. At 120 days, an additional 15% of patients not in treatment reported abstinence. PC staff assisted patients with navigation between levels of care, including detox, inpatient, outpatient, and sober housing. Out of the 298 patients enrolled, 45 (15%) attended at least two programs, and 154 (52%) attended at least one level of care or recovery support. Other services provided include family support, social service applications, primary care referrals, domestic violence support services, and coordination with the criminal justice system.

Conclusion: Project Connect has served to illustrate the importance of measured approaches in formulating cross-organizational collaborations and proven to be a successful model for supporting patients with substance use issues beyond the hospital setting. 52% of patients engaged in any treatment well exceeds the national average of 10%. Shared communication pathways have allowed for open conversation and continual process improvement. This model is being disseminated to additional EDs and future studies will evaluate patient experience measures.

87 Imbalance in US Emergency Department Openings and Closures Over 18 Years of Increasing Demand for Emergency Care: 2001 to 2018

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Study Objectives: Emergency departments (EDs) provide 24/7 emergency care and also serve as a health care "safety net." Rising dependence on this safety net role has heightened concern about the impact of ED closures on access to health care. We examined ED openings and closures, in both urban and non-urban areas, in the US between 2001 and 2018.

Methods: We created the 2018 National ED Inventory (NEDI)-USA using data collected from a national survey of non-specialty, non-federal US EDs and compared it to the 2001 NEDI-USA database of similar design. We classified ED urban status using county-based Urban Influence Codes (UIC). We collapsed UIC categories into four groupings, one urban area and three non-urban areas: adjacent to urban, large non-adjacent and small non-adjacent. We also characterized EDs by US region, freestanding ED, Critical Access Hospital Program (CAHP) and Council of Teaching Hospital (COTH). Multivariable logistic regression with generalized estimating equations was used to identify ED characteristics independently associated with closure.

Results: In 2018, there were 5,514 US EDs. Among the 4,435 EDs open in both 2001 and 2018, 82% reported increases in visit volume; the typical ED saw a median of 16,146 visits (interquartile range [IQR] 6,837- 30,179) in 2001 vs 23,725 visits (IQR 9,000-47,450) in 2018 (P<0.001), an increase of 47%. Overall, including all US EDs in a given year, there were 101.1 million ED visits in 2001 vs 159.0 million in 2018 (+57%). Over the 18-year period, a total of 1,079 EDs opened while 449 closed; representing a net gain of 630 EDs or 13%. Urban areas had the largest net ED gain of 685 EDs (997 openings, 312 closures), while non-urban areas showed a net loss of 55 EDs (82 opening, 137 closures). Regionally, net ED gains were observed in the Midwest (155 openings, 95 closures), South (708 openings, 185 closures), and West (193 openings, 70 closures); the Northeast was the only region to experience a net loss in EDs (23 openings, 99 closures). A large ED increase was observed among freestanding EDs, gaining 648 EDs (661 openings, 13 closures), an increase of 1,322%. CAHP EDs experienced a net loss of 4 EDs (44 openings, 48 closures), and COTH EDs experienced a net loss of 24 EDs (3 openings, 27 closures). In a multivariable model with annual ED visit volume, urban location, US region, freestanding ED, CAHP status, and COTH status, ED closure was more likely in the Northeast (OR 1.47, as compared to South; 95% CI, 1.16-1.86). ED closure was less likely in EDs with larger annual visit volumes (OR 0.95 per 1,000 visits, 95% CI 0.94-0.95); non-urban settings, as compared to urban areas (adjacent to urban OR 0.42, 95% CI 0.33-0.54; large rural OR 0.32, 95% CI 0.20-0.52; small rural OR 0.23, 95% CI 0.15-0.35), and among CAHP EDs (OR 0.15, 95% CI 0.10-0.21). Freestanding and COTH EDs were not associated with ED closure. Most EDs that closed were the result of a financial decision (74%). Other primary reasons for closure were merger/consolidation (11%), conversion to another facility type (7%; eg, urgent care center with limited hours), and other reasons (8%; eg, natural disaster).

Conclusion: Between 2001 and 2018, NEDI-USA data showed a net gain in US EDs (+13%) but a much larger increase in annual ED visit volume (+57%). While the total number of US EDs continues to rise, especially EDs in urban areas and freestanding EDs, ED openings are not keeping pace with the growing demand for emergency care.

88 Risk of Serious Bacterial Infections among Recently Immunized Young Febrile Infants in the General Emergency Setting

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Study Objectives: Fever following routine immunizations is a common presenting complaint for young infants in the emergency department (ED). Controversy remains over which well-appearing young febrile infants are at high risk for serious bacterial infection (SBI). The objective of this study was to determine the prevalence of SBI in febrile young infants 6-12 weeks who received immunizations in the preceding 72 hours.

Methods: The authors conducted a retrospective chart review of infants 6-12 weeks who presented with a fever ≥ 38°C to two military academic emergency departments (ED) over a 4-year period. This study was part of a larger review of febrile infants (between the ages of 0-160 days) investigating rates of SBI and resource utilization pre-and post-implementation of standardized febrile infant clinical pathways. Infants were considered recently immunized (RI) if they had received immunizations within the 72 hours prior to presenting to the ED and not recently immunized (NRI) if they had not received immunizations during this time period. The primary outcome of SBI was based on culture results and final radiology interpretation of chest radiographs.

Results: 508 febrile infants were reviewed, of whom 114 had received immunizations (RI) in the prior 72 hours. The overall prevalence of SBI was 11.4% (95% CI = 8.9-14.6) in our study population. The prevalence of SBI in infants not recently immunized (NRI) was 13.7% (95% CI = 10.6-17.6) compared to 3.5% (95% CI = 1.1-9.3) in the infants recently immunized (RI) (see Table 1). The prevalence of SBI in febrile infants who received immunizations within the prior 24 hours was 2% (95% CI = 0.4-7.9) compared to 14.3% (95% CI = 2.5-43.9) in those recently immunized infants who received immunizations greater than 24 hours prior to presentation (see Table 2). The relative risk of SBI in the setting of recent immunizations was 0.3 (95% CI = 0.1-0.7). All but one SBI in the RI group were urinary tract infections (UTI). The single non-UTI was a case of pneumonia in an infant who presented with respiratory symptoms within 24 hours of immunizations. There were no cases of bacteremia or meningitis identified.

Conclusion: The prevalence of SBI in febrile young infants presenting within the first 24 hours following immunizations is less compared to those not recently immunized. UTI, however, remains a substantial risk in this population and should be investigated as a potential source of fever. Future research utilizing a large prospective multi-center data registry would aid in further defining the risk of SBI among recently immunized infants.

Table 1. SBI in Infants with RI and NRI

	All (n=508) n % (95% CI)	RI (n=114) n (%, 95% CI)	NRI (n=394) n (%, 95% CI)
Bacteremia	3 (0.6%, 0.2-1.9)	0 (0%, 0-4)	3 (0.8%, 0.2-2.4)
UTI	47 (9.3%, 6.9-12.2)	3 (2.6%, 0.7-8)	44 (11.2%, 8.3-14.8)
Meningitis	1 (0.2%, 0.01-1.3)	0 (0%, 0-4)	1 (0.3%, 0.1-1.6)
Pneumonia	6 (1.2%, 0.5-2.7)	1 (0.9%, 0.05-5.5)	5 (1.3%, 0.5-3.1)
Other SBI	1 (0.2%, 0.01-1.3)*	0 (0%, 0-4)	1 (0.3%, 0.1-1.6)*
Overall SBI	58 (11.4%, 8.9-14.6)	4 (3.5%, 1.1-9.3)	54 (13.7%, 10.6-17.6)

*One infant with salmonella enteritis

Table 2. SBI in Infants with RI Compared to Infants with NRI

	Prevalence of SBI (95% CI)	Relative Risk (95% CI)
NRI (n=394)	54 (13.7%, 10.6-17.6)	Reference group
RI (overall) (n=114)	4 (3.5%, 1.1-9.3)	0.3 (0.1-0.7)
RI <24 hours (n=98)	2 (2%, 0.4-7.9)	0.2 (0.04-0.6)
RI 24-48 (n=14)	2 (14.3%, 2.5-43.9)	1.04 (0.3-3.9)

89 Effect of Ketamine on Intracranial Pressure in Pediatric Patients Assessed by Transcranial Doppler Ultrasound: A Pilot Study

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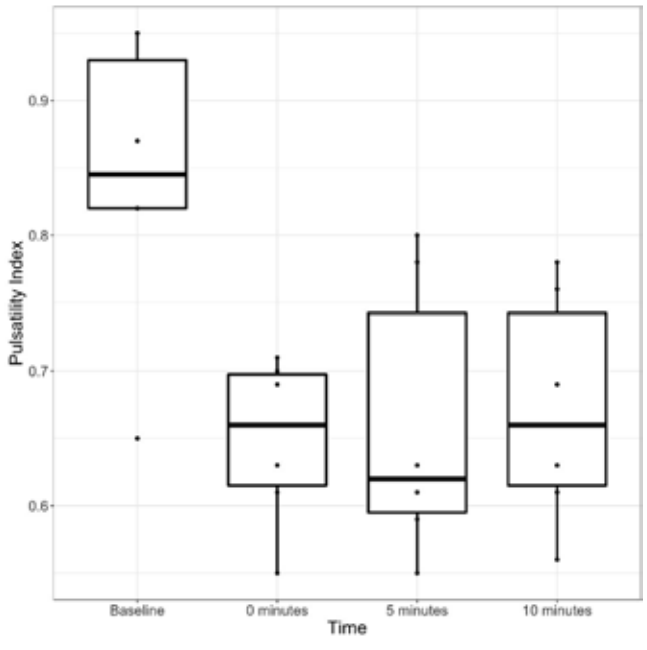
Study Objectives: There is controversy over whether ketamine increases intracranial pressure (ICP). In particular, research in children is lacking. Transcranial Doppler ultrasound (TCD) can assess changes in ICP non-invasively. Specifically, pulsatility index (PI) measured using TCD directly correlates with ICP changes. The objective of this study was to assess ICP changes using TCD in previously healthy children receiving ketamine monotherapy for procedural sedation. We hypothesized that subjects who receive ketamine would experience an increase in PI compared to baseline.

Methods: We conducted a prospective pilot study of subjects ages 5-18 years who underwent procedural sedation with intravenous ketamine as monotherapy at an academic tertiary pediatric emergency department. Our outcome of interest was change in PI from baseline after ketamine administration. PI was measured at the following times: baseline prior to sedation, sedation onset, 5 minutes after sedation onset, and 10 minutes after sedation onset. The primary outcome was analyzed in two ways: (1) paired t-tests to compare the maximum change in PI for each subject, and (2) one-way repeated measures analysis of variance (ANOVA) to compare all PI changes within each subject. Secondary outcomes included changes in heart rate, systolic blood pressure, diastolic blood pressure, pulse oximetry, and exhaled carbon dioxide (CO_2) which were compared using one-way repeated measures ANOVA or Friedman tests.

Results: Six patients were enrolled (ages 6-14 years). Procedures requiring ketamine sedation included fracture reduction (66%) and laceration repair (33%). The ketamine dose administered was 1.7 ± 0.3 mg/kg. The baseline PI was 0.84 ± 0.11. All six patients experienced a decrease in PI after ketamine administration. The mean maximum change for all subjects was -0.25 ($p < 0.001$, [95% CI, -0.16 to -0.33]). When evaluating all serial measurements within each subject, the PI was significantly lower after ketamine administration ($F(3, 15) = 12.8$, $p < 0.001$, Figure 1). There was a significant increase in heart rate ($p = 0.010$), systolic blood pressure ($p = 0.014$), and diastolic blood pressure ($p = 0.023$). No significant changes in respiratory rate ($p = 0.30$), pulse oximetry ($p = 0.916$), or exhaled CO_2 ($p = 0.29$) were observed.

Conclusions: In this pilot study, ketamine administration resulted in a significant decrease in PI. Based on available literature, this correlates with a small decrease in ICP of approximately 2 cm H_2O. No patient had an increase in PI. Additional enrollment and study may help to clarify the relationship between ketamine administration and ICP changes.

Figure 1



90 Intranasal Ketamine for Acute Pain Management in Children: A Systematic Review and Meta-analysis

Organick-Lee JY, Oliveira JE Silva L, Bellolio F, Homme J, Anderson J/Mayo Clinic, Rochester, MN

Study Objectives: We conducted a systematic review and meta-analysis to assess the efficacy and safety of intranasal (IN) analgesic-dose ketamine as compared to IN fentanyl for pediatric acute pain management in the emergency department (ED).

Methods: We searched PubMed, Embase, and Scopus for randomized controlled trials from inception to December 2019 without language restrictions. Reference lists of articles were hand searched. We conducted a meta-analysis and random-effects models to evaluate efficacy (pain reduction and rescue analgesia) and safety outcomes (rates of adverse events and sedation). We used the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) method to evaluate the quality of evidence for each outcome.

Results: A total of 546 studies were screened and 56 selected for full-text review. A total of 4 randomized controlled trials were included. In the meta-analysis of 4 studies, IN ketamine had similar reductions in pain scores from baseline to all post-intervention times (10 to 15 minutes: weighted mean difference [WMD] -1.42, 95% confidence interval [CI] -9.95 to 7.10; 30 minutes: WMD 0.40, CI -6.29 to 7.10; 60 minutes: WMD 0.64, CI -6.76 to 5.47). The use of IN ketamine was associated with similar rates of rescue analgesia when compared to fentanyl (RR 0.74, CI 0.44 to 1.25). IN ketamine had a higher risk of non-serious adverse events (RR 2.00, CI 1.43 to 2.79), and no patients receiving ketamine had a serious adverse event. There was one serious adverse event (hypotension) in the fentanyl group that self-resolved. No patients receiving either IN fentanyl or ketamine had significant sedation (University of Michigan Sedation Score > 2). The certainty in the pooled estimates was deemed to be "High" for all outcomes except for the outcome of rescue analgesia, which was downgraded because of imprecision given its wide confidence interval.

Conclusion: Intranasal analgesic-dose ketamine was found to be as efficacious as IN fentanyl in regards to pain reduction at all time points. Ketamine was associated with higher rates of non-serious adverse events. Intranasal analgesic-dose ketamine may be considered as an opioid alternative for acute pain management in children.

91 Where Have All the Children Gone? The Effects of COVID-19 on Pediatric Emergency Department Visits

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Study Objectives: Our syndromic surveillance system of patient chief complaints showed a marked rise in respiratory complaints on March 10th, 2020 as Covid19 arrived in our region. Subsequently, pediatric visits to the emergency department (ED) markedly decreased, likely due to recommendations for quarantine and fear of contracting the virus. Our goal was to determine the extent of decrease in ED visits for several common pediatric conditions for which parents normally would have sought emergency care.

Methods: This was a retrospective cohort design. The setting was at the EDs of 28 hospitals within 150 miles of New York City. Hospitals were teaching or non-teaching and rural, suburban or urban; 7 hospitals had separate pediatric EDs. Annual ED volumes of pediatric patients were from 3000 to 43,000.

Population: Consecutive pediatric patients (age $\leq$ 21yrs) seen by ED physicians between January 1 and April 30 in 2019 and 2020.

Data analysis: We chose to examine the monthly visits for the following using ICD-10 codes: anxiety, appendicitis, asthma, headaches, seizure, and urinary tract infection (UTI). We computed the changes in monthly visits for March and April from 2019 to 2020. We used chi-square to test for statistical significance. We set alpha at 0.002, using the Bonferroni correction for multiple comparisons.

Results: Our database contained 222,302 total pediatric visits. Compared to 2019, total visits in January and February 2020 increased by 15% and 4%, respectively, but in March and April they decreased by 36% and 81%, respectively. Visits in March and April 2020, compared to the same months in 2019, decreased by 17% and 76%, respectively, for anxiety; by 29% and 34%; for appendicitis; by 40% and 91% for asthma; by 17% and 76% for headache; by 13%, and 60% for seizures; and by 46% and 79% for UTIs. All p-values for comparisons were statistically significant, $p<0.002$, except, in March, for seizures ($p=0.25$), appendicitis ($p=0.007$) and headache ($p=0.02$).

Conclusion: We found a marked decrease in ED visits for several common pediatric conditions after COVID-19 arrived in our region. We suspect that this decrease was due to recommendations for quarantine during this pandemic as well as fear of exposure to COVID-19. Further studies are needed to determine if this has led to complications due to delay in seeking medical care.

92 Emergency Severity Index and Older Adults: Should Age Be Incorporated Into the Triage Algorithm?

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Study Objectives: Older adults make a disproportionate share of emergency department (ED) patients and there has been increasing attention paid to how to tailor care to geriatric patients in the ED. Although the Emergency Severity Index (ESI) has been validated in older populations, older adults seem to be at risk of under-triage. It is unknown if a given ESI level suggests the same degree of acuity and resource need in older adults as it does in younger patients. We compared ED and health care resource utilization and short-term mortality between older and younger adult patients with similar ED chief complaints and ESI triage levels.

Methods: This was an observational cohort study of consecutive adult patients (age $\geq$ 40) who presented to an academic ED over a 1-year period. We included visits with one of the following chief complaints: "chest pain," "abdominal pain", "altered mental status," "generalized weakness," or "headache." Patients were categorized into 40-64, 65-79, and $\geq$ 80-year old groups. The mean difference in ED relative value units (RVU) between age groups was assessed using linear regression. The odds of a visit resulting in hospital admission, or ICU admission, was assessed using logistic regression. The risk of 7-day mortality, and 30-day mortality was assessed using Cox proportional hazards. For all models, age group was the variable of interest and adjustments were made for both ESI level and chief complaint. Adjusted mean differences (MD), odds ratios (OR) and hazard ratios (HR) were calculated with 95% confidence intervals (CI). We adhere to STROBE guidelines for methods reporting.

Results: A total of 9,850 visits to the ED were identified for this study. Visits with an ESI level of either 1 or 5 were excluded, resulting in 9,795 visits included for analysis. There were 5,036 (51.4%) ED visits among the age 40-64, 2968 (30.3%) among the age 65-79, and 1791 (18.3%) among the age $\geq$ 80. After adjustment for ESI level and chief complaint, age 65-79 and age $\geq$ 80 were not associated with higher RVUs when compared to age 40-64 (MD -0.48 [CI -2.39 to 1.43] and -1.00 [CI -3.31 to 1.32], respectively). However, age 65-79 and age $\geq$ 80 were associated with higher hospital admission rates (OR 1.56 [CI 1.42 to 1.72] and 1.97 [CI 1.75 to 2.21], respectively). Age 65-79 and age $\geq$ 80 were also associated with higher ICU admission rates (OR 1.38 [CI 1.15 to 1.65] and 1.21 [CI 0.99 to 1.52], respectively). Patients age $\geq$ 80 had increased 7-day mortality when compared to age 40-65 (HR 2.06, CI 1.22 to 3.49). Those 65-79 years had higher 7-day mortality rates but the difference was not statistically significant (HR 1.41 [CI 0.85 to 2.35]). Finally, age 65-80 and age $\geq$ 80 were associated with higher 30-day mortality rates (OR 1.92 [CI 1.42 to 2.58] and 2.55 [CI 1.87 to 3.48], respectively).

Conclusion: Older adults required similar ED resources as measured by RVUs compared to younger adults when adjusted for ESI level and chief complaint, but had significantly higher rates of hospital and ICU admission, as well as short-term mortality. This suggests that ESI effectively estimates resource use by geriatric patients in the ED, but does not capture resource use more broadly or mortality risk.

93 A Geriatric Assessment Program in the Emergency Department is Associated with Increased Discharge Rate and Decreased Hospital Length of Stay

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Study Objectives: Patients over the age of 65 who present to the emergency department (ED) are more likely to be admitted to the hospital even without severe

illness and, if admitted, have a longer length of stay in the hospital than younger patients.

Our study objective was to determine if assessment and intervention by a trained ED Geriatric Intervention Team (GAT) would decrease the admission rate and reduce the hospital length of stay for admitted older adult patients.

Methods: We conducted a case control study of the impact of a GAT in a large academic community ED, consisting of Advanced Practice Providers (APP), Care Management, and Occupational Therapy. From 8am through 6pm, Monday through Friday, the APP screened patients >= 65 years for functional decline and, if necessary, evaluated for cognitive delay, fall risk, delirium, and other geriatric risk factors and determined the need for intervention. Potential interventions include: OT assessment and intervention in the ED, rehabilitation placement, outpatient geriatric clinic referral and delirium management. We excluded patients triaged as critical. Data on patients who were assessed by the Geriatric APP were collected prospectively. Our control population ("unassessed" group) were geriatric ED patients admitted during the similar hours of operation 6 months prior to team intervention and geriatric ED patients admitted during the first 6 months of operation who were not assessed. We used the Charlson Comorbidity index (CCI) to characterize baseline health status.

Results: During the study period we screened 815 ED geriatric patients. Assessed and unassessed groups were demographically similar. We found that the "assessed" group was found to have a longer ED LOS than the "unassessed" group (mean time in hours: 4.94 vs 4.41, $p<0.05$), $p<0.05$), but hospital LOS was shorter by over 24 hours (mean time in days: 4.49 vs 5.52, $p<0.05$). The "assessed" group was more likely to be discharged (54% vs 30%, OR 0.55 (95% CI: 0.51, 0.59)). "Assessed" patients had fewer comorbidities than "unassessed" (mean CCI score: 2.23 vs 2.55, $p<0.05$). However, when analyzing only hospitalized patients, the "assessed" group and control group had similar CCI to the "unassessed" group (mean CCI score: 2.57 vs 2.70, $p=0.30$).

Conclusions: Patients who were assessed by the GAT were more likely to be discharged directly from the ED, and if admitted, hospital length of stay was reduced by over 24 hours. Assessed patients had fewer comorbidities, which may contribute to the increased percentage of discharges. However, admitted patients were similar in health status in both assessed and unassessed groups. A targeted intervention in the ED can reduce hospital length of stay in geriatric patients and may reduce admissions as well.

94 Traumatic Intracranial Hemorrhage in Geriatric Patients on Warfarin, Direct Oral Anticoagulants, or No Anticoagulation: A Prospective Study

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Study Objectives: Head injuries are a common presentation of geriatric patients to the emergency department (ED), with greatest concern for potential intracranial hemorrhage (ICH). Previous research has demonstrated varied rates of ICH, especially when comparing warfarin to the direct oral anticoagulants (DOAC) and has not explicitly focused on the geriatric population. In a large prospective multicenter study of head-injured ED patients, this research aims to measure the rates of acute and delayed ICH, comparing those on no anticoagulants, warfarin, and the DOACs, to characterize the risk of anticoagulation and determine appropriate patient dispositions for those with initial negative head CTs.

Methods: A prospective cohort study was conducted at two level-one trauma centers covering a South Florida county. Patients >=65 were identified daily by ED census using ICD-10 diagnosis of head injury (S00-S09) or head CT performed for purposes of trauma. Patients were excluded if they were taking any antiplatelet agents or were transferred from another hospital. Primary outcome was rate of intracranial hemorrhage, which was compared between patients taking warfarin and DOACs, as well as patients on no anticoagulation. Acute ICH was defined as the initial head CT showing an acute bleed. Delayed ICH was defined as a subsequent CT showing an acute bleed after initial negative CT. Groups were compared by odds ratios (OR) with 95% confidence intervals (CI).

Results: From August 15, 2019 to May 14, 2020, 2,605 patients were enrolled in the study. Of these, 799 were on an anticoagulant (195 warfarin, 396 apixaban, 30 dabigatran, 2 edoxaban, and 176 rivaroxaban). The overall rate of acute ICH was 6.6% and delayed ICH was 0.4%. Hospital disposition was 3.8% to hospice and 0.9% died. Comparing patients on anticoagulants to those not on anticoagulants, there were no significant differences in rate of acute ICH (OR 0.84, CI: 0.56-1.19), delayed ICH (OR 0.97, CI: 0.25-3.76), hospice disposition (OR 1.14, CI: 0.74-1.74), or death (OR 0.80, CI: 0.31-2.03). There were also no differences between patients on DOACs and warfarin for acute ICH (OR 1.27, CI: 0.59-2.48), delayed ICH (OR 0.65, CI: 0.06-7.15), hospice disposition (OR 1.01, CI: 0.45-2.28), or death (OR 0.64, CI: 0.12-3.54). Neurosurgical intervention was only required for one patient with delayed ICH, likely due to iatrogenic cause: the patient received systemic heparin and catheter-directed thrombolysis for massive pulmonary embolism - likely the reason for the patient's fall with head injury.

Conclusion: In this prospective study of geriatric patients with head injury, anticoagulant use was found not to be a risk factor for ICH. The benefits of anticoagulation may therefore outweigh the risks in geriatric patients susceptible to head trauma. Additionally, patients with delayed ICH were few, none requiring neurosurgical intervention due to the head injury. Patients with an initial negative head CT need not be hospitalized for routine follow-up CT, whether anticoagulated or not.

Rates of intracranial hemorrhage, n (%)

	n	No ICH	Acute ICH	Delayed ICH
All patients	2,605	2,423 (93%)	172 (6.6%)	10 (0.4%)
No anticoagulant	1,806	1,674 (93%)	125 (6.9%)	7 (0.4%)
Any anticoagulant	799	749 (94%)	47 (5.9%)	3 (0.4%)
Warfarin	195	184 (95%)	10 (5.1%)	1 (0.5%)
DOAC	604	565 (94%)	37 (6.1%)	2 (0.3%)

95 Use of Antipsychotic and Sedative Medications in Older Patients in the Emergency Department

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Study Objectives: Antipsychotics and sedatives are often administered to treat acute agitation, but carry significant risk in older adults, including the potential to precipitate or worsen delirium and increase risk of mortality. Our primary objective was to determine the frequency with which these medications are administered to older patients in the emergency department (ED) and factors associated with their administration.

Methods: Using data from the 2014-2017 National Hospital Ambulatory Medical Care Survey, we identified ED visits for patients 65 years of age and older and determined whether they were administered either an antipsychotic or sedative during their ED visit. We excluded patients with visits related to substance use, substance withdrawal or psychiatric complaints; and patients requiring intubation. We performed unadjusted and multivariable logistic regression analyses to identify patient-level and facility-level risk factors for antipsychotic/sedative administration. Sensitivity analyses were performed looking at risk factors for each medication category separately.

Results: Over the study period, there were approximately 88,637,000 patient visits (95% confidence interval [95% CI], 80,298,000-96,975,000) by older individuals, of whom 11% (95% CI 10-12%) met exclusion criteria. Of the approximately 79,040,000 (95% CI 71,680,000-86,400,000) patients in the analytic cohort, 3.4% (95% CI 3.0-4.0%) received at least one dose of an antipsychotic or sedative medication. In patients who were administered one of these medications, 13% (95% CI 10-17%) received an antipsychotic and 92% (95% CI 88-94%) received a sedative agent. In multivariable analysis, factors associated with antipsychotic/sedative administration included age (age 75-84: OR 0.71, 95% CI 0.52-0.95; age 85+: OR 0.68, 95% CI 0.49-0.95), female (OR 1.39, 95% CI 1.06-1.83), dementia history (OR 1.81, 95% CI 1.15-2.85), CT or MR imaging (OR 1.80, 95% CI 1.40-2.32), and urbanicity of hospitals (OR 1.46, 95% CI 1.06-2.03). In sensitivity analyses, antipsychotic administration was associated with dementia (OR 5.62, 95% CI 2.50-12.64), nursing home residency (OR 2.73, 95% CI 1.07-6.96) and delirium (OR 7.03, 95% CI 2.20- 22.52), whereas sedative administration was associated with age (age 75-84: OR 0.70, 95% CI 0.51 - 0.95), female (OR 1.47 95% CI 1.08 - 2.00), CT or MR imaging (OR 1.91, 95% CI 1.46-2.50) and urbanicity of hospitals (OR 1.46, 95% CI 1.03 -

2.08). Patients who received an antipsychotic/sedative were more likely to be admitted to the hospital (37%, 95% CI 30-45%) compared to those who did not (21%, 95% CI 19-24%; p<0.001).

Conclusion: Older ED patients were infrequently administered antipsychotic and sedative medications. Sedatives were more commonly administered than antipsychotics, despite being considered potentially inappropriate in older adults. Predictors of antipsychotic or sedative administration included dementia history and need to perform advanced imaging. Delirium diagnosis and nursing home residence were also associated with antipsychotic administration.

96 Impact of Patient Age, Presentation Time and Complaint on Door to EKG and Door to Balloon Times for ST-Elevation Myocardial Infarctions

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Study Objectives: Door-to-EKG (D2EKG) time has been used as an important emergency department (ED) quality metric to improve door-to-balloon times (D2B) for patients with ST-elevation myocardial infarctions (STEMI). Atypical presentations, patient demographics, and patient presentation time may affect D2EKG and D2B times. We examined these factors on D2EKG and D2B times.

Methods: Retrospective case-control study in a large integrated health care system with ~1 million ED visits from April 1, 2018 to February 29, 2020. The health care system includes PCI and non-PCI centers and a well-developed transfer protocol. All STEMI patients were included. D2EKG greater than 10 minutes and D2B greater than 90 minutes for PCI-centers and 120 minutes for non-PCI hospitals were categorized as delayed. Delays in D2EKG were examined by patient age and sex, atypical presentations (all non-chest pain, dyspnea or cardiac complaints), and presentation time, categorized as day (7:00 AM-2:59 PM) versus evening and night (3:00 PM-6:59 AM). Correlation between DEKG and D2B delays are also reported. Data was abstracted from the electronic medical record. Continuous measures (median [Q1, Q3]) and categorical variables (frequency) are reported. The difference between delayed and non-delayed encounters was analyzed with Pearson's Chi-square test for categorical variables while Mann-Whitney and ANOVA were used for continuous variables. Analysis used Minitab (v19). 95% CI and p-values are reported.

Results: 750 STEMI patients were identified. Median age was 62y, & 67.5% were male. Median age for D2EKG delay was not significantly different than no delay (62.5 v 62.0, p = 0.391); however, octogenarians (14.5%) and nonagenarians (14.3%) had a higher prevalence of delay than other age groups (p=0.083). Females were more likely to be delayed (12.3% v 7.5%, p=0.032). Atypical presentation had a significantly higher rate of D2EKG delay (33/153, 21.6%) than typical presentation (35/97, 5.9%) (15.7, 95% CI 9.5, 23.0; p<0.0001). Presentation by time of day and delayed D2EKG was similar, 7.9% (evening, night) and 10.5 % (day) (2.8, 95% CI -2.6, 7.5; p=0.218). D2EKG delays were not significantly increased on weekends (9.4% weekends v 8.3% non-weekend; 1.1, 95% CI -3.9, 5.17; p=0.656). D2EKG delays were weakly correlated with delay to D2B at PCI sites (r=0.433, p=0.019) with median times of 69 min v 59 min (p=0.006). D2EKG delays had a weak correlation with D2B times for non-PCI sites (r=-0.05, p=0.872); median time (117.5min v 90min, p=0.002).

Conclusions: In this case-control study, advanced age, female sex and atypical presentations were associated with a higher prevalence of delays in D2EKG. Day of week and time of presentation were not. Delays in D2EKG led to small delays in D2B times however within limit of current guidelines, with unclear clinical significance. Continuous improvement efforts should be directed to prompt recognition of atypical presentations and older patients to avoid delays in definitive STEMI care.

97 Evaluation of the Multifunction Cardiogram (MCG) for Low Risk Chest Pain Patients Presenting to the Emergency Department

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Study Objectives: Emergency physicians (EPs) world-wide could benefit from a non-invasive, cost-effective, and accurate tool to determine which patients with suspected acute coronary syndrome (ACS) have significant coronary obstruction. A novel computerized, multiphase, resting electrocardiogram analysis device, the Multifunction Cardiogram (MCG), takes the traditional 12-lead ECG and combines it with mathematical modeling and functional measurements of the heart's electrical activity. Independent studies in patients with high risk coronary artery disease have shown the MCG to have a high correlation with coronary stenosis confirmed by angiography. The objective of this case series was to describe the application of the MCG to low risk chest pain patients with suspected ACS presenting to the ED and compare results to angiography.

Methods: This prospective study enrolled a convenience sample of adult patients presenting to a tertiary care academic teaching center with chest pain in whom the EP suspected low risk ACS. Patients with ECGs showing active ischemia (including STEMI and NSTEMI) and those unable to complete follow-up were excluded. After evaluation by the EP and obtaining informed consent, an MCG was performed. To obtain the MCG reading, data from two traditional ECG leads, lead II and V5, were collected for 82 seconds, and 3-5 tests were performed on each patient. MCG results were electronically transmitted to a central computer where the data was mathematically transformed and analyzed to identify distinct functional indices. A risk score ranging from 0 (minimal risk) to 20 (very high risk) was provided. The EP was blinded to the results of the MCG and the results did not change medical management. Outcome was based on the results of the coronary angiogram, either Coronary Computed Tomography Angiography (CCTA) or conventional angiography. Angiogram results were classified as no coronary artery disease (CAD), mild CAD, moderate CAD and severe CAD based on the degree of stenosis visualized by the cardiologist.

Results: There were 511 patients enrolled with a mean age was 52 (SD23) and 51% were female. 1% were Asian, 18% Hispanic, 33% African American and 47% White. Of these, 47 patients (9%) had an angiogram performed (63% CCTA): 23 (49%) had no CAD, (12) 26% had mild CAD, 7 (15%) had moderate CAD, and 5 (11%) had severe CAD. The mean MCG score for patients with no CAD was 2.3 (95% CI 1.0-3.1), mild 2.6 (95% CI 0.8-4.3), moderate 3.4 (95% CI 1.2-5.6) and severe 4.8 (95% CI 1.4-8.2). Angiogram results were dichotomized into severe and non-severe. Mean MCG scores in patients with severe CAD was 4.8 (95% CI 1.4-8.2) compared to non-severe CAD 2.4 (95% CI 1.6-3.2)(p=0.046). The mean of the highest MCG score was 6.8 (95% CI 4.3-9.3) for severe CAD and 3.1 (95% CI 2.2-4.0) for non-severe CAD (p=0.006). The area under the ROC curve (AUC) for predicting severe CAD was 0.76 (95% CI 0.57-0.95) using the average MCG score and 0.85 (95% CI 0.70-0.99) using the highest MCG score. The sensitivity of the highest MCG score for predicting severe disease using an index score of 4 or greater was 100% (95% CI 46-100%), specificity was 56% (95% CI 40-71%), negative predictive value 100% (95% CI 82-100) and likelihood ratio 2.3 (95% CI 1.6-3.2).

Conclusions: MCG scores increased with severity of coronary obstruction. This study introduces the MCG as a potential tool for assessing low risk chest pain patients with suspected ACS in the ED. A large prospective multicenter study is ongoing.

98 Rural Population at Risk of Delayed Percutaneous Coronary Intervention for ST-Elevation Myocardial Infarction in North Carolina

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Study Objectives: Emergent reperfusion by percutaneous coronary intervention (PCI) is indicated in patients with ST-elevation myocardial infarction (STEMI) and should be performed within 90-minutes of first medical contact (FMC), although long transport times make meeting this goal difficult in many parts of rural North Carolina (NC). Early fibrinolytic therapy is recommended in cases where PCI is not possible within 120-minutes of FMC and out-of-hospital fibrinolytics may improve outcomes in cases with long transport times. The objectives of this study were to determine the number of NC residents with prolonged transport times to the nearest 24/7 primary PCI (PPCI) center and to map this population.

Methods: We analyzed transport time to the nearest PPCI center using the ArcGIS Pro geographical information system (GIS). To identify those at risk of a >120-minute FMC-to-device time, a 60-minute transport time cutoff was selected. This cutoff is based on an estimated 15-minute scene time (national median in STEMI) and a 45-minute door-to-device time (NC median with EMS pre-arrival notification). US Census Data (2010) were used to cohort NC residents by time to PPCI. Counties with potential benefit from out-of-hospital fibrinolytics were identified as those with >10% of their population living >60 minutes from PPCI.

Results: We identified 28 PPCI centers in NC and 9 in bordering areas of adjacent states. The percentage of NC residents who have greater than a 60-minute transport time to PPCI is 7.5% (718,141/9,535,483). We found that 25 of 100 counties have more than 50% of their population in a long transport area and 15 of those have more than 90% of their population in long transport areas (Figure 1). The longest transport times are found in extreme western and eastern NC.

Conclusion: A large percentage of rural NC residents are at risk for delayed PCI. Emergency medical services medical directors should consider these data in conjunction with on-scene times and door-to-device times in their counties to guide decision-making about out-of-hospital fibrinolytic protocols.

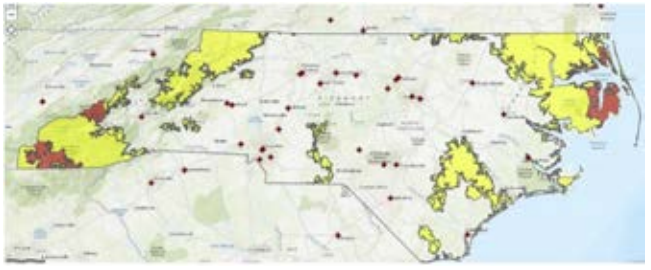

Figure 1. Graphical representation of the NC residents at risk for delayed PPCI (>120 minutes from FMC). Legend: red cross = 24/7 PPCI center, yellow shading = 60-120 minute transport to PPCI, red shading = >120 minute transport to PPCI

99 Delta Troponin Does Not Predict a Major Cardiac Event in Patients With Renal Dysfunction

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Study Objectives: Determine if delta conventional or delta high sensitivity troponin add value in determining a major adverse coronary event (MACE) in renal patients with an elevated troponin.

Methods: This retrospective cohort study of emergency department (ED) patients diagnosed with chest pain, angina, unstable angina, or myocardial infarction (ICD-10 codes R07, I20, I21) was conducted from January 1 to November 27, 2018 at a tertiary care academic ED center (annual volume 95,000). Inclusion criteria consisted of: 1) renal dysfunction (defined as an eGFR < 60 ml/min/1.72m2); 2) initial positive troponin; 3) at least two troponin measurements within 24 hours. The Roche® 4th generation conventional troponin (cTnT) was used until June 12 with a positive troponin defined as ≥0.06ng/mL. Then, the Roche® 5th generation high sensitivity troponin (hsTnT) was used with a positive troponin defined as ≥52ng/L. A significant delta troponin was defined as a rise or fall of at least 20% from the initial troponin. All patients were then reviewed for a MACE, defined as cardiac-related mortality, need for a coronary stent or bypass graft, or clinically diagnosed type 1 or 2 myocardial infarction within 6 weeks of initial ED visit.

Results: 6,360 ED chest pain patients were included in the study. 1,213 patients had renal dysfunction with eGFR < 60 (mean eGFR 38.8 ± 17), and of these ED chest pain renal patients, 303 patients (25%) had a positive troponin. 18 patients were excluded for having a single troponin. In total, 285 patients met inclusion criteria. For the 114 renal patients with a positive cTnT (69 ±13 years old, 62% male), 54 had a MACE (prevalence = 47.3%) with only 27 patients having significant delta troponins (PPV = 65.9%) (see Table). In the 60 patients without a MACE, 46 patients had insignificant delta troponins (NPV = 63%). The positive likelihood ratio (+LR) of a delta cTnT detecting a MACE was very low and nearly approached insignificance at 2.14 (95% CI 1.26, 3.64). The negative likelihood ratio (-LR) of a delta cTnT to exclude a MACE also nearly approached insignificance at 0.65 (95% 0.48, 0.88). For the 171 renal patients with a positive hsTnT (70±14 years, 58% male), 69 had a MACE (prevalence = 40.4%) with only 23 patients having significant delta troponins (PPV = 65.7%). In the 102 patients without a MACE, 90 patients had insignificant delta troponins (NPV = 66.2%). The +LR of a delta hsTnT to detect a MACE was very low and nearly approached insignificance at 2.83 (95% CI 1.51, 5.31). The -LR of a delta hsTnT to exclude a MACE also nearly approached insignificance at 0.70 (95% CI 0.63, 0.91).

Conclusion: The Fourth Universal Definition for Myocardial Infarction recommends a rise or fall of cardiac troponin greater than 20% to diagnose a myocardial infarction in renal dysfunction patients. However, this study of renal patients with elevated troponin levels shows that measuring a delta using either conventional or high sensitivity troponin does not add value to determine a MACE.

100 Pilot Study of Methylene Blue as an Antidote for Amlodipine Poisoning in Mice

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Study Objectives: Methylene blue has been proposed as an antidote for refractory shock from amlodipine poisoning because of its vasoconstrictive effects as a nitric oxide scavenger. The objective of this study is to perform a randomized control trial of the efficacy of methylene blue as an antidote for amlodipine poisoning in mice.

Methods: After performing baseline measures of cardiac function, twelve C57Bl/6 mice were poisoned with amlodipine 90mg/kg by oral gavage and then anesthetized with isoflurane. Mice were then randomized to receive either methylene blue 20mg/kg dissolved in 5% dextrose by intra-peritoneal injection, or an equal volume of 5% dextrose by intra-peritoneal injection. Cardiovascular measures included blood pressure, pulse, and central venous pressure. Ultrasound was used to determine cardiac output, contractility, and left ventricular dimensions. Blood pressure readings were obtained with a non-invasive tail-cuff system (SC1000, Hatteras Instruments). Central venous pressure was measured with Doppler ultrasound. Survival to 2 hours was recorded. Data analysis used Grubbs method to identify outliers with an alpha of 0.05. The Grubbs method was followed by an Unpaired T-test. $P<0.05$ was considered significant.

Results: Two-hour survival rate was 83% for methylene blue treated animals, while only 50% of the controls survived to two hours, which did not obtain statistical significance. Percent change of Ejection Fraction (EF): Controls displayed a decrease in EF of 86% (-86% ± 5.7), while the treated group presented a EF reduction of 42.5% (-42.5 ± 10.3). Heart rate: no significant difference at baseline. There was a significant difference in heart rate at endpoint between treated and control animals. Fractional shortening, a measurement of cardiac contractility, was higher in the treated group ($p=0.022$), indicating that methylene blue treatment preserved myocardial contractility. Both cardiac output and stroke volume were higher in the treatment group ($p=0.016$ and $p=0.013$, respectively).

Conclusion: This preliminary study suggests a benefit for methylene blue as an antidote for amlodipine poisoning in mice.

Conventional and High Sensitivity Delta Troponins in Predicting MACE

Renal dysfunct ED CP+TnT	# Pts	Sens	Specif	PPV (95% CI)	NPV (95% CI)	+LR (95% CI)	-LR (95% CI)
Delta cTnT	114	50%	76.7%	65.9% (+/-1.9%)	63.0% (+/- 1.9%)	2.14 [1.26, 3.64]	0.65 [0.48, 0.88]
Delta hsTnT	171	33.3%	88.2%	65.7% (+/- 1.9%)	66.2% (+/- 1.9%)	2.83 [1.51, 5.31]	0.76 [0.63, 0.91]

101 Thromboelastography versus Conventional Coagulation Tests in Pit Viper Envenomation and Antivenom Response

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Study Objectives: Pit viper envenomations represent a significant burden of disease worldwide, leading to severe hematologic derangements such as venom-induced consumptive coagulopathy (VICC). Recognizing this problem, the WHO recently launched a campaign to cut snake bite deaths in half by 2030. Immediacy in detection and treatment of coagulopathy with antivenom is paramount to reducing morbidity and mortality. Traditionally, administration of the pit viper antivenom, CroFab®, has been based on clinical signs and symptoms and conventional coagulation tests (CCT) such as fibrinogen, PT, PTT and INR. The purpose of this study was to assess the efficacy of TEG in detecting response to antivenom administration.

Methods: Blood samples from 25 healthy adult volunteers were mixed with different concentrations of western diamondback rattlesnake (Crotalus atrox) venom (50% and 100% LD50). Each group of envenomated blood samples was treated with 4, 6, and 10 vial equivalents ($vial_{eq}$) of CroFab®. All samples were assessed with CCTs including: PT, PTT, INR and Fibrinogen, as well as with TEG measures of reaction time (R), amplification (k), rate of clot formation (alpha angle), and clot strength (MA). Data was analyzed to determine the rate of return to normal range CCT and TEG values as a surrogate for return to normal coagulation.

Results: For the 50% LD50 group, CCT parameters of PT, PTT and INR returned to normal in 24%-32% of samples across all CroFab® doses. For the same group, 72% of Fibrinogen samples returned to normal at 4 $vial_{eq}$ with a max of 88% at 10 $vial_{eq.}$ TEG parameters R, k, alpha angle and MA returned to normal at a rate of 80%-96% across all CroFab doses. For the 100% LD50 group, CCT parameters of PT, PTT, and INR had a maximum of 24% return to normal for all CroFab® doses. For the same group, 16% of Fibrinogen samples returned to normal at 4 $vial_{eq}$ with a max of 88% at 10 $vial_{eq}$. TEG parameters showed incremental increases towards normal range with 92-96% of samples in range at 10 $vial_{eq}$.

Conclusion: Pit viper envenomations are a global health threat with significant morbidity and mortality and suboptimal methods to guide the utilization of the expensive and often limited CroFab® antivenom. In this in vitro model, TEG was shown to be more sensitive than CCTs in tracking antivenom-induced recovery from VICC. Additionally, our findings represent a step towards developing a dose-response curve for antivenom administration with the potential to reduce both the amount of antivenom used and the side effects associated with its use.

EMF 102 Expected versus Actual Concentrations of Ketamine and Propofol during Procedural Sedation in the Emergency Department

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Study Objectives: Target-controlled infusion (TCI) uses pharmacokinetic/pharmacodynamic (PK/PD) models to calculate and deliver optimal medication doses to achieve and maintain predefined target plasma drug concentrations associated with adequate sedation. No published adult study has tested the accuracy of TCI predictions in the relatively short procedures routinely performed in the emergency department (ED). This study evaluates the accuracy of TCI predictions against actual concentrations achieved with manual medication administration in patients requiring procedural sedation with propofol and/or ketamine in the ED.

Methods: A prospective cohort of non-pregnant, non-anemic adult patients 18 years of age and older undergoing a procedural sedation with ketamine, propofol, or a combination of ketamine and propofol in the ED were consented for a collection of blood samples during the sedation. These samples were collected one minute after the initial medication administration then every five minutes throughout the procedure to a maximum of 5 samples. Patients who received both agents had the sample split between two different tubes based on laboratory specifications. Vital signs, time of medication administration, and the modified observer's alertness/sedation scale (mOASS) were also recorded throughout the sedation. Computational simulations of effect site TCI and measured manual bolus injections (MBI) for both ketamine and propofol were performed using RUGLOOP software. The expected concentrations achieved via the simulations were compared to the actual drug concentrations that were obtained at predefined time points throughout the sedation. Statistical analysis including accuracy based on performance error (PE) {(predicted - actual)/predicted concentration} were measured by Median Absolute PE (MdAPE).

Results: Ten adult patients with a median age of 39 years (IQR 27.8-44.5 years) were included with 65 total blood samples collected during the sedations. Median sedation length was 22.1 minutes (IQR 16.8-25.9 minutes). Patients were administered ketamine only (n=3), propofol only (n=2), or both agents (n=5). The median total ketamine dose was 1.1 mg/kg (IQR 0.9-1.3 mg/kg), and the median total propofol dose was 1.7 mg/kg (IQR 1.2-2.3 mg/kg). Median actual versus MBI simulated ketamine plasma concentrations were 0.61 mcg/mL (IQR 0.4-0.94 mcg/mL) and 0.36 mcg/mL (0.23-0.5 mcg/mL), respectively, and were significantly correlated ($p < 0.001$). Median actual versus simulated propofol plasma concentrations were 0.88 mcg/mL (IQR 0.44-1.7 mcg/mL) and 0.79 mcg/ml (IQR 0.36-1.5 mcg/mL), respectively, and were not correlated. The MdAPE revealed the extent of variability within the small sample size, as resultant ketamine MdAPE of 109.9% (IQR 67.6%-155%) and propofol MdAPE of 100% (IQR 70.6%-185.6%) were shown.

Conclusion: Actual ketamine concentrations were correlated to simulated values at the same timepoints; however, correlation with propofol was not detected. The inconsistency could be resultant of physiologic and provider variability, which requires a larger sample size to resolve. There was large variability in MdAPE within the small sample size. Larger studies are needed to assess the quantitative accuracy of this model, and thus utility, for TCI in procedural sedations in the emergency setting.

†Deceased.

103 Impact of Stay-at-Home Orders on Reported Pediatric Poisonings during the COVID-19 Pandemic

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Study Objectives: Systemic Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), the virus responsible for the illness "COVID-19," was announced by China in December 2019. Soon after, a pandemic was declared by the World Health Organization (WHO) in March 2020. Cases of COVID-19 in Pennsylvania (PA) were first announced on March 6, 2020. Subsequently, there were limitations of gatherings and travel, closure of schools and non-essential businesses and physical distancing. With limitations, children were at home for longer periods of time and subsequently had increased access to potentially poisonous substances, such as over the counter medications, prescriptions, medications that are only delivered in a clinic but were given for home use due to closures, and increased amounts of cleaning supplies. The inherent isolation that comes with physical distancing was feared to surge depression and suicidal gestures particularly among adolescents. We know from previous natural disasters that an increase in reported exposures to poison control centers follow a major incident. We anticipated an increase in reported pediatric exposures to the Poison Control Center at Children's Hospital of Philadelphia (CHOP PCC) and nationally during the COVID-19 pandemic.

Methods: We analyzed all reported pediatric cases (less than 18 years old) in the American Association of Poison Control Centers' National Poison Data System (NPDS) and the CHOP PCC of eastern Pennsylvania and Delaware. Timeframes analyzed included January 1, 2020 to May 31, 2020, which were compared to the same timeframes in 2018 and 2019. The data was then characterized by total reported cases per month, and subsequently by age groups of zero to five years, six to twelve years, and thirteen to eighteen years. Out of the separated groups, we evaluated sex, site of reported case, unintentional or intentional ingestion, and reported outcomes.

Results: The number of reported pediatric poisonings did not vary significantly when comparing each month of 2020 to the previous two years. Sex, intent, and medical outcomes did not vary significantly from year to year or following the implementation of the stay-at-home order.The greatest increase observed was among the age group six to twelve years with site listed as "own residence," or the percentage of reports coming from a home, when comparing the months of March through May in the year 2019 to 2020 on both the local level (OR 2.2; 95% CI 1.8-2.6, P<0.0001) and the national level (OR 2.15; 95% CI 2.08-2.23, P<0.0001). This reflects a statistically significant increase in poisonings occurring in the home during a pandemic when compared to the same time in the year previous.

Conclusions: Following the implementation of stay-at-home orders during the COVID-19 pandemic, total volume of pediatric poisonings reported to both the CHOP

PCC and nationally did not increase when compared to previous years. However, the number of exposures listed as occurring in "own residence" increased significantly from March through May 2020 when compared to the year prior, particularly in the age group six to twelve years. This is important for emergency physicians to be aware of as many predictions call for "a second wave," as with the usual course of other coronaviruses. Additional stay-at-home orders to help mitigate spread of the virus may occur, along with an increase in school-aged children with reported poisonings.

104 Associations between Neighborhood Disadvantage Measures and COVID-19 Case Clusters

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Study Objectives: The spatial distribution of COVID-19 remains to be described, though there is growing evidence of an increased burden among already disadvantaged populations and neighborhoods. Understanding the pattern of population risk is critically important for health systems and policy makers responding to the pandemic. Our aims were: 1) to describe the association between neighborhood factors and incident cases of COVID-19; and 2) to examine the changes in cases over time. We hypothesized that there would be an association between disadvantaged neighborhoods and case clusters.

Methods: We analyzed data from patients presenting to a large health care system in Boston, MA from 2/5/20 to 5/4/20. Patient mailing addresses were geocoded to census tracts within a 20-mile radius of Boston. COVID-19 incidence per census tract was calculated using Empirical Bayes smoothed rates to adjust for small area estimation. Clustering of cases at the census tract level were assessed using local Moran's I, accounting for multiple comparisons. Quantile local spatial autocorrelation was used to determine the spatial association between neighborhood demographic and disadvantage measures (from the American Community Survey) and census tracts with high incidence of COVID-19. Poisson regression models were used to assess the independent associations between neighborhood factors and COVID-19. Finally, we mapped the distribution of cases in the study area over time.

Results: As of May 4, 2020, there were 9,898 patients in the study area who had been treated in the health care system for COVID-19. The overall crude incidence was 31.8 cases per 10,000 population; adjusted incidence per census tract ranged from 2.3 to 405.1 per 10,000 population. Two case clusters were identified in the Chelsea/Everett and Lynn areas ($p=0.007$). We found statistically significant co-location of the top quintile of cases with several neighborhood factors (all $p<0.05$): % of population Hispanic (n=72 census tracts), black (n=36), uninsured (n=33), receiving Supplemental Nutrition Assistance Program (SNAP) benefits (n=39), and living in poverty (n=23). In the adjusted model, factors associated with increased incidence of COVID-19 were a higher proportion of Hispanic population (aIRR 1.24, 95% CI 1.21-1.28) and households receiving SNAP benefits (aIRR 1.08, 95% CI 1.02-1.13). The distribution of cases varied over time, but with persistently high incidence in communities north of Boston.

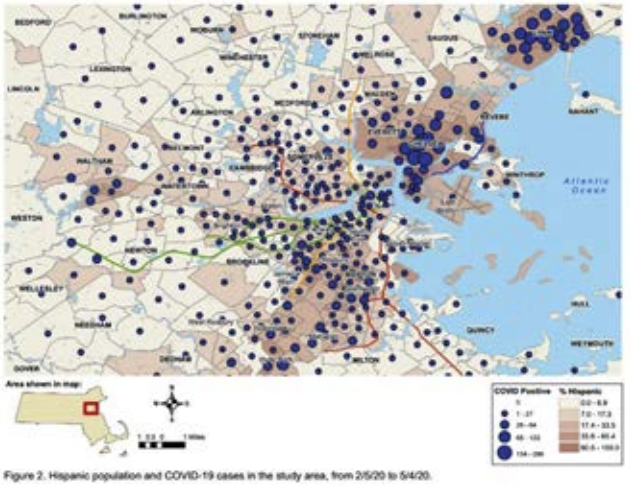

Figure 2. Hispanic population and COVID-19 cases in the study area, from 2/5/20 to 5/4/20.

Conclusion: We found a significant association between neighborhood disadvantage measures and high incidence rates of COVID-19. Limitations include case ascertainment challenges due to access to testing and possible selection bias from use of a single health care system. These results suggest that policy makers should consider health inequities as they respond to the ongoing pandemic and plan for future health needs.

105 Studying the Impacts of To-Go Medications for Vulnerable Populations Discharged from the Emergency Department during the COVID-19 Pandemic

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Study Objectives: Emergency departments (EDs) function as a safety net for vulnerable populations who lack reliable access to health care, including those who face housing insecurity and who lack or possess limited insurance. These groups commonly utilize emergency care for low acuity conditions including asthma, pneumonia, cellulitis, and urinary tract infections, which can be treated with short courses of steroids or antibiotics, respectively. However, vulnerable patients face multiple barriers to filling prescriptions including cost, transportation and wait times at the pharmacy. Providing these patients with full courses of pre-packaged medications has the potential to improve medication compliance and health outcomes. The COVID-19 pandemic has created unique challenges for discharging patients with low acuity conditions from the ED. Not only have vulnerable and disadvantaged populations been affected disproportionately by COVID-19, but also, barriers to filling prescriptions are now compounded by pharmacy closures and social distancing. In the face of increased demand for medications used to treat respiratory disease and infection, the goal of this work was to examine a potential solution to enhancing patients' access to medications during the COVID-19 pandemic.

Methods: In a large urban academic hospital in Boston, a "to-go" medication program was used for patients discharged from the ED during the local surge of the COVID-19 pandemic (March 2020 - April 2020). Patients diagnosed with asthma, cellulitis, COPD, pneumonia, or urinary tract infection who did not require hospitalization received pre-packaged to-go medications free of charge prior to discharge. A monthly report was generated for each to-go medication through the electronic medical record. Retrospective chart review was conducted to obtain de-identified demographic information for those patients. Microsoft Excel was used to generate descriptive statistics. This study was approved by the Institutional Review Board of Partners Healthcare, Boston.

Results: A total of 50 patients from March 13 - April 30, 2020 were discharged with to-go medications. Demographics are listed in Table 1. During the surge of the COVID-19 pandemic at our institution, 66% of patients who received to-go medications were diagnosed with a respiratory illness. Of the patients in the to-go medications program, 56% did not have private insurance, 26% did not speak English as their primary language, and 30% were undomiciled.

Conclusion: The "to-go" medications program has the potential to improve medication adherence while also reducing infection transmission by promoting social distancing through avoiding pharmacy visits. In future research, we aim to continue to analyze the effects of this program on vulnerable populations in order to improve equitable access to health care for all as well as to study how this program affects ED return visits and by extension overall hospital costs.

Table 1. Demographics of Patients who Received To-Go Medications

	March - April 2020	% (n)
Sex		
	Female	46% (23)
	Male	54% (27)
Age		
	19-49	52% (26)
	50-64	26% (13)
	65 - 99	22% (11)

Table 1. Continued.

	March - April 2020	% (n)
ICD-10 Diagnosis		
	Pneumonia	38% (19)
	Asthma	4% (2)
	All respiratory dx	66% (33)
	UTI	12% (6)
	Cellulitis	12% (6)
	Other - non respiratory	10% (5)
Hour of Discharge		
	8 AM - 8 PM	64% (32)
	8 PM - 8 AM	36% (18)
Housing Status		
	Domiciled	70% (35)
	Undomiciled	30% (15)
Insurance Status		
	Private	44% (22)
	State / Public (ie, Medicare, Medicaid)	48% (24)
	Uninsured / self-pay	8% (4)
Language Preference		
	English	74% (37)
	Spanish	24% (12)
	Other	2% (1)

106 Social Disparities of One-Year Cholecystectomy and Complication Rates after Emergency Department Diagnosis of Symptomatic Cholelithiasis

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Study Objectives: Symptomatic cholelithiasis is frequently diagnosed in the emergency department (ED), but there has been little published data on the outcomes of this patient population, in particular, the timing of cholecystectomy and complications such as recurrent symptomatic cholelithiasis, cholecystitis, or pancreatitis. The primary objective of this study was to compare cholecystectomy and complication rates at one year after the diagnosis of symptomatic cholelithiasis in the emergency department, specifically in regards to age, race, sex, and payor status.

Methods: This was a retrospective chart review at a single academic medical center, with approximately 64,000 annual ED visits. All patients with an initial ED diagnosis of cholelithiasis between 2012 and 2018 were included. Outcomes after ED diagnosis were followed out to one year and included return ED visits, cholecystitis, pancreatitis, and cholecystectomy. Descriptive statistics were used to summarize demographic and clinical characteristics of the patients. Chi-square tests evaluated associations of patient characteristics with outcomes. Age was dichotomized at 45 (the median for this sample) and ED visits within 1 year were categorized: 0 visits and $\geq$1 visit. Analyses were done using SAS, Version 9.4. $P<0.05$ was considered statistically significant.

Results: Over a 6-year period, 2398 patients were included. 1588 (66%) were female, 1610 (67%) white, 409 (17%) Hispanic, and 252 (11%) were black. The mean age and return ED rate were 48 and 0.14. Individuals who identified as black had statistically significant increased ED return visits and were less likely to undergo cholecystectomy compared to other races (16% vs. 11%, p=0.012; 60% vs. 69%, p=0.004, respectively). Those with Medicaid/Medicare or no insurance, had decreased rates of cholecystectomy and an increased incidence of cholecystitis at one year, when compared to individuals with commercial insurance (63% vs. 76%, $p<0.0001$; 4% vs. 2%, p=0.004, respectively). Males and individuals over the age of 45 were less likely to undergo cholecystectomy (65% vs. 70%, p=0.015; 63% vs. 74%, $p<0.0001$, respectively).

Conclusion: This is one of the largest studies to date looking at outcomes after ED diagnosis of cholelithiasis. Differences in ED return visits, cholecystectomy rates, and cholelithiasis suggest social disparities in individuals with Medicaid/Medicare or self-pay, and those of black race.

107 Improving Transitions of Care for Patients Initiated on Buprenorphine from the Emergency Department

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Study Objectives: Opioid use disorder (OUD) is on the rise nationwide with increasing emergency department (ED) visits and deaths secondary to overdose. Although previous research has shown that patients who are started on buprenorphine in the ED have increased engagement in addiction treatment, access to on-demand medications for OUD is still limited, in part because of the need for outpatient linkages to care. The objective of this study is to describe emergency and outpatient providers' perception of local barriers to transitions of care for ED-initiated buprenorphine patients.

Methods: Purposive sampling was used to recruit key stakeholders, who identified as physicians, addiction specialists, and hospital administrators, from 10 EDs and 11 outpatient clinics in King County, Washington. Twenty-one interviews were recorded and transcribed, and then coded by two team members in order to verify accuracy of the thematic analysis. Interview guides and coding were informed by the Consolidated Framework for Implementation Research (CFIR), which provides a structure of domains associated with effective implementation of evidence-based practice.

Results: From the 21 interviews with emergency and outpatient providers, four major barriers emerged around transitions of care for ED-initiated buprenorphine patients—stigma, X-waiver shortage, referral incoordination, and loss to follow-up. Interviewees desired a protocolized "standard of care" for the treatment of ED patients with OUD to destigmatize the condition and increase patient self-identification and mission-driven practice. Additionally, participants highlighted the need to increase program capacity through promoting X-waiver training and creating a central repository of outpatient providers in order to streamline referrals. Lastly, interviewees aspired to increase retention of patients in outpatient treatment by having low-barrier scheduling, walk-in appointments, navigation services, and care coordination.

Conclusion: There are a number of barriers to translating evidence-based practice around the transitions of care of ED-initiated buprenorphine patients to an urban community setting. Next steps for implementation of this intervention include increasing the number of X-waivered providers, creating a central repository for streamlined referrals and follow-up, and funding navigation services.

108 A Randomized, Placebo-Controlled Study of Metoclopramide + Diphenhydramine for Acute Post-Traumatic Headache

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Study Objectives: We conducted a randomized, placebo-controlled study to determine whether intravenous metoclopramide 20mg IV + diphenhydramine 25mg (M+D) was efficacious for acute moderate or severe post-traumatic headache.

Methods: This was a double-blind study conducted in two emergency departments. The primary outcome was improvement in pain on a 0-10 scale between time 0 and one hour later. Secondary outcomes were sustained headache relief for 48 hours and score on a 22-item post-concussive symptom scale, on which higher scores indicate more severe symptomotology.

Results: 416 patients were screened for participation and 160 were randomized, 81 to M+D and 79 to placebo. Baseline characteristics were comparable between the groups. By one hour, placebo patients reported mean improvement of 3.8 (SD 2.6) while M+D improved by 5.2 (SD 2.3). The 95% CI for difference of 1.4: 0.7, 2.2. Sustained headache relief was reported by 18/76 (24%) placebo patients and 24/78 (31%) M+D patients (95% CI for 7% difference -7, 21%. One week after the ED visit, the mean PCSS score in the M+D group was 14, and 21 in placebo (95% CI for difference of 7: 0, 15).

Conclusion: M+D was more efficacious than placebo with regard to relief of post-traumatic headache in the ED though this benefit was not sustained beyond the ED visit. Patients who received MCP reported fewer post-concussive symptoms one week later.

109 Rapid Response Electroencephalograph With Artificial Intelligence for Diagnosing Seizures and Highly Epileptiform Patterns in Emergency Medicine

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Study Objective: To test the performance of a recently FDA-cleared machine learning method (Clarityγ) that generates bedside alerts for possible status epilepticus and measures in real time the burden of seizure activity.

Methods: We designed a retrospective study of electroencephalographs from adult patients (n=353) who underwent monitoring with Rapid Response EEG system (Rapid-EEG, Ceribell Inc.) for evaluation of possible seizures between January 2018 and April 2019. We developed a machine learning method for automated detection of seizure activity and seizure burden throughout each recording. We measured sensitivity and specificity of possible status epilepticus (seizures>5 minutes) and real-time seizure burden measurements generated by Clarityγ compared to the majority consensus of at least 2 expert neurologists reviewing the same EEGs. Various thresholds of seizure burden were tested (≥10% indicating at least 30 seconds seizure activity in the last 5 minutes, ≥50% indicating at least 2.5 minutes of seizure activity, and ≥90% indicating at least 4.5 minutes of seizure activity and triggering an alert for status epilepticus).

Results: Majority consensus of neurologists labeled the 353 EEGs as normal or slow activity (n=249), highly epileptiform patterns (HEP, n=87), or seizures (N=17, nine longer than five minutes and eight shorter than five minutes). The sensitivity and specificity of various thresholds for seizure burden during EEG recordings for detecting patients with seizures was 100% and 82% for 50% seizure burden and 88% and 60% for 10% seizure burden. The algorithm generated a status epilepticus alert (≥90% seizure burden) with 100% sensitivity and 93% specificity. Of the 179 EEG recordings in which the algorithm detected no seizures, seizures were identified by the expert reviewers in only 2 cases, indicating a negative predictive value of 99%.

Conclusions: Combination of high sensitivity for status epilepticus events combined with a high negative predictive value for negative cases makes our novel algorithm a useful tool for triaging EEGs in emergency care settings. Confirming cases of non-convulsive subclinical status epilepticus cases within minutes of their arrival to emergency department and independently from neurologists and or EEG technicians will expedite the triage of these critically ill patients and will expedite their treatment. In addition, ruling out seizures accurately in cases being suspected to have seizures can help prevent unnecessary or aggressive over-treatment of such patients.

110 Reliability of Automated Interpretation of Computed Tomography Images in the Management of Acute Stroke: A Single-Center Analysis

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Study Objectives: This study analyzes if artificial intelligence (AI) technology is as reliable as neuroradiologist interpretation to identify patients who are candidates for endovascular thrombectomy (EVT) in the setting of acute ischemic stroke. The AI technology utilized in this study is called RAPID. This study also examines limitations of RAPID and aims to ascertain the degree to which RAPID can be used to triage patients for EVT in the acute setting.

Methods: This is an Institutional Review Board approved, retrospective study of 857 patients presenting to our institution from 1/1/2018 to 11/1/2019 with symptoms of acute stroke. Inclusion criteria included patients who entered our institutional stroke protocol and underwent CT, CTA and CTP scans interpreted by both RAPID and radiologists. Hospital records were also obtained to determine which patients were transferred for EVT and their post-transfer outcomes.

Results: A total of 294 patients satisfied the inclusion criteria. Overall, RAPID CTP analysis showed significant sensitivity (90.7%), specificity (92.5%) and negative predictive value (100%) for identifying EVT-eligible patients when using radiologist interpretation as the gold standard. RAPID CTA showed significant specificity (95.9%) and negative predictive value (94.5%) as well. There was also a significant association between RAPID interpretation and neuroradiologist interpretation of CTA and CTP studies.

Conclusion: The high specificity and 100% negative predictive value (NPV) of RAPID suggests that this technology is a reliable screening tool to accurately rule out patients who are not EVT candidates. All patients who had a negative RAPID scan did not require transfer for EVT, and upon review of these cases by a current neuroradiologist, the decision to not transfer those patients was deemed accurate. Correctly identifying patients who are not candidates for EVT is a vital step in the management of patients with stroke and enables providers to more quickly begin the next phases of treatment. If the use of AI technology as a screening tool can be validated, such technology can be incorporated into hospital protocols to potentially expedite patient care. Furthermore, AI technology can be most impactful in the setting of community hospitals, which may lack 24-hour neuroradiologist availability. Overall, this study suggests that RAPID is a reliable screening tool to rule out stroke patients who are not candidates for EVT.

EMF

111 Development of a Quality Measurement Framework for Acute Psychiatric Care

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Study Objectives: Emergency medicine is uniquely positioned to improve the quality of care and outcomes for acute psychiatric care in the emergency department (ED). Quality measures are essential to characterizing gaps and variations in psychiatric emergency care and guiding quality improvement initiatives. While some professional organizations have published best practices for acute psychiatric care, there is currently a paucity of nationally recognized quality measures for emergency psychiatric care. Our objectives are to (1) describe and evaluate existing US quality measures for emergency care of acute adult psychiatric conditions and (2) create a multi-stakeholder quality measurement framework to guide the development of measures for clinical quality improvement.

Methods: We performed a systematic literature review and environmental scan of national quality metric databases to identify existing US national quality measures for acute psychiatric care. In October 2019, we convened a panel of experts and used a modified Delphi approach to appraise how well the measures satisfy the National Quality Forum (NQF) criteria for performance measure development (importance to measure and report, scientific acceptability of measure properties, feasibility, usability and use, presence of related and competing measures). After iterative discussions, all identified performance measures were reviewed and ranked to develop a quality measurement framework for acute psychiatric care. All items included in the quality measurement framework were finalized by group consensus.

Results: We identified 91 local, regional, and national performance measures relevant to the emergency care of acute psychiatric conditions. Of these, we reviewed the four national quality measures: (1) Median time from ED arrival to departure for discharged psychiatric patients, (2) Median time from ED arrival to departure for admitted psychiatric patients, (3) Median admit decision time to ED departure time for admitted psychiatric patients, and (4) Follow-up after ED visit for psychiatric patients. These four quality measures did not meet all five of the NQF evaluation criteria. Taking implementation and measurement feasibility into account, we developed a quality measurement framework that includes 42 specific structural, process, and outcome measures for the following acute psychiatric care domains in the ED: evaluation, risk stratification, acute stabilization, treatment, disposition, care transition, boarding, and observation (Table 1).

Conclusion: Our review of existing quality measures for the emergency care of acute psychiatric conditions found that all four identified national quality measures did not meet the endorsed and utilized criteria. This highlights the need and the challenge in developing quality measures at the intersection of emergency medicine and acute psychiatric care. Future research and evaluation are needed to determine the feasibility, validity, and reliability of the measures included in the quality measurement framework.

Table 1: Preliminary quality measurement framework for acute psychiatric care*

	Structural Measures	Process Measures	Outcome Measures
Evaluation & Risk Stratification	Presence of a triage protocol for patients with behavioral health chief complaints	Door to diagnostic evaluation by primary ED clinician (physician or licensed advanced practice provider)	Variation in involuntary holds or number of involuntary holds
	Presence of a protocol for assessing suicidality in patients	Family involvement (social support identified/contacted)	
	Presence of a protocol for screening for lethal means for patients who screen positive for suicidality	Admission screening for violence risk, substance use, and intimate partner violence	
	Access to behavioral health specialist for initial evaluation	Documentation of current medications at assessment (excluded if patient cannot provide history)	
		Screening for Pregnancy	
		Variability in diagnostic evaluation (laboratory orders)	
Acute Stabilization	Presence of a protocol for acute agitation management	Hours of physical restraint use	Patient injury during restraint
	Presence of a designated behavioral health treatment space in the ED or affiliated with the ED	Proportion of behavioral health patients physically restrained	Incidence of workplace violence with injury related to care of behavioral health patients
	Presence of ED staff training modules for de-escalation of acute agitation	Proportion of patients requiring chemical sedation (oral, IM, and IV)	Unexpected escalation requiring chemical sedation or physical restraint after the first hour of ED stay
		Proportion of sedating medication given intramuscularly	Change in patient reported outcomes
		Initiation of new treatment (scheduled psychiatric medications) during ED stay	Reduction in agitation, risk adjusted
		Continuation of outpatient psychiatric medications during ED stay	
		Timeliness of medication administered	
Disposition & Care Transition	Presence of a prearranged transfer protocol for acute behavioral emergencies	Median Time from ED Arrival to ED Departure for Discharged ED psychiatric patients	Unscheduled return visits (admitted vs. not admitted)
	Presence of formal relationship with inpatient psychiatric units	Median admit decision time to ED departure time for admitted psychiatric patients (disease specific)	Follow-up after emergency department visit for psychiatric illness (disease specific)
		Referrals for substance abuse treatment for dually diagnosed patients	Community dispositions, risk adjusted (disease specific)
			Patient who returns to the ED after disposition to inpatient psychiatric unit
			Number of suicide-related deaths within 30 days of discharge
			Risk adjusted admission rate to inpatient psychiatric units
Boarding & Observation	Presence of a psychiatric observation unit	Hours in the hallway for evaluation and treatment	Proportion of patients whose final disposition was changed from the time of initial disposition (from the start of boarding process)
		Hours of constant observer	
		Treatment for substance use disorder provided	

*This preliminary quality measurement framework will be finalized by the time of ACEP 2020 presentation
ED: Emergency Department; IM: Intramuscular; IV: Intravenous

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112 Evaluation of MicroMend Wound Closure Device in Repairing Skin Lacerations

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Study Objective: Sutures, staples, tissue adhesives, and bandages are used for simple laceration closure, but they have limitations. Sutures and staples are painful and require clinic visits to remove. Tissue adhesives and bandages can cause inflammation and carry a risk of wound dehiscence. Therefore, there is an unmet need for better skin closure products. microMend® is a novel wound closure device that consists of microstaple arrays attached to an adhesive backing that is the size of a butterfly closure. This study aims to evaluate the feasibility of simple laceration closure using microMend in the emergency department (ED).

Method: This was an open label, single-arm study conducted at two EDs within a large urban academic medical center. Eligible participants were ≥18 years old. After informed consent, one device was applied for every 1-1.5 cm of wound length. Closure was performed by physicians and advanced practice providers. Device removal occurred on Days 5-7 for facial lacerations and Days 7-10 for other locations. A provider satisfaction survey was performed after device application at baseline ED visit. Follow-up assessments, participant satisfaction surveys and photographs of the wound were performed at Days 0, 10, 30 and 90. Photographs were rated by two independent plastic surgeons using a 100-mm visual analog scale (VAS) (0 = worst possible scar, 100 = best possible scar) and a wound evaluation scale (WES) assessing 6 clinical variables (the maximum score is 6). Descriptive statistics are reported.

Results: Thirty-one patients were enrolled in the study: 48% were female, the median age was 42 (IQR 30.5-58), and the median BMI was 27 (IQR 22-29.4); 68% non-Hispanic white, 19% Hispanic white, 10% non-Hispanic African American, 3% other. The median wound length was 2 cm (IQR 1.6-2.5). Ninety percent of the wounds were closed with 1 or 2 devices. The median pain score with application of the devices was 1 (IQR 0 - 10) on a 0-100 mm VAS. Mean time for device application was 89 ± 82 seconds. Local anesthesia was used in 29% of participants (usually for placement of deep sutures) and 97% of providers rated the ease of device application as good or excellent. In addition, 30 of 31 patients (97%) rated the overall device assessment as good or excellent on the Day 10 and Day 30 follow-ups, and 100% of patients rated the overall device assessment as good or excellent on the Day 90 follow-up. Two independent plastic surgeons evaluated wound appearance. At Day 90, the mean VAS and WES scores were 83 ± 15 mm and 5 ± 1, respectively. The agreement between plastic surgeons for these measurements was 82%; 61% of participants had an average WES of 5 or more. Deeper wounds tended to have lower scores. There were no serious adverse events.

Conclusions: Overall, microMend is an acceptable alternative for skin closure in the ED. Nearly all participants and providers rated high levels of satisfaction during application and removal. A majority of participants also had satisfactory cosmetic results at Day 90. Advantages of microMend include ease of use, short application time, low patient-reported pain upon application, and potentially decreased need for local anesthesia. Variability in cosmesis may be dependent on patient, wound, and provider factors. Future studies could evaluate the ability for patients to remove the device at home. Randomized controlled trials are needed to compare microMend to other wound closure methods.

113 Bier Block versus Sedation: A Comparison of Patient Characteristics and Emergency Department Metrics in Pediatric Forearm Reduction

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Study Objectives: Among children presenting to the pediatric emergency department with a forearm fracture requiring closed reduction, the primary objective was to compare the characteristics of children selected for Bier block versus procedural sedation. The secondary objective was to compare procedure-related outcomes for Bier block versus procedural sedation.

Methods: Children ages 4-16 years old, who presented to a single tertiary-care pediatric emergency department (PED) from 01/2013 to 06/2019 with a forearm fracture requiring reduction were eligible for inclusion in this retrospective cohort study if they underwent Bier block or procedural sedation. Patients with open fractures were excluded. Characteristics of interest included population variables, injury types, and visit-timing factors. Procedure-related outcomes included length of stay, pain scores during and after the procedure, procedure success rates, hospitalization rates and unplanned return visits.

Results: 260 children were eligible for inclusion, of whom 177 (68%) underwent Bier Block and 83 (32%) underwent procedural sedation. Children selected for Bier block were more likely to be older (mean 9.5 +/- 3.1 vs. 8.0 +/- 3.4 years, $p<0.001$), male (128/177[72%] versus 48/83[58%], $p=0.020$), have fractures involving the radius only (39/177 [22%] versus 8/83[9.6%], $p=0.048$) and arrive during the weekend (65/177[37%] versus 20/83 [24%], $p=0.043$) compared with children receiving procedural sedation. However, no characteristics were shown to be predictive of procedure selection based upon a binary regression model (Hosmer-Lemeshow goodness of fit $X^2=5.069$ and $p=0.750$, Nagelkerke $R^2 = 0.359$). In addition, no differences were identified in procedure selection based on based on race, mechanism of injury, pre-procedure pain scores, presence of underlying medical conditions, hour of arrival, comorbid injuries, or fracture morphology. PED length of stay (220.7 +/- 98.0 vs. 304.0 +/- 134.3 min) and time from procedure to disposition (60.8 +/- 31.9 vs. 91.6 +/- 88.4) were shorter for children who underwent Bier block. Pain scores, reduction success rate, hospitalization rate, and unplanned return visits were similar in both groups.

Conclusion: There were differences in the characteristics of children selected for Bier block versus procedural sedation for forearm fracture reduction, but these differences were not predictive of procedure selection. Length of stay was shorter for patients who underwent Bier block, but other procedure-related outcomes were similar.

114 Effect of Clinical Decision Support on Head Computed Tomography for Children With Minor Head Trauma

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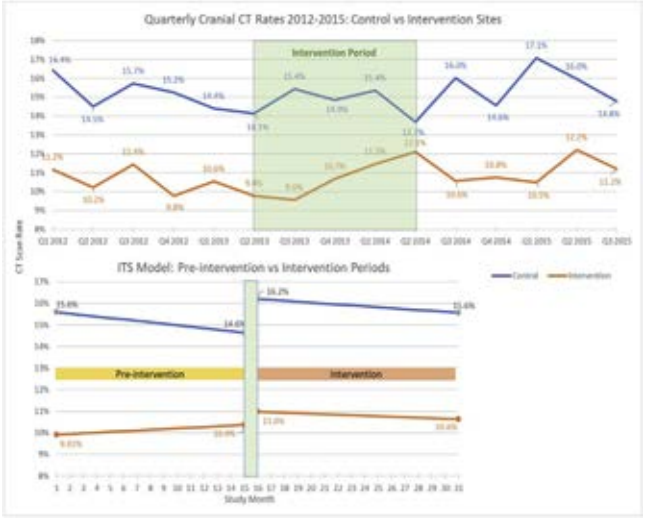
Study Objective: Incorporation of an emergency department (ED) clinical decision support system (CDSS) into the electronic health record for the evaluation of children with blunt head trauma has been shown to safely reduce cranial computed tomography (CT) use in a mixed academic/community ED setting. However, early analyses did not evaluate the broader impact of the CDSS intervention within a large integrated health care system. We aimed to compare changes in ED CT rates and length of stay (LOS)

before, during and after the CDSS implementation among children with minor head trauma across one large system with low baseline CT rates. We compared EDs with and without access to a CDSS tool that incorporated the Pediatric Emergency Care Applied Research Network (PECARN) minor blunt head trauma prediction rules.

Methods: We included children < 18 years old presenting to 21 community EDs between 2012-2015 with minor blunt head trauma, defined by a previously validated matrix of ED chief complaints and diagnoses. Seven EDs participated in a non-randomized CDSS intervention trial between 4/2013 and 7/2014 in which enrolling providers received computerized decision support for children with minor blunt head trauma (Glasgow Coma Scale scores of 14-15). This included patient-level risk estimates of clinically important traumatic brain injury (TBI) defined by the PECARN study. Fourteen EDs did not receive the intervention and served as a comparison group. To assess CDSS sustainability and diffusion, we examined CT rates and ED LOS across CDSS and control sites over 3 time periods: pre-intervention (12 months), intervention (15 months) and post-intervention (15 months) using interrupted time series (ITS) analyses. We excluded those with GCS scores < 14, a TBI diagnosis in the last year and a CT within 24 hours prior to the ED visit.

Results: There were 50,195 eligible patient ED encounters. The CT rates were as follows: pre-intervention: CDSS EDs 10.7% (95% CI: 10.0-11.3) vs. control 15.5% (95% CI: 14.8-16.2); intervention: CDSS EDs 10.7% (95% CI: 9.9-11.6) vs. control 14.7% (95% CI: 14.1-15.3); post-intervention: CDSS EDs 11.0% (95% CI: 10.5-11.6) vs. control 15.7% (95% CI: 14.9-16.5). The CDSS EDs started with and maintained a significantly lower CT rate compared to control EDs across study time periods. There was significant variation across EDs: CT rates ranged from 7.6-14.1% at CDSS sites and 7.8-21.3% at control sites. In ITS models, we found no significant difference in CT rate changes between the pre-intervention vs. intervention and intervention vs. post-intervention periods. We did not find clinically meaningful changes in ED LOS over the study period.

Conclusion: CT rates for children with minor blunt head trauma were stable in this community ED health system from 2012-2015. Unexpected baseline practice pattern differences at control versus CDSS facilities confounded our CT comparison and suggest that the CDSS sites may have already been close to a safe CT "floor" rate prior to CDSS implementation.



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115 A Retrospective Review of the Clinical Significance of Knee Effusions on X-ray Imaging and the Relation to Occult Tibial Plateau Fractures

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Study Objectives: Tibial plateau fractures can be difficult to visualize on x-rays and in the absence of routine use of advanced imaging modalities such as CT or MRI, they can be missed. Diagnosing this fracture early is critical and the delay in treatment can result in the tibia remaining in a subluxed position. This can lead to abnormal loading on the joint, resulting in early degeneration, deformity, and limitation of knee movements. The primary objective of this study was to determine if there is a correlation between effusions viewed on initial knee x-ray and occult tibial plateau fractures. Secondary objectives evaluated for associations between fractures and patient demographics, mechanism of injury, co-morbidities, and surgery rates.

Methods: This was a retrospective chart review conducted at a tertiary academic hospital with 64,000 annual ED visits and a second satellite facility with nearly 30,000 ED visits. ICD10 coding were used to extract all patients from the electronic medical record from 9/1/2012 to 6/30/2019, with the diagnosis of tibial plateau fracture. The medical records were individually reviewed for the presence of tibial plateau fractures and the imaging obtained. Specifically, the presence or absence of knee effusions on x-rays, in which the fracture was not initially seen, but subsequently confirmed on CT or MRI. Additional recorded information included patient demographics, trauma activations, surgery rates, fall from a height, and co-morbidities. Descriptive statistics were used to summarize demographic and clinical characteristics of the patients. Fisher's exact test was used to look at the association between diagnosis of fracture from plain x-ray and detection of effusion on x-ray. Additional analysis was done to look at the association of patient demographics with need for surgery. Results were reported as odds ratios and 95% CIs. Analyses were done using SAS, Version 9.4. $P<0.05$ was considered statistically significant.

Results: 321 tibial plateau fracture identified per x-ray, CT, or MRI. 50% were female and the mean age was 53 years old. There were 84 occult fractures, which by definition, did not reveal fracture on x-ray but ultimately confirmed on CT or MRI. There was a statistically significant association between the presence of an effusion and non-occult tibial plateau fracture (OR: 2.93, 95% CI: 1.20, 7.19; p=0.019). Statistically significant predictors of undergoing surgical repair included male sex (OR: 2.91, 95% CI:1.70, 5.01; p=0.0001), fall from a height (OR: 3.66, 95% CI:2.14, 6.26; p<0.0001), and fracture visualized on the initial x-ray (OR: 10.66, 95% CI:5.17, 21.98; p<0.0001)

Conclusion: The presence of an effusion on initial x-ray is more predictive of a non-occult tibial plateau fracture versus an occult one. Individuals of male sex, suffered injury due to fall from a height, or the fracture was visualized on the initial x-ray, were more likely to undergo surgical repair for their tibial plateau fracture.

116 Associations of Emergency Department Sedation and Analgesia and Hospital Outcomes in Mechanically Ventilated Patients

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Study Objectives: Sedation and analgesia are vital components of care provided to patients in the emergency department (ED) and intensive care unit (ICU) settings; they are largely necessary for alleviating pain, reducing agitation, and aiding patient synchrony with the ventilator. However, several prior studies have begun to shed light on the deleterious consequences of deep analgosedation, which take effect starting in the immediate post-intubation period in the ED, and carry over into the ICU. Yet, the most recent literature has been conflicting with regard to the impact of sedation on mortality.

Study Objectives: Thus, the authors of this study sought to further investigate the relationship between depth of sedation and mortality, immediately following ED intubation and within 24 hours of ICU admission.

Methods: The study was a retrospective cohort study of patients 18 years or older presenting to the Brigham and Women's Hospital (BWH) emergency department requiring mechanical ventilation from January 1, 2016 to December 31, 2017. Data were obtained from the National Emergency Airway Registry (NEAR), a multi-center observational intubation registry for patients presenting during this timeframe. Patients who were intubated at a referring hospital, died in the ED, or required chronic mechanical ventilation prior to presentation were excluded from the study. We conducted additional chart review and analysis to supplement the NEAR data. Patients were classified as receiving deep sedation or light sedation based upon the Richmond

Agitation-Sedation Scale (RASS) score (whereby a RASS score of -3 to -5 defined deep sedation, and a score greater than -3 defined light sedation, according to literature).

Results: A total of 237 patients were included. We found that 197 (83.1%) patients received propofol, 152 (64.1%) patients received etomidate, and 125 (52.7%) patients received fentanyl. There were 150 (63.3%) patients who received deep sedation in the ED. There was no significant difference in median RASS score in the ED between survivors and non-survivors ($p<0.08$). After multivariable logistic regression that adjusted for RASS in the ICU, Acute Physiology and Chronic Health Evaluation (APACHE) scores, and Sequential Organ Failure Assessment (SOFA) scores, patients with a deeper sedation RASS were found to have no statistically significant difference in mortality compared to the light sedation group. A total of 62.3% of patients under deep sedation were alive versus 66.7% in the light sedation group (between-group difference, 4.4%; adjusted odds ratio, 1.77; 95% CI 0.82-3.84).

Conclusion: In the ED, sedation often serves as a mainstay in management of the critically ill. Here, we affirm that deep sedation is widely used in the ED, though its effect on mortality remains unclear. The difference in results between prior studies and this study can be explained by the variation in clinical practices at the BWH ED compared to other medical institutions. Future studies with larger sample sizes are necessary to clarify the association. Accordingly, more standard guidelines for administering sedatives may also be developed.

117 Update: Dantrolene Sodium Suspension (250 Mg/5mL) in Patients with Exertional Heat Stroke

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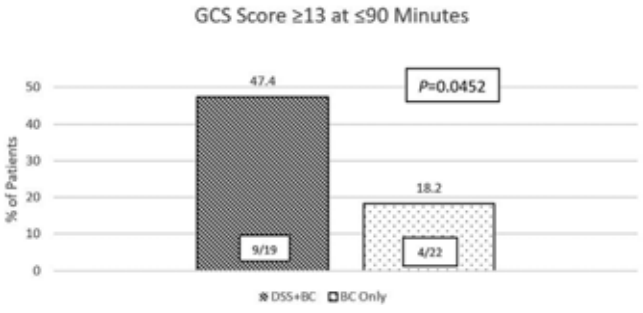
Study Objectives: Exertional heat stroke (EHS) is a rare, sudden and unpredictable hyperthermic, hypermetabolic crisis that may affect anyone performing intense physical activity. EHS is one of the most severe forms of heat illness and a leading cause of death and disability in athletes, outdoor workers and military personnel. EHS is marked by severe hyperthermia (core body temp. $\geq$40°C) and CNS dysfunction (eg, seizures, coma, abnormal behavior). The sporadic, unpredictable and life-threatening nature of EHS limits the ability to conduct prospective controlled clinical trials. Current treatment is limited to efficient body cooling which is infrequently available and inconsistently administered. Up to 1/3 of survivors may have long-term neurologic sequelae despite rapid body cooling. The objective was to evaluate the efficacy and safety of dantrolene sodium for injectable suspension (Ryanodex®) (DSS) for the treatment of EHS, administered as an adjunct to body cooling (BC).

Methods: We conducted two comparable clinical studies evaluating DSS+BC compared to BC alone in patients with EHS. Study 1 (ITT N=34, mITT N=24) and Study 2 (ITT N=17) were randomized, controlled, 2-arm parallel studies. Patients had a core temp. $\geq$40°C, impaired level of consciousness (LOC)(GCS score <13) and tachycardia. The primary efficacy endpoint in both studies was the cumulative incidence of recovery of LOC defined as a GCS score $\geq$13 at or prior to 90 minutes post-randomization. Safety and tolerability were assessed. As reported at the 2017 ACEP Research Forum, the mITT population in Study 1 excluded patients who were intubated at baseline (precluding full assessment of GCS). Study 2 ran from August 2018 to August 2019. These multicenter studies were conducted in a real-world emergency medicine setting in the same hospitals. Due to the limitations enrolling EHS patients and given the comparability of the studies, an integrated analysis of efficacy was warranted.

Results: Study 1 and Study 2 demonstrated consistent, clinically meaningful results. Demographics and baseline characteristics in the integrated analysis were balanced between the DSS+BC (n=19) and BC only (n=22) groups regarding age (median 45 vs 43.5 yrs.), baseline GCS (mean 7.1 vs 6.2) and baseline rectal temp. (mean 41.6 vs 41.3°C). 51% were male. A statistically significant number of patients in the DSS+BC group met the primary endpoint vs BC alone (47.4% vs 18.2%, p=0.0452). Safety and tolerability findings were comparable in both groups and consistent with the known safety profile in the approved indication.

Conclusion: Conducting clinical studies for EHS is challenging due to its rare, unpredictable and life-threatening nature. We conducted two comparable studies showing consistent and clinically meaningful benefit from the addition of DSS to BC. Approximately twice as many DSS treated subjects in each study achieved the primary endpoint. The integrated analysis of efficacy demonstrates that DSS added to BC results in a clinically meaningful and statistically significant improvement of neurologic impairment in subjects with EHS within 90 minutes of administration.



118 Delayed Emergency Department Fluid Resuscitation May Lead to Increased Mortality in Sepsis: A Call for an Optimal Fluid Resuscitation Interval

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Study Objective: Many hospitals struggle to maintain compliance with sepsis guidelines and to achieve a targeted fluid resuscitation of 30mL/kg of crystalloid within 3 hours. Recent data suggest that even earlier administration of these recommended fluids reduces mortality from septic shock, but the optimal timing of fluid delivery in the emergency department (ED) is still unknown. The objective of this study was to analyze the timing of fluid resuscitation as it relates to patient outcomes for severe sepsis/septic shock in the ED.

Methods: A retrospective cohort study in an urban/suburban (pop. 1.1 million) community health system from January 2017 through December 2019. Included were all adults (18 years and up) admitted with an ICD10 diagnosis coded for sepsis at discharge or a sepsis DRG code with associated bacteremia. The sepsis diagnosis had to be present at admission (POA). Excluded were patients with a sepsis discharge in the 90 days prior to the study case sepsis event. Primary outcome was hospital mortality. Other outcomes included ED and hospital length of stay (LOS) and any ICU admission. Detailed fluids data with time stamps was available from our institution database allowing us to compute multiple time-based fluid variables. Multiple tables of data were extracted from Epic using SQL query language, and then validated and analyzed using IBM SPSS Statistics v26. Analysis included student t-test, Mann-Whitney U and Chi-Square tests as appropriate. Adjusted odds ratios (OR) with 95% confidence intervals (CI) for mortality were determined by multivariate logistic regression using those factors found to be significant at the univariate level. This minimal risk study was approved by the hospital's Institutional Review Board.

Results: Of 2,696 patients, 2375 had sepsis POA: septic shock (44.9%), severe sepsis (42.4%), sepsis without organ dysfunction (5.4%), and sepsis with no classification (7.2%). Mean age was 66.2 years (SD=17.3) and 48.8% were female. ESI levels 1, 2 and 3 were 16.5%, 62.1%, and 21.3% respectively. Any ED hypotension (SBP<90mmHg or MAP<65mmHg) occurred in 51.9%. 'Surviving Sepsis' targeted 30mL/kg fluids was met for 75.1% at 3 hours, 63.7% at 2 hours, 55.1% at 1 hour and 53.6% at 30 minutes. Median (IQR) time to 30mL/kg was 7.0 hours (3.1-19.1), ED LOS was 5.5 hours (4.3-7.1) and hospital LOS 6.2 days (3.6-11.0). Admission to ICU at any point of hospitalization was 60.5%. Overall mortality was 13.7%. Variables associated with mortality at the univariate level (median;IQR) any ED hypotension (1.79;1.41-2.28), any ED MAP<65mmHg (1.63;1.28-2.21), discharge diagnosis of septic shock (3.60;2.78-4.63), and ICU admission (5.40;3.85-7.59). Younger age and longer ED LOS were associated with lower mortality. Multivariate analysis (OR;95% CI) identified increasing age (1.018;1.010-1.027), ESI level 1 (2.598;1.933-3.492), septic shock (3.176;2.383-4.231) and increasing time to 30mL/kg fluids (1.006;1.003-1.010) as independent factors associated with mortality. Theoretical application of the logistic equation to

the recommended 30mL/kg fluids in 3 hours would result in 32 fewer deaths compared to the study period.

Conclusions: Delays to fluid resuscitation may result in increased mortality in sepsis. Emphasis on measures to improve the timing and delivery of resuscitation fluids in the ED are warranted. Leveraging large health system data and predictive analytics will help us to optimize and customize fluid delivery to improve sepsis outcomes.

119 Factors Contributing to the Advancement of Women in Academic Emergency Medicine: A Multi-Institution Survey Study of Resident Physicians

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Study Objectives: Despite increasing numbers of women entering medicine, few academic leadership positions are held by women physicians in emergency medicine. This study aimed to identify factors that affect training and career planning of women resident physicians as future leaders in academic emergency medicine.

Methods: We distributed an electronic survey to women emergency medicine residents at eight institutions across the United States. We collected anonymous survey responses between November 2019 and January 2020. The survey consisted of demographic questions as well as questions in which participants rated categorical characteristics: determination, resiliency, support, career aspiration, obstacles, and sex discrimination. We utilized a Likert 5-point scale (1= strongly disagree; 5= strongly agree) and categorized responses in binary format for analysis (1-3= disagree, 4-5= agree). We calculated averages for each category and considered these to be significant if the average was $\geq$4 in the affirmative or $\leq$2 in the negative. For yes/no questions we report responses in a binary format.

Results: The overall response rate was 57.1% (36/63). All participants disagreed with the statements, "I do not seek career advancement opportunities" and "My career has been significant stunted due to childbirth or child rearing." Most participants reported goals of future career advancement (75%, 27/36) and an ability to achieve goals despite difficulty (88.9%, 32/36). Most participants felt positive about their careers (86.1%, 31/36 and 80.6%, 29/36) and family/personal relationships 75% (27/36). Most residents reported adequate support from both supervisors/colleagues and family (72.2%, 26/36 and 75%, 27/36), the availability of career mentoring programs at their institutions (58.3%, 21/36), and high levels of personal resiliency (average: 4.0). Sex discrimination by colleagues or supervisors was reported by 55.6% (20/36) of participants, while 5.6% (2/36) reported sexual assault and/or battery by colleagues or supervisors during their training.

Conclusions: Women in emergency medicine residency programs who participated in our study have career aspirations that include academic leadership positions, are resilient, and feel well supported by colleagues, supervisors, and family. Sex discrimination is still common during residency training. None of the resident participants view childbearing and childrearing as significant obstacles to career advancement. Further research is needed to promote women residents as future leaders in academic emergency medicine, specifically to develop strategies for career mentoring, research support, and improving sex discrimination.

120 Cardiopulmonary Ultrasound in Sepsis: A Pilot Study

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Study Objectives: Sepsis-induced cardiomyopathy (SICM) is a recognized and often reversible form of cardiac dysfunction in patients with sepsis. Few studies have assessed the utility of point-of-care ultrasound in the management of patients with sepsis, especially early in the disease course. The purpose of this study is to evaluate echocardiogram and lung ultrasound findings and correlation with clinical outcomes.

Methods: This was a prospective, pilot study enrolling adult patients (>18 years) with sepsis at a single academic emergency department (ED). Patients were enrolled within one hour of sepsis onset, defined as the time at which our sepsis screening tool in the electronic medical record alerted the provider of potential and/or severe infection. Echocardiogram and lung ultrasounds were performed and reviewed by an ultrasound-fellowship trained member of the research team. Ultrasound findings included left ventricular (LV) function, right ventricular (RV) function, RV size, and presence of anterior thoracic B lines. Demographics, clinical outcomes, sepsis measures, and ultrasound findings were analyzed using descriptive statistics. Multivariate logistic regression was performed with variables chosen a priori and included: hyperdynamic LV function, reduced right ventricular (RV) function or abnormal RV size, inferior vena cava (IVC) collapsibility with respiration, > 5 B-lines on lung ultrasound (LUS), >1 pleural effusion on LUS, and Mortality in ED sepsis score. Primary outcomes were need for positive pressure ventilation (PPV) or vasopressors at 12 hours.

Results: In total, 92 patients were enrolled, including 43 patients with hyperdynamic LV function and 49 with normal/reduced LV function. 10 patients required vasopressor and 11 required PPV at 12 hours from the time of ED arrival. Demographics and sepsis management variables were well matched between groups, with the exception of supplemental oxygen use being more prevalent in the normal/reduced group (28 v. 11, p = 0.002). Hyperdynamic LV function did not correlate with vasopressor or PPV use at 12 hours (OR 2.51—95% CI 0.32-19.88 and OR 4.63—95% CI 0.37-57.24, respectively). Abnormal RV function or size, IVC collapsibility, and lung US findings did not demonstrate statistical significance (Table 1).

Conclusions: In this small cohort of patients, hyperdynamic LV function did not correlate with need for vasopressors or PPV at 12 hours. However, abnormal RV size and >5 B-lines did trend towards significance for both primary outcomes. Future studies with a larger sample size are needed to better elucidate these findings.

121 Evaluation of a Novel Ultrasound Machine Learning Algorithm in Estimating Left Ventricular Ejection Fraction

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Background: Physicians with training in point-of-care ultrasound (POCUS) can reliably estimate left ventricular ejection fracture (LVEF). However, those without

Table 1. Multivariate Regression Analysis for primary outcomes.

	PPV Use at 12HR			Vasopressor Use at 12HR		
Variable	**OR**	**p**	**95% CI**	**OR**	**p**	**95% CI**
Hyperdynamic LV	4.63	0.233	0.37-57.24	2.51	0.382	0.32-19.88
RV Function- abnormal		Cannot Calculate		0.088	0.343	0.00-13.38
RV Size- abnormal	1.38	0.858	0.04-47.06	7.77	0.081	0.78-77.70
IVC Collapsible	0.04	0.060	0.00-1.15	0.14	0.139	0.01-1.90
>5 B-lines on LUS	11.57	0.053	0.96-138.72	0.20	0.245	0.01-3.10
>1 Pleural effusion on LUS	0.06	0.132	0.00-2.34	0.94	0.957	0.11-8.41
MEDS Score	1.48	0.005	1.13-1.95	1.40	0.003	1.12-1.74

experience or at novice level may misestimate LVEF. The reference standard for calculation of LVEF involves obtaining both apical four-chamber (AP4) and apical two-chamber (AP2) views, and tracing the endocardial border. In POCUS, these views are difficult to obtain due to a number of patient, machine and environmental factors. Physicians may therefore use other views such as the parasternal long axis (PLAX) when determining LVEF, and do not assign specific quantitative values to LVEF. This leads to differences between POCUS physician estimates and cardiologist-read LVEF calculations. To overcome these barriers, a deep learning AutoEF algorithm (Caption Health, Inc®) was created that to our knowledge, is the first machine learning system capable of calculating LVEF from a single view and using the PLAX view for LVEF estimation.

Study Objective: To compare AutoEF and POCUS expert LVEF estimations to the reference standard when categorizing images by LVEF depression severity, focusing on the PLAX view.

Methods: Sonographer-obtained PLAX, AP4, and AP2 images (n=1660) were reviewed by 10 physician experts, who provided visual integer estimates of LVEF for each image. A subset of images (approximately 15%) were processed through the AutoEF algorithm, which produced LVEF values for each image. Reference standard LVEF was calculated via Simpson's method technique by 3 cardiologists as per regular practice. Images were categorized into the following bins: hyperdynamic, normal, reduced, and severely reduced. Both AutoEF and physicians' visual LVEF were compared to the reference standard.

Results: AutoEF showed higher sensitivity than POCUS physicians in detecting reduced LVEF in single AP4 and AP2 views, as well as higher accuracy in correct bin placement with those views. However, in the PLAX view, AutoEF showed equal sensitivity with POCUS users (77% vs. 79%) in detecting reduced LVEF, as well as similar accuracy in correct bin placement (68% vs. 67%). Since PLAX view test characteristics were similar, a confusion matrix was generated to compare each categorical bin in this view (Figure 1).

Conclusion: The AutoEF algorithm overall outperforms visual estimation of LVEF generated from a single view, except in the PLAX view where test characteristics are similar. For this view, the greatest discrepancy in categorization occurred in the severely reduced LVEF bin, favoring visual estimation. Further research is needed to evaluate reasons for this difference. Nevertheless, automation of LVEF is reaching the turning point of being assistive both in clinical practice and with POCUS education.

Confusion Matrix PLAX: AutoEF + POCUS Physicians

AutoEF v.s. POC Physicians n (%)			Predicted: Severely Reduced	Reduced	Normal	Hyperdynamic
Actual	Severely Reduced	AutoEF	15 (57.7%)	11 (42.3%)	0 (0%)	0 (0%)
		POC Physicians	135 (73.8%)	48 (26.2%)	0 (0%)	0 (0%)
	Reduced	AutoEF	9 (14.5%)	42 (67.7%)	11 (17.7%)	0 (0%)
		POC Physicians	88 (19.3%)	268 (58.9%)	95 (20.9%)	4 (0.9%)
	Normal	AutoEF	0 (0%)	7 (13.0%)	39 (72.2%)	8 (14.8%)
		POC Physicians	1 (0.3%)	30 (7.7%)	302 (77.0%)	59 (15.1%)
	Hyperdynamic	AutoEF	0 (0%)	0 (0%)	3 (60.0%)	2 (40.0%)
		POC Physicians	0 (0%)	0 (0%)	18 (56.3%)	14 (43.8)

122 Point of Care Ultrasound Reduces Time to Diagnosis and Treatment of Ruptured Ectopic Pregnancy

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Study Objectives: Hemorrhage from ectopic pregnancy is the leading cause of pregnancy-related maternal mortality in the first trimester. An ectopic pregnancy becomes more dangerous the longer it is unidentified, thus the emergency physician's role in early identification of ruptured ectopic pregnancy cannot be understated. The objective of this study was to compare times between emergency department (ED) arrival and diagnosis of ruptured ectopic pregnancy, obstetric consultation, and operating room (OR) arrival for patients with either a point-of-care ultrasound (POCUS) or a radiology-performed ultrasound (RADUS) as their first imaging study.

Methods: This was a retrospective analysis of all patients diagnosed with a ruptured ectopic pregnancy between February 2012 and September 2018 at one academic medical center. Patients who received an ultrasound (US) during their ED course, went directly to the OR, and had evidence of ruptured ectopic pregnancy were included. Presenting symptoms, clinical findings, operative reports and outcomes were collected using a standardized abstraction form. We analyzed intervals between ED arrival, first ultrasound diagnosis by POCUS or RADUS, obstetric consultation, and OR start times. We also compared patient characteristics, vital signs, and clinical data. Chi-square analysis and unpaired t tests were used to determine significant differences between the two patient groups.

Results: During the study period, 262 patients were diagnosed with an ectopic pregnancy; 32 (12%) had a ruptured fallopian tube and abdominopelvic free fluid. We compared time intervals between two patient groups: patients who received POCUS first (n=10) and those who received RADUS first (n=22). Patients who received POCUS first had an average 123-minute shorter time interval between ED arrival and ultrasound diagnosis of hemoperitoneum, 116-minute shorter time between ED arrival and obstetric consult, 222-minute shorter time between ED arrival and OR arrival, and 98 minute shorter time between their first US and OR arrival (Table).

Eight patients (30%) had a previous ectopic pregnancy. Seven (70%) of the POCUS-first patients had a prior methotrexate injection compared to ten (45%) of the RADUS-first patients. Overall, 32 (100%) presented with abdominal pain and 24 (75%) reported vaginal bleeding. Six (18%) patients were unaware they were pregnant. POCUS-first patients had an average shock index of 1.1 and hemoglobin level of 11.3 g/dL, while that of the RADUS-first patients was 0.9 and 12.1, respectively. All patients had evidence of intraperitoneal free fluid on POCUS, RADUS, or both. The most common ultrasound finding in addition to hemoperitoneum was an adnexal mass, ranging in size from 2-17 cm; average mass size was 4.5 cm.

Conclusion: In this study, symptomatic patients with a concern for ectopic pregnancy who received POCUS first compared to RADUS had significantly reduced times to diagnosis, obstetric consultation, and OR arrival. The patients who received POCUS first had a higher shock index and were more likely to have a known ectopic pregnancy.

Table. Average time intervals (minutes).

	POCUSFirst (n=10)	RADUSFirst (n=22)	P-value
ED arrival to diagnosis	15	138	<0.001
ED arrival to obstetric consult	34	150	<0.001
ED arrival to OR arrival	159	381	<0.001
First US to OR arrival	144	242	<0.001

123 AI vs Expert: A Comparison of Rapid Visual IVC Collapsibility Assessment between POCUS Experts and a Deep Learning Algorithm

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Study Objectives: We sought to create a deep learning (DL) algorithm to determine the degree of inferior vena cava (IVC) collapsibility in critically ill patients to enable novice point of care ultrasound (POCUS) providers.

Methods: We utilized publicly available long short term Memory (LSTM) DL basic architecture which can track temporal changes and relationships in real-time video, to create an algorithm for ultrasound video analysis. The algorithm was trained on public domain IVC ultrasound videos to improve its ability to recognize changes in varied ultrasound video. A total of 220 IVC videos were utilized; 10% of the data was randomly used for cross correlation during training. Data was augmented through video rotation and manipulation to multiply effective training data quantity. After

training, the algorithm was tested on the 50 new IVC ultrasound video obtained from public domain sources and not part of the data set used in training or cross validation. Fleiss' kappa was calculated to compare level of agreement between the three POCUS experts and DL algorithm and POCUS experts.

Results: There was very good agreement between the 3 POCUS experts with kappa = 0.87. Agreement between experts and algorithm was good with alpha = 0.73.

Conclusions: Our algorithm showed good agreement with POCUS experts in visually estimating degree of IVC collapsibility which has been shown in previously published studies to differentiate fluid responsive from fluid unresponsive septic shock patients. Such an algorithm could be adopted to run in real time on any ultrasound machine with a video output, easing the burden on novice POCUS users by limiting their task to obtaining and maintaining a sagittal proximal IVC view and allowing the AI to make real time determinations.

124 Impact of a Novel Telehealth Follow-Up Protocol for At-Risk Emergency Department Patients Discharged With Presumptive or Confirmed COVID-19

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Study Objectives: The COVID-19 pandemic placed enormous stress on hospital infrastructure, particularly with regard to bed availability. We adopted a novel clinical pathway to discharge mild to moderately ill patients with Telehealth Follow-up and Remote Patient Monitoring (TFRPM).

The objective was to describe the impact of a novel clinical pathway for outpatient telehealth follow-up of patients with presumptive or confirmed COVID-19 discharged from the emergency department (ED).

Methods: The clinical pathway allowed patients with presumptive or confirmed COVID-19 disease to be discharged home if they had in-home support and consented to early telehealth follow-up with remote patient monitoring. Patients were eligible for TFRPM if they had a RR<22 AND an exertional oxygen saturation (eO2sat) of 90% or above after treatment and observation. Telehealth visits were performed at least once daily for up to seven days. Patients with an eO2sat of between 92% and 95% were discharged with pulse oximeters (PO) and those with eO2sat between 92% and 90% were given PO and oxygen concentrators (OC) (FIO2 up to 3 l/m). All telehealth visits were performed by providers trained to gauge both subjective and objective measures of disease progression (symptoms, O2 sat, HR, RR). Patients were followed until disease resolution or referral to the ED. We performed a retrospective review of data collected for quality assurance purposes. Trained abstractors performed chart review and data collection. The primary outcome measure was ED revisit. Secondary measures included: disease course, hospital LOS, ICU requirements, respiratory support, mortality and loss to follow-up (LTFU). Descriptive statistics were used to analyze the extracted data. 10% of charts were reviewed by an independent reviewer for data quality assurance. We report a sensitivity analysis accounting for those lost to follow-up and projected cost-effectiveness.

Results: From March-April of 2020, we discharged 488 presumed or confirmed COVID-19 patients with TFRPM. Of these patients, 155 were discharged with PO, and 86 were discharged with PO+OC for home use. First (12-24 hour) telehealth contact was successful in 81.7%, 90.3% within 3 days and 9.7% were LTFU. There was a total of 1,431 telehealth follow-up visits. Ninety patients (18.4%) returned or were referred to an ED a median of 3 days (IQR: 2.0 to 6.0 days) after index visit; 43 (8.8%) were admitted to the hospital's general medical floor. Two of these patients were transferred to ICU within 24 hours and both died 5 days after admission; 5 others were transferred to ICU and intubated more than 24 hours into their hospitalization and 4 expired (1 patient 9 days later, 2 patients 10 days later, and 1 patient 23 days later). The last patient recovered and was discharged after 7 days of ICU care. The mortality rate for this cohort was 1.2%. The telehealth program cumulative costs of were $621,800, including charges attributed to their actual admissions, were substantially less than the projected cumulative mitigated hospitalization charges of $6,718,296 (IQR: $4,767,344; $9,902,496).

Conclusion: Implementing a novel discharge and telehealth follow-up protocol for patients with presumed or confirmed COVID-19 was able to decompress our overburdened inpatient units. The addition of remote patient monitoring and oxygen support appears to be a safe alternative in mild-moderate risk discharges and may serve as an alternative to hospital admission during a crisis of pandemic proportion.

125 Linkage Outcomes for HIV/HCV Co-Infected and HCV Mono-Infected Patients Participating in an Emergency Department Screening Program

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Study Objectives: Recent studies demonstrate that the emergency department (ED) can play a critical role in hepatitis C screening and linking care for those who test positive. Along with other public health initiatives, ED HCV screening programs help reduce community HCV burden. Historically, HIV/HCV co-infected patients have had poorer rates of linkage to care, treatment initiation and treatment completion for HCV than HCV mono-infected patients have. We sought to compare the rates of linkage to care between HCV mono-infected and HIV co-infected patients who were screened for HCV and HIV as part of a non-targeted ED HCV/HIV screening program.

Methods: Retrospective review of prospectively collected program evaluation data collected between June 6, 2018 and December 31, 2019. Eligible patients had to be 18 years of age and older, triaged to the adult or pediatric ED and able to provide consent for HCV and HIV testing. Socio-demographic variables, HIV and HCV status and linkage to care outcomes were abstracted from the program-screening database. Successful linkage to care was defined as attending at least one outpatient appointment with an HCV care provider. Descriptive statistics (measures of central tendency and dispersion) were computed to characterize the data. Comparisons of groups (HCV mono-infected vs. HIV/HCV co-infected) were compared using Chi-square.

Results: Of the 427 patients found to have active HCV infection (VL+) during the screening period, 41 (9.6%) had unknown HIV status and were excluded from analysis. Of the 386 patients with known HIV status, 56 (13%) were found be HCV/HIV co-infected. HIV/HCV co-infected patients had a mean age was 51. The majority of HIV/HCV co-infected patients were male (70%), African American (25%) and had public insurance (64.2%). Successful linkage to care was achieved in 37.5% of HIV/HCV co-infected patients. HCV mono-infected patients had a mean age was 51. The majority of HCV mono-infected patients identified as male (78%) and white (24.4%). Most had public insurance (58.7%). Successful linkage to care was achieved in 31.8% of HCV mono-infected patients. A total of 49 patients, (4 with HIV/HCV co-infection and 45 with HCV mono-infection) were lost to follow up. There were no statistically significant differences in demographics, insurance status, or rates of linkage to care between HCV mono-infected and HIV/HCV co-infected patients.

Conclusion: Non-targeted HCV screening in the ED identified a large number of patients with active HCV infection, of which a significant portion were co-infected with HIV. There were no significant differences in age, sex, race, ethnicity or insurance status between HCV mono-infected and HIV/HCV co-infected groups. Contrary to prior studies, there were also no differences in linkage to care rates between these two groups. Further investigation is required to determine if there are significant differences in HCV treatment initiation and sustained viral response (SVR) between HCV mono-infected and HIV/HCV co-infected individuals.

126 Efficacy of Omadacycline in the Treatment of Acute Bacterial Skin and Skin Structure Infections in Patients With Cellulitis or Abscesses

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Study Objectives: Patients with acute bacterial skin and skin structure infections (ABSSSI) are often admitted for intravenous (IV) antibiotic administration. Omadacycline (OMC) is a novel aminomethylcycline antibiotic, approved for community-acquired bacterial pneumonia and ABSSSI, with activity against key causative pathogens, notably methicillin-susceptible (MSSA) and resistant (MRSA) *Staphylococcus aureus*. We report pooled results from a post-hoc analysis in patients with cellulitis/erysipelas or major abscesses who were not people who inject drugs (PWID), from the Omadacycline in Acute Skin and Skin Structure Infections (OASIS)-1 and -2 studies.

Methods: Patients with ABSSSI were randomized to OMC or linezolid (LZD), both IV-to-oral, in OASIS-1 (NCT02378480); and to once-daily oral OMC or twice-daily oral LZD in OASIS-2 (NCT02877927). Total therapy duration was 7-14 days. Populations included modified intent-to-treat (mITT, randomized patients without a

Table. Treatment efficacy at ECR and PTE in patients with cellulitis/erysipelas or major abscesses from the OASIS-1 and OASIS-2 clinical trials (mITT and micro-mITT populations)

	Cellulitis/erysipelas (N=294)			Major abscess (N=146)		
	Omadacycline	Linezolid	Difference (95% CI)	Omadacycline	Linezolid	Difference (95% CI)
mITT, n	148	146		77	69	
Success at ECR; n/N (%)	117/148 (79)	115/146 (79)	0.3% (−9.1, 9.7)	70/77 (91)	61/69 (88)	2.5% (−7.8, 13.4)
WBC count ≥10,000 cells/mm^3 or ≤4000 cells/mm^3, n/N (%)	44/60 (73.3)	43/55 (78.2)	−4.8% (−20.4, 11.1)	26/29 (89.7)	22/27 (81.5)	8.2% (−11.3, 28.4)
Fever >38.0°C, n/N (%)	35/39 (89.7)	32/43 (74.4)	15.3% (−1.7, 31.9)	17/20 (85.0)	15/16 (93.8)	-8.8% (−31.6, 16.1)
Lesion size 75–300 cm^2, n/N (%)	63/80 (78.8)	58/77 (75.3)	3.4% (−9.8, 16.7)	50/55 (90.9)	43/49 (87.8)	3.2% (−9.3, 16.5)
Success at PTE, n/N (%)	135/148 (94)	130/146 (90)	4.1% (−2.4, 10.9)	68/77 (87)	58/69 (81)	6.6% (−5.3, 18.9)
WBC count ≥10,000 cells/mm^3 or ≤4000 cells/mm^3, n/N (%)	57/60 (95.0)	46/55 (83.6)	11.4% (0.1, 24.1)	24/29 (82.8)	22/27 (81.5)	1.3% (−19.6, 22.6)
Fever >38.0°C, n/N (%)	38/39 (97.4)	40/43 (93.0)	4.4% (−7.1, 16.5)	19/20 (95.0)	15/16 (93.8)	1.3% (−18.9, 24.5)
Lesion size 75–300 cm^2, n/N (%)	75/80 (93.8)	69/77 (89.6)	4.1% (−4.9, 13.8)	50/55 (90.9)	38/49 (77.6)	13.4% (−0.6, 28.2)
Micro-mITT, n	64	82		67	56	
Success at PTE by S. aureus baseline pathogen*, n/N (%)	48/51 (94)	53/60 (88)		44/52 (85)	31/42 (74)	

*Success at PTE by MRSA baseline pathogen was achieved by 43/46 (93%) patients with cellulitis/erysipelas, and 42/56 (75%) patients with major abscesses; success at PTE by MSSA baseline pathogen was achieved by 59/66 (89%) patients with cellulitis/erysipelas, and 34/40 (85%) patients with major abscesses.

sole Gram-negative pathogen); and micro-mITT (mITT patients with ≥1 identified Gram-positive causative pathogen). Primary endpoint: early clinical response (ECR) in the mITT population (survival with ≥20% reduction in lesion size, 48-72 h after first dose, without rescue therapy). Secondary endpoint: survival with infection resolution/improvement at post-treatment evaluation in the mITT population (PTE; 7-14 days after last dose).

Results: Baseline characteristics were generally similar between groups. In the mITT population, 294 patients had cellulitis/erysipelas (148 OMC, 146 LZD); 146 patients had major abscesses (77 OMC, 69 LZD). In the micro-mITT population, S. aureus was the primary baseline pathogen, detected in 111 (76%) of patients with cellulitis/erysipelas and in 94 (76%) of patients with major abscesses (Table). MRSA was detected in 46 (41%) patients with cellulitis/erysipelas and in 56 (60%) patients with major abscesses. ECR was achieved in 117 (79%) patients receiving OMC and 115 (79%) receiving LZD with cellulitis/erysipelas, and in 70 (91%) patients receiving OMC and 61 (88%) receiving LZD with major abscesses; these results were similar for patients who presented at baseline with low/high white blood cell counts, fever, and lesion sizes ≤300 cm^2 (Table). Success at PTE was comparable between OMC and LZD across groups. When analyzed by baseline pathogen, high clinical success at PTE was observed with both OMC and LZD in patients with S. aureus for both infection types (cellulitis/erysipelas and major abscesses; Table). There were no new safety signals; nausea and vomiting were the most frequent treatment-emergent adverse events across groups.

Conclusion: OMC is a once-daily, IV or oral option for inpatient and outpatient treatment of ABSSSI in patients with cellulitis or major abscesses, including those due to MRSA.

127 Delayed Second Dose Antibiotics in Severe Sepsis and Septic Shock

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Study Objectives: Early antibiotic therapy is a mainstay in the management of patients with severe sepsis and septic shock. Recent studies have highlighted an increase in mortality in septic patients with delays in receiving their second dose of antibiotics. The purpose of this study is to: 1) Determine the frequency and factors associated with delays in second antibiotics administration in patients presenting to the emergency department (ED) with severe sepsis/septic shock (SS/SS) and 2) to evaluate if these delays influence a variety of clinical outcomes.

Methods: This was a retrospective cohort study of ED treated adults (age > 18 years, n=1,075) presenting with SS/SS. Patients receiving intravenous (IV) Vancomycin, Beta-Lactams, Daptomycin, Carbapenems, and Fluoroquinolones within 12 hours of ED arrival were included. Patients who expired prior to the second dose of antibiotics being given were excluded. Appropriate second dose was defined as receiving an antibiotic of the same class at the appropriate time point (timely); delayed second dose of antibiotic was defined as dose time >25% of the recommended interval (delayed). Primary outcome was in-hospital mortality. Secondary outcomes included: intubation, vasopressor use, intensive care unit (ICU) length of stay (LOS), and hospital LOS. Multivariate logistic regression analysis or Cox regression was performed with variables selected a priori as outlined below (Table 1).

Results: In total, 740 patients achieved timely antibiotics and 335 had a delayed second dose of antibiotics. The average ED length of stay was ~8.9 hours in the timely group and ~10.2 hours in the delayed group. In-hospital mortality in the timely group was 15.5% (17.6% in the shock cohort) and 13.7% in the delayed group (16.9% in the shock cohort). There was increased odds of delayed second dose of antibiotics for patients boarding in the ED (OR 2.54- 95% 1.81-3.55), patients who received antibiotics with need for re-dosing at 6-8 hours or 12-24 hours intervals (OR 2.99- 95% CI 1.95-4.57 and OR 2.46- 95% CI 1.72-3.51 respectively), patients who received 30by3 (OR 1.42- 95% CI 1.06-1.90), and in patients with ESRD (OR 2.57- 95% CI 1.50-4.39) (Table 1). Delays in the second dose of antibiotics was not associated with increased in-hospital mortality (OR 0.87- 95% CI 0.58-1.29) or other secondary outcomes.

Conclusions: Factors of delayed second dose of antibiotics can be identified, and include boarding in the emergency department, selection of antibiotics which require more frequent dosing, and history of ESRD. However, patients with delays in second dose of antibiotic administration demonstrated no increased risk of in-hospital mortality or other outcomes. These findings are retrospective and require additional validation.

Table 1. Multivariate Regression Analysis for Predictors of Delayed Second Dose

	Delayed Second Dose	
Variable	**OR**	**95% CI**
ED boarding at 2nd Dose Time	2.54	1.81-3.55
6-8 hour dose interval	2.99	1.95-4.57
12-24 hour dose interval	2.46	1.72-3.51
24-48 hour dose interval	1.09	0.66-1.81
30by3	1.42	1.06-1.90
Antibiotics by 3 hours	0.97	0.63-1.51
ICU admission	1.07	0.79-1.46
ESRD	2.57	1.50-4.39
Age	1.00	0.99-1.00
MEDS	1.02	0.99-1.05
Lactic Acid	0.98	0.92-1.04
AKI	0.84	0.60-1.18

128 Operation Kick the King: a Non-Governmental Organization's Response to the United States Novel Corona Virus 2019 Pandemic

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Study Objectives: The objective of this study was to investigate if a disaster relief non-governmental organization (NGO), who blended their non-medical disaster response footprint with their established international medical model, would be able to effectively integrate and support local health care novel corona Virus 2019 (COVID-19) pandemic operations broadly across the United States (US).

Methods: An observational study during the US COVID-19 pandemic was conducted collecting data from three primary sites during the NGO Team Rubicon (TR) COVID-19 pandemic response. The three sites chosen for disaster operations include: a drive-through triage system in Charlotte, North Carolina; an alternate care site in Santa Clara, California; and medical response support operation in Kayenta, Arizona in the Navajo Nation. Multiple aspects of the deployment were recorded including: number of TR volunteers deployed to each site, dates of operation, number of patients seen, roles TR volunteers performed, and the number of TR volunteers who were high concern for COVID-19 exposure and infection.

Results: Charlotte, North Carolina: This operation lasted between 4/2/20-4/22/20, and involved 10 volunteers who filled multiple roles in the hospital external ED drive through triage system. A total of 580 patients were seen in the drive-through, and 302 met criteria COVID-19 testing with subsequent discharge to home quarantine. None of the TR volunteers involved reported any symptoms (fever, cough, shortness of breath, nausea, vomiting, and others) concerning for COVID-19 infection.

Santa Clara, California: This operation took place between 3/31/20-5/1/20 and involved 40 volunteers who fully staffed a 250-bed alternate care site supporting the surrounding county's health care system comprising 10 local hospitals. A total of 16 patients required transfer and care at the site. All of the patients were able to be successfully discharged home. None of the TR volunteers who were involved reported any symptoms concerning for COVID-19 infection.

Kayenta, Arizona: This deployment began 4/10/20 and is currently still in operation in the Navajo Nation. 37 volunteers deployed for this operation through the end of May 2020, and a total 1,354 patients were treated. 64 of those patients seen required medical evacuation to a higher level of care, and 20 total intubations were performed. TR volunteers served multiple roles including: emergency physicians, incident command staff, nurses, and medics. There were 3 TR medical staff who were either confirmed infected or reported signs and symptoms consistent with COVID-19 infection.

Conclusion: Team Rubicon demonstrated how a disaster relief NGO, who operated in three completely different types of operations in three different locations across the country can successfully coordinate efforts on multiple organizational levels to provide effective care to patients seeking treatment during a pandemic. Whether staffing a drive-through triage system in Charlotte, establishing an alternate care site in Santa Clara, or working in an emergency department in the Navajo Nation, Team Rubicon exhibited how a group of highly motivated individuals can make a significant difference in an impacted population.

129 The Safety of Rapid Triage in a Coronavirus Epicenter

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Study Objectives: The COVID-19 pandemic has strained health care systems with massive influxes of potentially infectious patients with a respiratory virus. As the epicenter of COVID-19 in the United States, NYC public hospitals were strained well past their limits. Rapid triage, assessment, and disposition is essential in providing safe and appropriate care in a disaster scenario. Multiple studies have shown length of stay times as well as patient elopements improved with a brief physician assessment in triage. Our objective was to determine if rapid assessment medical screening exams are safe and effective means to decompress overcrowded waiting rooms during a respiratory pandemic.

Methods: All patients presenting to Elmhurst Hospital Center during peak capacity were rapidly assessed by board certified emergency physicians in the waiting room in lieu of formal triaging processes. Each medical screening exam was expected to last no longer than 5 min. In an institutionally approved IRB study, demographic data, chief complaint, medical comorbidities, and a full set of vitals were collected and recorded. Patients were then triaged to the emergency department or instructed to return home to self-quarantine with a comprehensive quarantine instructional packet. Patients sent home were contacted by nursing staff periodically to monitor their health status. Data was collected on patient returns, clinical status, and ultimate disposition.

Results: 219 patients were followed after a brief medical screening exam. 162 patients were discharged directly from the waiting room. Out of the discharged patients 14 (9%) returned to an HHC emergency department, and 3 (2%) of those patients ultimately required admission to the hospital.

Conclusion: Based on preliminary data, rapid assessment by board certified emergency physicians appears to be a safe and effective means to risk stratify all comers during a respiratory pandemic scenario. Patients who appear well, do not have significant comorbidities, and present with oxygen saturations above 95% can reasonably be reassured and sent home. Such processes are easily reproducible and can be rapidly implemented in times of mass patient influxes.

130 A Snapshot of Volumes in the "Epicenter of the Epicenter" of the COVID-19 Pandemic

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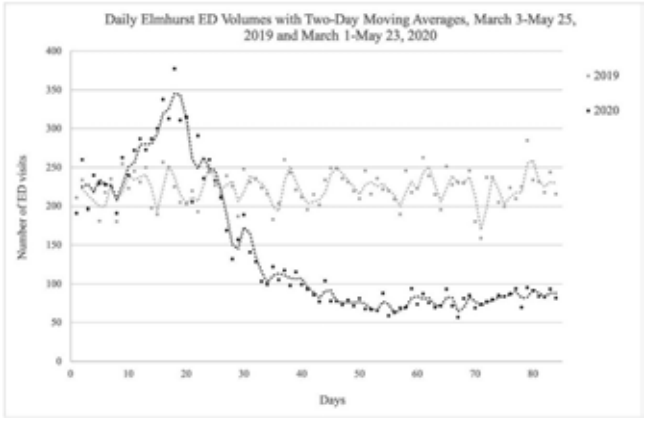
Study Objectives: NYC Health + Hospitals/Elmhurst, a public hospital in Queens, NY, was one of the first and hardest hit hospitals in the COVID-19 pandemic. Emergency department (ED) clinicians anecdotally began to note a rise in ED visit volumes near the end of February 2020, which quickly became an unprecedented surge before tapering to unprecedentedly low levels. This study quantifies Elmhurst ED volumes throughout the pandemic, from early March to late May 2020, and compares them to the corresponding 2019 volumes. In addition, rates of admission from the ED to the hospital are examined to help determine the severity of symptoms in patients who did present to the ED, especially as volumes declined.

Methods: Number of daily ED visits and daily admissions were obtained from the electronic medical record, EPIC, for the 12 weeks beginning the first Sunday of March 2020 (March 1-May 23, 2020) and the corresponding 12 weeks of 2019 (March 3-May 25, 2019). Daily ED visits were counted by the number of patients who registered to be seen during the 24-hour period.

Results: A sharply increasing trend in ED volumes began around March 10, 2020 and peaked on March 18, when the daily ED volume was 68% greater than on the corresponding Wednesday of 2019. A sharp decrease in ED volumes followed, leveling off around the week of April 12. Between April 12 and May 23, the average daily ED volume was 65% less than for the corresponding period in 2019. In addition, the daily percentage of ED visits admitted to the hospital began to rise around the fourth week of March 2020, peaking at 59% admitted on April 2. The admission rate trended down through April and May but remained notably higher than 2019: for example, between May 3 and May 23, 2020, the average daily admission rate was 22%,

compared to 14% during the corresponding period in 2019, a statistically significant difference ($p < 0.001$).

Conclusion: Although other sources have reported decreased ED volumes in some areas throughout the COVID-19 pandemic, it is important to note the two-stage response at the epicenter of the crisis. Similar patterns might be observed if COVID-19 spreads to new areas or reappears as a second wave, or in the event of a different, future pandemic. The speed and magnitude of the surge in ED volumes suggest that ED staff, testing capacity, and other resources can quickly be overwhelmed without advance preparation. In addition, the striking decrease in ED volumes in April and May 2020 compared to 2019, not unlike patterns being seen across the country, raises concern about delays in care due to the public's fear of seeking medical attention during the pandemic. The markedly elevated rates of admission from the ED to the hospital during this time confirm that patients presenting to the ED have more severe symptoms on average, possibly due to delaying seeking care for mild or early symptoms of serious conditions.



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131 A Novel Mobile Integrated Health Program for COVID-19 Response

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Study Objectives: COVID-19, the disease caused by the SARS-CoV-2 virus, has plagued patients and communities across the world. The pandemic has exposed and augmented gaps in access to care, particularly for vulnerable populations. Mobile integrated health (MIH) is the use of traditional out-of-hospital providers in untraditional ways to bridge gaps in health care. Early in the COVID pandemic, our health care system identified an opportunity to leverage our community's existing EMS workforce to respond to patients in their homes with confirmed or suspected COVID-19 who were otherwise unable to obtain needed health care services. Barriers to care included patient comorbidities in addition to homebound status, lack of transportation, or limited or absent technology to facilitate telehealth evaluation.

Methods: The primary objective of this novel program is to prevent ED visits by providing an alternative means of evaluating vulnerable populations with limited access to care. Patients with confirmed or suspected COVID-19 infection are referred for MIH evaluations through three pathways. A) Referred by the Respiratory Illness Clinic (RIC) for evaluation of disease progression in lieu of a referral to the ED; B) Referred by the ED as an alternative to hospital admission; C) Referred by a primary care physician (PCP) in lieu of a referral to the RIC or ED. MIH paramedics delivered home-based evaluations within 24 hours of referral. Patients not yet tested for COVID receive testing as part of the evaluation. Using an algorithm of vital sign thresholds and clinical features, paramedics treat patients in collaboration with a physician or advanced practice provider using telemedicine, and determine whether patients can continue in-home isolation or require ED referral for further treatment and potential hospitalization.

Results: Over 46 days from April 15 through May 31 our program received 170 patient referrals resulting in 116 (68.2%) dispatches and 102 (60.0%) evaluations. Of the declined referrals, failure to meet program criteria was most common (32 patients, 18.8%) followed by direct referral to the ED (16 patients, 9.4%). Most referrals came from our RIC (34.7%) followed by ED (22.4%) and PCP (20.0%). The majority of patients (90.6%) were COVID-19 positive or had results pending at the time of enrollment. Of 23 (22.6%) patients experiencing high-risk symptoms at the time of evaluation, ambulatory oxygen saturation < 91% was the most common (17.4%). Overall 92.2% of patients evaluated by our MIH program were able to continue in-home isolation with the remainder referred to the ED. There were no emergent transports to the ED.

Conclusion: During the COVID-19 surge in Massachusetts, our program successfully prevented 93 ED visits among 102 patient evaluations. By reducing ED use, we were able to preserve limited hospital resources including personal protective equipment and ED beds, reduce infectious exposure to both staff and patients, and reduce associated health care costs. Further, we mitigated health disparities by providing care to those with limited health care access, both physical and technological. While our program was safe and effective, with no patients requiring emergent ED transport, future evaluation of a more robust set of outcome data is warranted. MIH programs for COVID-19 response can prevent ED visits by safely evaluating and managing vulnerable patients with low-cost, high quality home-based care.

132 Provider and Administrator Perspectives on Reducing Patient Fear in the Emergency Department in Times of Heightened Immigration Enforcement

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Study Objectives: Heightened immigration enforcement may induce fear in undocumented patients when coming to the emergency department (ED) for care. Limited literature examining health system policies to reduce immigrant fear exists. In this multi-site qualitative study, we sought to assess provider and system-level policies on caring for undocumented patients in three California EDs.

Methods: We recruited 42 ED providers and administrators from three California EDs (in San Francisco, Oakland and Sylmar) with large immigrant populations. Participants were recruited using a trusted gatekeeper and snowball sampling. We conducted semi-structured interviews that included queries about providers' knowledge of and suggestions for policies and practices to reduce fear and enhance trust among immigrant patients in the ED, among others. We analyzed the transcripts using constructivist grounded theory.

Results: We have interviewed 41 of the 42 ED providers: 10 physicians, 11 nurses, 9 social workers, and 11 administrators. Their median years of experience was 12 years. We identified 7 themes. Two thirds of participants were aware of at least one of the two key policies that inform care for undocumented patients in the ED. Recent practice/ policy changes specific to undocumented patients included increased inclusive messaging and further restriction on immigration enforcement around and inside of the hospital. However, there is variation across and within sites in knowledge, including around status and policies. Providers reported that current training around policies and best practices for supporting undocumented patients is limited; communication about existing or new policies is mainly email-based and disparate among provider types. We identified uncertainty about policies, laws, and the jurisdiction of staff across a majority of interviewees. Providers stated that they are taking an active role in building safety and trust and see their role as providing resources and support to undocumented patients.

Conclusions: This study introduces ED-level health system perspectives and recommendations for caring for undocumented patients. Providers in three California EDs, which serve large immigrant populations, report existing policies and recent policy changes that facilitate access to care for undocumented patients. But even within this "sanctuary" setting, providers identify opportunities for growth. There is a need for active, multi-disciplinary ED policy training, clear policy details including the extent of providers' roles, protocols on the screening and documentation of status, increased patient communication about policies, rights, and resources, multi-sector collaboration to address gaps in resources for undocumented patients, and continual reassessment of our health systems to reduce fear and build safety and trust with our undocumented communities.

133 The Value of Out-of-Hospital Hypoglycemia Treatment Without Transport Using the National Emergency Medical Services Information System

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Study Objectives: Treatment of severe hypoglycemia by emergency medical services (EMS) personnel includes professional medical assessment and advanced medical care of patients, some of whom may not be fully conscious. The objective of this study is to describe the treatment interventions and transportation status of those who, based on EMS provider's impression, have 'diabetic symptoms' or 'hypoglycemia.'

Methods: This retrospective analysis used the National Emergency Medical Services Information System (NEMSIS) to identify patient encounters related to hypoglycemia. Of the approximately 22 million events in the database during 2018, only those that met the hypoglycemia diagnostic criteria according to ICD-10-CM codes were included in the analysis. The patient demographic data, including patient location, protocols used by the EMS team (ie, hypoglycemia protocol, altered mental status protocol, or other), specific treatment interventions carried out by EMS, EMS dispatch, response, scene, and transport times, and emergency department disposition are described.

Results: This study identified 187,135 patient encounters for hypoglycemia from the 2018 NEMSIS database. Most patients were adults (18-64 years) living in urban settings. The median Glasgow Coma Score for these patients was 14 (10-15) (25^{th} percentile - 75^{th} percentile), and 10.4% of patients were unresponsive. Of the encounters that EMS reported use of a protocol, about 48% of the events were treated according to a 'hypoglycemia' or 'altered mental state' protocol. The majority of the events (67.2%) occurred at home. Approximately half of the patient encounters resulted in transport by the EMS unit (51.1%), while the remaining half (48.9%) were not transported. Treatment of patients with severe hypoglycemia commonly included intravenous (IV) glucose (41.3%), oral glucose (17.6%) and glucagon (7.1%). Glucagon was used less frequently than IV glucose or oral glucose to treat hypoglycemia regardless of the event's transport status. The median time (25^{th} percentile - 75^{th} percentile) of an EMS unit on scene was 21 min (15 min-29 min). More time was spent at the scene when there was no transport (27 min [20 min-36 min]) than when the patient required transport (20 min [14 min-28 min]). Community paramedicine care was reported in less than 0.1% of events. Advanced life support was the most frequently coded service level for events resulting in either transport (61.5%) and no transport (50.2%).

Conclusion: Severe hypoglycemic events in patients who required transport were treated similarly to those that did not necessitate transport. Ultimately, creating a better understanding of EMS care of hypoglycemic patients may provide insight in to how to best optimize the utilization of out-of-hospital emergency services for this patient population.

134 Patient and Hospital Characteristics Associated With Postpartum Emergency Department Visits: A Statewide Analysis

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Study Objectives: US maternal mortality rates doubled from 1991-2014, and a majority of maternal deaths occur in the postpartum period. Emergency department (ED) visits may be sentinel events for women with higher risk of mortality. We describe patient and hospital characteristics associated with postpartum ED visits.

Methods: Retrospective study of all obstetric discharges and ED visits in New York state in 2014. We linked the State Inpatient Database to the State Emergency Department Database to examine ED visits within 42 days because guidelines during the study period recommended an initial postpartum visit at 6 weeks. We performed descriptive statistics of patient and hospital factors, including perinatal complications associated with severe maternal morbidity per the Centers for Disease Control and Prevention. We performed multi-level logistic regression with two-level nested mixed-effects to account for hospital-level clustering.

Results: Of 226,522 eligible deliveries, 12,832 (6%) were associated with an ED within 42 days. The median ED visit rate among hospitals was 7% (IQR 4.6-10%). ED visits were more frequent among women who were identified as Black (14.6% of deliveries vs. 23.6% of ED visits) or Hispanic (15.9% of deliveries vs. 20.8% of ED visits), those from the lowest income quartile (26.3% of deliveries vs. 37.6% of ED visits), and were less frequent among women who identified as white (47.3% of deliveries vs. 37.3% of ED visits) or who were commercially insured (49.1% of deliveries vs. 20.8% of ED visits). After adjusting for patient and hospital characteristics, patients were more likely to have an ED visit if they were age 10-19 (OR=1.19, p=0.001) compared to those age 20-29, Black (OR=1.29, p<0.001) or Hispanic (OR=1.23, p< 0.001), insured by Medicare (OR=2.04, p<0.001) or Medicaid (OR=1.56, p<0.001), from the lowest income quartile (OR-1.09, p=0.05), had a Charlson comorbidity score of 2 (OR=2.05, p<0.001) or 3 (OR=3.69, p<0.001), or delivered at a rural hospital (OR=1.19, p=0.02). ED visits were less likely among those age 30-34 (OR=0.86, p=0.02), 35-39 (OR=0.80, p<0.001) and those who delivered at a safety-net hospital (OR=0.005, p<0.001) or minority-serving hospital (OR=0.003, p<0.001) relative to non-safety or non-minority-serving hospitals. Obstetric complications most commonly associated with ED revisits were cesarean section (OR=1.35, p<0.001), hypertension (OR=3.83, p<0.001), severe preeclampsia (OR=2.30, p<0.001), or eclampsia (OR=2.50, p<0.001), asthma (OR-1.24, p=<0.001), cerebrovascular disorders (OR=2.20, p<0.001), pulmonary edema or acute heart failure (OR=4.07, p<0.001), sepsis (OR=5.32, p<0.001), air or thrombotic embolism (OR=8.57, p=<0.001), blood transfusion (OR=1.67, p<0.001), and hysterectomy (OR=1.28, p=0.001). The most common diagnoses associated with ED visits within 42 days were postpartum complications (6.5%), surgical wound complications (5%), and urinary tract infection (2.9%). The most common diagnoses associated with readmission from the ED were postpartum complications surgical wound complications, and postpartum hemorrhage, with ED admission rates of 28%, 26%, and 20%, respectively.

Conclusion: ED visits prior to the standard 42-day obstetric follow-up are not rare. Women of younger age, who are Black or Hispanic, with public insurance, comorbidities, obstetric complications, and those treated at rural hospitals had higher ED visit rates and may benefit from improved postpartum care coordination.

135 Effects of Maryland's Health Enterprise Zones on Disparities in Emergency Department Returns

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Study Objectives: In 2012, Maryland passed the Health Improvement and Disparities Reduction Act, an initiative creating health enterprise zones (HEZs), which increased resources for underserved communities to reduce racial/ethnic and geographic disparities with the aim of reducing avoidable health care utilization and costs. We examine whether HEZ implementation had its intended effect by examining disparity outcomes in ED returns. Since the ED serves as a safety-net, ED returns can signal unmet health care needs among disadvantaged populations that led to lapses in care transitions. We assess disparity outcomes in ED returns by race/ethnicity, payer, and rurality.

Methods: We conducted a secondary analysis of data from 2012-2017 using Maryland Health Services Cost Review Commission data for HEZs and matched HEZ-eligible control groups. We performed differences-in-differences comparisons to identify the effects of HEZ implementation and used differences-in-differences-in-differences to examine outcomes disparities. We used a generalized linear model to examine 3- and 9-day ED returns, including outcomes by racial/ethnic group, payer group, and rurality. Regressions included facility fixed effects with adjustments for yearly and seasonal time trends, patient characteristics, and case mix.

Results: For the overall study population, there was a similar decline in 3-day ED returns among HEZs and non-HEZs. However, HEZ implementation was associated with a statistically significant greater decline in 9-day ED returns compared to non-HEZs (-0.4%, 95% CI: -0.8%, 0.0%). Among racial/ethnic groups, HEZ implementation led to a 1.3% decline in 9-day ED returns for non-Hispanic whites (95% CI: -2.2%, -0.4%). However, improvements were not observed for non-Hispanic blacks nor Hispanics. This led to an increase in racial/ethnic disparities in ED returns. For non-Hispanic blacks and Hispanics, HEZ implementation was associated with a 1.2% (95% CI: 0.1%, 2.2%) and 3.7% (95% CI: 0.5%, 6.9%) relative increase in 9-day ED returns, respectively, compared to non-Hispanic whites. HEZs did not reduce payer group disparities in ED returns, with the exception of dual-eligible enrollees. For dual-eligible enrollees, who were likely subject to an HEZ senior housing resident program, HEZ implementation led to a 2.3% (95% CI: -3.8%, 0.7%) greater decline in 3-day ED returns compared to the privately insured. However, HEZ implementation led to a 1.4% (95% CI: 0.2%, 2.5%) relative increase in 9-day ED returns for Medicaid enrollees compared to the privately insured, which was driven by improvements among the privately insured that were not observed among Medicaid enrollees. HEZs did not lead to a reduction in geographic disparities.

Conclusion: Our study demonstrates that, although implementing HEZs can lead to overall reductions in avoidable ED use, it does not achieve its intended goal of improving disparities in avoidable utilization. Because HEZs did not provide guidelines on how to leverage its funds to improve disparities, significant heterogeneity in HEZ programs was observed with many programs applying resources to the general patient populations. This study emphasizes the importance of ensuring funds allocated for reducing health disparities are invested in evidence-based initiatives that target disadvantaged populations. Future research is need to gain a better understanding of the relationships between the various programs, incentives, and disparity outcomes.

136 Emergency Physician Knowledge, Attitudes, and Barriers to Emergency Department-Delivered Buprenorphine

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Study Objectives: Buprenorphine is evidence-based treatment for opioid withdrawal and opioid use disorder (OUD) that is increasingly available in emergency departments (EDs). Understanding provider factors influencing buprenorphine use in the ED can help improve its utilization. This study assesses ED provider's knowledge, attitudes, and barriers to providing buprenorphine for opioid use disorder in the ED prior to implementation of an ED buprenorphine quality improvement initiative.

Methods: An anonymous, Web-based, cross-sectional survey was administered to attending emergency physicians in 2019 at a New England hospital system staffing four EDs and caring for over 180,000 patients annually. Previously validated and novel questions assessed provider self-efficacy, confidence, attitudes, and knowledge about buprenorphine to treat OUD. Providers received a $25 gift card to incentivize participation. Responses were analyzed descriptively.

Results: Fifty-six of 95 (58.9%) attendings completed the survey. Almost half (48.2%, 27/56) of providers had already completed the Drug Addiction Treatment Act of 2000 (DATA 2000) waiver training; of those, only 62.9% (17/27) went on to receive their X-waiver, which is necessary to be able to prescribe or dispense buprenorphine under the DATA 2000. Physicians reported moderate self-efficacy (Mean 3.5 [SD 0.5], scale 1-5) and confidence (Mean 3.4 [SD 0.8], scale of 1-5) in caring for people who use drugs. Over half (55.4%, 31/56) of respondents reported ever administering buprenorphine in the ED; however, only 23.5% (4/17) of X-waivered providers reported ever prescribing buprenorphine upon discharge from the ED. Significant barriers to buprenorphine administration (scale 1-10) included patient disinterest in treatment (Mean 6.1 [SD 3.2]), availability of outpatient services (Mean 5.1 [SD 3.5]), comfort with counseling patients about buprenorphine (Mean 4.9 [SD 3.3]), time constraints (Mean 4.9 [SD 3.4]) and lack of knowledge (Mean 4.8 [SD 3.6]). Potential facilitators of buprenorphine prescribing included pre-packaged prescription kits (Mean 7.0 [SD 3.5], scale 1-10) and presence of an ED-based OUD patient engagement program (Mean 6.4 [SD 3.7], scale 1-10).

Conclusion: Providers reported moderate self-efficacy and confidence treating people who use opioids. Though over half had given buprenorphine in the ED, very few reported writing a discharge prescription for buprenorphine. Barriers to prescribing buprenorphine included lack of patient interest in treatment, perceived availability of outpatient services, time constraints, comfort with counseling patients about buprenorphine, and a lack of knowledge about prescribing buprenorphine. To improve use of buprenorphine for treatment of OUD in the ED, future investigations are needed to evaluate implementation strategies to decrease the identified barriers to ED buprenorphine use and improve provider knowledge, self-efficacy, and confidence.

EMF 137 Effectiveness of Emergency Department Screening on Hepatitis C Treatment and Cure

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Study Objectives: Emergency Department (ED) hepatitis C virus (HCV) screening programs are proliferating. The effectiveness of ED screening, compared to traditional clinic-based screening, at treating and curing HCV is unknown. The objective of this study is to evaluate treatment outcomes for patients identified HCV+ in the ED compared to those screened HCV+ in community clinics.

Methods: A retrospective cohort study was performed including all patients found HCV seropositive (HCV+) at two urban medical centers in New Orleans, LA from March 2015 to August 2017. Those screened HCV+ in the ED were compared to patients screened HCV+ at one of seven neighboring community clinics. In both screening settings, all chronically infected patients were referred to the same infectious disease outpatient clinic for management of HCV infection. Study outcomes were: starting HCV therapy, completing HCV therapy, and achieving functional HCV cure (sustained virologic response at 12 weeks). Time from HCV antibody screening to each treatment outcome was measured. Analysis was performed using multivariable log-binomial regression, adjusting for insurance and history of intravenous drug use.

Results: A total of 3,929 patients (3,556 ED and 373 clinic) were screened HCV+, while 2,720 patients (2,562 ED and 158 clinic) were found chronically infected by persistent HCV RNA. HCV therapy was started in 9.8% of ED patients (median time=13.4 months) and 3.8% of clinic patients (median time=15.8 months). Compared to those screened in a clinic, patients testing HCV+ in the ED had significantly higher likelihood of starting therapy (adjusted relative risk [aRR]=2.82; 95% confidence interval [CI]=1.28-6.23; p=0.01). HCV therapy was completed in 7.8% of ED patients (median time=16.4 months) and 3.8% of clinic patients (median time=18.1 months). Compared to those screened in a clinic, patients testing HCV+ in the ED had significantly higher likelihood of completing therapy (aRR=2.28; 95% CI=1.03-5.05; p=0.04). Functional cure was achieved in 5.6% of ED patients (median time=19.0 months) and 1.9% of clinic patients (median time=23.7 months). Compared to those screened in a clinic, patients testing HCV+ in the ED had significantly higher likelihood of achieving cure (aRR=3.29, 95% CI=1.06-10.19; p=0.04).

Conclusion: Patients diagnosed HCV+ in the emergency department were significantly more likely to initiate HCV therapy, complete HCV therapy, and achieve HCV cure, compared to patients screened in a community clinic. We believe the success of ED screening can be attributed to co-localization of follow-up HCV staging and treatment services in proximity to the ED. Furthermore, reflex ordering of viral RNA in the ED improved timeliness and confirmation of HCV chronic infection, likely increasing the momentum of ED patients to start treatment and achieve cure. Expanding ED-based HCV screening may serve as the most effective strategy to deliver HCV treatment and improve patient outcomes.

EMF 138 Emergency Department Syphilis Screening Practices Before and After the Implementation of an Electronic Health Record-Based Best-Practice Alert

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Study Objectives: The incidence of syphilis is growing in California and in the United States (U.S.). The U.S. Preventive Services Task Force and Centers for Disease Control and Prevention recommend targeted syphilis screening of all persons at increased risk of infection. Emergency departments (EDs) represent an important setting to test and treat patients who are not seen in routine outpatient clinical settings.

Methods: We developed an ED-based syphilis screening program that employed an electronic health record best practice alert (BPA). We performed a retrospective cohort analysis of two temporally matched, 11-month study periods (corresponding to before and after BPA implementation). The primary implementation outcome was ED testing volume (No. tests performed/month). The primary screening outcome was the number of new syphilis infections. Data were described with simple descriptive statistics.

Results: Approximately 75,166 patients were seen in the ED during the 11-month pre-BPA study period, and 494 patients were screened for syphilis during this period (mean 44.9 tests/month). A total of 75,901 patients were seen in the ED during the 11-month post-BPA study period, and 1,106 unique patients were screened for syphilis during this period (mean 100.5 tests/month), representing a 124% increase in syphilis screening following BPA implementation. Men were more likely to be tested in either

screening period. The median age of patients screened during the post-BPA period was much lower (pre: 52 years [IQR 35-65], post: 34 years [IQR 25-48]). There were 37 new syphilis diagnoses during the pre-BPA period and 87 new syphilis diagnoses during the post-BPA period, representing a 135% increase in diagnoses following BPA implementation. Patients tested in the post-BPA period who were screened using the BPA were much younger (30 vs. 46 years, $p<0.001$), were more likely to be female (62% vs. 47%, $p<0.001$) and were more likely to be African-American (38% vs. 26%, $p<0.001$) than patients screened by clinician-initiated testing.

Conclusion: Our study demonstrates that the use of a targeted BPA-driven screening protocol can increase the detection of new syphilis diagnoses and may help capture patients in demographic groups who might otherwise not be offered testing.

139 Characteristics of Nonfatal Opioid Overdose in Emergency Department Patients Surviving to Discharge or Hospital Admission

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Background: Emergency department (ED) presentations for opioid overdose have risen significantly over the past decade. Many of these visits result in hospital admission with substantial public health and economic consequences. Much is unknown about the patient and hospital characteristics associated with discharge versus inpatient admission for these patients.

Study Objectives: We investigated patient and hospital characteristics associated with nonfatal ED visits for opioid overdose were associated with hospital admission in the U.S. in 2016.

Methods: Using 2016 data from the Nationwide Emergency Department Sample (NEDS), we performed a cross sectional analysis and identified a weighted estimate of adult patients presenting to EDs across the United States with an ICD-10 diagnosis consistent with opioid overdose. Disposition, sex, age, expected payer, income quartile, geographic region, type of opioid ingested, co-ingestions, urban/rural designation and teaching status of hospital were examined. Logistic regression (proc surveylogistic) was used to identify predictors of hospital admission for overdose. Odds ratios and their associated 95% confidence intervals are reported.

Results: In 2016 there were 263,621 adult ED presentations for opioid overdose, and 25.5% of them were admitted to the hospital. Admission rates for opioid overdose were higher in the South (29.4%) and in the West (30.7%) compared with the Northeast (21.2%) and the Midwest (21.5%). Factors associated with hospital admission included female sex, older age, having any type of insurance, non-heroin overdoses and benzodiazepine co-ingestions.

Conclusions: Understanding the characteristics associated with inpatient admission of patients presenting to the ED with opioid overdose represents an important area for ongoing and future public health intervention.

140 Recruitment "Red Flags": A Thematic Analysis of Emergency Medicine Applicant Experience

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Study Objectives: EM-bound medical students must identify factors that will influence their selection of residency programs. They then rank programs using those criteria as well as information gained during the interview process. Love et al described the programmatic and geographical factors related to residency applicant program choice; however, we believe there are "red flags" that may cause an applicant to either lower their ranking of a program or not rank it at all. Our objective was to, therefore, describe the factors that medical students identify as "red flags," during the EM residency recruitment process.

Methods: We conducted a mixed-methods cohort study of graduates of US medical schools applying in emergency medicine (EM). We distributed our survey between the rank list certification (February 21st, 2020) and match day (March 20, 2020). As part of the survey, medical students were asked to provide a free text response to the following question, "Please describe any "red flags" that caused you to significantly lower the position of a program on your rank list or not rank it at all." Two independent reviewers then performed a thematic analysis and discrepancies were addressed via consensus with third-party oversight.

Results: We received a total of 1,183 completed surveys that met inclusion criteria and comprised 42% of all US applicants. The median age of respondents was 27 years, 55% were male, 44% were female, and <1% were nonbinary or preferred not to answer. Our respondents were diverse with 23% of our cohort identifying as underrepresented in medicine (URiM). Applicants were 66% white, 13% Asian, 8% black, and 10% of our population identified Latino. A total of 11% of respondents identified as LGBTQIA+. Forty-one percent of applicants identified as nontraditional students. Of all respondents, 73% reported "red flags" that we grouped via thematic analysis into 6 key themes - "Resident wellbeing/program culture," "leadership concerns," "training environment/quality," "program characteristics," "interview day," and "lack of diversity and discrimination" (Figure 1).

Conclusion: An alarmingly high 73% of EM-bound medical students reported "red flags" during the application and recruitment process that fit within 6 key themes. While some factors such as "program characteristics," are difficult to change, program leadership should focus on increasing wellness, maintaining a positive culture, focusing on quality, and confronting discrimination while supporting diversity.

Resident wellbeing/program culture	"Another program stressed how much they like to go to the bar after an overnight shift. If I were single and didn't have children then maybe this would be appealing to me. Since I have a lot of responsibilities, I would have felt like the grandpa of the residency class." "Casual use of the word "retarded." "Residents stating they were overworked or unhappy during interview day."
Leadership concerns	"A program telling me that although it is not required, a shadowing shift would help them be more comfortable ranking me. They told me that the day of my interview, the same day I was flying out." "PD answered a call during my interview to offer another candidate an interview"
Training environment/quality	"A resident didn't know what a thoracotmy was but was bragging that they did them all the time." "One program has a PA "residency" with those learners competing with residents for time in things like simulation, even for procedures the PAs will likely never perform."
Program characteristics	"New Program that wasn't well organized" "for profit healthcare system affiliation"
Interview day	"Hiding residents/poor resident turn out." "Disorganized interview day"
Lack of diversity/discrimination	"Lacking faculty or program diversity or lack of demonstrated commitment to improvement" " Having my religion be made fun of during the interview." "PD demonstrating utter lack of cultural competence towards patients and applicants."

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141 Simulation-Based Mastery Learning Leads to Superior Outcomes for Ultrasound-Guided IV Insertion Skills among Emergency Nurses

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Study Objectives: Obtaining IV access is a critical element of emergency care. Ultrasound-guided peripheral IV insertion (USGPIV) has become the procedure of choice for patients with difficult IV access (DIVA). However, in the past, this required the time and skill of a physician to perform. Emergency nurses (ENs) are now being increasingly trained in USGPIV insertion; however, there is heterogeneity in the curricular design and learning outcomes for nurses with overall USGPIV insertion success rates ranging from 76-86% after training, and first-pass success rates of 68%. Attrition, reported to be as high as 65%, has been another challenge facing EN USGPIV training programs. When ENs successfully insert USGPIVs it allays the need for physician intervention, reduces ED LOS, and avoids invasive lines and the associated complications and costs. Simulation-based mastery learning (SBML) is one

strategy that standardizes curricula and learning outcomes by training all participants to a rigorous, predetermined mastery standard. SBML has been shown to be highly effective for procedural training in physicians but has been underutilized in interprofessional education. Our objective was to establish a rigorous SBML USGPIV curriculum for ENs in order to determine if the combination of mastery learning with deliberate practice (DP) in both the simulation lab and at bedside can improve EN USGPIV procedural success rates.

Methods: We implemented a two-phase SBML USGPIV program for ENs at a large, urban academic ED in September 2019. In phase one, ENs first underwent a simulated pre-test assessment using a 30-item dichotomous checklist. Subsequently, they watched a recorded lecture and video and deliberately practiced the entire procedure on the simulator with feedback from experts in USGPIV insertion who underwent additional instruction in mastery learning and DP methodology. Finally, ENs underwent a simulated post-test using the same checklist. All participants were required to meet or exceed a minimal passing standard (MPS) before completion of training. Those who did not meet the MPS underwent further DP with feedback until they were able to meet MPS. In phase two, ENs performed supervised insertions on actual patients with expert feedback from trained proctors. ENs were deemed "independent" after completing 5 successful USGPIVs and were thereafter allowed to perform USGPIV insertion during clinical encounters, but all received 8-12 hours of dedicated bedside coaching. ENs recorded every insertion attempt in an online database. We evaluated database entries from Sept 2019 through May 2020.

Results: All 21 ENs enrolled in the training program completed the SBML curriculum and achieved independent status. From Sept 2019 through May 2020, ENs successfully inserted 781 USGPIV (74% of all USGPIV inserted in the ED). The ENs achieved an overall success rate of 97.3%, a first-pass success rate of 86.1%, and a mean of 1.15 insertions per encounter. All nurses reached independence (5 successful) with 7 or fewer insertions (with 14 nurses needing 5, 6 nurses needing 6, 1 nurse needing 7).

Conclusion: Compared with previously reported USGPIV curricula, ENs in our rigorous SBML curriculum with DP experienced no attrition and demonstrated marked improvement in overall and first-pass success. Improving EN USGPIV skills may reduce the number of insertion attempts, decrease the demand on physicians, and improve ED efficiency. SBML can help ENs achieve excellence in this difficult skill.

142 Withdrawn

143 Vitamin Therapies for Alcohol-Related Illnesses: Can an Intervention in the Emergency Department Impact Hospital-Wide Prescribing Patterns?

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Study Objectives: Therapeutic momentum is specifically defined as the reluctance to step down or withdraw therapy when further prescription is not needed or supported by evidence. We applied and expanded this concept by evaluating how therapeutic momentum starts in the emergency department (ED) and continues throughout the patient's inpatient admission. In 2009, researchers at our institution implemented an intervention to decrease the inappropriate prescribing of multivitamin infusions (MVI) in the ED for patients presenting with alcohol-related illnesses. Data were collected for one year after the intervention and showed a significant decrease in the proportion of MVI ordered in the ED. The primary objective of our study was to investigate whether this intervention expanded into continued impact on prescribing patterns upon admission in the inpatient setting. Our secondary objective was to evaluate the sustainability of the effect in the ED due to this intervention from the time of implementation through 2019.

Methods: A retrospective observational cohort study was conducted at a 60,000-visit ED at an academically affiliated tertiary referral hospital. Patients were included if they presented to the ED from 2009 to 2019 with an alcohol-related illness as defined by ICD-9 and ICD-10 codes. We identified medication-related treatments in the ED and inpatient setting during the course of treatment. The primary outcome was the change in the proportion of MVI ordered in the inpatient setting after the ED intervention was implemented between the first four months and last four months of the study period, and was measured as the mean difference (MD). Secondary outcomes included the proportions of MVI ordered in the ED, inpatient thiamine administrations, as well as enteral multivitamin administrations ordered in the ED and inpatient settings.

Results: An average of 200 patients per month presented to the ED with an alcohol-related diagnosis. Overall, including the ED and inpatient, there was a MD of -4.1% (95% CI: -7.0, -2.8) change between the first and last four months of the study period in MVI administrations. The mean percentage of MVI ordered in the ED in the first four months was 1.4% with none ordered in the last four months (95% CI: -2.5, -0.3). Average inpatient MVI administrations was 3.7% in the first four months as compared to 0.2% in the last four months (MD -3.5%; 95% CI: -5.3, -1.7). In the ED and inpatient combined, we observed an increase of 6.1% (95% CI: 1.1, 11.0) in overall thiamine administrations. They increased from a mean of 9.7% to 11.7% (MD 2.0%, 95% CI: -1.5, 5.5) in the ED and 18.8% to 21.8% (MD 3.0%, 95% CI: -1.5, 7.6) in the inpatient setting from the first to the last quarter of the study period. There was also a significant decrease in orders for enteral multivitamin overall (MD -8.2%; 95% CI: -12.7, -3.7), though this was largely due to a decrease in the inpatient setting (MD -6.7%; 95% CI: -10.9, -2.6).

Conclusion: An intervention made to emergency medicine (EM) providers in the ED was associated with decreased inpatient administrations of MVI in the absence of any known hospital-wide practice changes. It is reasonable to initiate practice changing interventions in the ED because we saw that an ED intervention can impact other areas of the hospital without providing direct education to EM practitioners outside of the ED.

144 An "Ultrasound-First" Protocol in Patients With Suspected Acute Diverticulitis Is Associated With Reduction in Time and CT Utilization

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Study Objectives: Although CT scans are highly accurate in diagnosing diverticulitis, they are costly, prolong ED length of stay, and expose patients to ionizing radiation. The objective of this study was to investigate the potential time-saving effect and reduction in CT scan utilization when point-of-care ultrasound (POCUS) was employed as a first-line imaging modality in the diagnosis of acute diverticulitis.

Methods: This was a prospective observational study in patients with suspected diverticulitis who underwent both POCUS and CT in their ED visits. To estimate the impact on CT scan utilization, negative CT scans and those with simple diverticulitis (Hinchey "0") were considered avoidable. To determine the potential CT reduction associated with an ultrasound-first protocol in ED patients with uncomplicated diverticulitis, we applied the findings from our study to institutional medical records of ED visits for diverticulitis over a period of 3.5 years. To estimate the time-savings of an ultrasound-first protocol, we compared the arrival time to the time in which the CT read was available as compared to the completion of POCUS.

Results: 72 patients in our study had both POCUS and CT scans. In 35% (25/72), both POCUS and CT showed simple uncomplicated diverticulitis. In 35% (25/72) both POCUS and CT were negative. In 30% (22/72), the CT scan showed complicated diverticulitis, identified an alternative diagnosis or changed management. Overall, CT scans could have been avoided in 70% (50/72) of the cases. When this rate of 70% is applied to the number of patients who had a CT scan for diverticulitis in the ED over a period of 3.5 years, approximately 959 CT scans (70% of 1,370 CT scans), or 274 CT scans annually could have been avoided if POCUS was used as the first-line diagnostic tool. As for the time-saving impact, the average time from arrival to completion of CT and POCUS scans were 5.3 hours (95% CI 4.9-5.7) and 1.1 hours (95% CI 1.0-1.3), respectively. A mean difference of 4.2 hours (95% CI 3.9- 4.5) reflects the potential decrease in length of stay for patients in the ED.

Conclusion: In ED patients with uncomplicated diverticulitis, using POCUS as a first-line imaging can substantially reduce the number of CT scans and time to diagnosis. There could be substantial implications and reduction on patient length of stay, radiation, and cost.

145 Physician Perceptions Impacting Snake Envenomation Treatment

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Study Objectives: Antivenom is currently the cornerstone of treatment for snake envenomation in the United States (US). However, its use in clinical practice by physicians varies and is not universal. Our study objective is to explore physicians'

perceptions of antivenom use and experience with snake envenomation treatment, to identify factors that influence treatment decisions and willingness to administer.

Methods: We performed a qualitative study based on a grounded theory framework including in-depth interviews via online video conferencing with physicians practicing in emergency departments (ED) across the US. Participants were selected based on purposive sampling methods and data analysis followed by a combination of inductive and deductive strategies, conducted by two researchers. The codebook was created based on the interview guide and the first four interviews. Subsequent transcripts were independently coded by two researchers and a content memo was created. The two researchers then discussed their analysis of each interview and synthesized the findings into an analytical memo of all emergent themes. The codebook and findings were continuously discussed with the other investigators.

Results: Sixteen in-depth interviews with physicians from nine states across the US were conducted. The participants' specialties include Emergency Medicine (EM), pediatric EM, and Medical Toxicology. The experience of treating snake envenomation ranged from only didactical knowledge to having treated over one hundred cases. Emergent themes were as follows: treatment approach and factors influencing clinical decision making, antivenom prescription and perceived competence as well as treatment hesitancy, commonly used resources to inform clinical practice, and the role of scientific evidence and suggestions to improve management. Overall, cost-related concerns were major barriers to administer antivenom. This was especially the case when the indications and effectiveness were not perceived to outweigh the potential financial burden on the patient. The potential to decrease recovery time and long-term morbidity was not commonly reported by participants as an indication to treat with antivenom. Common suggestions to address the lack of available follow-up from the ED was a system to receive information on long-term recovery through individual case follow up information and/or increased scientific evidence of long-term outcomes. Envenomation severity and perceived physician competence based on prior education and clinical experience also impacted the decision to treat. Physicians were not concerned about the safety of antivenom and most felt that potential side effects were mild and manageable. Resources such as Poison Control were well received and commonly used to guide the treatment plan. The need for clinical guidelines and updated treatment algorithms with clinical measurable indicators was a stated need to help the decision-making process, especially amongst those with low exposure to snake envenomation.

Conclusions: A major barrier to physician use of antivenom is concern about cost for the patients. Additionally, inconsistent awareness of potential benefits during recovery further increase inconsistent antivenom treatment practices. Antivenom safety concerns were not a major barrier.

146 Evaluating the Effectiveness of Providing New Primary Care Appointments Prior to Discharge from a Community Hospital Emergency Department

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Study Objectives: Emergency departments (EDs) across the United States are frequently used to address medical needs that are better suited for the outpatient setting. A key factor that has been noted to increase use of the ED for low-acuity needs is the lack of an established primary care provider (PCP). To help facilitate the process of establishing PCP care after an ED visit, the Swedish Hospital ED (SHED) in northern Chicago can arrange follow up appointments for patients at a partner federally qualified health center (FQHC), Erie Family Health Centers (EFHC), located on its hospital campus. This study analyzes the effectiveness of eliminating logistical barriers by comparing two-week PCP follow up rates between patients given a written referral only versus an appointment on SHED discharge.

Methods: This was a retrospective chart review of four months from August 1 to November 30, 2018. The investigators compared two-week follow-up rates for patients without established PCPs who were given referrals to EFHC on SHED discharge and patients who were given an actual appointment on discharge. The investigators cross-referenced SHED electronic medical record (EMR) patient data with EFHC EMR data to determine if/when follow up occurred. A successful follow-up visit was defined as a non-established patient being seen at EFHC within two weeks of their ED visit at SHED. Patients were excluded from the study if there was documentation of a visit at EFHC prior to their SHED visit, constituting previously established care. Primary outcome data was subsequently compared using chi square analysis to assess for statistical significance. Additionally, secondary data including demographics and discharge diagnosis were compared using descriptive statistics to assess factors that may correlate with better or worse clinic follow-up.

Results: In total, 980 patient encounters occurred during the study period where patients were either referred to or had an appointment scheduled at the EFHC on SHED discharge. After EMR review, 783 patients given a written referral had already established care within the EFHC system and were excluded from the study, leaving 66 patients in the control group. Six (9%) control group patients followed up within two weeks of their ED visit, while 60 patients (91%) did not follow up in the two week window. Of the 131 patients given appointments prior to their SHED discharge, 34 had already established care at the EFHC system and were thus excluded from the study leaving 97 patients in the study group. Fifty-six (58%) study group patients followed up successfully while the other 41 patients (42%) did not (chi-square 39.4272, p-value < 0.00001), indicating statistical significance.

Conclusions: This study demonstrates that eliminating barriers to follow up does increase patient follow-up after an ED visit. It validates the tangible benefits of having a supportive collaboration between a FQHC primary care clinic and community hospital ED with many uninsured or underserved patients. Because the ED is a key health care access point for our health system, especially for patients without regular access to care, it is well suited for interventions to increase establishment of primary care which may in turn decrease unnecessary ED visits and promote regular access to care in the clinic setting.

147 Impact of Direct Bedding on Length of Stay in the Emergency Department

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Study Objective: Crowding in the emergency department (ED) has negative impacts on the quality of care to the patients. Patients may spend more time in the waiting room than in the treatment area. This study aims to evaluate the impact of direct bedding on length of stay (LOS) in the ED.

Methods: This retrospective cohort study analyzing data from a level 3 trauma level ED. A direct bedding protocol was established and implemented in the ED on February 1, 2018. The protocol directs the ED staff on how to allocate the patients depending on their acuity level. If a patient arrives by the emergency medical services (EMS), the EMS personal presents the patient to the ED team, including the physician, primary registered nurse (RN), ED Tech and, and triage RN. ED staff reserves a treatment room in the EMR system. For walk-in patients, the ED staff registers the patient. If a treatment room is available, the patient is triaged and escorted to the room. The triage nurse provides a comprehensive triage assessment and reassesses as needed if there is no room available. The ED staff may have to move the patient with lower acuity to a hallway or lobby area to make the room available for the patients with higher acuity. The study analyzed ED visits from February 2017 to January 2019. The primary outcome is the ED length of stay (LOS).

Results: A total of 80,729 ED visits were analyzed. Forty-one thousand one hundred eighteen visits were enrolled before the protocol was implemented, and 39,661 were enrolled after the protocol was implemented. The average ED LOS is 3 hours and 29 minutes ($\pm$2.42 hours) before and 3 hours and 4 minutes ($\pm$1.55 hours) after the protocol was implemented ($p<0.0001$).

Conclusion: The Direct Bedding Protocol significantly reduces the ED LOS by 25 minutes. Utilizing the protocol, implement it in the electronic medical record system, and working with the local EMS help reducing the ED LOS and providing more efficient care to the patients.

148 Acute Pulmonary Embolism Patients With Low Risk Stratification Scores but Concerning CTPE Findings

Schaeffer WJ, Grace KA, Cranford JA, Kocher KE, Barnes GD, Greineder CF/University of Michigan, Ann Arbor, MI

Study Objectives: Outpatient management of low-risk patients with acute pulmonary embolism in the emergency department (aPE-ED) is safe and decreases

hospital resource utilization. Despite numerous society recommendations and incorporation into many local hospital guidelines, adoption by ED providers has been slow. One potential barrier is provider concern about "high risk" features on CTPE that are not included in the Pulmonary Embolism Severity Index (PESI) score.

Our study objective was to determine the frequency and assess the outcomes of aPE-ED patients with low risk PESI scores but concerning findings on CTPE.

Methods: We performed retrospective chart review of aPE-ED cases from a one-year period (1/1/2017-12/31/2017) at a single, tertiary academic center. aPE-ED cases were identified by a combination of EMR query and manual chart review by three emergency physicians (EPs). Clinical variables, including age, sex, ED vital signs, past medical history, and mental status were abstracted and used to calculate the Pulmonary Embolism Severity Index (PESI) score. Biomarkers (troponin I and B-type natriuretic protein), CTPE, point-of-care ultrasound (POCUS), and formal echocardiogram (TTE) results, length of stay, site of admission (ICU vs. non-ICU) and 7- and 30-day mortality were also recorded. Patients were grouped by risk based on PESI score, biomarkers, and presence of concerning findings on CTPE (bilateral PE with saddle, main, or lobar arteries involved OR infarct OR evidence of right heart strain).

Results: We identified 250 patients with aPE-ED. Low PESI score ($\leq$85), normal biomarkers, and no concerning CTPE findings were found in 53 (21.2%) of patients (Risk group 1). Low PESI score, normal biomarkers, but one or more concerning CTPE findings were identified in 47 (18.8%) of patients (Risk group 2). Elevated PESI score (>85) was identified in 150 (60.0%) of patients (Risk group 3). Risk group had a statistically effect on length of stay (LOS), ICU admission, and mortality at 7 and 30 days (all $p < .001$). Pairwise comparisons, however, showed no statistically significant differences between risk group 1 (mean LOS 59.2 hrs, 0% ICU admission, and no mortality at 7 or 30 days) and risk group 2 (mean LOS 56.4 hrs, 2.2% ICU admission, and no mortality at 7 or 30 days), while both groups were statistically different from risk group 3 across all measures (mean LOS 138.3 hrs, 17.6% ICU admission, and 8.1% and 15.3%, 7- and 30-day mortality, respectively, all p values < 0.001). The rate of echocardiography (POCUS and/or TTE) was significantly lower in risk group 1 (19.2%) than risk group 2 (58.7%) or risk group 3 (58.3%), $p < 0.001$, but the latter two groups were not statistically different, $p = 0.32$. The rate of abnormal echo (dilated RV, abnormal RV function, or septal motion suggestive of RV pressure overload) was higher in risk group 2 (16%) than risk group 1 (0%) or risk group 3 (4.8%), although these differences were not statistically significant.

Conclusion: Acute PE patients with low risk stratification scores and concerning CTPE findings accounted for nearly 20% of our cohort. Despite a higher rate of abnormal echocardiogram findings, their outcomes were not statistically different from low risk patients without concerning CTPE findings.

149 Association of ACE-I and ARB Prescriptions With Mortality in Patients Admitted to the Hospital With COVID-19 in New York City

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Study Objectives: For several weeks in March and April 2020, New York City was the global epicenter of the COVID-19 outbreak. Minority populations in the Bronx were disproportionately affected. Since the beginning of the outbreak, there has been speculation that angiotensin-converting enzyme inhibitors (ACE-Is) and angiotensin receptor blockers (ARBs) may worsen outcomes among patients with COVID-19.

Methods: This was a retrospective case series. We included patients >= 16 years with COVID-19 who presented to one of five EDs between March 9, 2020 and April 4, 2020 in the New York City borough of the Bronx. The population was largely Black and Hispanic. Included were 1,122 laboratory-confirmed cases of COVID-19, and 22 COVID-negative cases in which the clinical suspicion for disease remained high despite negative testing. Laboratory confirmation of COVID-19 was performed with reverse-transcriptase polymerase chain reaction (RT-PCR) assays on nasopharyngeal swab specimens. We abstracted data from the medical record on whether the patient had a current prescription for an ACE-I or ARB, as well as data on hypertension (HTN), diabetes (DM), chronic kidney disease (CKD), and congestive heart failure (CHF). Clinical outcomes included death, ICU admission, and need for renal replacement therapy (RRT). We determined inter-rater reliability for 10% of the data. We report Spearman's rho and p values for each variable and clinical outcomes. We performed a logistic regression model in which death was the primary outcome and each of the predictor variables listed above were entered and retained in the model. $P < 0.05$ was considered statistically significant.

Results: The mean age of our patient population was 62.0 (SD 16.1). Thirty-two percent of patients self-reported Spanish/Hispanic/Latino ethnicity, 42% reported their race as Black or African-American, 9% reported their race as non-Hispanic white, 2% reported their race as Asian, and 13% reported their race as mixed or other. There were no statistically significant associations between ACE-I or ARB prescription with admission to the ICU or the need for RRT. There was an association between ACE-I and ARB prescription and mortality (rho = 0.11, $p<0.001$), though not between ACEI/ARB prescription and ICU admission or need for RRT. In a multivariable logistic regression model in which we controlled for medical co-morbidities, ACEI/ARB prescription was associated with mortality (OR 1.39, 95% CI 1.03-1.87) after controlling for HTN (OR 1.72, 95% CI 1.20-2.47), CKD (OR = 1.45, 95% CI = 1.05-1.90), DM (OR 1.00, 95% CI 0.96-1.05), and HF (OR 1.14, 95% CI 0.77-1.70). Inter-rater reliability was 96%.

Conclusion: Prescriptions for ACE-I or ARB were associated with increased mortality among patients >= 16 years old admitted to the hospital with COVID-19 after controlling for medical comorbidities.

150 Differences in Weekly Geriatric Emergency Department Visits and Specialty Consultations

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Study Objectives: To adequately prepare to serve the growing population of older adults, there have been increased efforts to build or implement geriatric-focused health care staff, settings and processes. Geriatric Emergency Nurse Initiative Experts (GENIEs) are those specialized in emergency geriatric care that provide thorough assessments of a patient's well-being in the emergency department (ED). The objective of this study was to examine differences in the number of GENIE consults and number of patients admitted post-consult between to academic EDs in a single health system.

Methods: We conducted a multi-center, retrospective study among older adult patients (>=65 years) presenting to two EDs (hospital A, an urban level 1 trauma center and Hospital B, a suburban academic hospital with combined annual census of ~83,000). We compared differences in the weekly number of geriatric visits, number of GENIE consults and number of patients admitted post-GENIE-consult between October 2019 and May 2020 at two EDs.

Results: There were a total of 4,873 at hospital A and 5,724 geriatric visits hospital B in the study period. Overall, there were more weekly geriatric visits at hospital B ($p=0.006$), more weekly GENIE consults ($p<0.001$) and more GENIE consults admitted ($p=0.019$). For patients who received a GENIE consultation in the ED, 61.6% at hospital A compared to 38.6% at hospital B received at least one referral to a geriatric follow-up service.

Conclusion: As the population of older adults continues to grow, it is important to evaluate the staff, services and processes implemented to address their needs. These evaluations will be important in assessing how to optimize workflows and staffing to best support older adults where and when they need care in the ED. Further studies are needed to understand the downstream effects of the implementation of the GENIE role on overall patient care and outcomes.

151 Analysis of Race and Sex Disparities in the Emergency Department

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Study Objectives: Race and sex disparities in health care have been previously documented in the literature. A contributing factor may be "unconscious bias" - the concept that patients may be treated differently due to social stereotypes a provider is unaware they are acting upon. This effect may be more pronounced in busy and stressful environments such as the emergency department. Socioeconomic status and other social determinants of health likely also contribute to disparities in care.

Our study objective was to describe patterns in emergency care surrounding race and sex demographics. Subjective measurements included patient satisfaction surveys rating provider empathy and quality of visit. Objective measurements included admission rates and length of stay (LOS).

Methods: A descriptive secondary analysis of prospective data collected at a tertiary academic level 1 trauma center emergency department was performed from July to August 2018. All comers were included. A non-physician research assistant asked the patient or family member to complete a survey rating physicians on courtesy, listening, concern for comfort, informed on care, treatment of pain, time waiting, and overall visit. Patient demographics, length of stay, and patient disposition were recorded.

Results: 204 patients responded overall. Median satisfaction scores in nearly all categories ranged from 4 (good) to 5 (very good). Median White LOS was 192 minutes vs non-white LOS of 185.5 minutes, Black LOS was 207 minutes. White discharge rate was 47.9% vs 75.6% non-White overall, Black discharge rate was 80%, and Hispanic discharge rate was 74.1%. Male discharge rate was 60.7% vs 58.3% female. Complete Median LOS and % admission rate by race and sex are reported in Table 1.

Conclusion: Patient satisfaction scores were comparable across both race and sex. Median LOS and discharge rate by sex was comparable. LOS for Black demographic patients was 15 minutes longer than White patients and 21.5 minutes longer than non-White patients. This may be meaningful particularly given a high discharge rate of 80% for Black patients. Non-White patients overall had a much higher discharge rate from the emergency department compared to White patients. Possible factors for this large difference include lack of insurance, access to primary care, health literacy, and socioeconomic status. Another concerning possibility is that unconscious bias may result in providers downplaying the severity of patients' symptoms due to racial differences. This study is limited by population demographics specific to this single center. Further investigation is warranted to differentiate the cause of admission rate variance, and how this may impact patient outcomes.

Table 1.

	Length of Stay (median, range)	Disposition (n, %)
White (n = 121)	192 (32 - 646)	Discharged: 58 (47.9%) Admit Floor: 61 (50.4%) Admit ICU: 2 (1.7%)
Black (n = 25)	207 (0 - 1053)	Discharged: 20 (80%) Admit Floor: 4 (16%) Admit ICU: 1 (4%)
Hispanic (n = 54)	183 (3 - 582)	Discharged: 40 (74.1%) Admit Floor: 13 (24.1%) Admit ICU: 1 (1.9%)
Asian (n = 1)	88	Discharged: 1 (100%)
Other (n = 2)	223.5 (174 - 273)	Discharged: 1 (50%) Admit Floor: 1 (50%)
Non-White (all) (n = 82)	185.5 (0 - 1053)	Discharged: 62 (75.6%) Admit Floor: 18 (22%) Admit ICU: 2 (2.4%)
Male (n = 89)	189 (31 - 1053)	Discharged: 54 (60.7%) Admit Floor: 34.8%) Admit ICU: 2 (2.2%) Transferred: 2 (2.2%)
Female (n = 115)	193 (0 - 582)	Discharged: 67 (58.3%) Admit Floor: 48 (41.7%)

152 Correlation of Point of Care Lung Ultrasound and CT Scan Findings in Patients with COVID-19

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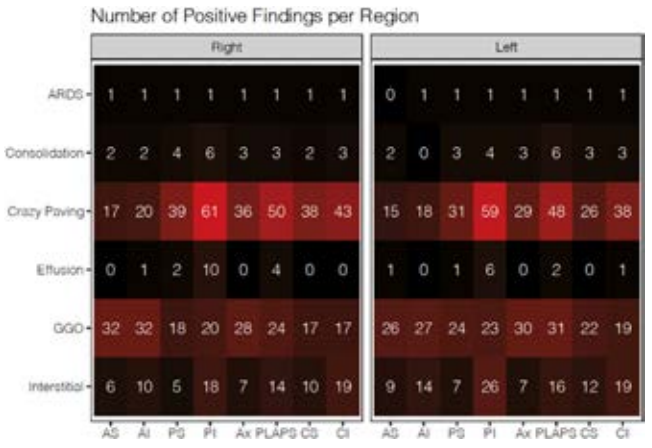
Study Objectives: Chest CT scan (CT) is often considered the gold-standard imaging modality to evaluate pulmonary pathology, and thus is used to assess patients with COVID-19. While CT offers higher resolution images, Point-of-care ultrasound (POCUS) has the advantages of being rapid, low cost, low radiation exposure, and offers the ability for monitoring real-time disease progression. As such, POCUS has also been used to assess patients with COVID-19, and characteristic POCUS findings of COVID-19 are described. In the present study, we compare chest CT to lung ultrasound findings in patients with COVID-19 and examine consistency in pathological findings between the two imaging modalities.

Methods: 125 patients presenting to an urban emergency department in Tehran, Iran with symptoms concerning for COVID-19 were prospectively enrolled. Participants underwent lung POCUS following a 12-zone protocol assessing each zone for pleural line irregularities, alveolar interstitial syndrome (eg, B-lines), and presence of consolidations including subpleural consolidations (SCs). Patients also received chest CT read by a radiologist evaluating for ground glass opacity, crazy paving patterns, or consolidations. For POCUS and CT, each zone was scored using a 4-point measure, then aggregated total lung involvement scores were calculated for each patient and imaging modality. Descriptive statistics were performed to asses consistently between POCUS and CT findings.

Results: POCUS findings overall corresponded well with abnormalities seen on CT, without a significant difference in lung involvement scores between the modalities. On CT, COVID-19 patients showed greater incidence of crazy paving in the AI, PS, PI, AX, PLAPS, CS, and CI distributions (p adj= .00293, 0, .000600, .000533, .00272, .0004) and effusion in CI (p adj= .0216), and on POCUS patients had increased B-lines in the AS, AX, and PLAPS distributions (p adj= .0086, .0012, .0024 respectively), increased pleural thickening in all lung regions (AS, AI, PS, PI, AX, PLAPS; p adj= .0182, .0014, .0375, .0328, .0003, 0), and SCs in AS, AX, and PLAPS (p adj= .0312, .0398, .0324). Both CT and POCUS demonstrated more right-sided findings as a whole, though sidedness of findings was not statistically significant. Both CT and POCUS demonstrated differences in finding densities between lung regions (for CT- ARDS: p adj= 1.00e+ 0; consolidation: p adj= 1.04e- 1; Crazy Paving: p adj= 1.92e-16; effusion: p adj= 8 4.94e- 8; GGO: p adj= 8.73e- 2; interstitial: p ajd= 68e- 6; POCUS-atelectasis: p adj= 1.92e- 7; B-lines: p adj= 6.77e -7; consolidation: p adj= 0.00119; effusion: p adj= 7.20e- 9; pleural thickening: p adj= 7.20e -9; SCs: p adj= 4.39e -5) with the highest concentration of positive findings in the PLAPS region on both modalities.



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Conclusion: Given comparable findings in the presence and distribution of abnormalities between POCUS and chest CT, POCUS may be a viable alternative to chest CT for diagnosis and risk stratification in patients with suspected COVID-19.

153 Do Hydroxychloroquine, Disease-Modifying Antirheumatic Agents or Steroids, Serve to Prevent COVID-19 Infection?

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Study Objectives: Emergency physicians and other specialists are in critical need of medicinal agents to prevent SARS-COVID-2 (COVID-19) infection. International attention has been given to hydroxychloroquine (HCQ), in particular, and other antirheumatologic agents for this purpose. Several very commonly used medications work to block the cascade of chemotactic influences and macrophage activation, but definitive prevention of ARDS is inconclusive. Agents proposed include TNF blocking agents, leukotriene antagonists and steroids. It may be possible to block infection, pneumonia and ARDS with prior use of these agents. The objective of this study is to compare attack rates of COVID-19 among patients who were already taking common rheumatologic agents prior to the COVID epidemic in the study region and those not taking these agents.

Methods: A retrospective cohort design Data was used across multiple hospitals in MI. 990 patients with lupus (SLE) or rheumatoid arthritis (RA) and a COVID-19 test (whether negative or positive) were included. Agents chosen for analysis included HCQ, infliximab, adalimumab, montelukast and steroids. Unadjusted differences between treatment groups with chi-square or Fisher Exact tests were used. Use of all agents other than HCQ and montelukast were combined as one group for comparative analysis. Adjusted treatment effects were estimated using logistic regression. Predictive covariates for the latter included demographics and Charlson comorbidities. Influenza testing was also evaluated.

Results: After dropping N = 30 patients with no data on pre-COVID prescriptions, a sample size of N = 960 patients with an existing diagnosis of rheumatoid arthritis (RA) or systemic lupus erythematosus (SLE) were analyzed. Of these patients, N = 214 patients had an active HCQ prescription at admission and N = 82 patients had a positive COVID-19 test result. None of the unadjusted or adjusted outcomes were statistically different between the "pretreatment" groups (on-agent or off-agent) for HCQ for other rheumatological agents tested as a group, or for steroids.

Conclusion: In a retrospective observational study, there was no evidence of benefit for the prophylactic use of hydroxychloroquine, several representative rheumatologic agents or steroids for the prevention of infection with COVID-19.

154 Virtual Telemedicine Training for Emergency Medicine Residents during the COVID-19 Pandemic

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Study Objectives: With the dawn of the COVID-19 pandemic and the need for enhanced social distancing measures, telemedicine has become an integral part of emergency medicine. Medical schools have started to integrate telemedicine training into their curricula, but there are few reports of telemedicine training in GME programs. The primary objective of this study was to examine current emergency medicine resident knowledge of telemedicine, expose residents to standardized telemedicine patients virtually, and analyze the effectiveness of telemedicine training on completing a successful encounter.

Methods: Seventeen emergency medicine residents first underwent a virtual standardized telemedicine encounter using the Zoom^{TM} application without prior training in telemedicine. Standardized patients were queried on resident success during this untrained encounter using a survey with aspects of a successful encounter. The following session with sixteen of those 17 residents, involved a lecture by a telemedicine physician with years of experience on the fundamentals of a successful encounter, as well as pre-reading materials on the topic. After this intervention, sixteen residents underwent a repeat virtual encounter, with standardized patients responding to the same questions as the pre-training. Residents also underwent a post-survey on their experiences.

Results: Standardized patients evaluated 17 emergency residents before telemedicine training, and 16 of those 17 residents after telemedicine training with a 13-question survey focused on aspects of a successful telemedicine interview. Statistically significant differences were noted on aspects of the encounter related to telemedicine when analyzing pre- and post-training data and using a Z test for proportions: obtaining informed consent (0% vs. 61%, p = 0.00012), asking about privacy in the patient's environment (6% vs. 87%, p <0.00001), verifying name and/or date of birth (29% vs. 94%, p =0.00014). Aspects of the encounter that did not have statistically significant results on pre- and post-test surveys included: resident introducing themselves (94% vs. 100%, p =.31732), asking focused questions about medical condition (100% vs. 100% p = 1), closing the encounter by explaining care plan (94% vs. 94%, p = 1). Fourteen residents responded to a post-training survey with 92.8% of respondents stating that they "strongly agree" that the telemedicine training was helpful to their education. Only 28.6% of respondents stated that they "strongly agree" that they understood how to do a virtual physical exam.

Conclusion: Overall, emergency medicine residents had significant improvement on aspects of an encounter with a standardized patient that were unique to telemedicine after undergoing training from an expert in the field. Residents scored well both before and after training on aspects of the encounter not pertaining specifically to telemedicine, suggesting good clinical overlap between virtual and in-person environments. Residents uniformly felt the training was helpful to their education. Participants did feel less confident with the ability to do a virtual physical exam, which could possibly be ameliorated with more practice in this environment. Many EM residencies are undergoing virtual didactics and because of this, similar training could easily be utilized across the country. This training could prove to be essential in the future because of the global health crisis of the COVID-19 pandemic.

155 Using Point-of-Care Ultrasound to Predict Clinical Outcomes in Patients With COVID-19

Shokoohi H, Chahardoli M, Loesche MA, Sabbaghan Kermani S, Schulwolf S, Abdollahzade Manqoutaei S, Tofighi R, Yadegari S, Duggan N/Massachusetts General Hospital, Boston, MA; Iran University of Medical Sciences, Tehran, Islamic Republic of Iran

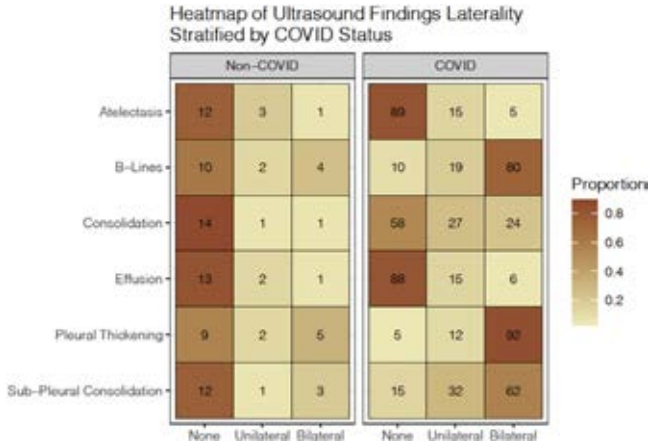
Study Objectives: Point-of-care ultrasound (POCUS) may be used as a valuable tool for risk stratification of patients with COVID-19 as its characteristic POCUS findings have recently been described. In the present study, we aim to define the prognostic value of cardiopulmonary POCUS in patients with COVID-19. Here, we correlate POCUS findings with patient-centered outcomes such as need for intubation, intensive care unit (ICU) admission, and mortality.

Methods: 125 patients presenting to an urban ED in Tehran, Iran with symptoms concerning for COVID-19 were prospectively enrolled between March 8 and April 4, 2020. Participants underwent pulmonary POCUS following a 12-zone PLUS-Co protocol, and cardiac POCUS using a standardized 4-view protocol. ED physicians performed scans and provided real-time scan interpretations, images were reassessed by a second, blinded reviewer for quality control and inter-rater reliability. For pulmonary POCUS, each lung zone was individually assessed for pleural line irregularities, alveolar interstitial syndrome (eg, B-lines), and subpleural consolidations (SCs), then scored using a 4-point measure. Zone scores were aggregated to generate a cumulative lung involvement score per patient. Cardiac POCUS was assessed for ejection fraction, right ventricular function, pericardial effusion and inferior vena cava collapsibility. Clinical course and outcome variables were collected via retrospective chart review. Descriptive statistics were performed to evaluate the distribution and frequency of positive POCUS findings and their correlation with patient outcomes including ICU admission, mechanical ventilation, inpatient length of stay, and mortality.

Results: COVID-19-positive patients demonstrated higher bilateral lung involvement scores than COVID-19-negative patients overall ($p<.001$, $r^2= .667$), with significantly increased B-lines (p adj= .000000804), pulmonary consolidations (p adj= .0304), pleural thickening (p adj= .000000742), and SCs (p adj= .000000500). Increased B-lines were most pronounced in the AS, AX, and PLAPS distributions (p adj= .0086, .0012, .0024 respectively), whereas pleural thickening was noted in all lung regions (AS, AI, PS, PI, AX, PLAPS; p adj= .0182, .0014, .0375, .0328, .0003, 0), and subpleural consolidation were most prominent in AS, AX, and PLAPS (p adj= .0312, .0398, .0324). In performing regression analysis no single positive POCUS finding was significantly correlated with patient outcomes inducing mortality, and need for intubation, nor was lung involvement score as a whole.

Conclusion: In patients with COVID-19, regionalized POCUS findings and aggregate lung involvement scores were not predictive of patient outcomes including mortality. Despite this, cardiopulmonary POCUS may still provide valuable diagnostic and risk stratification data in patients with suspected COVID-19.

Further investigation of the clinical applications of a cardiopulmonary POCUS disease profile in COVID-19 is needed.



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156 Use of a Risk Index to Predict Falls and Opioid Adverse Events in Opioid Naive Older Adults

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Study Objectives: Older adults initiated on opioids are at increased risk for falls and opioid adverse events. The Risk Index for Overdose or Serious Opioid-induced Respiratory Depression (CIP-RIOSORD) is a validated tool that calculates a patient's probability of an opioid OD within the next six months. Our objective was to gather preliminary data to determine if the CIP-RIOSORD tool could predict falls and or opioid adverse events within 30 days in opioid-naive older adults discharged with a prescription opioid from the emergency department (ED).

Methods: This was a pilot prospective observational study of opioid naïve ED patients age > 50 discharged to home from the ED with an opioid prescription for acute pain. Sociodemographic, clinical, and medication data were collected at enrollment. The Timed Up and Go (TUG) Test assessed fall risk at the time of enrollment. Health literacy was measured using Rapid Estimate of Adult Literacy in Medicine-Short Form. Patients completed telephone follow-ups at day 3 (+/- 1), 7 (+/- 1), 14 (+/- 2), and 30 (+/- 2) post ED visit to assess medication use and incidence of patient reported falls and opioid adverse events. Every third patient completed day 3 follow-up in-person to re-assess medication compliance and fall risk. Falls were defined using the Hopkins Falls Grading Scale. Opioid adverse events were defined as patient-reported low blood pressure, increased sleepiness/sedation, slow/decreased responsiveness, or decreased breathing. A CIP-RIOSORD risk class was calculated for each patient. Descriptive statistics were performed using Fisher's Exact and Wilcoxon's Rank Sum Tests. Pearson's chi–squared tests and logistic regression models were performed to assess for correlations and to identify preliminary predictive factors.

Results: A total of 44 patients were enrolled. The average age was 60, 52% (22) were male, 60% (25) African American, 58% (25) had a health literacy level of < 8th grade; and 40% (17) reported a fall history. Over half (53%) used > 3 home medications and 33% reported often taking medications in a manner not prescribed/uncertainty with how to take their medications. Most (59%) met fall risk criteria on the TUG Test. Thirteen patients reported 20 near-falls and 11 reported 12 opioid adverse events within the 30 days post-ED visit. Nearly 54% (7) of patients reporting a fall had a previous history of falling; 54% (7) were also a fall risk on the TUG test. Distribution of RIOSORD risk class was as follows: risk class 1 (1.9% average predicted probability of OD)- 5 patients; class 2 (4.8% probability)- 3 patients; class 3 (6.8% probability)- 3 patients; class 4 (15.1% probability)- 3 patients; class 5 (29.8% probability)- 4 patients; class 6 (55.1% probability)- 2 patients; class 7 (83.4% probability)- 2 patients. No significant correlations were identified between RIOSORD risk class, patient demographics, and incidences of falls and or opioid adverse events.

Conclusion: Our preliminary data does not support significant correlations between RIOSORD risk class and incidence of falls or opioid adverse events within 30 days of ED discharge in opioid naïve older adults. We found over-half of patients reporting a fall were a fall risk when discharged with a prescription opioid. A larger study population is needed to confirm our findings and to determine if improved ED screening is needed when discharging older adults with prescription opioids.

157 Initial Outcomes of Universal HIV and HCV Screening in a High Volume Academic Emergency Department

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Study Objectives: The Center for Disease Controls and Prevention (CDC) recommends routine HIV screening for all Americans aged 13-64 at least once in their lifetime and more often if they are higher risk. In 2020, the CDC released a new guideline recommending that HCV screening be done at least once in a lifetime for all adults aged ≥18 years. To facilitate compliance with these guidelines, the Frontlines of Communities in the United States (FOCUS) was established. This is a public health initiative that aims to decrease the stigma associated with viral testing and diagnosis and link HIV and HCV screening with care. In this study at an urban academic medical center emergency department (ED) we evaluated the effectiveness of a FOCUS intervention in 1) identifying new HIV and HCV cases and 2) linking positive screens to care.

Methods: A one-year retrospective chart review was conducted in 2018 for patients in the ED with positive HIV or HCV screening test. The number of positive tests was recorded as was linkage to care (represented by follow up attendance). Based on this gap analysis, the FOCUS program was designed and implemented by a multi-disciplinary group in February 2020. This program consisted primarily of intake RN screening for eligibility, and standing orders protocols for HIV/HCV lab testing. Data was collected through 5/31/20. Primary metrics included total number of patients tested in the ED with intervention group, number of positive HIV and HCV screening and confirmed tests during intervention and control, and numbers of acute HIV and HCV diagnoses with intervention.

Results: In the pre-intervention control group (2018), 7 screened positive HIV patients were identified. All were confirmed positive with HIV PCR testing. Of these, 6 attended a first visit (intake) and 5 continued to follow up at one year. In 2018, 13 patients screened positive HCV Ab. 7 patients had positive confirmatory HCV PCR testing. 3 patients attended intake, the other 4 were lost to follow up. In the intervention arm after FOCUS implementation from 2/24/20 through 5/31/20, 920 of 8339 (11%) eligible patients underwent testing. 907 (11%) patients underwent HIV testing: 4 screened positive and 2 were confirmed positive and attended intake. 895 (11%) underwent HCV testing: 83 screened positive and 34 were confirmed positive. 32 were contacted and given follow up with a specialist or primary care doctor, 1 was lost to follow up, and 1 was already in treatment.

Conclusion: The FOCUS has significantly increased the number of identified HIV and HCV patients in comparison to the retrospective control group. The greatest impact was found in the higher prevalence HCV group. In just over three months of intervention, 4.86 times as many confirmed HCV positive patient were identified than all of 2018 combined. We anticipate these numbers to grow exponentially as we add tools (such as EMR automation) to help drive our testing-to-eligibility ratio past the current state (11%).

158 Emergency Department Patients Presenting With Spontaneous Pneumomediastinum: A Retrospective Observational Cohort Study

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Study Objectives: Spontaneous pneumomediastinum, (SPM) the presence of air or other gas in the mediastinum that was not caused by blunt trauma, penetrating trauma, or iatrogenic injury, is often benign and self-limited. Primary outcomes were 30-day mortality, repeat ED visit in 30 days, or need for an invasive procedure. The variables we studied were admission for observation, antibiotics, use of supplemental oxygen, obtaining a swallow study, presence of pre-existing asthma, COPD, heart disease, primary lung disease, or use of an inhaled substance. We hypothesized that patients with SPM would have no difference in the described primary outcomes.

Methods: This study was a retrospective observational cohort study conducted in the emergency department (ED) of adult and pediatric academic, tertiary care hospitals in Saint Louis, MO. Inclusion criteria were any patients diagnosed with pneumomediastinum (ICD-10-CM J98.2) during their ED visit. Patients were excluded if they presented with traumatic, iatrogenic, or chronic pneumomediastinum. Data points collected include age, sex, race, chief complaint, diagnostic imaging modality, and pre-existing conditions: asthma, use of an inhaled substance, COPD, heart disease, or primary lung disease (lung cancer or interstitial lung disease). Data were analyzed as descriptive statistics via calculation of odds ratios.

Results: We evaluated 144 patients between January 2013 to December 2019. Seventy-three patients were excluded. The mean age was 31 years with a range from 7 to 92 years old. The most common chief complaints were dyspnea (31%), chest pain (24%), and GI complaints (21%). There was an admission rate of 70.4% with a 2 day median length of stay. Given that there was only 1 case of mortality analytics were unable to be performed. The remainder of the results is listed in Table 1.

Table 1. Odds of a return ED visit or need for invasive procedure in patients with SPM

	Return to ED	Invasive Procedure
Admission for Observation	3.81 (0.45 to 32.6)	N/A
Use of Supplemental Oxygen	2 (0.45 to 9.5)	2.2 (0.56 to 8.56)
Use of Antibiotics	1.36 (0.33 to 5.57)	4.21 (1.13 to 15.74)
Obtaining a Swallow Study in ED	1.04 (0.25 to 4.24)	5.05 (1.23 to 20.65)
Asthma	N/A	0.29 (0.62 to 14.0)
COPD	N/A	N/A
Heart Disease	2.24 (0.39 to 13.0)	2.94 (0.62 to 14.0)
Primary Lung Disease	8.57 (1.04 to 70.7)	1.7 (0.16 to 17.9)
Use of Inhaled Substances	0.13 (0.02 to 1.13)	0.91 (0.26 to 3.19)

Conclusion: There was no difference in need for a return visit to the ED within 30 days between groups of patients admitted for observation or discharged from the ED after primary evaluation. There was only one patient who expired within 30 days of presentation. Admission was associated with increased frequency of invasive procedures. Our findings support previous work that SPM is usually benign and self-limited. Our recommendation based on this study is that patients with SPM and negative swallow studies do not need to be admitted for observation. The study was limited by its single center design, small study sample, and potential for patients of interest not being included in the study sample due to mis-coding in the electronic medical record.

159 Successful Patient Navigation Through a Direct-to-Consumer Telemedicine Program

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Study Objectives: Patient navigation, first heralded by Dr. Freeman and colleagues for low-income breast cancer patients more than 25 years ago, is now an essential part of care coordination within our complex medical system, particularly for vulnerable populations. With the continued growth in health care spending (estimated at $3.6 trillion in 2018), the number of uninsured as well as patients' out-of-pocket expenses continue to increase. Navigator Programs have demonstrated success facilitating follow-up care for genetic counseling, geriatric populations, emergency department patients, and primary care. Further investigation into the impact and cost-effectiveness of patient navigation has been suggested. Direct-to-Consumer telemedicine services continue to grow, including exponential increase during the Covid-19 pandemic. There may be a role for patient navigation in facilitating ongoing/continuity of care following virtual urgent care encounters, especially given that the use of this type of service may be a marker for at risk patients who are using episodic telehealth encounters as their only access to care.

Methods: In July of 2016, the Weill Cornell Medicine Department of Emergency Medicine, in conjunction with NewYork-Presbyterian, implemented a virtual urgent care service staffed by faculty who are part of an academic EM practice. ED physicians could refer patients to a ED Patient Navigator (PN) program using a computerized provider order entry when patients were seen by telemedicine or when they were seen in the physical ED. PN referrals were made for both primary and specialty care at ED physician discretion. The PN contacted the patient asynchronously by telephone, scheduling the patient with the appropriate outpatient service appointment(s), facilitating patient compliance via follow up calls and documenting the outcomes of each referral. We compare PN quality assurance data for both telemedicine patients and for ED patients navigation success rate for ED and Virtual Urgent Care patients.

Results: Successful patient navigation was defined as the percentage of telemedicine patients referred to the program who attended their referred in person appointment. From March 1, 2019 until June 30, 2019, 234 patients were referred to the PN, 23 (10%) had appointments successfully made, and 10 (4%) completed their appointments. During the same time period 3,721 patients were referred to patient navigation in the physical ED, 1,663 (44%) had an appointment successfully made and 1,096 (29%) completed their appointment. All differences are statistically significant at the $p<0.01$ level.

Conclusion: As we increase virtual care, there is an opportunity to further explore the role of PNs. Navigation of virtual urgent care service patients had a lower rate of success in attempting to make appointments, and scheduled appointment compliance compared with emergency department patients referred to the same group of PNs by physicians in the same faculty practice. The extent to which this discrepancy was due to insurance status, patient investment in the PN process, or other differences between groups is not known.

160 Trends of Reported Marijuana Use in a Pediatric Emergency Department

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Study Objectives: Thirty-three states have legalized recreational and/or medicinal marijuana, leading to normalization of its use, and desensitization of perceived risk. We utilized electronic health record data from a Pediatric ED located in a state which has legalized medicinal marijuana, and examined the changes in reported marijuana use among adolescents, and the relationship between marijuana use, use of other drugs, and risk for substance use disorder (SUD).

Methods: We implemented a team-based adolescent Screening, Brief Intervention, and Referral to Treatment (SBIRT) program in a Pediatric ED in January 2018, utilizing the CRAFFT tool to screen patients ages 12-17. Individual CRAFFT responses were examined for the 8,694 of 24,057 (36.1%) patients screened from January 2018 to October 2019. Pearson chi-square tests were used to compare use of reported substances from 2018 to 2019 to identify trends in the use of each substance (alcohol, marijuana, and other drugs). Binary logistic regression was used to examine the predictors of both a positive CRAFFT score (2 or higher in Part B, validated for identifying an SUD) and other drug use.

Results: Reported alcohol use decreased from 2018 to 2019, from 8.5% to 7.3% ($p=0.04$), marijuana use increased from 9.1% to 11.3% ($p=0.09$), and other drug use did not change (1.9%). 39.2% of those reporting substance use reported using only marijuana. Those reporting alcohol use had 4.9 (95% CI 3.3-7.2) times the odds of other drug use, and those reporting marijuana use had 14.5 (95% CI 9.4-22.4) times the odds, adjusting for age and sex. Among the 1,066 patients with a "Yes" in Part A for whom Part B was completed, those reporting other drug use, marijuana use, and alcohol use had 8.7 (95% CI 5.7-13.4), 5.4 (95% CI 3.5-8.2) and 1.5 (1.1-2.0) times the odds of a positive score, respectively, adjusting for age and sex.

Conclusion: Marijuana use is the most prevalent form of reported substance use among adolescents in the ED and is increasing. Marijuana was a stronger predictor than alcohol of a positive CRAFFT, which has an 80% sensitivity and 86% specificity for a SUD. There is an association between reported use of marijuana and reported use of other drugs. Given the increase in social acceptance of marijuana use, and its association with additional drug use, it is critical for health care professionals to identify and address marijuana use with adolescent patients. One limitation of this study is that the version of the CRAFFT programmed into the EHR does not specifically ask about vaping, and therefore may not be capturing all patients who vape THC. Future directions include changing the CRAFFT embedded in the EHR to the CRAFFT

2.1+N, which specifically asks about vaping both marijuana/THC and nicotine. This will allow us to better identify and address the increasing marijuana use in our adolescent population.

161 Cardiopulmonary Ultrasound in Risk Stratification of Patients With Influenza

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Study Objectives: As the upcoming influenza season aligns with a forecasted second wave of COVID-19, diagnostics are needed to effectively and efficiently differentiate between the two. Point-of-care ultrasound (POCUS) is already widely used in the evaluation of cardiopulmonary dysfunction in the emergency setting, but scant research has been performed into the diagnostic implications of POCUS in patients with suspected influenza. This study investigated the utility of cardiopulmonary ultrasound as a novel diagnostic tool for patients with influenza.

Methods: A convenience sample of patients presenting to an urban academic ED with influenza-like symptoms who received polymerase chain reaction (PCR) influenza testing were enrolled. An ultrasonographer blinded to influenza results performed a POCUS using the CLIFF (Cardiac, Lungs, IVC, and Free fluid-t) protocol. POCUS scans were performed by emergency medicine attendings, ultrasound fellows, or advanced practice providers who received 1-hour training in the CLIFF protocol. Clinical data including demographics, relevant comorbidities, and influenza vaccine status as well as laboratory values, interventions, and disposition were retrospectively collected. POCUS findings of PCR positive flu cases were then compared to PCR flu negative cases. Descriptive analysis using Fisher's exact test was used to compare the two groups' findings. A subgroup analysis adjusting for heart failure was then performed.

Results: A total of 117 patients were enrolled, of which 41.9% (49/117) tested positive for the flu. Patients with flu negative had a higher rate of hospitalization (75.0%, 51/68; 36.8% 25/117) and found to have more comorbidities including congestive heart failure (57.1%, 28/49; 8.2% 4/49) (P=0.046; p=0.001). A subgroup analysis adjusted for CHF showed no statistical difference in POCUS findings of pulmonary b-lines (65.7%, 23/35; 42.5%, 17/40; p=0.075), a-lines (85.7%, 30/35; 82.5%, 33/40; p=0.95), consolidations (28.6%, 10/35; 15%, 6/40; p=0.251) in cases with flu positive and negative. Non-flu patients also showed significantly depressed EF as compared to flu-positive patients (25/68, 36.8%; 4/38, 8.33%; p=.001), as well as significantly higher levels of RV dysfunction (8/68, 14%; 1/48, 2.17%) and IVC dilation (15/68, 23.1%; 2/48, 4.44%; p=.027). The proportion of patients with normal EF was higher in patients with flu compared to patients without flu (85.0% vs. 65.7%, P = 0.042). Mild RV dilation was more prevalent in flu-negative patients.

Conclusion: In ED patients with suspected influenza, a POCUS CLIFF protocol showed no difference in cardiopulmonary findings in patients with confirmed influenza as compared to those who tested negative. Further studies comparing POCUS cardiopulmonary findings of influenza compared to COVID-19 are needed.

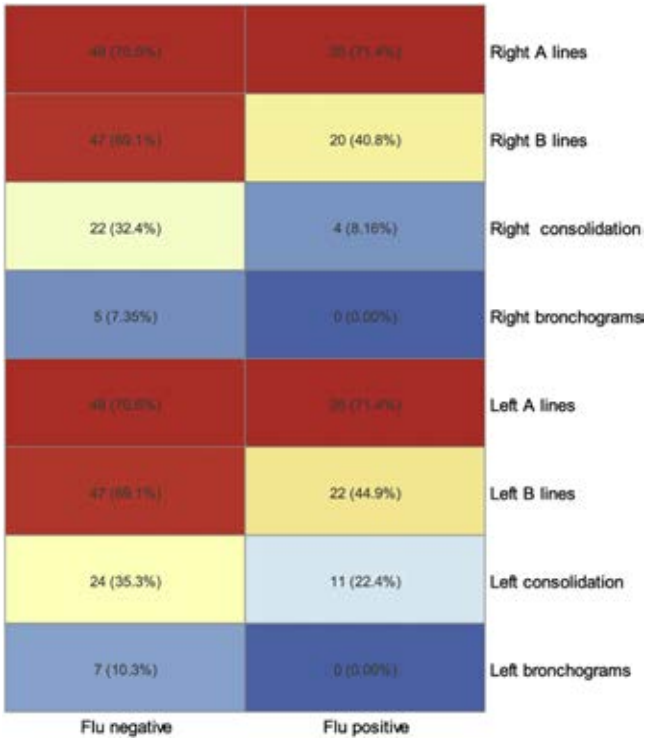

Figure 1. Heatmap showing overall lung findings between flu-negative (A) to flu-positive (B)

162 Simulation Based Mastery Learning for Ultrasound Guided IV Insertion Skills among Emergency Nurses Improves IV Failure Rates and Performance

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Study Objectives: Obtaining prompt and reliable intravenous (IV) access is a cornerstone of care in the Emergency Department (ED). Ultrasound guided peripheral IV insertion (USGPIV) has become the vascular access procedure of choice for patients with difficult IV access (DIVA). Despite the increasing reliance on this procedure, multiple recent publications have cast doubt on durability of these IVs. Studies report multiple markers of poor USGPIV performance, such as an 8% failure rate within the first hour, 47% failure within 24 hours, and only 19% survival (81% failure rate) at 72 hours. Reports have also shown poorer performance in USGPIVs compared with traditional PIVs (tPIVs). While high failure rates may be presumed to be inherent to USGPIVs, these events may instead be related to lines placed by providers with limited and non-standardized training in USGPIV insertion. Simulation-based mastery learning (SBML) is one strategy that standardizes curricula and learning outcomes by rigorously training all participants using deliberate practice (DP) to a predetermined mastery standard. Our objective was to implement a SBLM USGPIV curriculum for emergency nurses (ENs), and to study the performance of USGPIVs placed by trainees, and compare those rates to tPIVs placed in the same DIVA patient population.

Methods: We trained 21 ENs using a SBML curriculum in USGPIV insertion from September 2019 to May 2020 at an urban, academic medical center. ENs were instructed to only insert USGPIVs on patients with DIVA. ENs recorded information on all USGPIV insertions in a secure database. Data on USGPIV performance, such as time of insertion, time of removal, reason for removal, complications, as well as performance of any other IVs inserted during the patient stay, were prospectively collected by chart review. Failure was defined as removal of IV for any reason other than 'routine exchange,' 'IV access no longer required,' or patient discharge. We calculated failure rates at 1, 24, and 72 hrs after time of insertion, as well as overall failure rates. We performed a subset analysis of patients who received both a traditional IV and an USGPIV during their visit, and compared the failure rates.

Results: From September 2019 through May 2020 we reviewed 685 charts of patients who received USGPIVs inserted by ENs. Overall failure rate of all 685 USGPIVs was 20.15%. Failure rate at 1hr was 1.8%, at 24hrs was 10.1%, and at 72hrs was 21.2%. A subset analysis yielded 232 DIVA patients who had both an USGPIV and traditional PIV placed during their stay. Overall failure rates for USGPIV was 37.1% vs 39.2% for tPIV (p=.0.64), 1hr failure rates were 2.6% (USGPIV) vs 4.3% (tPIV, p=0.32), 24hr failure rates were 12.9% (USGPIV) vs 22.8% (tPIV, p=0.005); and 72hr failure rates were 24.6% (USGPIV) vs 35.3% (tPIV, p=0.01).

Conclusion: Despite reports of high premature failure rates and inferior performance of USGPIVs, SBML USGPIV training for ENs results in marked improvements in failure rates at 1hr, 24hr, and 72hr time points. Additionally, USGPIVs have equivalent or superior rates of failure when compared to traditional PIVs in a subset of DIVA patients who received both forms of IV access. Reducing USGPIV failure rates may improve care delivery, patient satisfaction, and prevent complications in the ED and beyond. Increasing attention should be paid to the quality and rigor of USGPIV training efforts.

163 Implementation of a Telephonic-Based Model to Continue to Address Substance Use as Part of Usual Care in Emergency Departments during COVID-19

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Study Objectives: Alcohol is associated with increased risk of hypertension and diabetes, which are associated with increased morbidity and mortality from COVID-19, as are opioids and methamphetamine. Our institution has a Screening, Brief Intervention, and Referral to Treatment (SBIRT) program in 18 emergency departments (EDs), 14 inpatient hospitals, and 5 primary care sites to universally address substance use with patients as part of usual care. As our region has a high prevalence of COVID-19, we had to minimize staff presence in the ED, including health coaches and social workers who normally work with patients with a positive SBIRT screen. The COVID-19 crisis demanded innovation; we implemented a "Telephonic SBIRT" (T-SBIRT) model to continue to address patients' substance use in the context of physical and mental health while minimizing in-person interactions.

Methods: Due to regulations regarding "non-essential" staff, 11 SBIRT Health Coaches were removed from their ED and primary care sites. Health Coaches were assigned to T-SBIRT where a central phone number forwards to the mobile phone of the remote health coach on duty. Shifts cover 8am-12am, 7 days per week. We developed a flyer with the services, hours, and phone number and broadly disseminated to ED chairs, primary care providers, nurse managers, all hospital social workers, the Health Home team, and others via virtual meetings and email. We developed a HIPAA-compliant Research Electronic Data Capture (REDCap) form for Health Coaches to use to document services, including the questions for AUDIT (alcohol) and DAST-10 (drug) full screens and checkboxes for brief interventions, referrals to treatment, and virtual resources provided (AA/NA, BottleCap for reducing alcohol use, tobacco cessation, etc). We developed a system via REDCap where the Health Coach emailed the caller the resource list from a central email address in real time. Finally, we developed a REDCap form to virtually obtain HIPAA consent to enroll participants in our substance use disorder care navigation program (Project CONNECT).

Results: In 13 weeks, we had 422 phone calls, 228 (54%) incoming, 190 (45%) outgoing, and 4 (1%) voicemails. 108 (26%) of calls were with patients, 13 (3%) with family/friends, 224 (53%) with staff members, and 79 (19%) with treatment providers. Calls stemmed from 14 hospitals, 2 primary care practices, and Health Home. We worked with 69 unique staff members and 94 unique patient cases, 75 (81%) male, 20 (19%) female, and 7 (8%) in Spanish. We provided 73 full screens, (91% high-risk), 47 brief interventions, referrals for 84 patients, emailed virtual resources to 40 individuals, and enrolled 16 patients in Project CONNECT.

Conclusion: We were able to have a health coach provide T-SBIRT services for patients from sites that do not normally have a health coach, and cover weekends and later hours. Since calls received were for patients with high-risk substance use in need of a referral to substance use disorder treatment, more frontline provider education is needed on the ability of the T-SBIRT Team to address the full spectrum of substance use, not just high-risk substance use. In conclusion, T-SBIRT is a model that we plan to sustain to continually expand reach, and to provide services to address substance use as part of usual care with patients at more locations than we could otherwise physically staff.

164 Emergency Medicine Resident Perceptions of a Novel Curriculum: Advanced Mental Performance in the Emergency Department

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Study Objectives: Emergency medicine (EM) physicians frequently encounter stressful clinical situations. The deleterious effects of stress on cognitive, physical and emotional performance are well-documented in other high-stakes professions. Other fields, such as the military and professional athletics, incorporate mental skills training to enhance performance under pressure and overall wellbeing. Such programs are notably absent in medicine. The goal of this study assessed EM resident perceptions of a novel mental skill training curriculum: Advanced Mental Performance in the ED (AMPED).

Methods: The AMPED curriculum is a multimodal didactic experience designed to optimize EM resident performance across four domains: Stress, Mindfulness, Team Dynamics, and Decision-Making. The curriculum was incorporated into required weekly didactic conferences at one EM residency, and four interactive lectures were given during the 2019-2020 academic year. Psychological skills training was also included with the goals of optimizing cognitive control and emotional regulation and mitigating performance degradation. EM resident perceptions of the curriculum were assessed at the conclusion of the curriculum using SurveyMonkey, an online survey application.

Results: Survey data from 30 of 41 eligible EM residents demonstrated that 83% of residents felt that mental performance topics were "extremely relevant" to the resident physician. Ninety-three percent rated mental performance training as either "important" or "extremely important" for optimizing residency training. Nearly half (43%) of residents rated the incorporation of mental performance principles as "invaluable" for the maintenance of a career as an emergency physician.

Conclusion: The AMPED curriculum provides EM residents with evidence-driven, actionable mental performance training to optimize clinical performance. These skills may decrease acute stress responses in critical clinical scenarios, highlight the importance of teamwork, and build emotional resilience for a career in medicine. Residents in this study highly valued the AMPED mental performance training. Further studies are needed to determine if optimizing mental performance in the ED may mitigate physician burnout and improve patient care.

165 Establishing an Oncology Observation Program to Improve Emergency Department Cancer Care and Decrease Hospital Admissions

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Study Objectives: Caring for cancer patients in the emergency department (ED) is challenging. Due to complex pathophysiology and evolving cancer therapies these patients often require prolonged ED/hospital visits. Admission rates for cancer patients are historically higher than the general population. Recently, there has been a push by CMS to cut down on cancer-related admissions and new laws (eg, OP35) have introduced penalties linked to these encounters. We created an oncology observation program to decrease unnecessary cancer admissions, improve patient care, and align our practices with CMS goals.

Methods: For this interventional study, we collected data on cancer-related ED visits during the first 3 months of our oncology observation unit (November 1, 2019 to February 28, 2020) and compared our findings to a historical control (November 1, 2018 to February 28, 2019). Data collected included demographics, number of cancer-related observation admissions, and hospital admissions/discharges. We compared the proportion of patients placed into ED observation between test/control groups using chi square analysis, with an alpha of 0.05. Descriptive statistics are reported.

Results: During our intervention period there were 2611 ED visits by patients with active cancer versus 2403 in our control group. The groups were similar (pre/post intervention) with regards to age (median 68 vs 67), sex (51.9% vs 59.8% female) and acuity (median ESI 3 both groups). There was a significant increase in ED observation utilization during our intervention period (n=241,9.2% vs n=135,5.6%,OR 29, p<.001). The admission rate for ED Oncology Observation patients during our intervention period was 33.7%, versus a 44.6% admission rate for all oncology patients during the same period. Extrapolated to a 12 month period, this increase in oncology observation utilization would result in approximately 104 prevented admissions at our institution.

Conclusion: The creation of an ED oncology observation program has the potential to decrease hospital admission rates for patients with cancer. Preventing unnecessary oncology admissions may decrease nosocomial infections, decrease patient and system costs, while increasing compliance with dynamic governmental regulations.

EMF

166 Prospective Comparison of 3D Point of Care Ultrasound and CT Angiography for Carotid Stenosis

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Study Objectives: Carotid ultrasound using dedicated 3D systems is more reproducible and better quantifies disease compared to 2D Doppler ultrasound, but

3D system costs limit access. Low-cost point-of-care 3D ultrasound (POC 3DUS) can augment any 2D ultrasound. This system previously had near-perfect agreement for fetal measurements between novice and expert operators. We hypothesized that carotid assessment would not differ between novice-acquired 3DUS interpreted by novices and experts and CT angiography (CTA) interpreted by radiologists.

Methods: We adhered to STARD criteria. Enrollment was by prospective convenience sample at a single medical center; any patient with recent/upcoming head and neck CTA was eligible. 2D B mode US acquisitions used a linear probe coupled to a screen capture device or smartphone, plus an orientation sensor and 3D reconstruction software. Scans were displayed as 2D stacks and intersecting cardinal planes (Figure). 3DUS were interpreted by medical students (novice), US fellowship trained emergency physicians, and radiologists (expert). CTAs were interpreted by neuroradiologists. Readers described NASCET stenosis, plaque, intimal-medial thickness, and minimum luminal cross-sectional area. Inter-reader reliability was measured by intraclass correlation coefficient (ICC)/kappa. We determined a sample size of 50 subjects for ICC 0.7 (alpha 0.05, power 0.8) and kappa 0.8. 3DUS sensitivity/specificity/LRs were estimated with CTA as the reference standard. Anonymous patient satisfaction surveys were administered.

Results: Due to COVID-19, enrollment ended after 30 subjects (144 3DUS, 33 CTAs). Of the 60 arteries imaged, 21 had plaque on clinical CTA interpretation. Analysis is still in process. Mean 3DUS acquisition and reconstruction times were 13.1 sec (median 12.7, IQR 9.1-17.3) and 7.9 sec (med 8.0, IQR 5.0-10.3). Mean 3DUS interpretation time was 3m, 52s (med 3:06, IQR 2:14-4:49) for the first 497 3DUS reads. 13 patient surveys were completed. Mean subject willingness to repeat 3DUS was 8.1/10 (med 10, IQR 6.1-10). 2 subjects reported increased discomfort during the exam (mean change 0, med 0, IQR 0-0). 9 of 11 (81.8%) perceived a shorter scan time for 3DUS than for CTA, MRA, and/or 2DUS (2 declined to answer). CTA inter-reader agreement on plaque presence is 11/14 (0.79, 95% CI 0.52-0.92). Expert interpretations of the first 120 3DUS agreed on 55 (0.45, 95% CI 0.37-0.55), disagreed on 35 (0.29, 95% CI 0.22-0.38), and one or both readers were "unsure" on 30 (0.25, 95% CI 0.18-0.33). Of 90 3DUS where both readers answered with certainty, there was 61% raw agreement (95% CI 0.51-0.71). For the first 264 expert 3DUS interpretations, sensitivity is 0.77 (95% CI 0.66-0.87), specificity 0.59 (95% CI 0.50-0.67), +LR 0.47, -LR 0.84, using the original CTA read as reference standard (excluding 42 "unsure").

Conclusion: POC 3DUS is time-efficient with good patient satisfaction and promising sensitivity. Potential applications include initial diagnostic evaluation for neurologic symptoms or carotid bruit in low-resource settings.

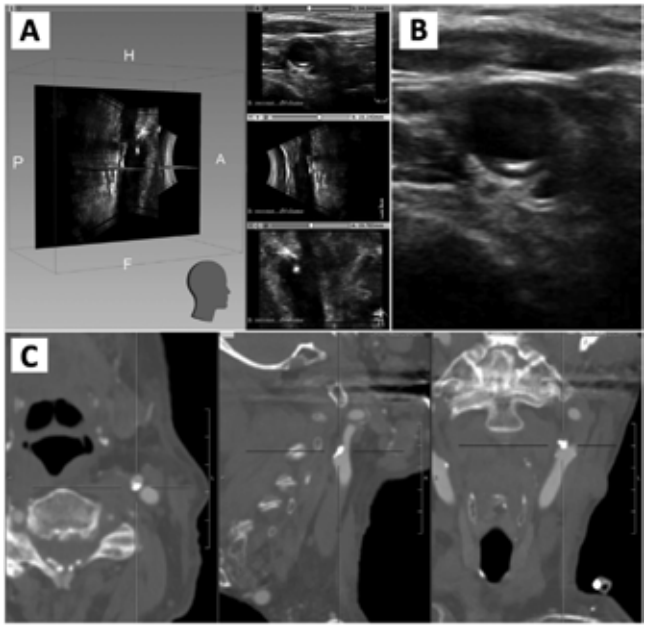

Figure. A: 3DUS with axial, sagittal, and coronal 2D images. B: Source 2DUS. C: Axial, sagittal, and coronal CTA.

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167 Changes in Patterns of Community Mortality during the SARS-CoV-2 Pandemic

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Study Objectives: We aimed to analyze causes of death during the SARS-CoV-2 pandemic as a way to quantify the relationship between reduced emergency department visits during spring 2020 and community mortality rates and causes. Our focus was on the eight-county area served by Southern Minnesota Regional Medical Examiner.

Methods: Chi-squared and Fisher's Exact tests were applied to compare deaths between time periods. All tests were two-sided and p-values less than 0.05 are considered significant. We compared the causes of death from 2/9-3/16 and 3/17-4/21 for the years of 2018 and 2019 to establish a baseline for comparison to the causes of death during these same periods in 2020. These dates were determined by taking the four weeks prior to a statewide stay at home order and the first four weeks of the order.

Results: The causes of natural death in 2018 and 2019 did not have any significant difference. When comparing the baseline with the same periods of time in 2020 there was no significant difference between the earlier time period, 2/9-3/16 (2018 = 227, 2019 = 203, 2020 = 204, p=.56), but there was a significant increase in the number of non-COVID reported deaths between 3/17-4/21/20 (2018 = 195, 2019 = 212, 2020 = 251, p = .029). There was no change in the proportion of natural versus unnatural deaths. Distribution of the cause of death remained stable as far as attributed organ system. There was a significant overall increase in the number of out of hospital deaths between 3/17-4/21/20. In 2018 there were 60, in 2019 there were 76 and this increased sharply to 128 in the same period during 2020 (p=<.001).

Conclusion: No single natural cause of mortality is identified as having a disproportionate impact on outpatient cause of death. Rather, all medical etiologies contributed to an overall increase in deaths during the early part of the SARS-CoV-2 pandemic in Southern Minnesota. News media has reported concerns about decreased ED visits during this time period, and our data show that in conjunction with a significant decline in emergency department visits of approximately 50%, there has been a correlating increase in out of hospital death. We do not have enough information to draw a conclusive relationship, however, it will be important to fully understand the public health implications beyond pandemic disease burden that contribute to overall mortality during public health crises to target interventions to promote appropriate use of the emergency department for urgent conditions.

168 Insights on Ultrasound Training for Ultrasound Naive Flight Paramedics and Nurses

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Study Objectives: While ultrasound is standard of care in the Emergency Department, out-of-hospital use of ultrasound is in early stages. With the proliferation of low-cost ultrasound machines, expansion into the out-of-hospital setting has broadened and a demand to teach these novel learners has emerged. How this technology can be applied, out-of-hospital providers' ability to use ultrasound, and the best approach to teach these providers need to be determined. The aim of this study was to evaluate what needs ultrasound can fill in the out-of-hospital flight setting and how to teach this technology effectively to flight paramedics and nurses.

Methods: This study was conducted with the flight EMS services for two tertiary care academic centers. An ultrasound curriculum was designed for flight paramedics and nurses to be incorporated into their care before and during helicopter transports. The ultrasound training included a 25 minute didactic lecture, including ultrasound physics, knobology, indications, anatomy, pathology, and interventions following abnormal exams. Didactics were followed by one-hour hands-on practice sessions in small groups led by ultrasound trained physicians on human models. The focus of the training was to correctly acquire 3 views "within the box". Scans were performed on the upper chest, simulating in-flight conditions of a patient with clothing on. Views taught were parasternal long view of the heart to evaluate for cardiac activity, pericardial effusion, and tamponade, anterior lung windows to evaluate for pneumothorax, and anterior neck view to verify ETT placement. A test was given before and after the session to evaluate knowledge and image interpretation. The test included multiple choice, true/false, and open ended questions.

Results: A total of 30 needs assessments were completed by the study population. Of this total, 20 (66%) had never used ultrasound before in any context. 10 (33%) had used it before but only for ultrasound guided intravenous line placement. No participants had previously performed an ultrasound of the heart, lungs or neck. A total of 16 paramedics and 19 flight nurses were present for the didactic and the hands on ultrasound scanning sessions. Average score on the pretest was 40.7 % and improved to 66.3 % after training. Of 35 total participants, 33 improved their performance from pre to posttest, while 2 participants' scores decreased. Questions regarding anatomy had the poorest performance while questions regarding pathophysiology and correlation between physical exam findings and image interpretation showed the strongest performance.

Conclusion: In this study, ultrasound education had a positive effect on test scores among EMS providers. Test performance reflected the learners' background focused in clinical medicine and pathology. Out-of-hospital providers performed poorly on questions identifying anatomical structures. This curriculum has implications for expansion of ultrasound education to EMS providers for earlier diagnosis and treatment of life-threatening conditions and the type of learning focus most appropriate for their background. The group of largely ultrasound naive learners was willing and excited to proceed with this educational protocol.

169 Emergency Department Utilization Trends during the COVID-19

Castillo EM, Cronin AO, Vilke GM, Killeen JP, Brennan JJ/University of California, San Diego, San Diego, CA

Study Objectives: With COVID-19 cases and fatalities increasing globally, health officials implemented many policies and restrictions to slow the rate of infection. In California, a statewide stay-at-home order was issued on March 19, 2020. Subsequently, individuals avoided gatherings and public places, which potentially increased their risk of contracting the virus, including emergency departments. There is concern that delaying preventive and emergent care could have negative health consequences, especially among those managing chronic conditions and the elderly. The objective of this study was to assess patterns of ED utilization during the initial COVD-19 pandemic, as compared to utilization during the prior year.

Methods: We conducted a multi-center, retrospective study among adult patients (>=18 years) presenting to two emergency departments (urban level 1 trauma center and suburban academic hospital with combined annual census of ~83,000). We compared weekly ED utilization between two distinct time periods: March 1 to May 30 in 2019 (n=21,226 visits) and 2020 (n=15,927 visits). We calculated the percent change in ED utilization from 2019 to 2020 for each of the 13 weeks, assessing trends over time by patient age, sex, race/ethnicity, homelessness, presence of chronic conditions, and primary reason for ED visit.

Results: Compared to 2019, weekly ED volume and admissions in 2020 decreased by as much as 41.8% and 37.2%, respectively. While weekly ED volume in 2020 did not return to 2019 levels (-17.0% at the highest), admissions did (-0.8% at the highest). Patients 65-74 year of age saw the highest weekly decrease at 50.8% below 2019, and while weekly admissions also decreased for this group by up to 48.3%, admissions spiked to an average of 23.0% above the previous year during the last two weeks of the study period. On average, ED visits by females decreased in 2020 by 30.1%, compared to 20.2% for males. ED visits by Non-Hispanic Asians were at least 30% below the prior year for 9/13 weeks, compared to Non-Hispanic Blacks who only surpassed a 30% decrease during one week. ED volume was relatively unaffected among patients experiencing homelessness, with an average weekly decrease of 4.5%. Patients with diabetes saw a high of 45.1% decrease in admission compared to 2019, but were within 5% of the previous year during 3 of the final 4 weeks of the study period. Psychiatric-related visits and alcohol and substance-related visits decreased as much as 50.6% and 32.0%, respectively; however, alcohol and substance-related visits averaged only 6.8% below 2019 volumes during the last 4 weeks of the study period compared to -26.0% among psychiatric visits. Visits for skin and subcutaneous tissue infections decreased up to 44.4%, but also saw volume above 2019 levels for 5 different weeks (range +2.2% to +34.1%). Similarly, weekly sepsis-related and cardiac dysrhythmia visits were at least 15% higher than 2019 for 2 of the last 4 weeks, and, 3 out of the last 4 weeks, respectively.

Conclusion: This study of ED utilization trends during the COVID-19 pandemic demonstrated that ED volume and admissions decreased dramatically compared to the prior year. However, there was much variation among the patient population, and unfortunately elderly patients and those with chronic conditions may be paying the price for initially avoiding the ED. Further study with a longer follow-up period is needed to evaluate potential health consequences for patients who may be delaying care.

170 Use of Transthoracic Ultrasound to Confirm Placement of Resuscitative Endovascular Balloon Occlusion of the Aorta in Medical Cardiac Arrest

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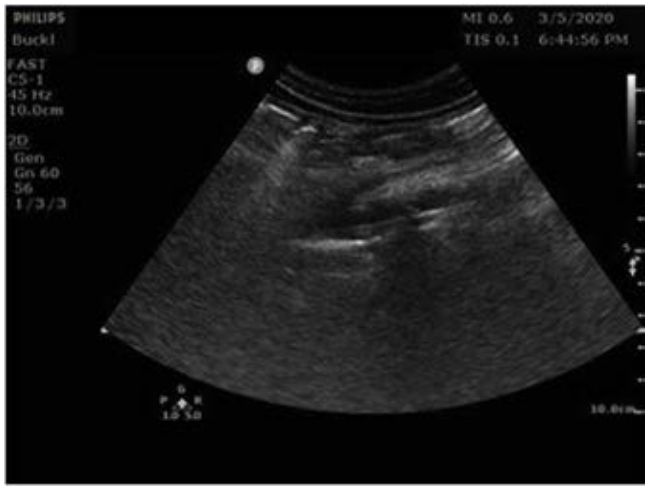
Study Objectives: The objective of this study is to assess the feasibility of using bedside ultrasound to visualize and confirm aortic placement of resuscitative endovascular balloon occlusion of the aorta (REBOA) within an emergency medicine (EM)-initiated multi-disciplinary protocol in non-traumatic OHCA.

Methods: REBOA is a hemorrhage control technique involving the intra-vascular occlusion of the thoracic aorta using a balloon catheter and may help to increase coronary and cerebral perfusion during non-traumatic out-of-hospital cardiac arrest (OHCA) by directing blood flow to the upper body. We are conducting a single-arm early feasibility study of REBOA initiated in the emergency department (ED) for OHCA using an investigational device approval by the Food and Drug Administration (FDA) with an exception from informed consent. During CPR, an emergency physician obtains common femoral access using a 7Fr introducer sheath while the REBOA catheter is prepared and subsequently advanced by an interventional radiologist (IR). While sheath introducer placement can be confirmed with ultrasound views of the common femoral artery, we seek to confirm intrathoracic REBOA placement using transthoracic bedside ultrasound. Our goal is to enroll 20 patients into this study and use transthoracic ultrasound to confirm REBOA placement in each.

Results: Two of the initial twenty patients were enrolled between January and February 2020, with a temporary pause in enrollment due to the COVID pandemic from March to July 2020. In both enrolled patients, transthoracic views were obtained confirming intra-thoracic aortic placement of REBOA by an emergency physician.

Conclusion: In our initial two cases, thoracic aortic placement of the REBOA in non-traumatic OHCA was confirmed by emergency physicians using transthoracic ultrasound. This demonstrates correct placement of aortic endovascular devices can be confirmed using emergency physician operated ultrasound. Further research is needed to determine what factors may impact emergency physicians' ability to successfully identify and confirm aortic device placement.



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171 COVID-19 Symptoms among Emergency Department Patients and Implications for Screening

Castillo EM, Brennan JJ, Cronin AO, Killeen JP, Vilke GM/University of California, San Diego, San Diego, CA

Study Objectives: With COVID-19 cases increasing nationally, there is demand for policies that can slow the spread of the virus. As businesses and health services begin

to relax restrictions, there are increased efforts to identify individuals who are most likely to have contracted the virus based on symptomology. One commonly employed screening method has been body temperature checks prior to being allowed entry to an establishment. The objective of this study was to assess both measured and self-reported body temperature among Emergency Department (ED) patients tested for COVID-19.

Methods: We conducted a multi-center, retrospective study among patients presenting to two EDs with a combined annual census of ~80,000 (an urban level 1 trauma center and a suburban academic hospital). The study period included all ED encounters between March 10, 2020 (start of testing for COVID-19 in the ED) and May 25, 2020. We compared fever based on patient body temperature of >=100.4 degrees Fahrenheit (measured in the ED) as well as subjective fever/chills complaints among patients with a positive COVID-19 test result (n=235), a negative COVID-19 test result (n=4412), and no COVID-19 testing performed (n=8179). Odds ratios (OR) and 95% Confidence Intervals (CI) are presented for comparisons between patients with a positive and negative test result.

Results: Overall, 26.5% (n=62) of patients who tested positive for COVID-19 presented with a recorded temperature of 100.4 degrees Fahrenheit or greater, compared to 7.5% of (n=334) of patients who tested negative (OR=0.89; 95% CI=2.86-5.30). For reference, 1.1% (n=91) of patients in which a COVID-19 test was not performed had a recorded temperature >=100.4 degrees. Among patients who tested positive for COVID-19, 59.6% (n=140) presented with a subjective fever and/or chills, compared to 26.8% (n=1187) of patients who tested negative (OR=4.03, 95% CI=3.08-5.28). For reference, 6.1% (n=505) of patients without COVID-19 testing reported subjective fever and/or chills. Among patients who tested positive for COVID-19, elderly patients >=65 years of age were just as likely to have a recorded fever (OR=0.72, 95% CI=0.38-1.37) and self-reported fever (OR=0.80, 95% CI=.46-1.38) as patients under the age of 65 years; although, among patients who tested negative for COVID-19, elderly patients were less likely to report a subjective fever (OR=0.58, 95% CI=.0.49-0.68).

Conclusion: In this study of ED patients tested for COVID-19, we find that patients with a positive test result are more likely to have both a recorded and subjective fever. Further, nearly three quarters of the patients who tested positive were not identified as having a recorded fever of at least 100.4 degrees at presentation. Given this result, and the similarity between recorded and self-reported fevers in this study, self-report questions used in tandem with temperature checks should be explored for screening individuals prior to entry into general patient areas, as well as other businesses and facilities that rely on temperature screening for admittance.

172 Influenza Reporting in an Academic Health System

Cronin AO, Frink ER, Vilke GM, Killeen JP, Castillo EM/University of California, San Diego, San Diego, CA

Study Objectives: During flu season, hospitals report daily flu patient numbers to county public health as part of community surveillance. The object of this study was to assess the magnitude, demographics, and mechanism of influenza under-reporting by the University of California San Diego Health System and to assess frequency of presenting chief complaints of the patients in both Emergency Departments (EDs) who tested positive for influenza.

Methods: This was a multicenter retrospective cohort study of patients who presented to the ED with an influenza-related chief complaint, was tested for influenza, a clinical impression of influenza or was prescribed Tamiflu between July 2019 to March 2020 at two tertiary care university hospitals in San Diego County. Influenza lab testing was ordered at the discretion of the health care provider but if ordered, these results were then included in a data set. Demographic characteristics are summarized for patients with a lab test ordered, patients with a clinical impression of influenza and patients with Tamiflu prescribed. Demographics characteristics are further summarized for patients who received a clinical impression (but not a lab test) for those with and without a Tamiflu prescription. ICD-9 codes were used to summarize diagnosis codes related to influenza. Descriptive statistics are presented.

Results: Between July 2019 and March 2020, of 9,831 patients with an influenza-related chief complaint, 581 tested positive for influenza. From December to January, there was a 150% increase in positive cases of influenza, going from 102 to 264 cases positive cases reported. Flu-like symptoms, cough and fever compromised the top 3 presenting chief complaints for patients who tested positive for influenza. Of the 9,831 patients, 121 did not receive a lab test but received a clinical impression and/or prescribed Tamiflu. The top chief complaints of those who did not receive a lab test but received clinical impression of influenza were flu like symptoms, fever, cough, and shortness of breath. Out of the 995 people that were admitted to hospital with respiratory infection only 148 (15%) were not tested for influenza whereas 252 of 573 cases that were admitted into hospital with cough were not tested for influenza.

Conclusion: In this study 581 tested positive for influenza, 21% of assumed influenza cases were not included in the count sent to health department indicating under-reporting may have occurred. Top presenting chief complaints of those positive for influenza were consistent with CDC's defined symptoms of influenza.

173 Trauma Activations Are Associated with Decreased Time to Diagnosis & Treatment of Intracerebral Hemorrhage When Compared to Trauma Evaluations

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Study Objectives: Intracerebral hemorrhage (ICH) is a major complication from traumatic brain injury. The 30-day mortality rate is 35-52%, with half occurring within 24 hours. Early diagnosis leads to early treatment and potentially better patient outcomes. To expedite patient care, when injury severity meets institutional criteria, a trauma activation is called. Trauma activations are immediately roomed and evaluated by a multispecialty resuscitation team. A trauma evaluation occurs when injuries do not meet trauma activation criteria. Instead patients are triaged and assigned a room as one becomes available. Trauma evaluations potentially have increased wait times and increased length of stay. The objective of this study was to evaluate whether or not trauma activation patients with ICH were diagnosed more rapidly than trauma evaluation patients and to assess the impact of this diagnosis on the time to treatment in this population.

Methods: This was a retrospective cohort study of patients presenting to one of three trauma centers within a large hospital system between January 2018 and December 2018 who were diagnosed with acute traumatic ICH. Time to diagnosis, defined as minutes from patient arrival in the ED to computed tomography (CT) results received by treating provider, was evaluated between the two groups. Additional time points evaluated between groups were time to imaging, time to CT interpretation by radiology, and time to treatment of ICH. Demographics, patient medical history, and injury details were also abstracted. Categorical variables were described using frequencies and percentages and differences between groups were tested using Pearson chi-squared tests. Continuous variables are presented as median and standard deviation and differences between groups tested using t-tests.

Results: A total of 398 subjects met inclusion criteria for this study. Demographics and past medical history were similar and there was no difference in head abbreviated injury score, injury severity score, or anticoagulant use between groups. Trauma evaluation patients were older, predominately suffered a fall, and had an increased incidence of hypertension and chronic kidney disorder. Time to diagnosis was decreased for trauma activation compared to trauma evaluation patients ($p<0.0001$). Additionally, median treatment time for trauma activation was 107 minutes compared to 184.5 minutes for trauma evaluation patients (p-value $<$ 0. 0001).

Conclusion: Diagnosis and treatment times for traumatic intracerebral hemorrhage were significantly faster in trauma activation patients when compared to trauma evaluation patients. Given the similarities in injury severity between the two groups, the increased time of treatment could have detrimental impact on the treatment of patients. While trauma activations are a resource heavy process, our data suggests that an intermediary process may be beneficial.

174 Evaluation of Undifferentiated Dyspnea with Point of Care Ultrasound Performed by Primary Emergency Department Physician Compared to a Dedicated Emergency Department Ultrasound Team

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Study Objectives: Undifferentiated dyspnea is among the most challenging emergency department (ED) presentations. Emergency physicians (EP) must often

perform critical actions while operating with diagnostic uncertainty. Point of care ultrasound (POCUS) has been shown to be highly beneficial in the initial evaluation of dyspneic patients but prior studies often study POCUS performed by experts or a dedicated physician ultrasound (US) team. Performance of POCUS by the primary treating team is often limited by the time and workflow constraints. This study aims to evaluate the effectiveness of POCUS in narrowing diagnostic uncertainty and guiding initial management of acutely dyspneic patients when performed by treating EP compared to a dedicated US team.

Methods: This is a multi-center, prospective non-inferiority cohort study investigating the effect of POCUS on the differential diagnosis of patients presenting with undifferentiated dyspnea. During the initial evaluation of these patients, the primary attending provider completed a survey evaluating initial differential diagnosis and treatment plan. The provider team or a separate US team then performed targeted POCUS on the patient. After POCUS, the treating provider completed a second survey to evaluate changes in differential and management. The primary outcome was change in the most likely diagnosis and was assessed for non-inferiority between primary and US team performed POCUS using an a priori specified non-inferiority margin of 20%. Secondary outcomes included change in number of diagnoses considered, change in confidence in diagnosis assessed on a Likert-like scale, and change in interventions.

Results: We enrolled physicians evaluating 156 patients presenting with undifferentiated dyspnea at a university affiliated ED or a community hospital ED. In 40% (95% CI, 28 - 52%) of studies performed by the primary team the most likely diagnosis changed compared to 32% (95% CI, 22 - 41%) for studies performed by the US team. This was declared non-inferior using a margin of 20% ($p < .0001$). Post-POCUS differentials decreased by a mean 1.8 diagnoses and this change was equivalent within a margin of 0.5 diagnoses between primary and US team performed studies ($p = 0.034$). Secondary outcomes were also notable for a modest change in any management being considered (34% primary team vs 32% US team), an increase in post-POCUS confidence in diagnosis (0.7 vs 0.6-point increase), and 3 cases of cardiac tamponade were found when COPD or CHF was the initial suspected diagnosis.

Conclusion: POCUS performed both by the primary team and a dedicated US team resulted in a significant narrowing of the differential diagnosis, a change in the primary diagnosis and an increase in confidence of diagnosis. The change in primary diagnosis was non-inferior when comparing primary to US team performed studies and the two groups were equivalent when considering change in confidence in diagnosis as well as mean reduction in number of diagnoses. There was also no significant difference in effect between performing sites. POCUS is a valuable tool for limiting the cognitive burden in the initial evaluation of undifferentiated dyspneic ED patients when performed in a targeted fashion.

Table 1a. Changes in Diagnosis and Management by Performing Team

	Primary Team	US Team	p-value
Number POCUS Studies Performed, n	65	91	
Change in Primary Diagnosis, n (%, 95% CI)	26 (40%, 28 – 52%)	29 (32%, 22 – 41%)	< .0001*
Any Change in Management, n (%, 95% CI)	22 (34%, 22 – 45%)	29 (32%, 22 – 41%)	0.0014*
Pre-POCUS Confidence, Mean 5-point scale	3.2	3.2	
Post-POCUS Confidence, Mean 5-point scale	3.9	3.9	
Difference in mean confidence (95% CI)	0.7 (0.5 – 1.0)	0.6 (0.5 – 0.8)	0.0059**
Pre-POCUS Differential, mean # diagnoses	4.1	4.1	
Post-POCUS Differential, mean # diagnoses	2.3	2.3	
Difference in mean # of diagnoses post-POCUS (95% CI)	-1.8 (-2.2 – -1.4)	-1.8 (-2.1 – -1.4)	0.034**
Pre-POCUS management, mean # interventions	1.0	0.8	
Post-POCUS management, mean # interventions	1.0	0.8	
Difference in mean # of interventions post-POCUS (95% CI)	0.0 (-0.2 – 0.1)	-0.1 (-0.2 – 0.1)	< .0001**

Table 1b. Changes in Diagnosis and Management by Site

	Community Site	University Site	p-value
Number POCUS Studies Performed, n	36	120	
Change in Primary Diagnosis, n (%)	14 (39%, 23 – 55%)	41 (34%, 26 – 43%)	0.0013*
Any Change in Management, n (%, 95% CI)	8 (22%, 9 – 36%)	43 (36%, 27 – 44%)	0.21*
Pre-POCUS Confidence, Mean 5-point scale	3.1	3.3	
Post-POCUS Confidence, Mean 5-point scale	3.8	3.9	
Difference in mean confidence (95% CI)	0.6 (0.3 – 1.0)	0.7(0.5 – 0.9)	0.01**
Pre-POCUS Differential, mean # diagnoses	4.6	3.9	
Post-POCUS Differential, mean # diagnoses	2.5	2.2	
Difference in mean # of diagnoses post-POCUS (95% CI)	-2.1 (-2.7 – -1.59)	-1.7 (-2.0 – -1.4)	0.43**
Pre-POCUS management, mean # interventions	1.1	0.8	
Post-POCUS Management, mean # interventions	1.3	0.7	
Difference in mean # of interventions post-POCUS (95% CI)	0.1 (0.0 – 0.3)	-0.1 (-0.2 – 0.0)	0.015**

*p-value for non-inferiority with -20% margin

**p-value for equivalence with ± 0.5 diagnosis, ± 0.5 intervention or ± 0.5 level of confidence difference

175TF Design and Integration of an Emergency Medicine Focused Interpersonal Skills Simulation Curriculum

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Introduction: Simulation is one of the most powerful tools for emergency medicine (EM) resident education and training. Standardized patients (SPs) are frequently used to help further create the near-realistic environment, adding to the experiential learning for trainees. Simulation with SPs have also been shown to be an excellent tool, both well-established and well-studied for teaching and evaluating communication skills, an ACGME core competency. To improve training in communication and interpersonal skills, we have created a simulation curriculum with an EM focus, utilizing SPs and cases that go beyond medical management.

Study Objectives: Upon completion of the Interpersonal Skills Simulation Curriculum participants will: 1) recognize the importance and relevance of having communication skills for all patient and family encounters, 2) demonstrate excellent communication skills and apply learned strategies in all patient care scenarios, and 3) express greater confidence and comfort in challenging patient encounters.

Methods: The curriculum spans over 4 years. At the start of each academic year, each residency class will have 2 designated cases for each resident to run. Prior to the simulations, residents will fill out pre-evaluations on confidence and comfort levels. Post-evaluations will be done by the SP and an observing attending with immediate feedback given during debrief. Following each debrief, the residents will run through a mirror case to allow for incorporation of feedback received and learned strategies. For example, a pediatric blunt traumatic code requiring the delivery of bad news to highly emotional parents would be mirrored by a case of Sudden Infant Death Syndrome requiring similar delivery of bad news. There would be a graded experience of cases each year, concordant with training level, with cases ranging from delivering bad news, to managing difficult consultants, withholding confidential pediatric patient history from demanding parents, and caring for the transsex patient.

Results: Excellent communication skills are absolutely necessary for physicians. Despite the need, a 2018 CORD survey found that EM residents are uncomfortable in several communication scenarios and that training is lacking. At our institution, a survey of graduating residents demonstrated that they felt there was not enough formal education in regards to communication skills, especially in the setting of challenging patient encounters. They also felt particularly less confident in managing difficult pediatric scenarios. This curriculum was piloted amongst a focus group of chief residents and simulation faculty in coordination with our institutional simulation center to assure feasibility of this longitudinal curriculum and will begin over the upcoming years.

Conclusion: To our knowledge, no other EM-based, longitudinal simulation curriculum with a focus on interpersonal skills and communication exists. Training in communication is essential and overall appears to be lacking in many EM residencies, including our own institution. After completion of our longitudinal simulation curriculum, residents will be able to display excellent communication skills and feel more confident and comfortable with the variety of challenging patient care scenarios that we face in EM.

176 Use of Disposable Pressure Transducer With Resuscitative Endovascular Balloon Occlusion of the Aorta in Medical Cardiac Arrest

Daley J, Buckley R, Cannon K/Yale School of Medicine, New Haven, CT

Study Objectives: The objective of this study is to assess the feasibility of using a disposable pressure transducer to obtain mean aortic pressure (MAP) during CPR and placement of resuscitative endovascular balloon occlusion of the aorta (REBOA) within an emergency medicine (EM)-initiated multi-disciplinary protocol in non-traumatic out-of-hospital cardiac arrest (OHCA).

Methods: During medical cardiac arrest obtaining a MAP >55 mmHg has been associated with greater survivorship. Use of an arterial line and monitor requires calibration which may demand additional personnel resources during management of a cardiac arrest. A disposable pressure transducer (Centurion Compass® Pressure Monitor) is able to detect and display mean aortic pressure within seconds of placement onto an arterial line. We are conducting a single-arm early feasibility study

of REBOA initiated in the emergency department (ED) for OHCA using an Food and Drug Administration (FDA) investigational device approval with an exception from informed consent. During this study we are evaluating the feasibility of using disposable pressure transducers to determine MAP during CPR and REBOA placement. Our goal is to enroll 20 patients as part of this feasibility study.

Results: Two of the initial twenty patients were enrolled between January and February 2020, with a temporary pause in enrollment due to the COVID pandemic from March to July 2020. A disposable pressure transducer was used to obtain continuous MAPs in both patients. Our initial patient was a 77-year-old man who presented in refractory ventricular fibrillation and we were able to obtain pre- and post-REBOA inflation MAPs. After inflation of the aortic balloon, investigators noted immediate improvements in mean aortic pressure (MAP) (37 to 50 mmHg). The second patient, a 63-year-old man, underwent successful REBOA placement with similar improvements in MAP (22 to 50 mmHg). Investigators were also able to identify large differences in MAPs generated between individuals performing CPR, noting MAPs between 34 and 50 between multiple CPR providers despite visually adequate chest depth compressions.

Conclusion: The use of disposable pressure transducers during CPR and REBOA in OHCA to rapidly obtain MAP may be feasible. Further, use of these transducers may assist in guiding CPR to achieve target MAPs during cardiac arrest. More research is needed to determine what impact a targeted MAP has on patient outcomes, and whether or not it correlates with changes in end-tidal carbon dioxide ($ETCO_2$).

177 Emergency Department Observation Unit Utilization for the Care of Patients with Left Ventricular Assist Devices

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Study Objectives: Emergency Department Observation Units have traditionally been utilized for protocol driven care for lower risk patients needing additional time for diagnostic or therapeutic interventions with a high likelihood of eventual discharge from the ED. In this study, we look at a very high risk population of those patients with Left Ventricular Assist Devices (LVADs) who were placed into the ED Observation Unit.

Methods: We conducted a retrospective review of all ED Observation Patients in our quaternary academic medical center (40,000 annual census) for a twenty-four-month period from May 1, 2017 until Nov 30, 2019 with an observation unit census of 4310 patients. During this time period we cared for 67 LVAD patients in ED Observation for various complaints such as chest pain, lab abnormalities, etc. For all LVAD patients, care was in conjunction with an advanced heart failure service.

Results: Of the 67 LVAD patients placed in the ED observation Unit, 41 (62.1%) patients were discharged home with 26 (38.8%) patients being admitted to the Cardiology Advanced Heart Failure Service. 22 patients (32.8%) were placed in ED Observation for lab abnormalities such as hyperkalemia and INR abnormalities (subtherapeutic or supratherapeutic).

Conclusion: Caring for complex patients in an ED based observation unit is discouraged and can lead to poorer outcomes. LVAD patients represent some of the most complex and chronically ill patients we see in our ED. They often represent hospital readmissions which health systems are trying to reduce. With a strong relationship with the advanced heart failure team and ED staff comfortable with the care of the LVAD patient, a significant percentage of these patients can be safely observed in the ED and discharged home avoiding a hospital admission and the risks associated with an inpatient stay.

178 Pattern of Skin Infection Presentations in the Maritime Environment

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Study Objectives: There is little known on the epidemiology and management of injury and illness at sea, an environment, which is distant from definitive care and defined by limited on-site medical resources. Worldwide, there are tens of thousands of ships engaged in shipping, fishing, construction, pleasure cruising, and other activities. The cost of time lost to illness and the cost of mariner evacuation can be substantial, as can the cost to maintain unexpired medicines and supplies on a vessel. We sought to characterize skin infections presentation on commercial vessels.

Methods: This is a retrospective chart review of adult patients evaluating the incidence and types of skin infections occurring on ships. Data was abstracted from a maritime practice chart review that provides emergency telemedical care to vessels globally. Charts from January 2018 through December 2019 were reviewed by emergency physicians who collected data regarding demographics, type of skin infection, and patient management. This study was approved by the IRB.

Results: We enrolled 1558 patients, of which 39 (2.5%) were diagnosed with a skin or soft tissue infection. The lower extremity was the most common site of infection (48.7% of cases), followed by the upper extremity (30.7% of cases). The remaining 20.5% of cases were distributed among the chest, abdomen, back, buttocks, neck, and face. 15.3% of infections had a preceding cut or puncture injury. 20 of 39 cases had an associated abscess. Antibiotics were recommended in 89.7% of cases while the remaining cases were treated with I&D only. Treatment failures, defined as lack of improvement or worsening after initiation of antibiotic therapy, occurred in 7/39 (17.9% of cases). Of these, 3/7 (42%) occurred in patients for whom antibiotics were started prior telemedical physician consultation. The most commonly recommended antibiotic treatment was monotherapy with Cephalexin (n=12, 34.3%), followed by dual therapy with cephalexin and Trimethoprim / Sulfamethoxazole (n=8, 20%). The remaining 45.7% of cases were treated with other monotherapies (Amoxicillin/Clavulanic acid, Trimethoprim / Sulfamethoxazole, Clindamycin, Doxycycline, or Vancomycin) or dual therapies (Trimethoprim / Sulfamethoxazole /Azithromycin, Ciprofloxacin/Clindamycin, Ceftriaxone/Vancomycin). 2 of 35 cases managed with antibiotics were treated with IV antibiotics. 3 of 39 (7.6%) cases required evacuation from the vessel for further medical care.

Conclusions: The majority of skin infections can be managed aboard a commercial vessel without patient evacuation, though expert telemedical consultation may reduce treatment failure. Because nearly one fifth of skin infections are a result of injury, injury prevention interventions may provide an opportunity for infection reduction. Further analysis of the rationale behind antibiotic choices and the presence or absence of first line recommended antibiotic on the vessel is needed to improve recommendations for vessel pharmacy stocking.

179 Ethnicity and Symptom Onset in the Emergency Department during the SARS-CoV-2 Pandemic at the "Epicenter of the Epicenter"

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Study Objective: New York City Health + Hospitals/Elmhurst located in Queens, New York, has one of the most diverse patient populations in the United States, and likely the world, and was deemed the "epicenter" of the Covid-19 pandemic in 2020. Given its unique population, high number of Covid-19 cases and growing concern that Covid-19 disproportionately affects minority patients, this study seeks to examine the correlation between ethnicity and time from symptoms onset to ED presentation to further understand this disparity.

Methods: This is a retrospective chart review of 2216 patients who tested positive for SARS-CoV-2 (COVID-19) with 2254 unique ED visits. Preliminary analysis was conducted on 212 of these patients with data extracted from Epic through chart review for time from symptom onset to ED presentation and documented ethnicity, defined for this study as Hispanic or non-Hispanic. Symptom onset to ED presentation was defined as one of seven categories: one through seven days or >1 week. The data were analyzed using statistical analysis software to assess for correlation between ethnicity and time of symptom onset to ED presentation.

Results: Results demonstrated that 37.5% of Hispanics presented to the ED after one week of symptoms as compared to 34.9% of non-Hispanics ($p>0.05$). Of non-Hispanics, 22.2% presented after one day of symptoms. While not, statistically significant, this demonstrates a trend toward Hispanics having a delay from symptom onset to ED presentation. Further analysis of available data is pending.

Conclusion: Based on preliminary data, ethnicity does not seem to predict symptom onset to ED presentation. This aids in determining causes of high mortality rates of COVID-19 minority populations. Several media outlets have suggested that COVID-19 has disproportionately affected minorities and this paper sought to examine possible confounders to this statement. Further research and analyses are underway and it is hypothesized that other social determinants of health care likely play a role in this disparity.

180 Impact of the COVID-19 Pandemic on an Emergency Department-Based Universal Opt-Out HIV Screening Program in Atlanta, GA, 2020

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Study Objectives: Emergency department (ED) HIV screening programs are important sites for diagnosing HIV-infected individuals. Our EMR-assisted, triage-based, routine, opt-out program is based at an urban, safety-net ED where patient volume is approximately 148,000 annually and all patients presenting to the ED are offered HIV screening if eligible (18 years or older, not known to be HIV positive, not tested in prior 6 months). Georgia's COVID-19 peak occurred April 20, 2020, right behind our hospital peak COVID-19 diagnoses on April 19, 2020. During this time our ED volumes dropped significantly. We sought to characterize the impact on our HIV screening program.

Methods: Data were analyzed to compare total ED visits and patients eligible for screening between January – April 2019 and 2020, and tabulated the percent who were offered testing through opt out screening language, had blood drawn for testing, and resulted in a confirmed positive test result. A simple comparison was used to analyze differences between 2019 and 2020, as well as between months in the same year.

Results: Comparisons of ED visits between January – April 2019 versus 2020 showed a modest reduction in overall patients eligible to be screened in January – March 2020, and a 43% reduction in patients eligible in April 2020 (5540) compared with April 2019 (9781). In April 2020, only 26% of those eligible were screened, compared with 80% in 2019. On average 2020, 16% of patients screened were tested compared with 19% in 2019. The largest drop off in testing acceptance occurred in March 2020, with only 13% of patients who were screened being tested. Overall percent confirmed seropositivity was similar, 1.9% (2019) vs 2.3% (2020), p=0.12, but absolute number of confirmed HIV positive patients identified (108 in 2019 vs. 74 in 2020) was reduced.

Conclusion: Our ED-based HIV screening program was impacted by the COVID-19 pandemic in Georgia. In April 2020, the month most heavily impacted by COVID-19, we had a stark reduction in eligible patients presenting to the ED, reflecting our lower ED volumes at the time likely due to fear in the general public to come to the hospital and stay-at-home orders in place. Interestingly, in March 2020 as the pandemic was ramping up and heavily featured in the media, there were fewer patients who either agreed to testing or had their blood drawn for testing than we would have expected. This may reflect fear of additional health care steps in patients presenting to the ED and/or frequently changing ED processes during that time to streamline care, impacting blood draws. As acute HIV can present as a febrile illness, it is also important to maintain an HIV screening program during a pandemic of febrile illness, and continue to work to provide linkage and access to care services for this especially vulnerable group.

EMF

181 Prospective Evaluation of Novice-Acquired 3D Ultrasound for Identification of Upper Extremity Fractures

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Study Objectives: The initial imaging modality recommended by the American College of Radiology for suspected hand and wrist fractures is radiography. As there are radiation exposure risks associated with radiography, 2D ultrasound (2DUS) has also been investigated for diagnosis of these injuries. While sensitive and specific, 2DUS is operator dependent, requiring expertise to acquire and interpret images. 3DUS by novices is little studied in orthopedic evaluation. We aimed to determine whether novice-acquired 3DUS with expert or novice readers can identify hand and wrist fractures. We hypothesized that expert and novice interpretations of novice-acquired 3DUS of orthopedic injuries would show high agreement with each other and with the reference standard.

Methods: The STARD criteria for studies of diagnostic tests were applied. Following IRB approval and informed consent, we prospectively enrolled subjects at a tertiary care academic medical center and an associated orthopedic clinic. We estimated a sample size of 70 subjects for an intraclass correlation coefficient (ICC) 0.7 (with alpha of 0.5 and power 0.8) and to detect kappa of 0.8. A single novice operator third-year medical student (MS3) performed all image acquisitions without any specific effort to identify anatomy or injuries during acquisition. 2D B mode US images were acquired using a Philips Lumify L12-4 transducer connected to a smartphone, and paired to an inertial measurement unit. All scans were reconstructed in volume rendering mode and displayed in 3DSlicer, an open-source visualization tool. Scans were interpreted by three groups of readers: 2 MS3s (novice), 3 emergency physicians with US fellowship training, and 2 board certified radiologists with musculoskeletal fellowship training (expert). The reference standard was board-certified radiologist interpretation of x-rays obtained during routine clinical care. Readers were blinded to all clinical data and x-ray diagnosis and rated 3DUS volumes for the presence or absence of fracture, fracture characteristics when present, and additional findings. Agreement between novices and experts in 3DUS interpretation and between 3DUS and x-ray findings are reported (kappa/ICC). Sensitivity/specificity/LR+/LR- with 95% CI were calculated. Time to perform and interpret 3DUS were reported.

Results: 22 subjects were enrolled before the study was suspended due to the COVID-19 pandemic, with 90 3DUS volumes available for interpretation. Analysis is ongoing as results continue to be submitted, precluding calculation of kappa/ICC at this time. Expert 1 had sensitivity 0.8 (0.28, 0.99), specificity 0.69 (0.39, 0.91), LR+ 2.58 (1.03, 6.49), and LR- 0.29 (0.05, 1.73). Novice 1 had sensitivity 0.4 (0.05, 0.85), specificity 0.31 (0.09, 0.61), LR+ 0.58 (0.19, 1.79), and LR- 1.94 (0.66, 5.70). Interpretation times declined by over 50% for both novice and expert readers with an increasing number of scans interpreted. Mean acquisition time was 97 seconds per volume (median 97, IQR 57.75) with a mean of 2.5 volumes acquired per subject (median 2, IQR 1.25).

Conclusion: Novice-acquired 3DUS by augmentation of 2DUS was rapid, and interpretation times decreased rapidly with experience. Preliminary results show a promising LR+ when scans are interpreted by an expert reader.

182 Initial Evaluation of a Palliative Care Screening Tool in the Emergency Department

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Study Objectives: Patients with complex Palliative Care (PC) needs presenting to the Emergency Department (ED) may benefit from PC screening and referral. The Palliative Care Screening (PCaRES) tool can be used by ED clinicians to quickly screen ED patients for the need for PC consultations.

Methods: Prospective study for the initial assessment of the use of the PCaRES tool in the Emergency Department from February 2019 to December 2019. Using the PCaRES tool, ED patients are evaluated for the need for a palliative care consultation based on having both a life-limiting illness (eg, Advanced Dementia or CNS Disease, Advanced Cancer, End Stage Renal Disease, etc.) and a palliative care need (eg, Frequent visits, uncontrolled symptoms, Functional Decline, etc.). Descriptive statistics and differences were evaluated for those ED visits meeting both criteria.

Results: In the study period, there were 641 ED visits evaluated for palliative care consultations. Of those evaluated, nearly one-third (n=194) met both criteria for having a life-limiting illness and having a palliative care need listed therefore qualifying a patient for a palliative care consultation. There was a statistically significant difference in age ($p<0.001$), sex ($p<0.001$) and race ($p<0.001$) between groups that met both criteria to qualify for a palliative care consultation during an ED visit. Of those patients who met both criteria, most were white (62.8%), female (54.1%) and age 66-75 (47.4%). A similar trend was found for those who did not meet both criteria.

Conclusion: These results reveal preliminary demographic findings in evaluating the PCaRES tool for use in the ED. Statistically significant differences in demographic characteristics suggest that the PCaRES tool may be helpful in identifying patients they may especially benefit from a PC consultation and/or referral during their ED visit to ensure care coordination as needed.

183 Raising the Bar on Treatment of Patients with Intellectual Disabilities in the Emergency Department

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Study Objectives: Within the medical education system there is a lack of training for clinicians on how to best treat patients with intellectual disabilities (ID). Going

back to the 1980s this disparity was recognized however little to no change has occurred within medical school and residency curricula. This lack of training creates unfavorable treatment environments for our most vulnerable patients, especially within unpredictable work environments such as the emergency department (ED). This study's aim is to improve clinician preparedness and thereby improve the quality of health care delivered to patients with ID in the ED.

Methods: We conducted a pre-test, post-test study with ED Attending and residents' working in an urban academic teaching hospital. The physicians were asked to complete a 10-question survey (pre-test) prior to attending a 2-part presentation and a 30-minute simulation case. The physicians were then asked to complete another survey (post-test).

Results: The pre-test survey received 95 responses with 40 (42%) female physicians, distributed evenly in terms of level of training (15% responding from each post graduate year (PGY) 1, 2, 3, 4, 5-9, 10-14, and greater than 14 years post-graduate training. There was 85% that had received either no education or one lecture on ID medicine during their medical training despite greater than 95% of respondents agreeing that such education should be a part of their post-graduate curriculum. The post-test revealed that 85% of respondents now had an idea of how to approach the medical care of patients with ID compared to 56% prior to the presentations and simulation case. In addition, 91% of respondents reported that they are likely to change their medical practice after participating in the presentations and/or simulation case.

Conclusion: With further education and multimodal educational platforms, it is possible to change the practices of new and seasoned ED providers to provide higher quality medical care for patients with ID.

EMF

184 Low-Value Imaging for ED Patients with Consumer-Driven Health Plans

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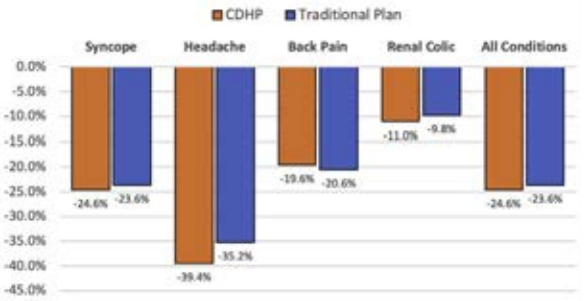
Study Objectives: Consumer driven health plans (CDHPs) - high deductible health plans paired with health savings account or health retirement account - have increased dramatically in the commercial insurance market. A key intent of these insurance products is to reduce low-value care by incentivizing consumers to use health care resources cost-consciously. Simultaneously, the cost of emergency department (ED) care has been a major concern for payors, with a key driver of ED costs being diagnostic imaging. Several imaging tests commonly performed in the ED are considered to be of low-value. The objective of this study was to compare trends in receipt of low-value imaging in the ED among patients with CDHPs versus those with traditional insurance plans.

Methods: We examined ED visits among commercially insured adults from 2008-2015 using the Truven MarketScan® Database. ED visits were classified by patient's plan type including CDHP or traditional insurance. We examined utilization of 4 low-value imaging tests commonly performed in the ED based on Choosing Wisely recommendations: 1) head computed tomography (HCT) in syncope, 2) HCT in atraumatic headache, 3) lumbar spine imaging for low back pain (x-ray, CT, or magnetic resonance imaging) and 4) CT abdomen/pelvis in renal colic among patients with a history of urinary stone disease. For each cohort, we first identified whether any imaging test was performed. Then, we utilized specific exclusion criteria to determine whether the test was low-value or appropriate based on the presence of risk factors. Rates of low-value imaging were calculated by assessing the number of ED visits in which an imaging test was performed wherein no high-risk exclusion was found. Logistic regression was used to examine trends in any and low-value imaging, adjusting for differences in patient case-mix, and comparing patients with CDHP versus traditional insurance.

Results: From 2008-2015, the proportion of ED visits that had any imaging test performed increased from 41.4% to 44.0% (relative increase 6.0%) across the 4 clinical conditions studied. However, ED visits with imaging tests classified as low-value decreased significantly over the study period from 26.2% to 21.6% (relative decline 17.6%). Low-value imaging declined in all of the clinical cohorts and to a similar degree in both insurance plan groups (Figure). While patients enrolled in a CDHP were just as likely to have any imaging test (low-value or appropriate) performed during their ED visit as patients with traditional insurance (OR 1.00, 95% CI 1.00-1.01), they were significantly less likely to receive a low-value imaging test overall (OR 0.93, 95% CI 0.92-0.94), a HCT for syncope (OR 0.88; 95% CI 0.85-0.91) or headache (OR 0.93; 95% CI 0.92-0.95) or abdominal imaging for renal colic (OR 0.93; CI 0.89-0.96). No significant differences in imaging for low back pain was noted across plan types.

Conclusion: Across 4 common ED clinical presentations, low-value imaging has declined over time in the ED. Patients with CDHPs were slightly but significantly less likely to receive a low-value imaging test in the ED compared to those with traditional insurance, though had similar rates of imaging overall.

Figure. Changes in low-value imaging among ED patients enrolled in a CDHP versus traditional insurance plan, 2008-2015.



185 Data-Driven Staffing Decision-Making at an Emergency Department in Response to COVID-19

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Study Objectives: During the COVID-19 pandemic, the incidence of critical patient encounters decreased significantly presumably due to shelter in place orders. With the reopening of the economy and an associated increase in patients presenting to the ED, we fear utilizing staffing models established prior to the advent of COVID-19 will be inadequate to handle both the increasing overall patient volume and workflows necessary to evaluate patients in the COVID-19 era. Our objective was to identify whether length of stay (LOS) and left without being seen (LWBS) rates are sensitive to physician staffing changes when simulating for both previous standard patient volume and the expected volume of patients presenting with COVID-19-like illness (CLI). Our research question sought to identify whether the addition of physicians to CLI care areas, standard care areas, or some hybrid could significantly improve these throughput measures.

Methods: We built a discrete-event simulation model to capture patient, provider, and nurse flow through the ED system and gauge its throughput. We analyzed data of actual standard patient (SP) and CLI patient (CP) encounters to define the model's input. The model was validated by ensuring its output replicated the data's statistical features. To assess the impact of CLI on the ED's throughput, we modified the validated simulation model to capture the capacity and features of both standard evaluation and CLI-dedicated care areas. We identified five different staffing options and compared their performance to our baseline staffing model and performed a statistical analysis under multiple scenarios representing different encounter volumes.

Results: We fit specific probability distributions to represent the interarrival times of 28,454 SP and 1,693 CP encounters. We evaluated the impact of alternative staffing options under 16 different permutations of SP and CP, focusing on improvements in LOS and LWBS rates. Adding one provider floating between standard care spaces led to the highest observed average reduction in LOS for SP, equal to 24.34% or 69 min for discharged patients (LOS: 300 min, 95% CI: 299 - 300, n=100), under a mix of 75% (21,318) of SP and 100% (5,932) of CP (Mix 1), and 13.91% or 88 min for admitted patients (LOS: 547 min, 95% CI: 545 - 548, n=100), under a mix of 100% (29,722) of SP and 100% (5,932) of CP (Mix 2), as well as to the highest observed

average reduction in LWBS rate, equal to 84.57% or 50/week (LWBS: 9.12/week, 95% CI: 8.53 - 9.32, n=100), under Mix 1. Further, adding one provider floating between CLI-dedicated care spaces led to the largest average improvement in LOS for CP, equal to 10.44% or 38 min for discharged patients (LOS: 323 min, 95% CI: 322 - 324, n=100), and 8.11% or 36 min for admitted patients (LOS: 408 min, 95% CI: 407 - 409, n=100), all under Mix 2. These CLI-area improvements were smaller than those achieved by adding one provider floating between standard care spaces, suggesting that the baseline staffing of a single provider per CLI care area provided enough capacity to satisfy the CLI demand.

Conclusion: We assessed the performance of five different staffing options, focusing on LOS and LWBS rates, and found that adding an additional provider floating between standard patient ED care spaces lead to the most robust decrease in LOS for both discharged and admitted patients. Interestingly, the improvements of adding an extra provider to CLI-dedicated ED care spaces had an insignificant impact compared to the baseline staffing model.

186 Resident Views on the Educational Impact of Covid-19 at the Beginning and Two Months Into the Pandemic

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Study Objectives: The COVID-19 pandemic obviously had a significant impact on emergency medicine resident education. Hospital guidelines regarding resident contact with COVID-19 patients, drastic changes in emergency department volume, and social distancing rules regarding resident weekly conferences affected their education. We sought to compare how residents viewed the impact of the Covid-19 pandemic on their education at the beginning of the pandemic ("pre-pandemic") and two months later as the restrictions were being lifted ("post-pandemic").

Methods: All emergency medicine residents at a suburban emergency medicine department in an area severely affected by the COVID-19 pandemic were surveyed during the first week that hospital guidelines were enacted (pre-pandemic) and again two months later as restrictions were being lifted (post-pandemic). Using a 5-point Likert scale, residents were asked if they thought their education would be impacted negatively by COVID-19 (1-not at all, 5-very significantly), if they thought holding conference virtually would be less effective (1-they are the same, 5-I won't learn a thing), and if they were afraid to go to work because of COVID-19 (1-not at all, 5-terrified). They were also asked if they should be allowed to see patients with COVID-19 (yes/no). Differences between pre-pandemic and post-pandemic evaluations and 95% confidence intervals were calculated.

Results: All 25 emergency medicine residents participated in the survey: nine PGY-1s, eight PGY-2s and eight PGY-3s. 52% of residents are males. There was no difference between the way residents viewed the impact of COVID-19 on their overall education pre- and post-pandemic (2.8 vs. 2.5, Difference -0.3, CI: -0.9, 0.3, p=NS). Residents' view of the effectiveness of having conference virtually pre-pandemic vs pro-pandemic did not change significantly but approached significance (2.3 vs. 1.8, Difference -0.5, CI: -1.1, 0.8, p=0.07.) suggesting that residents might have a more positive view of virtual didactics after the pandemic. There was also no difference in how afraid residents were to go to work (2.0 vs. 1.7, Difference -0.3, CI:–0.9, 0.3, p=NS). Pre-pandemic, 40% of residents thought they should be able to evaluate and treat COVID-19 patients compared to 100% post-pandemic (Difference 60%, p<0.001).

Conclusion: At the start of the pandemic, residents expected that their education would be moderately affected by COVID-19. This belief persisted throughout the pandemic. Although most residents initially did not think they should be evaluating and treating COVID-19 patients, two months into the pandemic 100% thought they should.

187 Get Waivered Remote: Comment Analysis of an Interactive Digital Educational Course for Physicians Obtaining a DEA-X Waiver

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Study Objectives: COVID-19 has created opportunities to explore remote learning technologies that can be used to improve the treatment of various patient populations. As a result, many educational conferences moved to digitally broadcasted remote formats. Get Waivered sought to deliver a live, nationwide, digitally broadcasted Drug Enforcement Administration (DEA) buprenorphine waiver course. On May 20, 2020, from 10 AM to 6 PM Eastern Standard Time, Get Waivered Remote hosted an interactive virtual DEA-X waiver session. Most sessions target primary care or addiction medicine specialists, and little is known about what questions emergency clinicians have about this process. Information obtained can inform future EM-oriented waiver courses, especially those sponsored by the ACEP. In order to foster information exchange among participants and facilitators and maximize user experience, the Get Waivered Remote platform implemented the Zoom^{TM} chat function to provide a forum for real-time information exchange. Aim 1: Better understand participant questions and concerns on obtaining a DEA-X waiver in real-time. Aim 2: Demonstrate how the medical education community can utilize live, synchronized, remote platforms to improve clinician education accessibility. Aim 3: Introduce aspects for improvement and propose additional techniques in digital nudge methodologies to increase the number of waivered clinicians through the use of remote platforms.

Methods: We retrospectively reviewed and analyzed the question-and-answer contents of exported data from the chat. The contents were qualitatively assessed using a framework that evaluated the poster's intention (PI) and comment features (CF).

Results: PI: A total of 450 posts were analyzed. Seeking information represented 53.32% of posts. Non-question represented 24.78% of posts. The remaining PI categories spanned topics such as seeking discussion, answering a question, or furthering discussion. CF: Making an Inquiry - Course Content represented 33.78% of posts. Making an Inquiry - Attendance/Course Credit and Making an Inquiry - Technologically Related represented 17.78% and 14.67% of posts, respectively. The remaining CF categories spanned topics such as Making an Inquiry - Administrative Questions about the Waiver Process, Requesting Resources, and others.

Conclusion: Results show that most participants sought to obtain information with the intention of receiving a response from course moderators or facilitators in real-time. It may be worth investigating why there was not as much bidirectional conversation among participants. Most participants posted questions about course content, receiving course credit, and others primarily technologically related. Potential reasons for the last

Table 1. Question-and-answer contents of exported data

Poster's Intention	Number of Posts	% of total (n/total)
Seeking Information	241	53.32 (241/450)
Seeking Discussion	87	19.25 (87/450)
Non-question	112	24.78 (112/450)
Answering a Question	7	1.55 (7/450)
Furthering Discussion	3	0.66 (3/450)
Total	450	100

Comment Features	Number of Posts	% of total (n/total)
Providing Factual Information	6	1.33 (6/450)
Providing Personal Experiences	12	2.67 (12/450)
Making an Inquiry - Administrative Questions about the Waiver Process	56	12.44 (56/450)
Making an Inquiry - Course Content	152	33.78 (152/450)
Making an Inquiry - Technologically Related	66	14.67 (66/450)
Making an Inquiry - Attendance/Course Credit	80	17.78 (80/450)
Providing Opinions	23	5.11 (23/450)
Requesting Resources	34	7.56 (34/450)
Off Topic	21	4.67 (21/450)
Total	450	100

two topics include: heterogeneity in user technological ability, connectivity issues, uncertainty on the impact of switching devices, and lack of periodic attendance checks. Implementing a method to collect attendance periodically, possibly through the use of the Zoom™ poll tool, may be helpful in the future.

188 Does Sex Bias Impact Faculty Clinical Teaching Awards?

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Study Objectives: Recently, the implications of sex bias for female trainees has taken a prominent place in graduate medical education (GME) research and discussions. However, there is a relative lack of research addressing sex bias in how female faculty are evaluated by their trainees. Teaching awards are given at many residency programs to recognize excellence in teaching. These awards not only offer prestige but are an essential component of academic promotions. Research suggests that women are underrepresented in the recipients of many professional medical association awards and in awards given to medical school faculty. Our objective is to determine whether women are underrepresented in teaching awards honorees in a single Emergency Medicine Residency.

Methods: We assessed whether there is a discrepancy between female and male faculty clinical teaching award honorees and the overall representation of women in the teaching faculty at a single Emergency Medicine (EM) program. The Regions Hospital Emergency Medicine Program is a 3-year EM Program with 9-11 residents per class over the past 10 years.. Two yearly teaching awards are presented to clinical teaching faculty, based on evaluations from EM residents and on nominations from rotating medical students. We collected data on the sex of the recipient of each award and reviewed the female-to-male ratio of recipients between 2009 and 2018 (table 1). During that same time period, the percentage of female clinical teaching faculty averaged 31.9%.

Results: We found there is a discrepancy between the proportion of women who received a clinical teaching award based on evaluations by learners when compared with the proportion of women faculty: 23.1% of awards were given to women when compared with a teaching faculty averaging 31.9% women. Also, the discrepancy between the percentage of resident-selected teaching awards given to women and percentage of female faculty (28.6% vs 31.9%) was less than that of student-selected awards (16.7% vs 31.9%).

Conclusion: In a single Emergency Medicine Residency Program, there is a discrepancy between the percentage of women EM faculty who receive clinical teaching awards and the overall percentage of female faculty who are eligible for the award, despite whether the award is chosen by EM residents or medical students. Sex bias may play a role in determining teaching award recipients in our department over the past 10 years.

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	Resident - Selected Award	Medical Student - Selected Award	Total Faculty Clinical Teaching Awards
Number of awards	14	12	26
Number of women receiving awards	4 (28.6%)	2 (16.7%)	6 (23.1%)
Number of men receiving awards	10 (71.4%)	10 (83.3%)	20 (76.9%)

189 Get Waivered Remote: A Nationwide, Remote, and Interactive Educational Conference Designed in Response to COVID-19

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Study Objectives: COVID-19 has created numerous challenges for the United States' health care system. Restrictions on in-person gatherings have impacted access to care for patients with opioid use disorder (OUD) by making it more difficult for clinicians to learn about evidence-based prescribing practices. Many educational conferences, previously delivered in-person, have moved to remote formats but national training sessions are not always filled. While virtual conferences have been described in other academic settings, there have been no interactive, virtually delivered, real-time, large scale courses offering a Drug Enforcement Administration (DEA) Buprenorphine Waiver. This paper describes a nationwide, digitally delivered, interactive DEA X-Waiver educational conference and provides guidance to Emergency Medicine organizations seeking to increase attendance at and engagement in remote courses.

Aim 1: Describe the implementation of the Get Waivered Remote Course. Aim 2: Use the RE-AIM framework to evaluate our program outcomes. Aim 3: Suggest potential opportunities for future improvement.

Methods: Our team delivered a virtual educational course to allow clinician participants to obtain their DEA-X-waiver. Using a novel approach, we aimed to offset the additional barriers COVID-19 has created for clinicians to assess evidence-based practices to treat patients with Opioid Use Disorder (OUD). Our previous work has identified behavioral patterns that were found to act as barriers and restrict the number of clinicians who completed the "X" waiver process. Physicians, residents, nurse practitioners and physician assistants, including those in training, were eligible for the course. The didactics were delivered via the Zoom platform on May 20, 2020 from 10 AM to 6 PM Eastern Standard Time. Utilizing the RE-AIM model we evaluated our training session's outcomes in terms of course enrollment, delivery, reception, and overall efficacy.

Results: The DEA-X waiver course had 1,179 people enrolled, of which 799 attendees remained in the course for the necessary time to qualify for the X waiver. 814 attendees completed the pre-survey and 103 completed the post-survey. The majority of students (59.5%) heard about this course through emails sent out via medical association newsletters. Most (52.4%) participants chose to enroll due to the Zoom webinar format making this training more convenient than other options. Participants indicated that the largest barriers to receiving their waivers previously had been the time and hassle (44.7%) and lack of knowledge about the process (29%). The course was well-received, with 92.2% of attendees rating it as neutral or better compared to in-person classes and 94.2% indicating that they would recommend the course to a friend (measured by 6 or higher on a scale of 10). Prior to taking the course, 65% participants said they were at least somewhat familiar with the practice of opioid dependency treatment with approved buprenorphine medications, after the course, 98% of participants were at least somewhat familiar.

Conclusion: Results show that moving to a Zoom™ webinar training format in response to COVID-19 increased the number of waivered physicians by providing a convenient, hassle-free waiver course option. This indicates that completion of non-mandatory training courses, including future DEA X-waiver courses, can be improved through the use of remote educational technologies.

190 Long-Term Survival of Ultrasound Guided Peripheral Intravenous Catheters

Harrison NJ, Gerhart C, Kimlinger M, Mercer E, Gray C, Boyd J, Ferre R/Vanderbilt University School of Medicine, Nashville, TN; Vanderbilt University Medical Center, Nashville, TN; Indiana University School of Medicine, Indianapolis, IN

Study Objectives: In patients with difficult vascular access, ultrasound-guided peripheral IVs (USGPIVs) have emerged as a safe and viable option. After placement in the emergency department (ED), current CDC guidelines recommend removal or replacement of the USGPIV no more frequently than every 72 to 96 hours. However, the effective longevity of USGPIVs in adults is poorly defined; on review, only two studies have indirectly assessed survival of the most common USGPIV catheters after the 96-hour mark. Therefore, the primary objective of our study was to define, in admitted patients, the long-term survival of USGPIVs that were placed in the ED. Secondary objectives included defining the risk factors for early removal of USGPIVs and the reasons for USGPIV failure.

Methods: We performed a prospective cohort study in admitted patients, in which we followed 124 USGPIV catheters placed in the adult ED for 7 days or until removal, whichever came first. After enrollment, study personnel used ultrasound to measure vein depth and width. Catheter gauge and the chosen

vein were recorded. We performed chart review to assess patient factors including BMI, diabetes, intravenous drug use, sickle cell disease, thrombophilia, and cancer. If the catheter was removed early, the reason for unplanned removal was documented.

Results: Of the 124 USGPIV catheters followed, 84 (68%) lasted until discharge or until the catheter was no longer needed (planned removal), while 40 (32%) were removed early due to complications (early removal). However, surviving 84 hours after placement significantly reduced the risk of early removal (relative risk, 0.760; $p < 0.05$); only 22% of USGPIV catheters that survived 84 hours subsequently required early removal. In contrast, a BMI > 40 increased the risk for early removal (relative risk, 2.23; $p < 0.05$). No other factors we assessed were significantly associated with early USGPIV removal. Complications resulting in early USGPIV removal included infiltration (35%), loss of catheter function (32.5%), pain (17.5%), dislodgement (12.5%), and excessive bruising (2.5%).

Conclusion: In our study of admitted patients with an USGPIV placed in the ED, approximately 1/3 needed to be removed earlier than anticipated. A BMI >40 was the only risk factor we found to be significantly associated with need for early removal. Infiltration or loss of catheter function were the two most common reasons for early removal.

191 Characteristics of Patients Treated in the Emergency Department "Hallway Beds"

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Study Objectives: In order to maintain a semblance of patient flow in situations of boarding-induced emergency department (ED) crowding, many EDs use open areas not originally designed as a treatment space for patient care. These spaces are most frequently a hallway stretcher or chair ("hallway bed"). Such spaces have a variable degree of privacy and often lack call bells, oxygen, suction, or monitors. Patients are often not completely disrobed, which could lead to missing significant physical findings. We compared the demographic and clinical characteristics of patients who were placed in a hallway bed at some time during their ED stay to those who remained in an originally designated treatment room throughout their stay.

Methods: A retrospective analysis was conducted in a single, urban, academic ED between July 2014 and June 2019 that included all adult ED patients (ages 18 -110) whose length of stay (LOS) was between 6 minutes and 72 hours. The characteristics of patients who remained in a "room" were compared to patients who resided in a hallway at some point during their ED stay. We compared the demographic characteristics, mean LOS, mode of ED arrival, emergency severity index (ESI), number of prior ED visits, and disposition of the two groups. T-tests were used to compare mean age and mean LOS between the two bed locations (hallway and room). Chi- square and post hoc tests were performed to assess the association between bed location and the categorical variables listed above.

Results: During the study period, the ED had 430,000 total registrations. A total of 61,000 patients (14%) had all or part of their ED evaluation in a hallway bed. The mean age of "room" patients was 44.7 years and that of "hallway" patients, 45 years. 56% of hallway patients were male, and 17% of all male patients had all or part of their visit in a hallway space compared to 11.7% of female patients ($P<0.05$). No differences were noted in the racial distribution of hallway versus room patient as 68% of hallway patients were Black or African American as were 67% of the room patient, 25.8% hallway patients were white as were 26.8% of the room patients. Patients with more than 20 prior ED visits were more likely to be evaluated in a hallway treatment space, with 26% of their visits occurring in the hallway versus 13.5% of patients with 19 or fewer prior ED visits ($p<0.01$). The most common chief complaints among hallway patients were alcohol intoxication (8%), altered mental status (7%), abdominal pain (2.8%), chest pain (2.6%), and fall (1.9%). The difference in mean LOS between hallway patients was 7.75 hours and room patients 5.9 hours were significant (95% CI: 1.81 - 1.89).

Conclusion: Compared to room patients, hallway patients were more likely to be male, have a history of frequent ED utilization, and more likely to be intoxicated or have an altered mental status. Further inquiry into risks of placing patients with sensory impairment into areas, where they cannot be completely disrobed should be considered.

192 Efficacy of a Novel Re-Training of Ophthalmology Residents as Palliative Care Extenders in the Emergency Department during the COVID-19 Surge

Fleischer-Black J, Horton J, Woodrell C, Ankuda C, Chai E/Icahn School of Medicine at Mount Sinai, New York, NY

Study Objectives: During the COVID-19 surge in New York City, our hospital system put in place a 24-hour helpline to connect Emergency Department (ED) physicians to Palliative Care specialists. During the surge of critically ill COVID-19 patients, there was concern that large volumes, high acuity, and the need to wear protective equipment, were barriers to ED physicians calling the helpline. To address this concern, we placed ophthalmology residents in the ED from 8am to 11pm each day to act as palliative care extenders, helping connect ED physicians, Palliative Care physicians, patients and families. Ophthalmology residents were chosen for this role due to their clinical expertise and availability after the cessation of elective surgeries during the state of emergency.
We sought to evaluate the number of palliative care connections made with this model.

Methods: We performed a retrospective review of admissions from the acute areas of our ED from April 6, 2020 to April 19, 2020. During the first week, only the 24-hour helpline was available. During the second week, both the palliative care helpline and in-situ residents were available. Number of palliative care notes from the ED were compared before and after the intervention.

Results: In the week when only the helpline was available, 443 ED visits occurred, of which 169 (38.1%) were admitted and 10 (5.9%) had palliative care notes written in the ED. In the week when both the helpline and in-situ residents were available 464 ED visits occurred, of which 131 (30.0%) were admitted and 36 (27.4%) had palliative care notes written in the ED.

Conclusion: Compared to a helpline alone, in situ palliative care presence in the ED increased the opportunity for early palliative care intervention, as reflected by an increase in the number of palliative care notes written in the ED. This model was an effective re-tasking of specialized health care practitioners from a specialty that was less strained by the pandemic to one that was under pressure.

193 Identification and Misidentification of Cases of ED Diagnosis of Acute Pulmonary Embolism on Retrospective Chart Review

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Study Objectives: Retrospective chart review (RCR) is a widely used and valuable technique, which can help identify trends in patient outcomes or resource utilization, as well as inform the need for prospective studies. RCR is increasingly reliant on queries of the electronic medical record (EMR), an approach which may be problematic for identification of acute PE cases diagnosed in the Emergency Department (aPE-ED). Uncertainty regarding the chronicity of embolism, the existence of radiographic mimics, and diagnosis after patients have been admitted for other reasons (eg, syncope, cardiac arrest) may all lead to missed cases or misidentified cases of aPE-ED. We took advantage of the Michigan Emergency Department Improvement Collaborative (MEDIC), which manually abstracts data from every ED encounter in which a PE-protocol CT (CTPE) is performed, to compare the accuracy of various methods of RCR for aPE-ED.

Our study objective was to determine the frequency of aPE-ED cases missed or misidentified by electronic query and/or manual chart abstraction by non-medically trained personnel.

Methods: aPE-ED cases from a one-year period (1/1/2017-12/31/2017) at a single, tertiary academic center were identified by one of two methods: (1) Electronic query of the Epic Clarity database or (2) Manual review by non-medically trained abstractors. Cases were pooled and each chart was reviewed by an Emergency Physician (EP) to determine the presence or absence of aPE-ED, as well as patient disposition. Interrater reliability was assessed for 30% of cases. Equivocal cases were adjudicated by a panel of three EPs.

Results: A total of 292 cases were reviewed by EPs, 250 of which (85.6%) were ultimately judged to be aPE-ED. Interrater reliability was high, with > 95% agreement

as to which cases represented aPE-ED and kappa > 0.8. EMR query identified 232/292 cases (79.4%), of which 212 (91.4%) were found to be aPE-ED. Abstraction by non-medical personnel identified 253/292 cases (86.6%), of which 226 (89.3%) were found to be aPE-ED. Of the 193 cases (66.1%) identified by both methods, 188 (97.4%) were found to be aPE-ED. The most common reason for misclassification amongst non-medical personnel manually abstracted charts was abstraction error (14/27, or 52%), while the most common reason in EMR query was CTPE overread due to radiographic mimic or equivocal findings (7/15, or 47%). All five charts misclassified by both methods were found to be chronic PEs and/or patients who returned to the ED with persistent symptoms. Misidentification more than doubled the calculated discharge rate, which was 5.1% (15/292) when all cases were included vs. 2.4% (6/250) with only aED-PE.

Conclusion: Both EMR query and manual review by non-medically trained abstractors resulted in missed and misidentified aPE-ED cases. Misidentification had a substantial effect on the calculated discharge rate. Improved methods are needed to enable accurate retrospective identification of aPE-ED without the need for medically-trained abstractors.

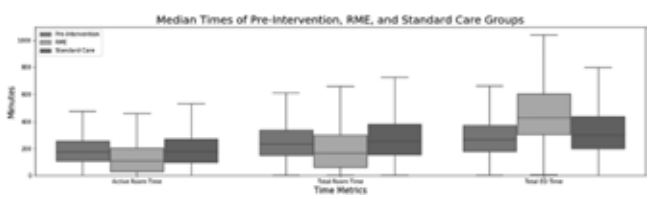
194 Impact of Rapid Medical Evaluation on Patient Flow Through an Urban Emergency Department

Furmaga J, McDonald SA/UT Southwestern, Dallas, TX

Study Objectives: Emergency Department (ED) crowding is a major issue impacting hospitals across the nation and occurs when the demand for health care exceeds the facility's capacity. In a standard ED flow model, after presenting to the ED patients are either sent to an ED Treatment room or the Waiting Room to await room availability. All treatments and diagnostics are done within the ED Treatment room. In the Rapid Medical Evaluation (RME) model, after ED check-in, if there are no available ED Treatment rooms patients are evaluated by an RME provider who initiates collection of laboratory and radiographic testing; patients are then sent back to the Waiting Room to await room availability. The objective of this study was to implement an RME process that would decrease ED Treatment room occupancy time with a goal of improving overall throughput. Secondary objective was to expedite initial patient evaluation as measured by door-to-provider time.

Methods: This is a retrospective chart review examining ED encounters 12 months before (PRE) and 12 months after RME implementation (POST), which occurred on December 25, 2018. The POST group was divided into those that underwent RME and those managed through standard ED flow (STND). Effects of RME on ED Treatment room utilization were assessed using the following three metrics: (1) Active ED Room Time, defined as the time between the patient entering the ED treatment room and when disposition is entered into the electronic health record, (2) Total ED Room time, defined as the cumulative time patient spent in an ED treatment room and excluded time spent in the Waiting Room or the RME room, and (3) Total ED Time, defined as the time from patient's arrival in the department to their departure. Door-to-Provider time was defined as time from ED check-in to time of first evaluation by a provider. Mann-Whitney test was used to compare differences between PRE and POST groups and between RME and STND ED flow models.

Results: The PRE group had 47,116 encounters and the POST group consisted of 48,653 ED visits divided into 11,140 RME and 37,513 STND evaluations. PRE and POST groups had similar disposition distributions with admission rates of 33% and 34% respectively. Overall, the POST group had significantly lower Active ED Room times compared to the PRE group with difference of 11 minutes (162 vs 173 minutes, $p<0.001$) and practically similar Total ED Room times (237 and 234 minutes, $p<0.02$). When comparing the RME and STND subgroups, RME had much lower Active ED Room times with median difference of 69 minutes ($p<0.001$), and Total ED Room time with median difference of 90 minutes ($p<0.001$). Additionally, RME providers had significantly shorter Door-to-Provider times with a median difference of 151 minutes ($p<0.001$), a 68% reduction.



Conclusion: RME implementation during busiest ED times resulted in a significant improvement to patient throughput. We found that for every 4 patients undergoing RME, one additional patient could be evaluated in that same period of time. This increased our ED's capacity without impacting diagnostic freedom. Additionally, patients were evaluated by a provider much earlier when RME was utilized potentially minimizing risk of poor outcomes and improving patient satisfaction.

195 Workload Measure is Responsive to Staffing Changes in a High-Volume Emergency Department

McDonald S, Good D, Paladugu S, Gardner A, Kirk A, Metzger J, Diercks D/UT Southwestern, Dallas, TX

Study Objectives: With the growing burdens of patient volume and boarding in the emergency department (ED), the ability to measure changes aimed at improving physician wellness is needed. The NASA Task Load index (NASA-TLX) is a tool that measures perceived work burden that has been previously validated in other fields. Given planned staffing changes at high volume times, we aimed to determine whether the NASA-TLX could be used to identify a change in perceived workload after the addition of an extra resident physician for the swing and night shifts.

Methods: This was a before and after observational study evaluating the impact of perceived shift workload after the addition of an extra resident during swing shift in a single, urban academic ED. Perceived workload was assessed using the NASA-TLX via an online survey completed after the conclusion of a physician's shift. Shift times and days were controlled for when sending out surveys. Data was evaluated using Wilcoxon Rank Sum with 95% confidence intervals. Multiple linear regression was performed utilizing patients seen per shift, shift time, and whether the shift was before or after the addition of an extra resident. Significance of the added variable was assessed utilizing an F-test comparing the nested models.

Results: The survey results were collected from 1/2019 to 11/2019, with a break of about 2 months after the intervention was implemented resulting in 144 surveys completed, 73 prior to the intervention. Females made up 43% of the surveys with a 37%, 40%, and 23% distribution amongst the day, swing and night shifts, respectively. Significant decreases were found in NASA-TLX scores for both the swing and night shifts, both with a mean difference in scores of 185 (Swing: 95% CI 55 - 315, $p<0.01$, Night: 95% CI 5 - 390, $p<0.05$). No significant difference was found for the day shift with mean difference 30 (95% CI -100 to 165, $p>0.5$). A significant linear regression model was found (F 5.3, $p<0.01$) with an R2 0.13. When adjusting for shift type and patient volume, the addition of an extra resident offers a statistically significant improvement (F 9.2, $p<0.01$) in the explanation of the variance of NASA-TLX scores.

Conclusion: NASA-TLX appears a responsive measure to staffing changes during busy shift times, but there remains a large variance in scores overall. Despite its validation in other fields, validation of the NASA-TLX in describing the burden of work in ED shifts would be a useful measure when evaluating departmental changes with respect to physician wellness and workload.

196 Comparing Response Times, Intensity of Care and Outcomes between Private versus Municipal Emergency Medical Services Systems

Gunaga S, Nippert J, Kerr M, Young B, Muller G, Charping A, Goeller K, Jarski R/Henry Ford Wyandotte Hospital, Wyandotte, MI; Oakland University School of Health Sciences, Oakland, MI

Study Objectives: The financial and oversight complexities associated with providing emergency medical services (EMS) in the United States ultimately led

to the creation of both private and municipal-based EMS systems providing out-of-hospital medical care to our communities. For over four decades an emotional debate has spurned regarding which system can provide better coverage and quality of care to patients. Although there are many heated editorials and commentary papers on this topic, there is very little scientific research to support one method of delivery over the other. The primary objective of this study was to identify any quantitative differences in care between private and municipal EMS systems related to response times, intensity of services and patient outcomes.

Methods: This IRB approved retrospective chart review included all patients presenting to a 60 bed community Emergency Department (ED) via advanced life support (ALS) ambulance between Jan 1, 2017 and March 31, 2017. Our ED receives ambulance traffic from 9 EMS agencies (7 municipal, 2 private) who provide 911 coverage for approximately 20 square miles of suburban communities. Data were collected using the hospital's electronic records and included patient age, emergency severity index score (ESI), out-of-hospital response and transport times, IVs started, fluids and medications given, airway interventions (oxygen delivery, CPAP, Intubation), cardiac monitoring, 12 lead EKGs, ED intubations, ED mortality, hospital mortality and ICU admission. Categorical data were summarized as counts and percentages, and continuous data as means with corresponding standard deviations. Between-group mean differences were compared by calculating t-tests for independent measures. Categorical data were compared using the chi-square test for association or Fisher's exact test.

Results: A total of 769 patients were included into the study sample with 483 in the private EMS cohort and 286 in the municipal EMS cohort. A detailed breakdown of cohort demographics, out-of-hospital response times, intensity of services, outcomes and comparisons between these groups are displayed in Table 1. A p-value $\leq$0.05 (two-tail) was considered statistically significant.

Conclusion: The current operating structure of providing EMS to our communities is based around the premise that there are no significant quality and safety differences between municipal and private EMS systems. It is therefore surprising to see so many statistically and potentially clinically significant differences between these two modes of EMS delivery. Municipal EMS agencies in our community were identified to provider faster care with more intense services in nearly every out-of-hospital time and intensity of care metric. Despite these differences, no outcome disparities were identified in regards to ED and hospital mortality, ICU admissions or ED intubations. Recognizing strengths and potential weakness related to these two systems is essential as we continue to minimize any disparities in care to our communities and maximize the benefits of mutual aid within our national EMS system.

	Private EMS	Municipal EMS	P Values
Patient Demographics			
Average Age	51.5	63.4	p<0.0001
Average ESI	2.008	2.49	P=0.605
Prehospital Times			
Response Times (911 to Arrival on Scene)	8.1 Minutes	3.9 Minutes	P<0.0001
Transport Times (Scene to Hospital)	10.5 Minutes	5.3 Minutes	P<0.0001
Total Prehospital Time	34.4 Minutes	25.2 Minutes	P<0.0001
Intensity of Services			
Cardiac Monitoring	13.9%	30.9%	P<0.0001
12 Lead EKG	37.1%	18.9%	P=0.01
IV Started	47.6%	55.6%	P=0.032
IV Fluids Given	19.7%	30.8%	P=0.001
Airway Intervention	19.5%	39.7%	P<0.0001
Patient Outcome Measures			
ED Mortality	0.21%	1.1%	P=0.15 (two-tail test)
Hospital Morality	1.42%	1.91%	P=0.73 (two-tail test)
ED Intubations	2.8%	2.9%	P=0.929
ICU Admission	2.6%	4.2%	P=0.255

Table 1. A Detailed Comparison of Private and Municipal EMS Services with Associated Means, Percentages, and p-values (N=769).

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197 The Use of High-Risk Medications in the Emergency Department and the Prevalent Delirium within the First 24 Hours of Hospitalization

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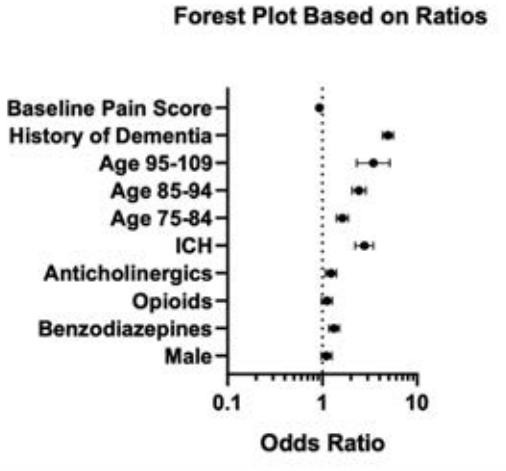
Objectives: Delirium is a global brain dysfunction that is serious and common. We conducted an observational study using a hospital-wide database to examine whether opioid, benzodiazepines, and anticholinergics in the emergency department (ED) are associated with positive delirium screening. This was a retrospective cohort study, including patients aged 65 years and older who were hospitalized from ED at a tertiary care academic medical center from 2014 to 2017. We extracted demographic and clinical variables to examine the association with a positive delirium screen. Medication administration record was extracted for opioids, benzodiazepines, and anticholinergics given during the ED stay. Nurses used the Delirium Observation Screening Scale (DOSS) twice daily to assess delirium during hospitalization as part of a standard institutional protocol. The outcome was a positive DOSS within 24 hours of hospital admission.

Results: We identified 2010 visits (25.34%) with a positive delirium screen and 877 (11.06%) visits with a diagnosis of delirium from ICD9/10 codes among 7932 encounters. A total of 4331 (54.60%) received opioids, 3562 (44.91%) received benzodiazepines, and 2341 (29.51%) received anticholinergics. A total of 877 (11.06%) received a combination of opioids, benzodiazepines, and anticholinergics. In this cohort, the odds ratios for positive delirium were 1.12 (95% CI 0.98, 1.28) for opioids, 1.33 (95% CI 1.17, 1.51) for benzodiazepines, and 1.24 (CI 1.08, 1.41) for anticholinergics administered in the ED after adjusting for age, sex, known history of risk factors for delirium, and pain scale. The odds ratio for positive delirium for patients who received drugs from all three categories vs. those who received none was 2.04 (95% CI 1.63, 2.55). (Figure. This Forest plot shows the list of variables from ED and the odds of having positive delirium screening within the first 24 hours of hospitalization. The age reference group 65-74).

Conclusion: In this study, the use of benzodiazepines, anticholinergics, and the combination of opioids, benzodiazepines, and anticholinergics in the ED were associated with a positive DOSS within 24 hours of hospitalization.



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198 Withdrawn

199 False Positive or Acute Seroconversion? Examination of Patterns of Equivocal HIV Screening in the ED.

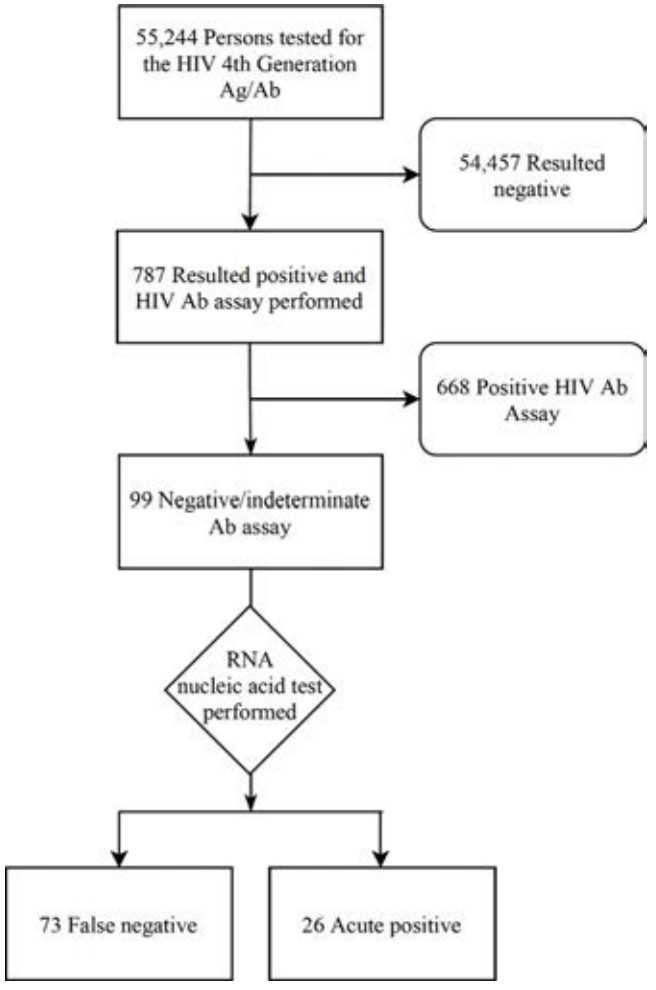
Wilson J, Henderson H, Periera K/University of South Florida, Tampa, FL

Study Objectives: We consider the clinical presentation of patients with equivocal HIV test results in the ED (HIV Ab/Ag +, HIV Ab -) found through routine ED-based

HIV screening and further describe those patients who presented to the ED during acute seroconversion (acute +) compared to the clinical characteristics of patients who were ultimately found to have false + initial screening results.

Methods: We analyzed 4 years of HIV testing data (2016-2020) and determined the number of patients who had a Ab/Ag + screen. Patients with Ab/Ag + but a non-equivocal HIV+ lab signature (Ab/Ag +, Ab +, viral load > 0) were removed. Then we determined the remaining number with an equivocal laboratory signature (Ab/Ag +, Ab -). We separated those patients into 2 groups: false + (Ab/Ag +, Ab -, viral load 0) and acute + (Ab/Ag +, Ab -, viral load > 0). We conducted chart review on all patients with an equivocal laboratory signature and the clinical presentation was considered to detail patterns in false + compared to acute + patients presenting to the ED.

Results: We screened approximately 55,224 patients for HIV (16% volume) in 4 years. 787 patients had a Ab/Ag + result (1.4%) and, of those, 688 had non-equivocal positive HIV results (87.4% of Ab/Ag +, 1.2% of tested). 99 (12.5% of Ab/Ag +, 0.13% tested) were Ab/Ag +, Ab -. Of those 99, 73 had no detectable HIV RNA (false +, 9.3% of Ab/Ag +, 0.13% tested). 26 of the 99 with equivocal results had viral load > 0 (acute +, 3.3% of Ab/Ag +, 0.05% tested). Qualitative review of equivocal patient charts during the Ab/Ag reactive screening encounter showed statistically significance for acute positive results in younger male patients who have sex with men.



Conclusion: 787 patients had a reactive screening test but 99 had an equivocal laboratory signature (12.5% of Ab/Ag+), making the information difficult to interpret during an ED encounter in high prevalence populations and challenging the ability to scale up ED based HIV screening, especially given the long turn around time for HIV RNA testing via PCR. ED based screening is an important strategy to help reach the WHO goal of eliminating HIV as a public health threat by 2030. However, the current algorithm and existing testing technology may not be best designed for acute clinical encounters and false + encounters are higher than previously reported. The results of this study detail characteristics of patients with equivocal test results that may improve clinical decision making in patients with false + compared to acute + laboratory signatures and suggest that young men who have sex with men and have a reactive HIV screening test in the ED should be considered HIV positive.

200 Implementation of a COVID-19 Cohort Area Resulted in No Surface or Air Contamination in Surrounding Areas in One Academic Emergency Department

Barksdale AN, Santarpia J, Herrera V, Ackerman D, Lowe J, Wadman M, Zeger W/ University of Nebraska Medical Center, Omaha, NE

Study Objectives: Over 90,000 health care workers worldwide have been infected with SARS-CoV-2. In response to the COVID-19 pandemic, emergency departments (EDs) implemented new measures to minimize the spread of the disease within their patient care areas. The primary objective of this study was to determine if SARS-CoV-2 viral particles were present on surfaces or in the air, in a designated COVID-19 cohort area, or 'hot zone.' Secondary analysis involved testing for viral particles in others areas of the ED outside of the 'hot zone.'

Methods: This study took place in the ED of a tertiary academic medical center, with approximately 64,000 annual visits. We designated a pod of 8 rooms for known COVID-19 infection or individuals with high suspicion for infection. The area consisted of a single entry (Personal protective equipment donning area) and exit (PPE doffing area). Health workers would change gowns and gloves between patients, but maintain their N-95 mask and face shield, after cleaning with a germicidal wipe. Fifteen surface samples and four air samples were taken in the ED to evaluate SARS-CoV-2 contamination levels and the effectiveness of infection control practices. Samples were collected outside of patient rooms in 3 primary areas, the reception area, the primary nurses station, inside the cohort area, and the PPE donning and doffing areas immediately adjacent. The 15 surface samples were collected using 3x3 sterile gauze pads pre-wetted with 3 mL of phosphate buffered saline (PBS), over an approximately 100 cm^2 area by wiping in an "S" pattern in 2 directions. Stationary air samples were collected using a Sartorius Airport MD8 air sampler operating at 30 liters per minute for 30 minutes onto an 80mm gelatin filter. All samples were recovered in sterile PBS, had RNA extracted and were analyzed for the presence of SARS-CoV-2 by RT-PCR targeting the E gene of SARS-CoV-2.

Results: SARS-CoV-2 was not detected on any surface samples collected in the ED. All air samples outside the COVID-19 hot zone were also negative for SARS-CoV-2. The air samples from inside the cohort area had a low level of viral contamination, but no surface samples in or around the cohort area showed any indication of viral contamination. These data suggest that despite having a large influx of COVID-19 patients on the day of sampling, the infection control practices were sufficient to either prevent or eliminate surface contamination. The positive air sample from the cohort area suggests that respiratory protection with an N-95 respirator inside the cohort area, even outside of patient rooms is warranted to adequately protect health care providers.

Conclusion: A designated COVID-19 cohort area resulted in no air or surface contamination outside of the hot zone, and only minimal air, but no surface contamination, within the hot zone.

201 Analysis of Social Determinants of Health Affecting Patient Outcomes during the SARS-CoV-2 (COVID-19) Pandemic in Elmhurst, New York

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Study Objective: New York City Health + Hospitals/Elmhurst (EHC) in Queens, New York is one the most diverse populations in the United States of America and in the world. During the SARS-CoV-2 (Covid-19) pandemic, EHC was deemed the "epicenter of the epicenter" due to high rates of Covid-19 infection in the patient population and the disproportionate number of minorities affected by the virus. This study seeks to examine the effects of various social determinants of health on patient outcomes during the Covid-19 pandemic and to assess contributing factors which put these patients at increased risk.

Methods: This retrospective chart review included review of 2216 patients with 2254 unique emergency department (ED) visits to EHC with positive SARS-CoV-2 (Covid-19) tests. Data were extracted from Epic into REDCap. Groups were stratified based on their occupation, race and ethnicity, insurance status, sex, language and zip code with primary endpoints being rates of mortality, delayed ED presentation (defined as ED visit after 1 week of symptoms), severity of symptoms on arrival, and number of COVID-19-related hospital visits (ie, bounce backs). Final data were extracted and analyzed using statistical analysis software.

Results: Preliminary data is currently being extracted from the chart review and being analyzed.

Conclusions: Given that the data is currently under active extraction and analysis, initial conclusions cannot be discussed. It is hypothesized that the data will highlight disparities and gaps in health care and outcomes that may be utilized to better inform future care and allow for increased preparedness for the next pandemic, specifically focusing on reducing care barriers for those most at risk.

202 Linking Emergency Department Patients at Risk for Human Immunodeficiency Virus to Pre-Exposure Prophylaxis

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Study Objectives: Emergency departments (ED) provide a critical opportunity for individuals at high-risk of contracting human immunodeficiency virus (HIV) to interact with health care professionals. Historically, EDs have been engaged in the HIV Care Continuum, a spectrum of care ranging from diagnosis to viral load suppression, at screening and diagnosis and delivery of post-exposure prophylaxis (PEP). With pre-exposure prophylaxis (PrEP), an option for HIV prevention, EDs can be increasingly engaged in linkage to HIV care. Our objective is to evaluate the success of a program that identifies, screens and links HIV negative patients who are at high-risk for seroconversion to a clinic in order to initiate PrEP.

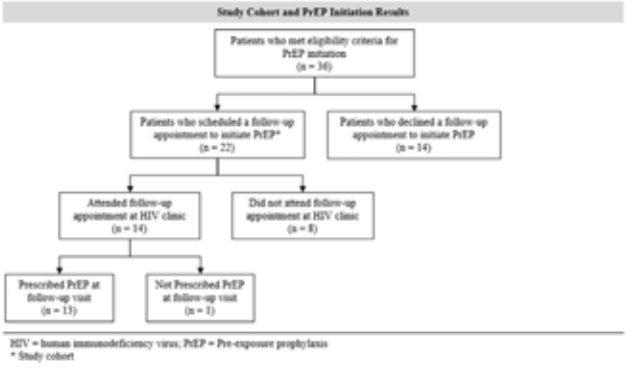
Methods: This is a retrospective cohort study of patients who presented to an urban, academic, adult (age≥21) ED with an annual census of 65,000 between January 1, 2019 to November 30, 2019 and were referred to the clinic to start PrEP. All patients were identified through an ED-based patient navigation program and were recruited based on presenting complaints to the ED, physician request or if the patient requested HIV testing. If the patient met criteria for PrEP and was interested in starting PrEP, an appointment was made in an affiliated clinic to speak to a physician about PrEP. Outcomes were whether or not the patient complied with the appointment and received a PrEP prescription.

Results: The program identified 1,285 HIV negative patients to receive HIV education and counseling during their ED visit. 36 patients met criteria for PrEP; of these, 14 patients declined clinic referral (see Figure 1). Of the remaining 22 PrEP-eligible patients, 14 (63%) patients attended a visit with an affiliated clinic and 13 (59%) patients were prescribed PrEP (Table 1).

Conclusion: The results of this study demonstrate the feasibility of a PrEP linkage program in the setting of a high volume, urban ED. The rates of appointment attendance and PrEP initiation in our study indicate initial success of a navigation program and demand for PrEP among patients in the ED. Further research will consider providing a bridge prescription of PrEP in the ED.

Table 1. PrEP linkage results

Linkage status	N	%
Follow-up visit scheduled in ER	22	100%
Attended 1 or more follow-up visit	14	63%
PrEP prescription at initial follow-up visit	13	59%
Discontinued PrEP after initial prescription	3	14%
Discontinued PrEP after 1+ refill	2	9%
Continued PrEP through end of study period	8	36%
Did not attend scheduled appointment	8	36%



203 Telemedicine Response to COVID-19 Surge in New York City: How Emergency Department Telemedicine Changed With the Curve

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Study Objectives: To describe how a major medical system in New York City (NYC) leveraged emergency department telemedicine services to meet the demands of COVID-19. New York-Presbyterian Hospital System (NYP) is comprised of 10 hospitals in the greater NY metro area, including Weill Cornell Medicine (WCM) and Columbia University Irving Medical Center (CUIMC). The EDs at WCM and CUIMC began adopting telemedicine in 2016 and were well positioned to leverage these tools in response to the COVID-19 surge in March and April of 2020.

Methods: Each of these areas saw telemedicine programs expanded or augmented: 1) Virtual Urgent Care (VUC); 2) In-ED-based telemedicine; and 3) Post-ED follow-up care.

Results: 1) Virtual Urgent Care (VUC): Our VUC program saw a 20-fold increase in patient volume, with over 300 patients per day at the peak. Through partnership with NYC 911, calls were also redirected from dispatch to the VUC program to help decompress that system. To meet demand, staffing was increased 20-fold. Redeployed physicians from idled areas of the hospital and advance practice providers were rapidly onboarded through a combination of WebEx training sessions, remote shadowing, cognitive aids, and real-time clinical support from seasoned ED virtual care providers in a group chat that allowed for both real time and asynchronous decision support from experienced emergency physicians. Most callers to virtual urgent care reported viral

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symptoms and COVID-related concerns. Information was disseminated according to guidelines and local resources and was updated daily and synchronized across the enterprise. VUC provided remote treatment, defraying countless in-person visits, and also allowing for escalation to in-person care where needed.

2) In-ED-based telemedicine: Within the ED, our existing tele-medical screening exam was redesigned to help identify patients who could undergo a rapid treat and release without requiring a nurse resource. This triage-based system helped to rapidly discharge the worried well, minimizing their exposure to illness, and helped to reduce person-to-person transmission within the ED. In addition, pan-tilt-zoom video carts in isolation rooms facilitated staff communication with patients and avoided unnecessary exposures or PPE use.

3) Post-ED follow-up care: To decompress the ED and hospital, an enterprise-wide pathway was created that risk stratified patients with COVID-like illness in the ED and allowed for discharge home of patients with moderate exertional hypoxia. Appropriate patients were sent home with pulse oximeters and oxygen concentrators. A telemedicine remote patient monitoring pathway was created that provided daily focused virtual respiratory exams for seven days and returned patients to the hospital when needed. This pathway provided a safety net for over 1,000 patients discharged from the ED under crisis conditions who were at risk for deterioration at home.

Conclusion: The health care crisis associated with the COVID-19 peak of illness led to collaborative innovation within the NYP hospital system EDs. Out-of-hospital telehealth care served many, eliminating the immediate need for ED care and burden on the EDs. Virtual communication minimized infection spread within the ED. Remote patient monitoring protected the safety of patients discharged from the ED. Further study of the implications of these innovations on patient safety and public health are needed.

204 Website Usability Analysis of United States Emergency Medicine Residencies

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Background: The Counsel of Residency Directors in Emergency Medicine (CORD) has recommended all emergency medicine (EM) residency programs conduct virtual interviews for the 2020-2021 application cycle due to COVID-19. While residency factors such as geographical region, city, program size or hospital affiliation are not modifiable, EM residencies can still bridge the information gap created by a lack of face-to-face interaction by representing themselves digitally via their Web sites. Whether or not this representation is effective can be measured by evaluating usability, a term meaning ease of user experience on a Web site. Many variables determine a Web site's usability, and this measure provides an objective method for EM residencies to improve their Web presence and effectively represent themselves to potential applicants.

Study Objectives: Aim 1: Categorize EM residency programs and their Web sites. Aim 2: Utilize a usability scoring system to objectively and quantitatively analyze their Web sites. Aim 3: Introduce aspects for improvement amongst EM residency Web sites.

Methods: Our sample set included 53 U.S. EM residency program Web sites. These programs used their own primary domain or subdomain for the program's respective emergency department. Programs using a subpage of a larger domain (ie, hospital or university) were excluded as the analysis would include non-residency related content (ie, patient care). Using methodology adapted from previous literature on health care Web site usability (Calvano, 2020), we divided usability into four categories for quantifiable analysis: Accessibility (ability of users to access and navigate a Web site), Marketing (search engine optimization, social media), Content Quality (relevance of material, frequency of updates, readability, and grammar), and Technology (Web site infrastructure, quality of program coding, and download speed). Utilizing several content analysis tools, analysis was performed on each Web site and scored in all four categories. An overall "General Usability" score was calculated for each Web site using a composite of the key factors within the four categories. Using a weighted percentage across all of the factors, an overall score was calculated.

Results: Content Quality was the overall highest scoring category with a mean score of 5.3 (std +/- 2.50) (SE 0.34). The overall lowest performing category was Technology, with an average of 0.8 (std +/- 0.09) (SE 0.01) (Table 1).

Conclusion: On average, Content Quality had the highest score amongst EM residency program Web sites. To effectively promote their programs, residencies need quality content that communicates their key features. The lowest scoring category on average was Technology. Our recommendation is for all residency programs to periodically perform audits on their web pages using usability measures in order to improve their digital presence, especially during times when face-to-face interactions will be limited.

Table 1.

Category	Mean	Standard Error	Standard Deviation
Accessibility	1.9	0.08	0.61
Marketing	1.3	0.07	0.48
Content Quality	5.3	0.34	2.50
Technology	0.8	0.01	0.09
General Usability	1.3	0.05	0.38

205 Utility of Non-Invasive Volume Assessment Methods to Predict Acute Blood Loss in Spontaneously Breathing Volunteers

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Study Objectives: The use of non-invasive volume assessment methods to predict acute blood loss in spontaneously breathing patients remains unclear. We aimed to investigate changes in the pleth variability index (PVI), vena cava collapsibility index (VCCI), end-tidal carbon dioxide (EtCO2), pulse pressure (PP), and mean arterial pressure (MAP) in spontaneously breathing volunteers after acute loss of 450 ml blood and passive leg raise (PLR).

Methods: This prospective observational study enrolled healthy volunteers in the blood donation center of an academic hospital. We measured the PVI, EtCO2, VCCI, MAP, and PP before blood donation; at the 0^{th} and 10^{th} minute of blood donation; and after PLR. The primary outcome was the changes in PVI, EtCO2, VCCI, MAP, and PP.

Results: We enrolled thirty volunteers. There were significant differences among the four obtained measurements of the PVI, EtCO2, and MAP ($p<0.0001$, $p<0.0005$, $p<0.0001$, respectively). Compared to the pre-donation values, post-hoc analysis revealed an increase in the PVI at the 0^{th} min post-donation [mean difference (md): 5.4 ± 5.9, 95% CI: -7.6, -3.1, $p<0.0005$]; a decrease in the EtCO2 and MAP at the 0^{th} min and 10^{th} minute post-donation, respectively, (md: 2.4 + 4.6, 95% CI: 0.019-4.84, $p = 0.008$ and md: 6.4 + 6.4, CI: 3−9.7, $p<0.0001$, respectively). Compared with EtCO2 at the 10^{th} minute, the value increased after PLR (md: 1.8+3.2, CI: 0.074-4.44, $p=0.006$)

Conclusion: The PVI and EtCO2 could detect early hemodynamic changes after acute blood loss. However, it remains unclear whether they can determine volume status in spontaneously breathing patients.

206 Urine Testing Is Associated With an Increased Length of Stay in Discharged Emergency Department Patients

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Study Objectives: Despite United States Preventive Services Task Force guidelines that recommend against it, urine testing is often ordered in the emergency department as a screening test in the absence of urinary symptoms. This may contribute to the over-diagnosis and treatment of urinary tract infection. Obtaining a urine sample can be time-consuming, and there are data showing an association between urine testing and ED length of stay (LOS). The objective of this study is to build on these data by investigating the association between urine testing and ED LOS in specific patient populations at risk of over-testing.

Methods: This was a multi-center retrospective cohort study of patients seen at two academic emergency departments: an urban safety-net hospital and a tertiary academic medical center. We included all adult discharged ED patients between 2015-2019. Patients were excluded if they were placed in ED Observation, received psychiatric consultation, had a discharge diagnosis of alcohol intoxication, or had a LOS greater than 9 hours. We analyzed patients with the following chief complaints: chest pain, vaginal bleeding in pregnancy, abdominal pain, and weakness/confusion in females

Table 1. Association of urine testing with length of stay in discharged ED patients.

Chief Complaint Group	Mean LOS (minutes) Urine Test Completed (95% CI)	Mean LOS (minutes) Urine Test Not Completed (95% CI)	Mean Difference (minutes)(95% CI)	P-Value
Chest pain[1](n=12,724)	270 (263, 278)(n=2,205)	233 (228, 238)(n=10,519)	37 (35, 40)	P < .001
Vaginal bleeding in pregnancy[2](n=1,990)	346 (323, 369)(n=1449)	314 (304, 324)(n=541)	32 (19, 45)	P < .001
Abdominal pain[1](n=21,665)	381 (367, 395)(n=16,049)	349 (346, 352)(n=5,616)	32 (21, 43)	P < .001
Weakness, altered mental status, confusion, female > 65 years old[3](n=896)	416 (331, 501)(n=688)	381 (365, 396)(n=208)	35 (35, 105)	P < .001
Received CBC and/or blood chemistry[1](n=111,082)	374 (369, 379)(n=53,770)	354 (353, 355)(n=57,312)	21 (17, 24)	P < .001

LOS=length of stay, UTI=urinary tract infection, CBC=complete blood count.
1: Adjusted for age, sex, presence of fever, and completion of CT abdomen/pelvis.
2: Adjusted for age.
3: Adjusted for age, presence of fever, and completion of CT abdomen/pelvis

>65 years. We also included an additional group of all patients who had blood testing (complete blood count or electrolyte panel). Linear regression analysis was used to adjust for age, sex, presence of fever, and completion of CT imaging when appropriate. Chief complaint groups and confounder variables were pre-specified.

Results: ED length of stay was found to be significantly longer in patients who had urine testing completed than in those who did not, across all subgroups analyzed. In all discharged patients (n=228,494 visits), patients who had urine testing had a mean LOS which was 78 minutes longer (unadjusted) than patients who did not have urine testing. In all patients who had labs done (n=111,082 visits), the mean LOS difference was 21 minutes after adjusting for age, sex, fever, and CT A/P. In all chief complaint groups analyzed, patients who had urine testing had longer LOS, with adjusted mean differences ranging from 32 to 37 minutes. All comparisons were statistically significant.

Conclusion: In this multicenter retrospective cohort study, urine testing was associated with an increased LOS that was both statistically significant and appears clinically meaningful. This was found in all pre-specified patient groups examined. If this finding is replicated in other settings with prospective data, decreasing unnecessary urine testing might help to decrease ED LOS.

207 Virtual Powers of Observation: A Telemedicine Pathway for the Suspected COVID-19 Patient

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Study Objectives Prior to COVID-19, telemedicine and its applications to the emergency department (ED) had made significant inroads towards remote evaluation and care. During the local peak of the COVID-19 pandemic in NYC, telemedicine patient encounters for suspected COVID-19 symptoms dramatically increased. In response, pathways were developed to promote a standardized telemedicine approach to remote evaluation and assessment of suspected COVID-19 patients.

Methods: A pathway was developed and implemented at two academic emergency departments in New York City that collectively had approximately 8300 telemedicine visits for suspected COVID-19 from March 2020- June 2020. Protocol was developed via an expert consensus panel of 4 board certified emergency physicians and 2 pediatric emergency physicians, all with telemedicine training/administrative roles.

Results: The pathway was initiated for any telehealth patient with suspected COVID-19 symptoms (cough, fever, shortness of breath, bodyaches). A standardized history solicited known or suspected risk factors for worse prognosis including: age>50, cardiovascular or lung disease, obesity, immunosuppression, living alone) as well as a focused assessment of symptom severity and exercise tolerance. An exam at rest included visual counting of breaths along with instruction on palpation of radial pulse. Saturation was included if pulse oximetry was available. If exam at rest was reassuring, providers were instructed to repeat the respiratory assessment on exertion by having the patient walk in place briskly for one minute. Patients with severe illness, defined by resting or exertional respiratory rate greater than 30 and/or oxygen saturation less than 90% were instructed to go to the ED. Patients with moderate illness defined by exertional metrics of respiratory rate less than 22, oxygen saturation greater than 94 percent and heart rate less than 125 were discharged from the virtual urgent care visit with a repeat telehealth follow up call at either 12 or 24 hours depending on the number of risk factors. Patients without risk factors and with reassuring respiratory assessment were discharged from the telemedicine encounter with reassurance and standard discharge precautions for escalation of care.

Conclusion: Designing and disseminating a standardized pathway helped provide a framework to approach patients suspected of COVID-19 over telemedicine. Future work focusing on patient outcome data, will help guide and refine any standardized telehealth approach to the COVID-19 suspected patient.

208 Sleep Time and Characteristics Measured Using Fitbit Devices in Emergency Medicine Residents

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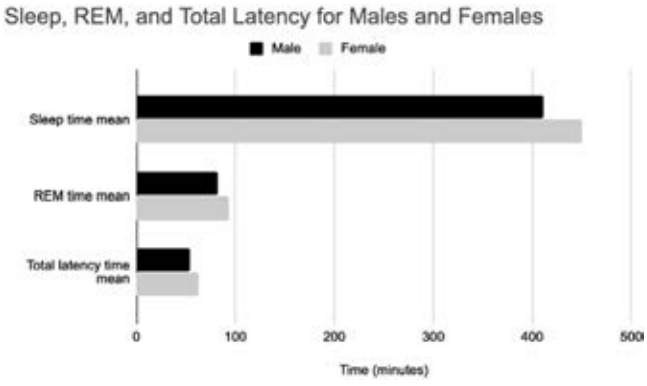
Study Objectives: Sleep is an integral part of both physical and mental well-being, and has been long revered as a delicacy during medical residency training. We sought to quantify and characterize the sleep of emergency medicine (EM) residents training at a level one trauma center in eastern PA.

Methods: This study was an IRB-approved, prospective, observational study that assessed EM residents' objective sleep data obtained from a Fitbit. EM residents gave consent to participate in the study. A Fitbit Charge 3 device was given to each resident and they were asked to wear the Fitbit at all times, except for a brief period required for weekly charging of the device. The Fitbit automatically tracks time in bed, total sleep time, and time spent in light, deep and REM sleep. The study was conducted over a three-month period. The data from each Fitbit was automatically synced to a database, Fitabase. Each resident was identified by a subject number and their identity was hidden from investigators. Data was interpreted using descriptive statistics, first taking the median time for each subject and then the mean for the group. Median times overall for female and male subjects were compared using a two-tailed t-test.



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Results: Fitbit sleep data were collected for 33 EM residents over a three month period, 10 female and 23 male. The average median sleep time per night was 423.1 minutes (7.1 hours), 450.1 for females and 411.4 for males (P=.0063). In total, 18 participants had a median nightly sleep time of less than 7 hours (54.5%), only 2 subjects had a median sleep time of less than 6 hours (6.1%), and there were no subjects with a median sleep time of less than 5 hours. The average median REM time nightly was 85.7 minutes, 93.3 for females and 82.3 for males (P=.087). The average median time spent in bed while awake was 56.5 minutes, 62.9 for females and 53.7 for males (P=.0064). This value represents the total latency, defined as the time it takes the subject to fall asleep as well time spent awake between sleep phases. In that regard, it may be used as a marker for poor sleep quality or difficulty initiating sleep.

Conclusion: Although average median sleep time in our EM residents is 7.1 hours, more than half of our residents had a median sleep time of less than 7 hours nightly. Comparatively, only 35.2% of adults in the United States sleep less than 7 hours nightly per 2014 CDC data. Females had statistically significant higher average median sleep times and total sleep latency. EM residents in particular are at risk for poor sleep hygiene given the predominance of shift work, which may be one reason many of our residents had a median sleep time of less than 7 hours nightly. For residents especially, paying attention to sleep amount and adequacy may be an important wellness tool to promote both physical and mental health.

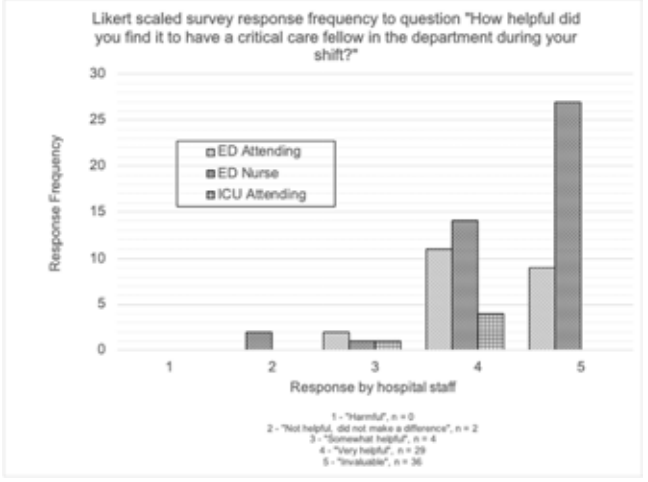
209 Assessment of a Novel Emergency Department-Based Critical Care Consult Service in an Urban Level-1 Trauma Center.

Madden L, Hockstein M, Franczak M, Moore B, Ratcliff J, Strickler S, Nugent K, Atallah H, Tekwani S, Patel D/Emory University, Atlanta, GA

Study Objectives: Multiple prior studies have demonstrated worse outcomes for critically ill patients with a prolonged emergency department (ED) length of stay. We developed an ED-based critical care consult pilot program staffed by an emergency medicine (EM)-trained critical care medicine (CCM) fellow. Our objectives were to determine the effectiveness of the pilot program through the use of surveys and to determine the amount of time spent by the fellow performing critical care or procedures.

Methods: The EM/CCM fellow worked 26 eight-hour shifts during a two-month period from October to November 2019 in the ED facilitating the care of patients awaiting beds in the intensive care unit (ICU). An anonymous Web-based survey was completed by ED nurses, ED attending physicians, and ICU attending physicians for feedback. Survey participants ranked the "helpfulness" of the consult service on a Likert scale (1 to 5), assessed whether the service improved patient care (yes/no), and provided optional open response. For all patient encounters, the EM/CCM fellow documented time spent on patient care, including procedures and interventions performed. A productivity analysis was performed to determine theoretical work relative value units (wRVU's) generated by the fellow using the published CMS physician fee schedule (cms.gov).

Results: The online survey was completed by 44 ED nurses, 22 ED attendings, and 5 ICU attendings. When asked "Did the ED critical care fellow improve patient care?", 69 out of 71 (97%) respondents answered "yes." The same number of survey participants (69/71; 97%) rated the consult service as "helpful" (Likert rankings 3 through 5). Responses to "helpfulness" of the consult service are summarized in the attached graph. There were 132 patient encounters with an average of 4.75 hours per shift of direct patient care. The average critical care time per shift was 253 minutes, which could potentially generate 3.07 wRVU per hour or 4.84 wRVU per patient by a physician. The EM/CCM fellow also supervised or performed 17 central lines, 10 arterial lines, 3 temporary dialysis catheters, 1 lumbar puncture, and 4 intubations, which are not reflected in the wRVUs.



Conclusion: The majority of nursing and physician staff surveyed considered the EM/CCM fellow "helpful" and responded favorably regarding their impact on patient care. Additionally, the clinical productivity of the fellows demonstrates that there is a notable amount of time that can potentially be billed by a critical care provider in this role. The impact of this pilot program on patient outcomes after hospital admission is currently being evaluated.

210 Association of the Affordable Care Act Provisions on Young Adult Emergency Department Mental Health Visits in California (2005-2018)

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Study Objectives: We seek to understand the differential effects of the Affordable Care Act (ACA) insurance expansion provisions on young adults. We study mental health visits in this population because of historically high rates of uninsurance and onset of 75% of mental health disorders by young adulthood. We analyze the effects of the ACA dependent care (2010) and the Medicaid expansion (2014) on emergency department (ED) mental health visits for 19-25 compared to 27-33 year-olds.

Methods: California's Office of Statewide Planning and Development Emergency Department Discharge data (2005-2018) was used to identify mental health (psychiatric and substance abuse) diagnoses. Visits by younger (ages 19-25) and older (ages 27-33) young adult populations were compared. The main outcome was per 1000 age group population rates of ED visits. A secondary outcome was the proportion of mental health visits by payer status. We test statistical significance between changes in trend for each group.

Results: There were 2,092,390 and 2,204,755 ED mental health visits in the 19-25 and 27-33 age groups respectively during the study period. In the younger population, the average percent change (APC) in ED visit rates was 10.13% (CI: 8.92, 11.35; $p < 0.05$) from 2005-2014; and 1.80% (CI: -1.08, 4.77; $p > 0.05$) from 2014-2018. In the older population, the APC was 10.93% (10.05, 11.81; $p < 0.05$) from 2005-2014; and 2.57 (CI: 0.55, 4.62; $p < 0.05$) from 2014-2018. (Figure 1a) Overall, from 2005-2018, the proportion of ED mental health visits with private insurance increased from 29% to 35% in the younger population and decreased from 27% to 23% in the older population. In the younger population, the APC for ED mental health visits with private insurance decreased -0.52% (CI: -2.91, 1.92; $p > 0.05$) prior to 2010; increased 11.14% ($p < 0.05$) per year from 2011-2012 and decreased -1.25% (CI: -2.29, -0.21, $p < 0.05$) between 2012-2018. For the older group, the APC was -1.80% (CI: -2.25, -0.23; $p < 0.05$) per year throughout the study period. (Figure 1b) From 2005-2018, the proportion of ED mental health visits with public insurance increased from 31% to 52% in the younger, and increased from 37% to 64% in the older population. For the younger population, the APC for ED mental health visits was 1.32% (CI: -0.09, 2.76; $p > 0.05$) from 2005-2013; 20.20%* from 2013-2015; and 1.85% (CI: -1.4, 5.20; $p > 0.05$) from 2015-2018. For the older population, the APC was 3.17% (CI:2.5, 3.84; $p < 0.05$) from 2005-2013; 17.18%* from 2013-2015; and 1.12% (CI: -0.17, 2.42; $p > 0.05$) from 2015-2018.

Conclusions: Analysis of ED Mental Health visit rate trends for two groups of young adults over a 13-year period provides understanding of the years and population for which ED mental health visits changed. Significantly, the effects of dependent care expansion on 19-25-year-olds are notable only when insurance type is analyzed separately. The effects of Medicaid expansion are noted in both groups prior to the 2014 national implementation deadline.

* Join point is significant at $p < 0.05$; however, due to the short duration of the trend, the confidence intervals and t-statistic could not be calculated.

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Fig 1a. Mental health –related ED visits per 1000 population from 2005-2018 in 19-25 and 27-33 year-olds

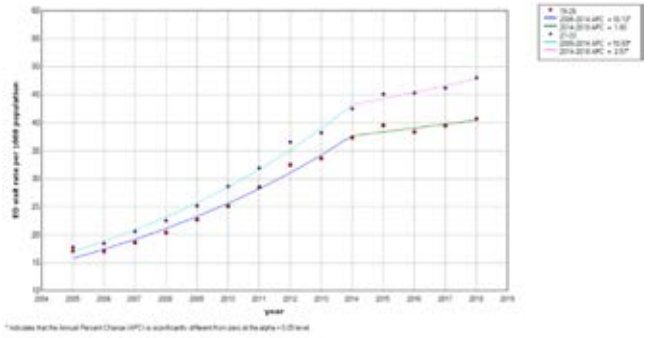
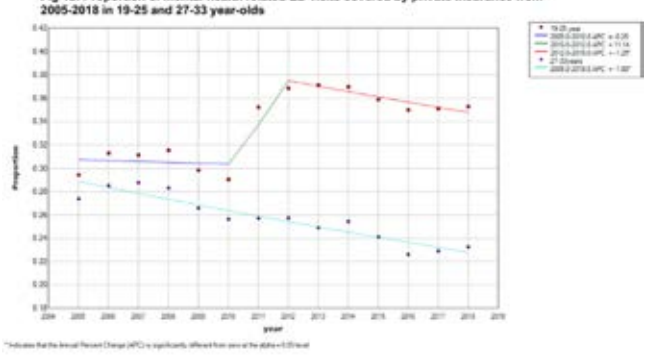


Fig 1b. Proportion of mental-health related ED visits covered by private insurance from 2005-2018 in 19-25 and 27-33 year-olds



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211 Impact of X-Waiver Training on Resident Barriers and Biases Surrounding Buprenorphine Treatment for Opiate Use Disorder

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Study Objectives: As the opiate epidemic continues, patient access to comprehensive care for opiate use disorder (OUD) remains a challenge. Buprenorphine administration in acute opioid withdrawal can lead to improved outcomes for patients with OUD, increased follow-up with addiction treatment, reduced injection drug use and fewer drug-related ED visits. Emergency providers can provide an induction to buprenorphine and a bridge to outpatient treatment. However, across the spectrum of practice, there continue to be barriers to utilization of buprenorphine, including fears of precipitating withdrawal, fears of diversion, and confusion about license requirements. Residency education on can impact an emerging generation of physicians as they develop lasting practice patterns. We examined the impact of X waiver training on these barriers among residents.

Methods: LAC+USC is an urban, tertiary care facility with a large emergency medicine residency. We conducted X waiver training for all EM residents. Prior to training, we surveyed residents on barriers and biases surrounding patients with OUD. The survey deployed was an abbreviated version of that used by Lowenstein et. al. Three months after training, residents were again surveyed regarding their comfort with buprenorphine and biases surrounding OUD. We also stratified responses by buprenorphine adoption, comparing residents who reported prescribing buprenorphine or using it to treat withdrawal, with residents who had not given buprenorphine. We analyzed surveys using matched pair t-tests; findings discussed below reached a statistical significance of $p<0.05$ unless stated otherwise.

Results: 49 of 74 residents completed the pre-training survey, and 34 of these completed the follow-up survey. Barriers and Knowledge Residents reported improved preparedness to treat aspects of OUD across all areas queried. Residents reported decreases in perceived barriers to providing buprenorphine based treatment, specifically decreases in concerns about access to care, specialty backup, insurance, and increased comfort prescribing naloxone. We also identified decreases in institution-specific barriers, including dosing protocols and resistance from senior residents. There were no significant differences in perceived barriers or statements surrounding clinical preparedness to treat OUD when we compared residents who had treated a patient with buprenorphine with those who had not. Biases after training, residents were significantly less likely to agree with the statement "patients with OUD are more challenging than the average patient" and "patients like this irritate me," and more likely to report that they felt comfortable counseling patients, prescribing buprenorphine, and treating opiate withdrawal. Residents who had given buprenorphine were significantly less likely to agree with the statement “there is little I can do to help patients like this” and more likely to report finding “caring for patients with OUD as satisfying as my other clinical activities.”

Conclusion: X-waiver training improved resident comfort providing buprenorphine-based treatment and increased comfort prescribing naloxone. Training not only increased resident perceived efficacy and preparedness to treat OUD but also decreased agreement with some bias-related statements surrounding OUD. As the opiate epidemic continues to smolder, incorporating X waiver training into residency education may improve comprehensive care for OUD.

212 Do the Milestones Addressed by Faculty in Workplace-Based Narrative Assessments of Residents Differ by Sex?

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Study Objectives: Significant sex disparities are seen throughout emergency medicine, and biases in resident assessment may contribute to differences in professional advancement. Though the adoption of ACGME milestone assessments provided an opportunity for more objective, competency-based feedback, several studies have found sex differences in quantitative milestone assessments. Less attention, however, has been given to the milestone assessments found in workplace-based narrative assessments (WBNAs), which have been shown to be useful in identifying milestone sub-competencies that are more difficult to assess. Therefore, we aimed to identify differences in the frequency of milestones assessed in WBNAs based on faculty and resident sex.

Methods: We retrospectively analyzed the content of WBNAs of postgraduate year 2-4 residents completed by faculty evaluators between the second semester of 2016 and the first semester of 2017. In each WBNA, faculty were asked to describe for each resident at least one area of strength and at least one area for potential improvement. Three investigators first established a shared mental model by reading and discussing the milestones framework. They created a guide for coding assessments to the milestone sub-competencies in an iterative process and completed several rounds of review until inter-rater reliability was satisfactory ($k<0.8$). The investigators, blinded to the identity and sex of the faculty and resident, then reviewed the WBNAs to determine which of the 23 EM-specific milestones were assessed. We performed Fisher’s exact test to determine whether individual milestone sub-competencies were addressed more frequently based on sex of faculty or resident.

Results: A total of 2,517 WBNAs were included in the analysis. Female faculty provided 1,158 (46%) of assessments. Female residents received 37.5% of assessments. At the time of the study sample collection, 47.5% of the faculty were female and 37% of residents were female. There was no interaction between sex of residents and sex of faculty assessor for any of the 23 variables. We found significant differences in the milestones assessed based on faculty sex. Male faculty were more likely to assess: General Approach to Procedures, Airway Management, Practice-based performance improvement, Professional Values, and Patient-centered communication. Female faculty were more likely to assess: Diagnostic studies, Diagnosis, Pharmacotherapy, Disposition, Multitasking, Technology, and Accountability. The only significant difference in milestones assessed by resident sex was Patient-Centered Communication, where female residents were more likely to be assessed.

Conclusion: This analysis of milestone assessment frequency for emergency medicine residents at a large, diverse, urban institution found that narrative assessments addressed milestones with relatively equal frequency based on resident sex. There were however, significant differences based on faculty sex. Male faculty were significantly more likely to provide feedback on procedural skills, whereas female faculty were more likely to evaluate residents on workup and patient management. This analysis supports faculty education on assessment for both procedural and diagnostic aspects of

emergency medicine competencies and suggests that a diverse workforce of male and female faculty may provide more comprehensive and robust trainee feedback.

213 Age Differences among Persons With Positive COVID-19 Molecular Testing Later Testing Negative for Antibodies to SARS-CoV-2

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Study Objectives: Controversies exist regarding both the accuracy and value of SARS CoV-2 antibody (Ab) testing, particularly when those with prior + molecular testing (PCR+) are later Ab-, or those testing Ab+ are PCR-. While PCR test timing, delays, technique and assays might (in part) explain PCR-/Ab+ (beyond simple "false+"), PCR+/Ab- explanations range from inadequate assays/techniques to transient, entirely absent, or delayed Ab responses. However, prior observations of other corona viruses (eg, MERS-CoV) have paradoxically indicated undetectable Ab among younger infected persons, particularly those with milder illness. The objective here was to determine if significant age or illness severity differences did exist among COVID-19 PCR+ persons later testing Ab negative, specifically comparing 2 different manufacturers' assays in two dissimilar U.S cities.

Methods: In step 1 of an ongoing study, 2 EMS agencies (1 fire, other 3rd service) in 2 well-distanced U.S. cities with different populations, evaluated PCR+ employees with subsequent (later date) IgM/IgG testing, each respectively using 2 different lateral flow chromatographic immunoassay (LFCIA) products. Among 70 volunteering at Site 1, 39 were selected as a reference group from the general population with no prior COVID-19 symptoms or testing (Sx-/NoPCR group). The other 31 (PCR+) principals had +nasal swab tests obtained between late March and end of April 2020 (for exposures or Sx). On May 9, all 70 received testing for IgM/IgG using a fingerstick (FS) LFCIA along with simultaneous venipuncture specimens (later demonstrating identical IgM/IgG congruence in the 140 samplings). At Site 2, using the other LFCIA product, 17 PCR+ persons also had FS IgM/IgG testing. Participants were surveyed (both sites) for pre-selected Sx categories, illness severity indicators, age, sex & date of PCR+ test or Sx onset.

Results: The Sx-/NoPCR reference group (n=39; mean age 45.51 yrs, range 26-75; 59% women) all tested negative for both IgG & IgM. For the Site 1 PCR+ group (n=31, mean age 41.5 yrs, range 21-81; 52% women), only 67.7% (n=21) were Ab+. Similar to the reference group, the PCR+/Ab+ subgroup mean age was 44.7 yrs (21-81 yrs) with 57% women (p=NS). However, among the 10 (32.3%) with prior PCR+ tests but no IgM/IgG, the mean age was 34.7 yrs (range 21-50) with only 40% women. Compared to either PCR+/Ab+ (n=21) or the reference group (also Ab-), age differences were significant (two-tailed, p=0.048 & 0.021, respectively). Strikingly similar, even using a different assay in a different population, 5 (29.4%) of the 17 PCR+ persons at Site 2 were also Ab- with mean ages 32.2 (27-39) vs. 42.75 yrs. (25-62) for the 12 Ab+ persons (p=0.048). Combining both sites, mean ages for PCR+/Ab- (n=15) vs. PCR+/Ab+ (n=33) were 33.93 vs 43.97 (p=0.0089). Comparing PCR+/Ab- age vs. the reference group, p=0.0028 (Table). At both sites, trends were evolving between Ab- and milder disease, women and shorter PCR to Ab testing intervals.

Conclusion: Using different IgM/IgG LFCIA products in different ecological settings, 30% of persons with prior COVID-19 PCR+ tests were Ab- at both locations and, in either venue, those PCR+/Ab- persons were significantly younger than PCR+/AB+ counterparts.

	Combined Site 1 & 2 PCR+ / Ab neg (n=15) vs.	Combined Site 1 & 2 PCR+, Ab+ (n=33)
Mean Age	33.93 yrs (range 21 to 50)	43.97 yrs (range 21 to 81)
	Two-tailed p value	= 0.008929
	Combined Site 1 & 2 PCR+ / Ab neg (n=15) vs.	Reference Group (No Sx & No Prior PCR) / Ab neg (n=39)
Mean Age	33.93 yrs (range 21 to 50)	45.51 yrs (range 26 to 75)
	Two-tailed p value	= 0.002811

TF 214 Advancing Communication Excellence at Stanford in Emergency Medicine Residency: A Curriculum for Interns

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Introduction: Effective communication is essential for patient safety and enhancing the patient experience in the Emergency Department. Effective communication also promotes efficiency in practice and a culture of wellness needed to attain professional fulfillment. Patient-centered care may conflict with physicians creating boundaries and their attempt to advocate for self-care and self-valuation in their roles as healers. With a strategic focus of developing a relationship-centered culture, the EM residency leadership, EM interns and the Physician Partnership Team in Patient Experience designed an innovative pilot using formative and summative evaluation to identify how best to deliver knowledge, and practice 3 relationship-centered communication (RCC) skills. A series of 4 workshops and individualized coaching observations were part of the design. We proposed a curriculum for EM interns focusing on relationship-centered care using the Advancing Communication Excellence at Stanford (ACES) initially designed for Stanford faculty. By teaching evidenced-based strategies on managing challenging interactions in the health care arena, we hope to provide our EM interns a curriculum to develop skills that will enhance the physician-patient relationship, while also addressing physician wellbeing.

Study Objectives: The primary objective was to learn how best to engage EM interns to learn and adopt the 3 foundational RCC ACES skills. The second objective was to design a reproducible EM RCC curriculum within the residency program based on time constraints and entry-level cognitive demands. Curricular Design: We developed a curriculum for EM interns, supplemented by individualized coaching and asynchronous learning using the flipped-classroom model. We used intern-driven scenarios and role-playing techniques to demonstrate and emphasize key communication skills. We used online surveys and text-messages check-ins to assess the effectiveness and further iterate this learner-centered curriculum. The first 3 sessions included a reflection, a check-in, demonstration of a skillset and small group practice with an ACES coach. Bedside clinical EM coaching was scheduled with each intern between sessions 3 and 4. Session 4 integrated all 3 skills with a standardized patient. This session was video-recorded and coded in addition to the immediate feedback and debrief after each encounter. This will be used in the final individual coaching session.

Conclusion: The ACES in EM Residency Curriculum is an effective way to teach communication skills that promote relationship-centered care. We have successfully integrated the RCC into the EM intern curriculum over 3 in-person, 60-90-minute workshop sessions and individualized clinical coaching. The impact will be assessed through a learner self-assessment and coaching assessment. We plan to scale this to the entire EM residency.

215 Understanding and Improving Population Health from the Emergency Department Through Medical-Legal Partnerships

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Background: Emergency departments (EDs) in the United States are mandated by federal law to stabilize and treat any person seeking emergency care regardless of citizenship, insurance, or socioeconomic status. Therefore, EDs serve as health care "safety net." As over 96 million low-income, uninsured, and undocumented individuals rely on the ED annually for medical care, the ED may be the only point of contact with the health care system. In fact, patients living under the 250% federal poverty level are more likely to have presented to an ED within the last month, in addition to having at least one baseline basic resource need. Thus, the ED offers a unique touch point to address social determinants of health, supporting innovative solutions such as medical-legal partnerships, to reduce barriers to care and improve outcomes for vulnerable populations.

The Wellness Center (TWC) at the Los Angeles County + University of Southern California (LAC+USC) Medical Center was established in 2014 as a "one-stop shop" where patients can obtain not only health care resources, but also assistance for basic social resources and enrollment in legal aid services offered by the Neighborhood Legal

Services of Los Angeles (NLSLA). In 2018, a referral program was established that connected at-risk patients seen in the LAC+USC ED to TWC.

Study Objectives: The objectives of this project are to understand: 1) social needs characteristics, 2) health care utilization patterns, and 3) rate of NLSLA referrals of patients seen at TWC.

Methods: This is a longitudinal, retrospective, observational study (January 2018 to June 2019). Patients in the ED were identified as appropriate candidates using un- or under-insurance as a proxy and referred to TWC via multimodal methods (eg, discharge instructions, TWC flyer). Patients then self-presented to TWC after discharge. Data were analyzed using SPSS Version 25.

Results: Within the study timeframe, we made approximately 36,000 referrals from the ED; 3,664 (9.8%) presented to TWC (mean age = 47.5 ± 13.3). Of these patients, 78.2% identified as Hispanic; 3,183 individuals (86.9%) were identified as living under the 250% federal poverty level. Of the referred patients, 1,395 (38.1%) reported that they primarily utilize the ED for medical care; 2,214 (60%) reported having visited the ED within the last six months. Moreover, 468 (12.8%) also reported having been admitted to the hospital within the last six months. In terms of primary care, 2,438 (66.5%) reported not having a primary care provider at LAC+USC. Approximately 2,400 referred patients (66%) described their overall health as "poor" or "fair." In terms of basic resources, 479 (13%) reported that they are currently unsheltered or are worried about housing, and 844 (23%) reported food did not last within the last 12 months. Finally, 278 (11.4%) were ultimately referred to the NLSLA from TWC for legal aid.

Conclusions: The results from the LAC+USC ED to TWC referral program supports that 1) the ED serves a diverse patient population and 2) can identify patients who are most in need not only from a medical standpoint, but also from a social and legal needs. Therefore, the ED can function as a potent referral source in medical-legal partnerships.

216 Defining Quality in the Emergency Department Care of Long Bone Fractures in Children: Identifying Parents and Youth's Priorities

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Background: Long bone fractures are a frequent reason for visits to the pediatric emergency department (ED) where patients obtain the care they require. To provide families with quality ED care, it is important to identify their care priorities.

Study Objective: To identify parents' and youth's priorities for the ED care of children with suspected long bone fractures.

Methods: This was a prospective survey study of parents/youth consulting a tertiary care pediatric ED with suspected long bone fracture. A list of family-oriented clinically relevant quality indicators was co-constructed by an interdisciplinary team of ED clinicians and parent partners and used to create 2 electronic surveys (parents and youth) asking participants to assess quality indicators for importance on 4-point Likert scales. Surveys were pretested with 12 youth and 14 parents. English/French speaking patients aged 10 to 18 years old with suspected long-bone fracture at triage – and their parents – were eligible to complete the survey during their ED stay. Friedman's test for the nonparametric comparison of related samples was performed with SPSS v.25 (IBM Inc.) to rank quality indicators as per youth's/parents' answers.

Results: From March to June 2019, 300 surveys were distributed to eligible participants; 249 surveys were completed by 148 parents and 101 youth. At least one family member from 189 families completed a survey. Respondent parents and youth had median ages of 44 and 12 years old, respectively. Parent's and youth's top 6 priorities were statistically more important than other survey items ($p<0.001$ for both). Parent's preferences could be ranked from 1 to 6 with statistical significance ($p=0.001$), while youth's top 6 priorities could not ($p=0.724$). Parents gave less importance to the ED and hospital environment (ED wait room comfort, signage), while youth did not prioritize wait times.

Conclusions: Pain management, high quality clinician-patient relationships, length of stay and the ED physical environment are important aspects of ED care for families visiting with suspected long bone fractures.

Parents' priorities (n=115)	Youth's priorities (n=80)
1. To trust the health care team.	To feel listened to.
2. To receive clear information about their child's diagnosis.	To be talked to and explained what is going on.
3. That the ED team answer their questions.	That questions be answered.
4. That the ED team treat their child's pain.	That pain be treated well and quickly.
5. That the ED visit be as short as possible.	That the waiting room be comfortable.
6. To be informed of the different steps of the ED visit.	That the signs in the hospital be clear.

EMF 217 Use of an Online Simulation Platform for Diagnostic Assessment of Entrustable Professional Activities during Transition to Residency

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Background: Entrustable professional activities (EPAs) are important competency-based, learning outcomes in medical education. There is a need for better assessment tools to be developed for the widespread implementation of EPAs.

Study Objectives: We propose the development of a web-based simulation platform to diagnostically assess senior medical students transitioning to residency on specific EPAs that are uniquely suited to online assessment. We piloted this platform to evaluate feasibility and acceptability.

Methods: We created four online simulation cases based on common chief complaints in the emergency department. A consensus panel of medical educators, emergency medicine residency faculty, and trainee stakeholders discussed case presentations and critical actions checklists for each case. The digital platform allowed learners to manage all clinical actions necessary to care for simulated patients for the purpose of EPA assessment. Two rounds of pilot testing occurred prior to implementation.

Results: The platform was asynchronously accessed by fifteen incoming emergency medicine interns. Incorrect actions that were unnecessary, harmful, or missing generated "look for" statements; these were aggregated as assessment reports for residency leadership.

Conclusion: Our study demonstrates the feasibility and acceptability of an online platform for evaluation of specific EPAs during the transition to residency. Future steps will be to generate validity evidence. Web-based applications may have the potential to provide large-scale diagnostic assessments in order to generate individualized learning plans.

218 Outcomes after Reversal of Anticoagulation after Intracerebral Hemorrhage

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Study Objective: To study whether receiving KCentra® prothrombin complex concentrate for ICH results in improved outcome.

Methods: This study is an analysis of a large hospital system database involving all adult patients who presented to any of the emergency departments in our system from January 1st, 2016 - January 1st, 2020. All patients had an intracerebral hemorrhage (ICH) as identified by ICD-10 code, and have received KCentra® a prothrombin complex concentrate (PCC) containing heparin, Factors II, VII, IX, X, Proteins C and S, Antithrombin III and human albumin for the reversal of ICH. These data were compared to an age-matched cohort of patients with ICH who did not receive anticoagulation reversal. Baseline data obtained on patients in both groups included home use of warfarin, aspirin or a direct oral anticoagulant (DOAC), history of diabetes or hypertension, and age, sex, ethnicity and ultimate discharge disposition. The primary outcomes was mortality in the reversal group compared to the no reversal

group. Secondary outcomes included prevalence of KCentra use for ICH in patients who were neither on a DOAC or warfarin.

Results:The cohort consisted of 2291 unique patient encounters who received KCentra® PCC. A total of 1309 patients who were not on warfarin at home nonetheless received KCentra® for their ICH; similarly, 1369 patients who were not on DOACs received KCentra®. The age-matched cohort comprised 5854 unique patient encounters. Table 1 shows the cohort characteristics.

Table 1.

	KCentra® (N=2158)	None (N=5854)	P-value
Median Age	77 yrs (IQR 68-84)	76 yrs (IQR 68-83)	
Male sex	57%	54%	0.01684
Hispanic ethnicity	9%	14%	P<0.00001
Diabetes Mellitus	31%	30%	NS
Hypertension	50%	58%	P<0.00001
White race	83%	77%	P<0.00001
Median LOS	5 days (IQR 1-10)	4 days (IQR 1-8 days)	
Overall Mortality	19%	11%	P<0.00001

Tables 2-4 shows the mortality rate in each of the groups based on whether or not they had reversal with KCentra®.

Table 2. KCENTRA given for ICH

	Mortality rate	N	p-value
+ Warfarin at home	16%	849	P=0.0193
- Warfarin at home	20%	1309	
+ DOAC at home	13%	796	P<0.0001
- DOAC at home	22%	1362	

Table 3. No reversal drug given for ICH

	Mortality rate	N	p-value
+ Warfarin at home	11%	304	P=NS
- Warfarin at home	11%	5550	
+ DOAC at home	6%	446	P=0.0004
- DOAC at home	12%	5408	

Table 4. comparison of KCentra mortality in patients on warfarin or DOAC

		Mortality rate	N	p-value
+ Warfarin at home	+KCentra	16%	849	P=0.00012
	- KCentra	11%	304	
+ DOAC at home	+KCentra	13%	796	P=0.09296
	- KCentra	6%	446	

Conclusion: In this hospital system database, there were a significant number of patients who were not on warfarin or a DOAC who received KCentra®. Amongst those who were, it appears that patients who received KCentra® PCC for their warfarin- or DOAC-associated ICH had a higher mortality rate than patients who did not. These results suggest that blanket anticoagulants reversal for ICH is not warranted. There is likely a subgroup of patents who benefit, but also a group that does not.

219 Successful Implementation of Universal Opt-Out Hepatitis C and Human Immunodeficiency Virus Screening in the Emergency Department

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Study Objective: In April 2020, the United States Preventative Services Task Force (USPSTF) changed its recommendations for Hepatitis C (HCV) screening to be inclusive of all adults aged 18-79. This new recommendation replaces guidance to screen only those born between 1945-1965. In accordance with this new recommendation, we as health care providers must find efficient ways to implement population-wide screening for HCV.

Methods: In January 2017, the emergency department at the Medical University of South Carolina (MUSC), in Charleston, South Carolina, started universal adult screening for HCV and human immunodeficiency virus (HIV). We created an automatic pop-up in Epic which prompted nurses in the emergency department to test for HCV and HIV if the patient did not have documentation of a negative screen for both viruses in the past year and if the patient did not opt out of testing. For patients who had a resulting positive screen, we contacted with the patient with results and offered linkage to an appointment for treatment.

Results: From 2017-2019, we found 250 positive screens for HIV and 1379 positive screens for HCV (total = 1,629). These are demographically represented in Table 1. We also examined whether these patients would have been screened for HCV under the previous USPSTF guidelines. If we had only screened patients born between 1945-1965, we would have missed 50.1% of our positive HCV screens. After patients were provided with the results of their screening test, 47.2% of HCV positive patients and 45.6% of HIV positive patients who could be contacted attended at least one medical appointment related to their diagnosis.

Conclusions: 50.1% of our positive screening results would not have been selected for screening under previous USPSTF guidelines, suggesting that other hospitals implementing universal adult HCV screening may see a spike in detected HCV cases. Additionally, our program shows that the emergency department can be successfully used to implement universal adult screenings. The new HCV screening guidelines call for all adults to be screened, but many adults in the United States do not have insurance, do not regularly see a physician, or are otherwise left out of the health care system. Under these conditions, achieving universal screening of adults may be difficult without using the emergency department, which sees all patients regardless of their insurance status and is the safety net of adult health care in the United States.

Disclaimer: The FOCUS Program is a public health initiative that enables partners to develop and share best practices in routine blood-borne virus (HIV, HCV, HBV) screening, diagnosis, and linkage to care in accordance with screening guidelines promulgated by the U.S. Centers for Disease Control and Prevention (CDC), the USPSTF, and state and local public health departments. FOCUS funding supports HIV, HCV, and HBV screening and linkage to the first medical appointment after diagnosis. FOCUS partners do not use FOCUS awards for activities beyond linkage to the first medical appointment.

Table 1. Demographics of patients with positive HIV and HCV screening results

	Positive HIV test	Positive HCV test
Sex		
Male	160 (64.0%)	896 (65.0%)
Female	89 (35.6%)	483 (35.0%)
Transgender	1 (.4%)	0
Race		
American Indian	0	3 (.2%)
Asian	0	5 (.4%)
African American	190 (76%)	466 (33.8%)
White	44 (17.6%)	871 (63.2%)
Multiracial	1 (.4%)	3 (.2%)
Unknown	15 (6.0%)	31 (.2%)
Totals	250	1379

TF 220 A Didactic Curriculum for the Emergency Medicine Sub-internship, Designed to Be Delivered by Residents

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Introduction: The emergency medicine (EM) sub-internship at OHSU is a popular and well-established four-week elective rotation for fourth-year medical students. The students are largely taught both on-shift and in didactic sessions by a third year EM resident on their "teach rotation," which is also an educational experience for the residents.

Study Objectives: We aimed to create a didactic curriculum for the medical student rotation that provides an improved didactic experience for the medical students while still being feasible for the residents to facilitate. We sought to develop a curriculum that would prepare the students to: 1) demonstrate knowledge of introductory clinical concepts of EM; and 2) perform basic emergency department procedures under direct supervision. A secondary aim was to incorporate residents in small group didactic session and interactive workshop facilitation as part of our resident-as-teacher curriculum.

Methods: We used Kern's six-step approach to curriculum development. We started by reviewing the existing didactic material to identify opportunities for improvement and to develop strategies to optimize the materials for student learning (problem identification and targeted needs assessment). We tailored the material to meet the stated goals and objectives of the course; namely, to introduce basic clinical concepts of EM, and to teach suture, splint, and ultrasound skills. For our educational strategies, we combined a skills workshop with small group learning sessions. The workshop occurs on the first day of the clerkship and covers suture, splint, and ultrasound skills. We provide the teach resident with a PowerPoint that intersperses lecture-based teaching with opportunities for students to practice each skill. We also provide the resident with an outline of suggested teaching points that complements the slides and helps to ensure students are getting a consistent and comprehensive experience each time. After the workshop, students have a total of four two-hour didactic sessions led by the teach resident. We provide the teach resident with a repository of one-hour PowerPoint-based lectures from which they and students can choose based on interest and gaps of knowledge in the group. The expectation is that the resident will teach most, though not necessarily all, of the lectures included. The lectures are designed to be interactive in the small group setting, with many including a "pass the pointer" component to encourage student participation. We designed the slides to be self-explanatory with additional information provided in the "presenter's comments" section so minimal advance preparation is required by the resident. The new curriculum was implemented in January 2020, and has been feasible to implement and acceptable to the learners. Student learning will be assessed on the clerkship final exam and in their shift assessment forms. Curriculum evaluation will be performed by collecting anonymous feedback from students using surveys distributed to students after they complete the clerkship, and the curriculum will be iteratively revised based on learner assessment and program evaluation data.

Conclusion: This didactic curriculum developed for the EM sub-internship provides a consistent didactic experience for the medical students while being feasible to implement for the teach residents who are delivering the content.

EMF 221 Development and Validation of a Text Rendering and Data Retrieval System for Extracting Clinical Information from Paper Medical Records

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Study Objectives: Despite the ubiquity of electronic health records (EHRs), the coordination and sharing of medical records as part of inter-facility transfers remain largely antiquated due to continued use of paper records. Paper records are difficult to navigate in real-time, limit information availability, and prohibit structured data extraction. We sought to develop and validate a framework to apply several technologies to distill information from paper transfer records into consistent, information-dense representations of essential information.

Methods: We developed a document pipeline that sequentially applies "filters" to transfer reports that were electronically scanned into our EHR. These include document cleaning, document structure analysis, optical character recognition (OCR), and natural language processing (NLP). Our pipeline was analyzed and compared to gold standard developed by our team, with results measured as precision, recall, and accuracy. The review was conducted at two levels: accuracy of the OCR at rendering the imaged text (characters, boxes, tables), and accuracy of the NLP at extracting a set of patient identifier classes from the text rendered by the OCR. Accuracy of text outside of regions identified as tabular data were reviewed at the level of character fidelity. The NLP-derived classes reviewed were name, date of birth, sex, race, medical record number, and Presence of CT Scan. We selected patients transferred for acute ischemic stroke evaluation as a population requiring emergent care but necessitating an understanding of what care was provided at the transferring hospital. Patient records selected from a convenience sample of inter-facility transfer records for stroke patients in 2019 were used to develop and test the pipeline.

Results: Forty-three pages were processed by our OCR-to-NLP system. Document cleaning and structure analysis took on average 1.2 seconds per page, and OCR required on average 2.2 seconds per page. Tables within scanned records were identified with a precision of 95.7% and recall of 88.7%, and component tabular data were identified with a precision of 95.5% and recall of 90.8%. Measuring the performance on text data in all page segments (both tabular & non-tabular text), with the document cleaning and structure analysis filter run first, yielded a precision of 92.6% and recall of 90.7%. OCR run without this filter yielded an accuracy of 59%. Measures of the system's performance extracting patient-identifiers, done at the level of the record, used the most frequent value per class across all pages of each record, yielding a 100% precision and accuracy of 91%. Error analysis indicates that key anchors for race and sex in some records were formatted such that the values were missed by the current NLP system.

Conclusion: Development and validation of our pipeline are ongoing; however, we have addressed several key steps of the deconstruction of scanned transfer records as demonstrated by our success with context-specific improvement of OCR, the extraction of tabular data, and our patient-identifier-based NLP system. Current and future work focuses on the evaluation of the entire pipeline including the extension of the NLP module to clinical values mapped to concepts within the UMLS. Delivery of consistent, timely, accurate summaries of important, granular information contained in often unpredictably structured transfer records by our system is feasible within our current development cycle.

222 Introducing the Emergency Department Consumer Assessment of Health Care Providers and Systems Survey

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Study Objectives: Although hospital-based EDs treat ~145 million patients annually in the USA and are the first or only contact many patients have with the health care system, there is no standardized, validated mechanism for collecting or reporting information on ED patients' experience of care. To address this deficit, the Centers for Medicare & Medicaid Services (CMS) has developed, rigorously tested, and recently made publicly available a survey instrument and implementation protocol to enable EDs to collect and evaluate their own data and understand and improve their patients' experience of care. Similar in design and content to the widely employed HCAHPS (Hospital CAHPS) Survey, the Emergency Department Consumer Assessment of Healthcare Providers and Systems (ED CAHPS) Survey aims to foster and promote standardized collection of information on patients' experience of critical aspects of ED care.

Methods: Designed for patients discharged to home (about 90% of ED patients), the survey consists of 35 questions: 24 questions about key aspects of the encounter (eg, getting timely care, doctor and nurse communication, communication about medications) and 11 demographic variables. Data from four large-scale randomized field tests of the survey conducted across over 50 hospital-based EDs nationwide, several rounds of cognitive interviews and focus groups with ED patients, and multiple technical expert panels informed the development of the survey. The survey development process followed the principles and guidelines outlined by the Agency for Healthcare Research and Quality (AHRQ) and its Consumer Assessment of Health Providers and Systems (CAHPS®) Consortium in developing a patient experience of care survey. This survey received the CAHPS trademark in April 2020. The survey, available in English and Spanish, was designed for administration by mail, telephone, and email; the Web survey version of ED CAHPS is also mobile- optimized. The ED CAHPS Survey is in the public domain and available for use at no cost.

Results: Analysis of multiple field tests of the ED CAHPS survey revealed that communication with staff is the critical element that colors patients' assessments of ED care. Another critical finding was that perceptions of ED care vary by several patient characteristics (eg, reason for visit, sex, age). Tests of several survey modes of

implementation and combination of modes, including electronic, revealed that multiple modes are necessary to adequately engage the full range of ED patients.

Conclusion: We encourage hospital-based emergency departments to adopt the ED CAHPS Survey to inform and support their quality improvement efforts. Use of the ED CAHPS is completely voluntary and data is not submitted to CMS. However, widespread adoption by hospitals, systems or states could enable future CMS initiatives in this area. A CMS Web site contains the survey itself in its mail, telephone and web modes, detailed recommended guidelines for administering the survey in each mode, technical specifications for collecting survey and administrative data, and instructions for coding and scoring: https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/CAHPS/ED.

223 Evaluation of Pneumonia Scores in Patients Hospitalized for COVID-19-Related Dyspnea

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Study Objectives: The primary objective is to evaluate the performance of pneumonia risk stratification tools in patients with COVID-19 for predicting adverse outcomes within 72 hours of admission. The secondary objective is to evaluate pneumonia scores in predicting ICU admission, mortality and hospital revisits at 7 days. An exploratory objective is to evaluate patient risk factors and pneumonia risk stratification scores on likelihood of intensive care unit (ICU) admission at 72 hours and 7 days.

Methods: This is a prospective observational study at an academic ED. Adult patients who presented with dyspnea in the ED, were hospitalized with pneumonia symptoms and under investigation for COVID-19 were eligible for enrollment. Demographic data, triage vital signs and laboratory data within 12 hours of presentation were collected via chart review and utilized for predictor variables. Adverse outcomes were defined as patients needing intensive respiratory support or vasopressor support or death within 72 hours of admission. MuLBSTA, CURB-65, and SMART-COP scores were evaluated using sensitivity, specificity and ROC curve analyses. Regression analyses were performed to determine correlations between clinical predictors and ICU admission.

Results: Of 1196 patients, 139 tested positive for COVID-19 (11.6%). The COVID-19 positive cohort was comprised of 65.5% male with a mean age of 48.5 (±15). The most common comorbidities were hypertension (41.7%), smoking history (34.5%), and diabetes (31.7%). The most common chief complaints were cough (51.7%) and shortness of breath (50.4%), while common vital sign abnormalities were fever (24.5%), tachypnea (31.7%) and hypotension (8.6%). Adverse outcomes within 72 hours of arrival were noted in 33 (23.7%) patients with 31 (23%) admitted to the ICU. Of these, 15 (10.7%) patients required non-invasive respiratory support while 21(15.1%) required endotracheal intubation. Only 5 more patients (3.6%) required ICU care beyond 72 hours of arrival. Overall mortality rate was 5%. Of the three scores evaluated for adverse outcomes within the first 72 hours, CURB-65 was the only score with significant area under the curve (AUC 0.72 [95% CI 0.61,0.83], n=63), with sensitivity of 0.07 and specificity of 0.98 at a cut-off value of 3 (admission criteria per scoring system). For the 7-day outcome, once again, CURB-65 had a significant area under the curve (AUC 0.76 [95% CI 0.66, 0.86], p=0.00) with sensitivity of 0.06 and specificity of 0.98 with cut-off of 3, while SMART-COP and MuLBSTA did not reach significance (AUC 0.56 [95% CI 0.47, 0.71], p=0.15) and (AUC 0.55 [95% CI 0.43, 0.66], p=0.41) respectively. Significant predictors for ICU admission include history of cancer, chronic kidney disease and diabetes. A higher CURB-65 score was associated with increased odds of ICU admission at 72 hours and 7 days.

Conclusion: Current pneumonia risk stratification tools have poor sensitivities in detecting adverse outcomes in COVID-19 patients. Hence, there is a need for new scoring tools to manage patients with COVID-19 related pneumonia in the ED.

224 Prospective Application of Modified NEXUS Criteria in Geriatric Fall Patients: A Prospective Cohort

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Study Objectives: The NEXUS criteria is used extensively in emergency departments to rule out C-spine injuries in the general population. Although the NEXUS validation set included 2943 elderly patients, multiple case reports and the Canadian C-spine Rules question the validity of applying the NEXUS criteria to a geriatric population. We sought to determine NEXUS adherence in geriatric patients in our ED. Additionally, we sought to validate a modified NEXUS criteria in a low risk elderly fall population with two changes: a modified definition for distracting injury (including signs of trauma to the head or neck only) and the definition of normal mentation to include any patient at his or her baseline mental status regardless of GCS score.

Methods: This is a prospective, observational cohort study of geriatric fall patients who presented to a level 1 trauma center. Enrollment took place for 8 months. Providers enrolled a convenience sample of geriatric patients who had fallen, regardless of their mental status or whether they were triaged as trauma alerts. Baseline data collection included whether patients lived independently, arrival via EMS, arrival in a C-collar, GCS, change in neurologic exam and mental status, signs of trauma to the head or neck, midline tenderness, alcohol intoxication, distracting injury, and frailty score. Study investigators then reviewed the patients' charts to determine imaging and findings and disposition. All patients underwent detailed chart review and publicly searchable database review to determine if the patients had returned for related complications or had died. Data was analyzed using descriptive statistics and Fisher Exact. The study was reviewed and approved by the IRB.

Results: 312 patients were enrolled during the study period. The median age was 84, with an interquartile range of 76-90 years. 92% of the patients had fallen from ground level, and about half came from a care facility. 27% of patients (n=84) had a GCS of 14 or less, but only 9 (3%) were altered compared to their baseline mental status. Using our modified NEXUS criteria, 170 patients were NEXUS negative. Of these, 80 had cervical imaging, all of whom were negative. 142 patients were NEXUS positive, of whom 18 did not get CTs. 5 patients had significant injuries found on CT imaging of the neck. Using modified NEXUS criteria, the sensitivity of NEXUS was 100% with a specificity of 55, and a negative predictive value of 100% (97-100). Broadening NEXUS criteria to include other distracting injuries including long bone fractures worsened the rule's specificity with no improvement in sensitivity.

Conclusion: Although our data set is currently small, it suggests with a growing body of literature that NEXUS can be safely applied in geriatric patients. In our ED, geriatric patients who are NEXUS negative frequently still undergo neuroimaging.

225 Impact of Anti-immigrant Political Climate on Latinx Families and Children's Utilization of Health Care Services

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Study Objectives: Fear of being identified as an undocumented immigrant, with risk of deportation, may constitute a major barrier to not only undocumented Latinx immigrants' access to health care, but their children regardless of their legal status. Our team has demonstrated that political rhetoric from the United States president influences Latinx adults' feelings of safety and their decisions to seek emergency department care. In this study, we sought to examine the impact of political rhetoric on feelings of safety and health care utilization in the pediatric population.

Methods: Using a previously validated structured survey, we conducted a cross sectional study from November 2018 to February 2020, interviewing a convenience sample of families who brought their child to pediatric clinics and emergency departments in San Francisco and Fresno. Our study population consisted of undocumented Latinx families (ULF), Latinx US Citizen families (LCF) and non-Latinx US families (NLF). Our survey assessed the following domains:

-Demographics (including immigration, insurance, and housing status)
-Health care access and utilization (including primary care physician)
-Perceptions of health care providers and medical settings
-Knowledge of the current president, anti-immigrant rhetoric and policy
-Perceptions of the current political climate's impact on child safety and health care access

Results: We enrolled 447 families: 135 ULF, 154 LCF and 158 NLF. The majority of ULF reported primary language was Spanish (92%) while LCF and NLF reported English as their primary language (72% and 91%, respectively). Despite having the lowest percentages of our study populations, the majority of children in ULF were legal residents/citizens (80%), have Medi-Cal (92%) and have a primary care physician (89%). ULF and LCF had the higher recall of anti-immigrant presidential statements than NLF (94% and 89%, p<0.01, respectively). Compared to NLF, ULF were more likely to believe these presidential statements/actions are currently occurring or likely to occur (95% vs. 86%, p<0.01). Perceptions of political climate had an

impact on ULF perceived child safety and health care access: 1) Feel unsafe about their child living in the US (75% vs 33%, p<0.001); and 2) Had fear of accessing care for their child at the hospital (16% vs 3%, p<0.05).

Conclusion: Presidential anti-immigrant rhetoric has had a substantial negative impact on ULFs' perceptions of child safety and decisions to seek medical care for their child. Further research should investigate the role of health care institutions in providing a setting of safety and community education with respect to immigration policy, available health care services, and barriers outside of the hospital setting to promote health care equity.

226 Emergency Department Hyperoxia Exposure and Mortality

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Study Objectives: To investigate the deleterious effects of excess oxygen exposure among patients presenting to the emergency department (ED).

Methods: The study was a retrospective cohort study of patients 18 years or older presenting to the Brigham and Women's Hospital (BWH) ED requiring mechanical ventilation from January 1, 2016 to December 31, 2017. Data were requested from the National Emergency Airway Registry (NEAR), a multi-center observational intubation registry, for patients presenting during this timeframe. Patients who were intubated at a referring hospital, died in the emergency department, or required chronic mechanical ventilation prior to presentation were excluded from the study. The NEAR data was then supplemented with our own chart review and analysis. Patients were classified into groups of hypoxia, normoxia, or hyperoxia based upon oxygen exposure post-intubation (PaO2<60 mmHg, PaO2 60-120 mmHg, PaO2>120 mmHg, respectively, according to literature).

Results: A total of 262 patients were included. ED normoxia occurred in 54 (20.6%) patients, and 202 (77.1%) had exposure to ED hyperoxia. The ED hyperoxia group had a median [IQR] ED PaO2 of 188.50 mmHg [156.00-247.50], compared to an ED PaO2 of 100.50 mmHg [81.25-110.00] in the normoxia group (p<0.001). Patients with ED hyperoxia had greater hospital mortality (26.7%) when compared to those with normoxia (16.7%), but less then hypoxia (66.7%). After multivariable logistic regression analysis, the hyperoxia group had a greater chance of dying compared to the normoxia group (adjusted OR 1.99 [95% CI, 0.91-4.77]).

Conclusion: In the ED, oxygen is often used liberally in the treatment of the critically ill. However, hyperoxia has been associated with increased mortality in patients following mechanical ventilation. In this study, we demonstrate that many ED patients are exposed to supratherapeutic oxygen levels and its potential risk of increased mortality. There is a fine line for achieving adequate oxygenation but preventing its toxic downstream sequelae. Future research with a larger sample size may be indicated to reinforce this association. The development of guidelines for more judicious use of oxygen therapy should also be strongly considered.

227 Impact of Active versus Passive Preoxygenation on Emergency Department Mortality in Kigali, Rwanda

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Study Objectives: Preoxygenation for endotracheal intubation (EI) is well studied in high-income countries (HIC). However, its effect on emergency department (ED) airway management in low- and middle-income countries (LMIC) is not well characterized. This study compared the impacts of active versus passive preoxygenation methods on ED mortality among patients presenting for emergency care and undergoing EI at the University Teaching Hospital-Kigali (UTH-K).

Methods: A prospective cohort of patients requiring ED EI, accrued continuously over twelve months (January 1st, 2017 – December 31st, 2017) with documented preoxygenation methods, were evaluated. The exposure of interest was active preoxygenation (defined as bag-valve mask or positive pressure ventilation) versus passive preoxygenation (defined as non-rebreather mask or oxygen facemask). The primary outcome was ED mortality. Collected data included: duration of preoxygenation, EI indication, clinical characteristics, and pre-intubation vital signs. Magnitudes of effects were quantified using multivariable regression models to yield adjusted odds ratios (aOR) with 95% confidence intervals (CI).

Results: Of 194 patients undergoing EI, 163 met inclusion and were analyzed. Median age was 38.7 years (IQR 6-84), 72% were male, with 52% trauma patients. Within the cohort, 73.6% received passive preoxygenation while 26.4% were actively preoxygenated. The shock index (SI) was higher than 0.9 in 45% of those with passive preoxygenation and 58.6% of those who were actively preoxygenated. The majority of both passively (68.3%) and actively preoxygenated (53.9%) patients were preoxygenated for 3-5 minutes. Actively preoxygenated patients had higher ED mortality (81.4%) as compared to passively preoxygenated patients (45.8%) (p<0.001). This translated to significantly lower adjusted odds of ED mortality for those with passive preoxygenation in multivariable models controlling for EI indication, pre-intubation oxygen saturation, pre-intubation SI, and intubation method (aOR 0.30, 95% CI: 0.11, 0.82, p=0.02).

Conclusion: In adjusted analyses, passively preoxygenated patients had much lower odds of ED mortality. This association could be due to the impacts of active preoxygenation methods or potentially unmeasured confounding factors. Further research is needed to better understand this clinical approach in LMICs where there exists limited data on preoxygenation methods in emergency care and where there are often barriers to oxygen availability.

228 Epidemiologic Differences in Respiratory Failure Due to COVID-19 in a Large Suburban Health Care System

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Study Objective: A subset of patients infected with COVID-19 exhibit respiratory failure requiring intubation. The clinical course in patients severely affected by COVID-19 requires a better understanding. Our aim is to describe the outcomes of respiratory failure in COVID-19 positive patients and compare them to those COVID-19 negative patients with respiratory failure in a single suburban health care system.

Methods: We performed a multicenter retrospective cohort study of patients admitted to the Beaumont Health system, an eight-hospital system in southeast Michigan, who underwent COVID-19 testing from 1/1/20-4/6/20. We selected patients with respiratory failure, documentation of mechanical ventilation, and a completed hospital course. We abstracted patient demographics, mode of transport to the hospital, residence from where they were transported (home, nursing facility, public) as well as lab data and information on the patient's hospital course. We then dichotomized subjects between positive and negative results for COVID-19. We compiled descriptive statistics between COVID positive and COVID negative patients as well as between those COVID positive patients who survived through hospitalization and those that did not.

Results: During this study period, 644 subjects received endotracheal intubation, 6 were < 18 years and excluded. Of the remainder 411 (64.4%) were COVID positive. COVID-19 positive patients were more often obese (BMI 35.2 vs 30.7), African American (69.1% vs 30.8%), and less likely to arrive by ambulance (35.7% vs 71.4%) or arrive from a skilled nursing facility (8.5% vs 17.2%) (all p<0.001). COVID-positive patients had an almost twofold decreased survival compared to COVID-negative patients (36.3% vs 62.6%, OR=0.34, 95% CI 0.24., 0.48). Of COVID-positive patients, survivors were younger (57.9 vs 64.9 years,p<0.001) and more often AA (39.1% vs 28.1%, OR=1.6, 95% CI 1.1,2.4). Early intubation of COVID + patients was associated with slightly shorter mean mechanical ventilation duration (78.5 vs 111 hours,p=0.09) but no difference in survival (38.5% vs 35.7%, OR=0.89, 95% CI (0.53,1.5)). Consistent with previous studies, COVID+ patients with comorbidities were less likely to survive than those without significant comorbidities.

Medical History	Died	Alive	% Alive	N
Asthma	29	13	31.0%	42
COPD	32	5	13.5%	37
ESRD	13	1	7.1%	14
Cancer	33	13	28.3%	46
CAD	36	8	18.2%	44
CHF	32	8	20.0%	40
CVA	2	3	60%	5
DM	112	42	27.3%	154
HTN	157	83	34.6%	240
No comorbidity	191	130	40.5%	321
Any Comorbity	71	19	21.1%	90

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Conclusion: Our study confirms early reports of a higher mortality in patients intubated for severe COVID-19 infection and higher rates of respiratory failure related to COVID-19 in African American patients. However, intubated survivors in our hospital system were more often younger and African American. More work is needed to clarify what physiological and socioeconomic factors are associated with severe COVID-19 infection and outcome.

229 Simulation-Based Mastery Learning for Ultrasound-Guided IV Insertion Improves CT Contrast Extravasation Rates in the Emergency Department

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Study Objectives: Computerized tomography (CT) with intravenous (IV) contrast have become an indispensable component of evaluation and management in the emergency department (ED). Contrast extravasation (CE) is a known complication of contrasted CTs, and results in direct patient morbidity, delays in care, and increased costs. Therefore, patients needing CTs with IV contrast require a reliable point of IV access. For patients with difficult IV access (DIVA), ultrasound guided peripheral IV (USGPIV) insertion is increasingly relied upon to establish IV access for critical studies. However, prior studies have shown rates of CE up to 4x higher with USGPIV compared to traditional PIV. While high CE rates may be presumed to be inherent to USGPIVs, these events may instead be related to lines placed by providers with limited and non-standardized training in USGPIV insertion. Simulation-based mastery learning (SBML) provides a potential solution to this training problem. SBML is an extreme form of competency-based training that ensures all learners meet a predetermined mastery standard when objectively tested. SBML has been shown to be highly effective for procedural training in physicians, but has been underutilized in interprofessional education. Our objective was to establish a rigorous SBML USGPIV curriculum for emergency nurses (ENs) to determine if USGPIVs inserted by ENs in patients with DIVA would result CE rates comparable to pre-intervention standards, and if CE events differed between USGPIV inserted by ENs vs non-SBML-trained physicians or advanced practice providers (APP).

Methods: We trained 21 ENs using a SBML curriculum in USGPIV insertion from September 2019 to May 2020 at an urban, academic ED. Subsequently, data was prospectively collected on all patients who underwent USGPIV insertions, and any CE events that occurred. Prior to initiating our curriculum no ENs were trained or permitted to insert USGPIVs, therefore September 2018 through August 2019 served as the pre-intervention comparison. The baseline CE event data from the pre-intervention period was obtained from a database collected and maintained independently by the radiology department. We compared CE events between the control and intervention periods. We also compared the extravasation attributable to MD/APP vs ENs since our initiative began.

Results: During the pre-intervention period there were 9249 contrast-enhanced CT studies with 67 CE events, (baseline CE event rate of 0.72%). During the intervention period, ENs inserted 737 USGPIV with a total of 168 USGPIVs used for contrast enhanced CT with 1 CE (CE event rate of 0.6%). There was no statistical difference in CE rate for EN-placed USGPIVs compared with the pre-intervention rate. Since the intervention there have been a total of 20 CE events in our ED, of which MD/APP USGPIVs are responsible for 25% (n=5) while EN-placed USGPIV account for 5% (n=1), p=0.08.

Conclusion: Despite previous reports of high CE rates with USGPIV, SBML USGPIV training for ENs results in low CE rates which are similar to previously established institutional standards. When comparing USGPIVs placed by MD/APPs and ENs, there are likely important differences in rates of CE, which may be related to differences in procedural training. Increasing attention should be paid to the quality of USGPIV training to prevent these deleterious patient outcomes.

230 Mortality Associated With COVID-19 among ED Patients in Southeast Michigan

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Study Objective: Recent data suggest that comorbidities could explain race-related differences in health outcomes related to coronavirus disease 2019 (COVID-19). Further data is needed on the relationship between race, comorbidities, and mortality due to COVID-19. Our objective was to measure the adjusted association between race, comorbidities, and mortality due to COVID-19.

Methods: A retrospective cohort study of all patients who had Covid-19 confirmed by PCR for SARS-CoV-2 and presented to one of 9 EDs within an integrated health system that cares of a racially diverse population. Patients' first encounter was included for analysis between the dates of March 7 and April 30, 2020. Through an established Covid-19 data registry that was cross-validated, we collected demographic information, Charlson comorbidities, data on obesity, insurance information, and info on low-income residential areas. Outcome assessment was complete through May 31, 2020 and included cross-checking all deaths with a state-level health information exchange. We used multivariable logistic regression to build 2 a priori models: (1) measuring association between death with demographic, socioeconomic, and comorbidities and (2) addition of ED laboratory, respiratory vitals, and oxygen treatment to model 1.

Results: There were 3,674 included patients with an average age of 58.6 ±18.1 years. A majority were female (1,972, 53.7%) and 2,040 (55.5%) were black, non-Hispanic. The overall admission rate was 63.6%. Admission rate did not differ by race but was significantly higher if patients were age >60 years (82.0% vs. 46.8%), resided in a low-income area (66.2 vs. 60.8%), or had more than 2 comorbidities (90.6% vs. 55%). Unadjusted death rates were higher in white, non-Hispanic patients compared to black, non-Hispanics (16.4% vs. 9.9%) and in patients >60 years (21.3% vs. 3.0%) or with more than 2 comorbidities (27.8% vs. 6.6%). In adjusted analyses (Table 1), the presence of comorbidities and age >60 years were highly associated with 30-day death. Black, non-Hispanics had reduced odds of death compared to white non-Hispanics patients.

Conclusions: Similar to early reports on the epidemiology of Covid-19, ED patients with comorbidities, advanced age, and physiological abnormalities in the ED had higher odds of death. To our knowledge, this is the first data demonstrating lower adjusted odds of death among black, non-Hispanic patients.

Table 1. Odds Ratios for 30-Day Mortality among 3674 Covid-19 Patients

Variable	Model 1	Model 2
	Odds ratio (95% CI)	
Male sex	1.62 (1.30 – 2.02)	1.3 (1.00 – 1.65)
2 or more comorbidities	3.29 (2.58 – 4.19)	1.94 (1.48 – 2.56)
Resides in low income area	0.94 (0.73 – 1.20)	0.94 (0.72 – 1.24)
Obesity	0.94 (0.75 – 1.18)	0.88 (0.68 – 1.13)
Black, non-Hispanic	0.67 (0.52 – 0.86)	0.66 (0.50 – 0.87)
Age >60 years	4.19 (3.04 – 5.77)	3.02 (2.14 – 4.26)
Commercial insurance	0.49 (0.35 – 0.69)	0.73 (0.50 – 1.05)
Oxygen delivery in ED	---	2.93 (2.27 – 3.78)
Respiratory rate >24/min	---	1.87 (1.45 – 2.43)
Troponin >99th percentile	---	2.89 (2.19 – 3.81)
Absolute lymphocyte < 1000/ul	---	1.41 (1.09 – 1.83)
Creatinine >1.5 mg/dl	---	1.26 (0.95 – 1.68)

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EMF 231 Investigating Psychosocial Factors, Health Behaviors, and Diabetic Control in Emergency Department Patients

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Study Objectives: While the emergency department (ED) treats patients for a short time we have the opportunity to impact long-term health through targeted intervention. The goal of this study is to identify how psychosocial factors may impact diabetic control and self-care behaviors in ED patients.

Methods: Survey and health data were collected from patients through the PRIDE registry, a prospective, observational, multicenter study conducted at Detroit Receiving, Harper University and Sinai Grace Hospitals by research personnel from the Wayne State University School of Medicine, Department of Emergency Medicine (WSUSOM EM). Enrollment was completed via convenience sampling from June 2018-March 2020. The diabetic cohort of interest was approached by highly trained WSUSOM EM research staff based on the following inclusion criteria: age $\geq$18, and self-reported or documented history of type 1 or type 2 diabetes. Patients <18, pregnant women, those who are incarcerated or in police custody, and those without a history of diabetes were excluded. For this study we focused on psychosocial and health behavior surveys compiled specifically from diabetic patients. All data utilized were collected during the patient's baseline ED visit during which time they were enrolled in the PRIDE registry. Surveys include the Perceived Stress Scale (PSS14), Socio-Economic Status Ladder (MacArthur Scale), Racism and Life Experiences Scales (RaLES), Diabetes Self Care Behaviors (SCI-R), and EQ-5D, a multi-attribute utility instrument used to assess health-related quality of life. Patients with blood glucose $\leq$300 were considered to have acute diabetic control and those with HbA1c $\leq$7% were considered chronically controlled. To assess the relationship between psychosocial variables and diabetic self-care behaviors with both acute and chronic diabetes control, we performed chi-squared analyses for categorical data and t-test for continuous data.

Results: 284 patients were enrolled in the study (44.0% male, 92.6% African American (AA), age 49.6 (14.4) yrs), of which blood glucose was completed for 258 (44.6% male, 93% AA, age 49.9 (14.2) yrs) and HbA1c was available for 143 (46.2% male, 93% AA, Age 50.3 (14.6) yrs). From these cohorts 56.2% (n=104) were acutely controlled and 17.5% (n=25) were chronically controlled. Increased age was associated with increased control in both the acute and chronic control groups (53.0 vs 46.2 years; p=0.0001 and 50.3 vs 48.1 years; p<0.0001, respectively). HTN was seen at a higher rate in both acutely and chronically controlled patients (81.7% vs 68.4%; p=0.0137; 96.0% vs 70.1%; p=0.0068, respectively). Patients with chronic blood glucose control completed fewer blood glucose tests per day (1.5 vs 2.6; p<0.0001). The SCI-R survey score was higher in patients who regularly read food labels (50.4 vs 37.9, p<0.0001) as well as in those who regularly check their glucose levels (48.9 vs 34.1; p<0.0001). Additionally EQ5D scores were higher in the acutely controlled blood glucose cohort (10.8 v 9.0; p=0.0010).

Conclusion: With both acute and chronic diabetic control we found that age and history of HTN were associated with better control. Our health behavior surveys suggest that patients achieve better control when regularly reading food labels and testing blood glucose levels, and that lower quality of life is associated with poor control. Whether addressing such issues from the ED could impact outcomes for diabetic patients warrants further exploration.

232 National Cost Savings, Length of Stay Reduction and Preventable Cancer from Expanded Use of Point-of-Care Ultrasound for Small Bowel Obstruction

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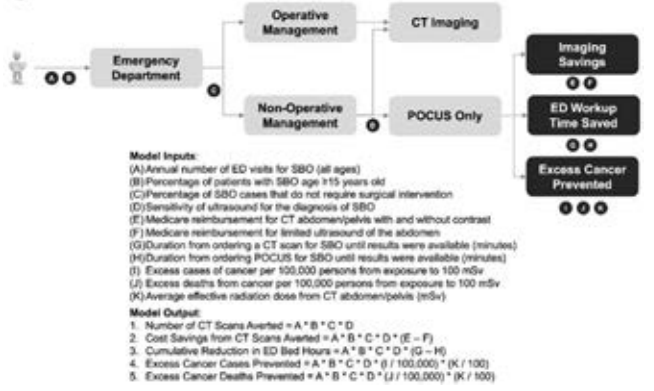
Study Objectives: Computed tomography (CT) has long been the gold standard for the diagnosis of patients presenting to the emergency department (ED) with suspected small bowel obstruction (SBO). However, point-of-care ultrasound (POCUS) has been shown to have comparable test characteristics to CT imaging and perform superior to abdominal x-ray for the diagnosis of SBO. Our primary objective was to estimate the annual cost savings in the United States by estimating the number of CT scans averted by using a POCUS-first approach for evaluation of SBO. Our secondary objectives were to estimate the reduction in radiation exposure and ED length of stay.

Methods: We created and ran 1,000 trials of a Monte Carlo simulation by building a model that uses inputs from the most recent available peer-reviewed literature and national survey data. The model assumes that all patients who require surgery and all cases for which POCUS is non-diagnostic will still undergo CT imaging. We estimated the annual number of ED patients with a diagnosis of SBO using the National Hospital Ambulatory Hospital Medical Care Survey. We calculated the direct cost of a CT abdomen and pelvis replaced with POCUS for SBO using Medicare reimbursement data from the Centers for Medicare and Medicaid Services. We estimated radiation exposure and resultant excess cancer cases and deaths using a model proposed by the Committee on the Biological Effects of Ionizing Radiation. The study population included all patients aged $\geq$15 years presenting to the ED with abdominal pain who were diagnosed with SBO.

Results: The mean ($\pm$SD) national annual cost savings was estimated to be $52.7 million ($\pm$12.1 million) from avoiding 187.6 thousand ($\pm$42.9 thousand) CT scans. This resulted in a national cumulative decrease of 658.8 thousand bed hours ($\pm$356.9 thousand) in ED length of stay. The reduction in radiation exposure to patients would prevent 270 ($\pm$171) excess annual cancer cases and 137 ($\pm$84) excess annual cancer deaths.

Conclusion: If adopted widely and used consistently, a POCUS-first approach for SBO would yield substantial national cost savings in averted advanced imaging. Further, secondary benefits would accumulate to key stakeholders through improved ED efficiency via shorter visits and preventable cancer. Clinical algorithms are needed to better identify which patients would benefit from CT imaging for SBO in the ED.

Figure 1. Monte Carlo Model



TF 233 Making Antibiotics Stick

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Introduction: Learning in medical school still involves the "fire hose model" where vast amounts of information are being unleashed upon the students who are then responsible for recalling as much as possible in order to pass the test. The challenge occurs when they make the transition from fourth year medical student to first year resident, when they need to recall the information learned, more precisely, when they need to know what information to recall. In order to facilitate this transition, I created an online module to help the students recall useful antibiotics once they start their internship and are faced with the responsibility of being a doctor. In creating this module, I am combining two well-known teaching principles, that of microteaching alongside spaced repetition. In order to take these concepts a step forward, I am combining the spaced repetition model with information retrieval as I am using the same quiz at different time intervals in order to facilitate long-term knowledge retention. This course is not intended to teach new information, but rather to allow the learner to review information once known and facilitate long-term recall.

Study objective: At the end of this elective, the student/intern will be able to recall specific antibiotics to treat different infections, from common ones to deadly ones. Along with the name of the antibiotic, the student will recall the dose, the route and the frequency.

Methods: During their emergency medicine core rotation, the learner will be enrolled in an online module composed of three sessions: two knowledge review sessions and a quiz. They will start by completing the quiz first, followed by completion

of the two educational sessions during the assigned two weeks. Within one day of completing lesson two, the learner will be required to take the same quiz again. Once the student finishes the EM rotation, they will be enrolled in spaced repetition schedule where they will be receiving emails with links to take the same quiz at progressively longer time intervals. In this way, we can use spaced information retrieval to solidify the knowledge. The two knowledge review sessions were created using Articulate 360 platform and the spaced quizzes were created using "Google forms," a free online resource.

Results: The spaced quizzes would serve both as teaching tools as well as assessment tools. The learner will also be asked to complete a 4-question survey of the course in order to fine tune the material as well as identify other potential topics suited for this format.

Conclusion: Teaching antibiotics is just one of the thousands of topics that can be adapted to this teaching format. I can easily see this format being used to teach rare EKG finding such as Brugada, DeWInter's, etc. This format could also be used to teach management of common ED presentations such as CHF exacerbation, PNA, sepsis etc. I can see creating an online database of such short, teaching modules that the learner can access at any time, modules focused on knowledge needed during "transition to the wards."

234 A Scoping Review of Current Social Emergency Medicine Research

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Study Objectives: Social emergency medicine (social EM) is an emerging field at the intersection of emergency medicine and social risks and adverse determinants that influence health outcomes; however, the breadth and scope of existing research is not well defined. We conducted a scoping review of existing research pertaining to social emergency medicine.

Methods: We conducted a comprehensive PubMed search using a combination of MeSH terms and phrases pertaining to topic areas identified using a previously published journal supplement informed by expert consensus (Ex. "homelessness," "housing instability"). For topics yielding fewer than 100 total publications, the PubMed "similar articles" tool was utilized to expand the search and ensure no relevant articles were missed. We restricted studies to those conducted in the US or Canada. Relevant studies were defined as those relating specifically to both emergency medicine and the topic area, and were independently abstracted by two investigators. Relevant publications were classified by design (original observational or interventional research, literature synthesis, or commentary) type, study site, and year. Discrepancies in relevant articles or classification were reviewed by a third investigator and resolved through discussion.

Results: The PubMed search identified 1,587 total publications, of which 37% (N=534) were classified as relevant to social EM. Among relevant articles, 77.5% (N=414) were original research, and the remainder were commentary (17.4%, N=93) or literature synthesis (5.1%, N=27). Among original research publications, 7.2% were interventional; the remaining 92.8% were observational. Topics with largest number of relevant publications were intimate partner violence (N=115), child abuse (N=104), and homelessness and housing instability (N=87). The majority of studies were published between 2010 and 2020. Research output related to firearm injury (N=55) and LGBTQ health (N=22) in particular grew rapidly over the last five years. The human trafficking topic area had the highest proportion (16.7%) of interventional studies. Over one-third (35.2%) of publications focused on pediatric patients. Research in the transportation, financial insecurity, education, employment, racism, and legal needs areas was sparse, with fewer than ten relevant publications related to EM in each topic. Overall, existing research largely focused on the increased ED utilization associated with adverse social determinants, with a small but growing body of work describing the influence of adverse social determinants to poor health outcomes. Inter-rater agreement with respect to relevant article classification was 91.8% (kappa=81.7).

Conclusion: There is substantial variation in the breadth and scope of social EM research by topic area, with increases in research output among specific topics within the past five years. The growth in research suggests increased interest, though the relative paucity of interventional studies may reflect insufficient resources or funding. A consensus-driven research agenda and dedicated funding to areas to priority areas would be useful to catalyze higher-quality research, including evidence-based interventions to improve patient outcomes for ED patients most impacted by adverse social determinants of health.

235 An Assessment of Health Care Worker Safety during COVID-19

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Study Objectives: The COVID-19 pandemic has been associated with significant occupational stressors and challenges for frontline health care workers (HCWs), including COVID-19 exposure risk. Our study sought to describe the proportion of HCWs infected with COVID-19 in a diverse sample of United States-based HCWs, in addition to evaluating potential risk factors contributing to health care worker infection, and possible psychological distress associated with infection risk.

Methods: We conducted a cross sectional survey of HCWs (physicians, nurses, trainees, EMTs, techs, hospital non-clinical staff), collected via social media platforms. Participants completed a 42-item survey assessing disease transmission risk (clinical role, work environment, availability of personal protective equipment) and mental health (anxiety, depression and burnout) risk.

Results: 3,083 HCWs accessed the survey and 2,040 participants completed at least 80% of the survey. Participants were largely from the Northeast and Southern US, with attending physicians (31.12%) or nurses (26.80%), with emergency medicine being the most common specialty represented (38.30%). Twenty-nine percent of respondents met criteria for being a probable case due to reported COVID-19 symptoms or a positive test. HCWs in the emergency department (31.64%), outpatient departments(36.16%), long term health care facilities (35.14%) were more likely to contract COVID-19 compared to HCWs in the ICU (23.17%) and inpatient settings (25.53%). HCWs that contracted COVID-19 also reported higher levels of depressive symptoms (Mean Diff.=0.31; 95% CI: 0.16, 0.47), anxiety symptoms (Mean Diff.=0.34; 95% CI: 0.17, 0.52) and burnout (Mean Diff.=0.54; 95% CI: 0.36, 0.71).

Conclusion: The physical and psychological fallout of COVID-19 is broad, particularly impacting HCWs.

236 Access to Covid-19 Testing by Homeless/ Housing-Insecure Individuals in Northeast Ohio

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Study Objectives: Homelessness and housing insecurity is a global public health issue that leads to increased mortality from a multitude of health conditions and low life expectancy. The complex interplay between medical, psychiatric and social factors raises questions about how this population accesses available health care resources. This is magnified in times of global health crises, such as the current coronavirus disease 2019 (COVID-19) pandemic. Patients experiencing housing insecurity may have limited access to health care resources, and live in settings, such as homeless shelters, that place them at high risk for COVID-19 transmission. Moreover, the high prevalence of underlying medical conditions in this population puts them at high risk for developing severe illness associated with COVID-19. Therefore, how this population accesses COVID-19 testing is of public health interest. This study's objective was to compare the testing patterns of homeless/housing insecure patients for COVID-19, as well as results, compared to the general population across a large health system.

Methods: A retrospective cohort study was conducted at the Cleveland Clinic Health System in Ohio and Florida. All patients tested for COVID-19 between March 8 and April 15, 2020 were included, including drive-through, emergency department (ED)-based and inpatient testing. Homeless/housing-insecure patients were identified based on a previously utilized address-based registry: patients listing their address as "homeless" or using the address of transitional housing/homeless shelter during at least one ED visit across the health system between 2014 and 2019. Descriptive statistics were calculated and compared with Chi-squared testing.

Results: During the study period, 21,561 patients were tested for COVID-19, 94 of whom were identified as homeless/housing insecure (0.4%). 3/94 of these patients (3.2%) tested positive for COVID-19, compared to 2,027/21,467 patients (9.4%) in the general population. Out of all patients tested, 12,776 patients had a testing site listed, 78 of whom were homeless/housing insecure. Homeless/housing insecure individuals were significantly more likely to be tested for COVID-19 in the ED setting rather than drive-through testing, X^2 (1, N = 12718) = 22.8, $p < .00001$) [Table 1].

Conclusion: In a regional health system during the COVID-19 pandemic, homeless and housing-insecure patients were reliant on the ED to access COVID-19 testing. Despite risk factors in this population for disease transmission, patients had a low likelihood of testing positive, suggesting that the disease is likely underdiagnosed in this population. Expanding testing availability outside of the ED may improve COVID-19 detection and interventions in homeless and housing insecure individuals, and thus inform public health interventions to reduce disease transmission in this high risk population.

Table 1: COVID-19 testing location

	Homeless/Housing Insecure	*Non-Homeless/Housing Insecure*
Drive-Through	9	4784
ED	69	7856
Inpatient	0	58
Total	78	12,698

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237 Do Sex and Racial Disparities Exist in Door-to-Drug Time on the Administration of TPA?

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Study Objectives: The purpose of this study is to examine the association of sex and race in door-to-drug times for the administration of tPA in the treatment of acute stroke.

Methods: This is a retrospective chart review of all patients ages 18-89 years old, that received tPA after presenting to the emergency department (ED) with an acute stroke from October 2015 to December 2018. The study site is located in a diverse suburban setting with a volume of 43,000 patients per year and is a designated stroke center. Charts were reviewed to determine door-to-drug time, sex, and race.

Results: A two-way analysis of variance (ANOVA) was conducted on a sample of 156 patients to explore the effects of sex and race on the time it would take for patients presenting with a stroke to receive tPA. The overall door-to-drug time (in minutes) for the sample was 68.7 (SD = 27.2) with the following mean door-to-drug times for groups: male not black/African American: 57.2 (n = 30), female not black/African American: 65.4 (n = 22), male black/African American: 66.0 (n = 56), female black/African American: 80.5 (n = 48). There was no statistically significant interaction effect between sex and race ($p = .487$, partial $\eta 2 = .011$). However, there was a significant main effect of sex, $F(1, 152) = 6.46$, $p = .012$, partial $\eta 2 = .041$ with higher time to receive tPA for females (n = 70, M = 72.93) in comparison to males (n = 86, M = 61.58). There was also a significant main effect of race, $F(1, 152) = 7.15$, $p < .008$, partial $\eta 2 = .045$. Patients who are black/African American (n = 104, M = 73.23) had a significantly higher time to receive tPA than non-black/African American effect on the time to receive tPA (n = 52, M = 61.29).

Conclusion: In patients presenting with an acute stroke, the American Heart Association (AHA) standards are a door-to-drug time of less than 60 minutes with a new goal to reduce the time to 45 minutes. In order to meet those standards, it is important to examine any potential barriers to the timely delivery of tPA. This study demonstrates that being female or black/African American had statistically significant effects on door-to-drug time without any interaction effect of sex and race. Racial and sex disparities in medical treatment are known to exist in multiple other diseases. Further research will be directed in determining the potential underlying causes of the results seen in this study.

238 Point-of-Care Ultrasound in Morbidity and Mortality Cases in Emergency Medicine

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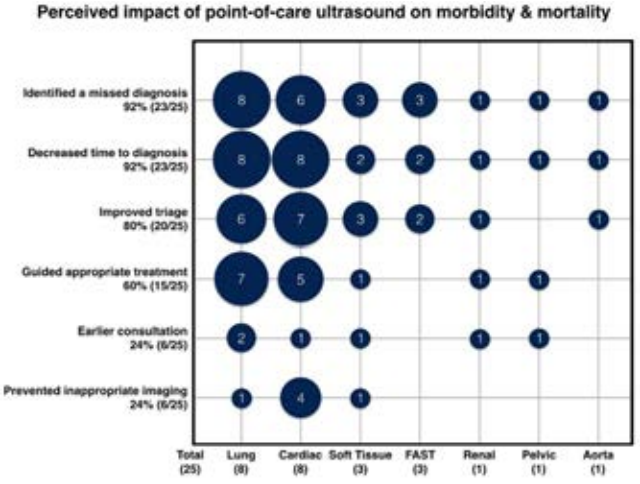
Study Objectives: Point-of-care ultrasound (POCUS) is an essential tool in the timely evaluation of an undifferentiated patient in the emergency department (ED). The study's primary objective was to determine the perceived impact of POCUS in high-risk cases presented at emergency medicine (EM) morbidity and mortality (M&M) conferences. Additionally, we sought to identify in which types of patients might POCUS be most useful, and which POCUS applications were felt to be highest yield.

Methods: This retrospective survey of cases submitted to M&M at an EM residency program which spans two academic EDs, over one academic year. PGY-4 residents who presented M&M cases at departmental sessions were surveyed on perceived impacts of POCUS on individual patient outcomes. We evaluated POCUS use and indications while the POCUS was utilized.

Results: Over the 12-month period, a total of 667 cases from 18 M&M sessions were reviewed by 15 PGY-4 residents and a supervising EM attending physician who chairs the M&M committee. 75 of these cases were selected by the M&M committee for review and presentation. POCUS was used in 27% (20/75, 95% CI 17-38%) and not used in 73% (55/75, 95% CI 62-83%). In cases where POCUS was not used, retrospective review determined that if POCUS had been used it would have "likely prevented the M&M" in 45% (25/55, 95% CI 32-59%). Of these 25 cases, the majority of POCUS applications that could have helped were cardiac (32%, 8/25) and lung (32%, 8/25) ultrasound (US). POCUS was felt to have greatest potential in identifying missed diagnoses (92%, 23/25, 95% CI 74%-99%), and decreasing the time to diagnosis (92%, 23/25, 95% CI 74%-99%). Patients with cardiopulmonary chief complaints and abnormal vital signs were most likely to benefit.

Conclusions: POCUS was felt to have potential to reduce or prevent M&M in 45% of cases in which it was not used. Cardiac and lung POCUS were among the most useful applications, especially in patients with cardiopulmonary complaints and in those with abnormal vital signs.



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239 Development of a Unified National Trauma Center Database, 2018

Bedell BR, Boggs KM, Espinola JA, Sullivan AF, Hasegawa K, Samuels-Kalow ME, Zachrison KS, Camargo CA, Jr./Massachusetts General Hospital, Boston, MA

Study Objectives: Organized trauma systems reduce morbidity, mortality, and cost. To date, no unified trauma certification system exists across the U.S., as participation in the American College of Surgeons' Verification, Review, and Consultation (ACS) national trauma certification program is not universal. Many states maintain distinct trauma certification systems with criteria that often differs from ACS. We combined these two certifications into a unified national trauma center database and compared the characteristics of ACS versus state-certified trauma centers.

Methods: We performed a cross-sectional study of U.S. emergency departments (EDs). The 2018 National ED Inventory (NEDI)-USA (a database consisting of all non-federal, non-specialty U.S. EDs) was matched to 2018 ACS and distinct state trauma certifications, obtained from ACS, state health departments, or hospital associations. For the same trauma "level," criteria across certification systems differed; therefore, two definitions were created for this study. For the "strict" definition, we reassigned all level I-III state-certified trauma centers to an ACS equivalent level by comparing trauma receiving protocol, allowed maximum response times, and general surgical coverage; through this process, levels across systems were standardized. The "loose" definition included all level I-III state-certified trauma centers, without

reassignment. These definitions were used to compare ACS and state certification system criteria. The unified database used the strict definition for improved internal consistency. Statistical analyses included chi-square, Fisher's exact, and Wilcoxon-rank-sum tests, as appropriate.

Results: In 2018, ACS certifications spanned 47 states and DC; 3 states did not participate in ACS (Mississippi, Pennsylvania, and Washington). A distinct, non-ACS state certification system was present in 47 states and DC; 3 states had no state certification system (Maine, Rhode Island, and Vermont). Of the state certification systems, 12 (25%) used exact ACS criteria, 23 (48%) used modified ACS criteria, and 13 (27%) used other criteria. Among 5,514 US EDs open in 2018, we identified 2,132 trauma centers (39%) holding certification (ACS, state, or both); 1,083 (51%) were certified levels I-III, and the rest (1,049, 49%) were levels IV-V. Of the 1,083 centers with any level I-III certification, 498 (46%) held ACS certification. Under the strict definition, 935 (86%) were state-certified levels I-III. Under the loose definition, 1,059 (98%) were state-certified levels I-III. The strict definition included 959 (89%) adult and pediatric centers levels I-III, with 21 (2%) ACS certified only, 460 (48%) state certified only, and 478 (50%) certified by both. Focusing on adult trauma centers, when compared to all other 4,608 EDs, the 906 centers under the strict definition were more likely to have higher median (IQR) annual ED visit volumes (52,000 [35,853-73,000] vs. 15,712 [6,205-35,000]) and be academic EDs (174 [19%] vs. 53 [1%]).

Conclusion: State trauma certification systems differ from the ACS standard. The differences in level I-III state criteria confirm discrepant standards for a given trauma "level" across the U.S. Increased awareness of the need for consistency across trauma certification systems may assist with further reductions in trauma-related morbidity, mortality, and cost.

240 Is Multidisciplinary Checklist Utilization Associated With Guideline Adherence or Mortality in Patients With Severe Sepsis?

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Study Objectives: Sepsis is a syndrome caused by overwhelming systemic infection without a single curative treatment, frequently associated with high mortality in the emergency department (ED). Best practice treatment is currently a bundle of interventions based on recommendations from national experts, and incentivized by Centers for Medicare and Medicaid Services (CMS) reimbursement policies. Timely adherence to these guidelines varies widely across the United States. There is broad interest in tools that could be implemented to improve adherence and patient outcomes. This study explores the association of a multi-disciplinary electronic medical record checklist with adherence and mortality for patients with severe sepsis.

Methods: A retrospective chart review was performed for all patients admitted from the ED who were assigned a sepsis diagnostic code at an urban, academic medical center from 5/24/18 to 2/28/19. CMS guidelines were used to identify all patients meeting criteria for severe sepsis and determine if treatment was adherent to the applicable bundle while in the ED. Checklist completion percentage was compared to CMS bundle adherence and patient mortality for all eligible patients. Checklist components were as follows: lactic acid within 3 hours, blood cultures before antibiotics, antibiotics within 3 hours, crystalloid intravenous fluid bolus within 3 hours (if applicable), and repeat lactic acid within 6 hours (if applicable). Checklist completion percentage was examined as a categorical variable grouped as 0%, 0-90%, 10-90%, 10-100%, or 100% using Chi-square testing.

Results: There were 197 patients meeting the CMS definition for severe sepsis, of which 79.7% (n=157) received treatment adherent to the applicable CMS bundle. Additional CMS criteria for septic shock were met in 34.7% (n=68). All-cause mortality during hospital admission was 9.2% (n=19). The checklist timer function was activated in 88.3% (n=174). Median elapsed time to checklist completion in hours was 2.88 (mean=3.65; std=4.27). CMS treatment bundle adherence was not significantly different between any categorical checklist groups. Mortality rate was not significantly different between checklist completion groups of 0%, 10-90%, and 100%, or between groups of 0% and 10-100%. Mortality rate was significantly lower in the checklist completion group of 0-90% compared to the 100% group (38.9% vs 61.1%; p=0.036). Mortality was not significantly associated with median hours elapsed for checklist completion or with bundle adherence.

Conclusion: Utilization of a multi-disciplinary checklist does not appear to impact CMS severe sepsis treatment bundle adherence in the ED. There was significantly lower mortality in patients with 0-90% checklist completion compared to those with 100% checklist completion. This disparity may be a result of critically ill patients prompting greater checklist utilization due to heightened clinical concern or anticipation of quality control review. Patients may also have received treatment without the corresponding checklist use. A larger sample size would be useful to study associations using ordinal grouping of checklist components.

TF 241 Education Soundbites: A Longitudinal Clinical Teaching Curriculum for Emergency Medicine Faculty Educators

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Introduction: Despite the importance of clinical teaching skills among core faculty in emergency medicine, little formal instruction is offered following completion of residency training. Faculty often have multiple demands, including clinical work, research, administrative duties, and teaching responsibilities. High-yield, brief faculty development modules that can be readily integrated into recurrent departmental faculty meetings can potentially improve teaching skills.

Study Objectives: After participation in this curriculum, learners should be able to: 1) Apply fundamental concepts of medical education to improve on shift-clinical teaching, 2) Demonstrate bedside teaching techniques well adapted to the emergency department setting, 3) Experiment with various teaching techniques and skills presented in the modules.

Methods: This faculty development curriculum is designed for faculty operating within an academic emergency program associated with resident and student learners. The curriculum includes eight 10-20-minute brief didactics covering key concepts in medical education in PowerPoint form. Case-based role-play can be incorporated when appropriate. Additional reading resources for learners to review following the presentations will also be available. The modules can be presented during faculty meeting or recorded and administered asynchronously in podcast format to faculty not in attendance or to faculty at remote sites and programs.

Evaluation: Faculty participants will be evaluated according to the Kirkpatrick levels. A brief survey will be administered following each module to those in attendance in order to assess learner reaction and knowledge. In order to evaluate the impact of the curriculum on behavior, results from a resident survey evaluating faculty teaching skills in the domains addressed will be compared before and after the curriculum implementation. Faculty aggregate teaching evaluations of participants will also be compared before and after the curriculum. To assess impact on the residency program, components of both the resident and faculty ACGME annual program survey will be compared pre- and post-intervention.

Conclusion: This faculty development curriculum including brief, high-yield content intended to improve clinical teaching can be easily administered in departmental faculty meetings and adapted to other learner groups, such as senior residents and fellows.

242 The Impact of Hospital Resources on Secondary Overtriage: A Population-Based Analysis

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Background: Nearly half of all injured patients transferred to trauma centers do not have a severe injury. This practice, known as overtriage, offers no clinical benefit and has significant resource implications. While certain patient characteristics have been associated with overtriage, how hospital structures and processes might contribute to overtriage is unknown. Understanding these factors is critical to system improvement and to ensuring that patients are cared for in the right environment.

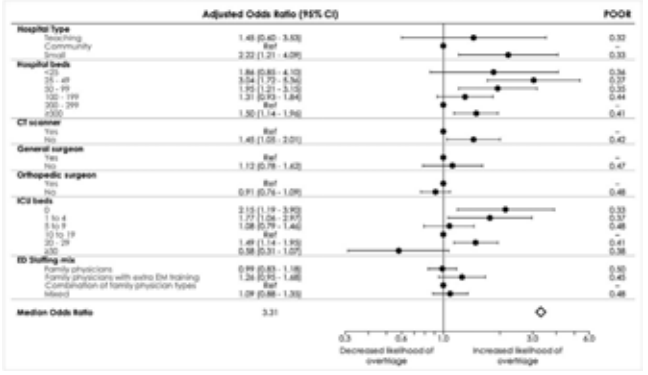
Study Objectives: To explore potential modifiable factors that lead to overtriage, we sought to evaluate hospital characteristics associated with the transfer of non-severely injured patients from non-trauma centers to trauma centers.

Methods: We performed a population-based, retrospective cohort study of a large regional trauma system. Adults who sustained a non-severe injury and presented to a non-trauma center were included. Patients were defined as having a non-severe injury if they had an Injury Severity Score < 15, survived > 24hrs, and did not have an American College of Surgeons defined critical injury. We defined overtriage as the transfer of a patient with a non-severe injury to a trauma center. The association

between hospital resources (hospital type, number of beds, access to surgical support, presence of a CT scanner, size of intensive care unit [ICU], and training of physicians staffing the emergency department) and the likelihood of a patient being overtriaged was evaluated using hierarchical logistic regression, which allowed for adjustment for patient and physician characteristics. We calculated the median odds ratio (MOR) to evaluate the variability in a patient's odds of overtriage across hospitals after accounting for case-mix and available resources.

Results: Over an 8-year period, there were 81,335 patients with non-severe injuries treated at 166 non-trauma centers - 7,802 (9.6%) were overtriaged. Adjusted analysis demonstrated that presentation to hospitals with fewer beds, no access to a CT scanner, and no or small ICUs was independently associated with greater odds of overtriage (Figure). These relationships were inconsistent across hospitals. After adjusting for patient, physician, and hospital characteristics, the median difference in a patient's odds of overtriage varied more than 3-fold across non-trauma centers (MOR = 3.31).

Conclusion and Relevance: Almost 10% of patients are transferred to a higher level of trauma care when care may be possible locally. Although presentation to smaller hospitals with fewer resources is associated with overtriage, this association is not consistent at all hospitals. After accounting for hospital resources, significant variability remains in a patient's likelihood of overtriage across centres, to the extent that hospital of presentation has a greater impact on overtriage than any specific hospital resource. These finding suggests that some centres have developed processes to identify patients who can safely be cared for locally, independent of available resources. These processes need further exploration to understand the extent to which they can be broadly implemented to ensure patients receives the right care at the right time.



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243 Spontaneous Coronary Artery Dissection in the Emergency Department: The Elusive Dissection

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Study Objective: Emergency physicians are well versed in the dangers of arterial dissection; however, there is one type of dissection that has proven to be particularly elusive. Spontaneous coronary artery dissection (SCAD) has emerged as a common cause of acute coronary syndrome (ACS) in young women. In a population that is otherwise considered low risk there is a danger of missed diagnosis. In this study we describe associated symptoms and initial diagnostic findings among those who have presented with SCAD. We aim to increase awareness of this potentially fatal diagnosis among emergency practitioners.

Methods: Subjects were those who had consented to the Mayo Clinic "Virtual" Multicenter SCAD Registry with a SCAD diagnosis as confirmed by angiography. Data were collected from both medical records and surveys following the SCAD event. Data points regarding symptoms were abstracted from survey narrative responses. Exact words were extracted when possible; however, synonyms were also used to help classify (for example, "an elephant on my chest" was categorized as "pressure/weight on chest").

Results: Of the 1196 subjects included, 95.6% were female and mean age was 46±9 years. Chest pain was reported during the initial SCAD event in 95.7% (3.8% report no chest pain, and 0.5% did not respond). The most common descriptors of chest symptoms were pain (as the only descriptor), pressure/weight on chest, and tightness with radiation most often mentioned in one or both arms or shoulders (85.1%, left more often than right). After chest symptoms, the next most frequently reported were nausea (18.9%), shortness of breath (17.8%), and diaphoresis (17.2%). Presentation included unstable angina (1.7%), non ST-elevation myocardial infarction (57.5%), ST-elevation myocardial infarction (38.5%), and cardiac arrest (8.8%), with some patients included in multiple categories in the setting of evolving changes. Most common electrocardiogram (ECG) findings reported were ST elevation (45.8%), T-wave abnormality (21.8%), and normal ECG (15.8%). Initial troponin values were negative in 20.1% of patients. There was no ECG or troponin data available in 9.8% and 14.5%, respectively.

Conclusion: Our study, developed from the largest SCAD database to date, provides insight into how SCAD presents to the emergency department. With young healthy women often considered "low risk" for ACS and common risk calculators heavily relying on atherosclerotic risk factors, it is important to define this presentation and bring awareness to emergency physicians. The data shown here emphasizes the importance of including SCAD on the chest pain differential, as well as obtaining appropriate diagnostic workup including serial ECG and troponin levels in young women who present with chest pain.

244 Emergency Department Utilization by Older Homeless/Housing-Insecure Patients With a History of Admission to Inpatient Psychiatry

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Study Objectives: The prevalence of older adults with mental illness and the age of the homeless population continues to rise as the current population lives longer. Advancing age, homelessness/housing insecurity, and comorbid mental illness are all risk factors for emergency department (ED) utilization and hospital readmission. Risk factors for homelessness such as family breakdown, unemployment, elder abuse, and cognitive impairment become more common with advancing age. Older homeless adults to have poorer health, less social support, lack of employment, longer duration of homelessness, and are more likely to have received mental health care in the past. This complex interaction between medical, psychiatric, and social factors deserves to be better understood if health care systems and community organizations are going to best deliver care to this exceedingly vulnerable and understudied population. The objectives of this study is to better understand the population of older homeless/housing-insecure adults and how they utilize ED and inpatient psychiatric services.

Methods: Patients who presented with an address of a homeless shelter/transitional housing or other standard address for homelessness at least once during the study period 2014-2019 were initially identified using concurrent electronic medical record (EMR) registration data. All patients over the age of 50 years old with at least one admission to the general adult inpatient psychiatry unit, geriatric psychiatry, or the alcohol and drug rehabilitation unit during the study period were included. Characteristics, demographic information, and common measures of inpatient psychiatric and ED utilization were examined. Data was abstracted from the EMR, and continuous measures (median [Q1, Q3]) and categorical variables (frequency) are reported.

Results: We identified 1,657 homeless/housing-insecure patients over the age of 50 with at least one psychiatric admission, representing 4,818 admissions to psychiatry and 24,494 ED visits over the study period. Overall, 930 (56.1%) identified as Caucasian and 646 (39.0%) African American; 1,080 (65%) were male; 320 (19%) were >65 years old at first inpatient psychiatry admission recorded. Most patients 1178 (71%) were admitted to the general inpatient psychiatry unit; 443 (27%) admitted to geriatric psychiatry; 351 (21%) admitted to the alcohol and drug treatment unit. This group had an average of 3.0 [1.00, 7.0] ED visits/year with 498(30%) having between 4-9 ED visits/year and 123(7%) having >10 ED visits per year. The study population averaged two admissions to psychiatry over the study period, with a 52 (3%) having 4-9 inpatient psychiatry admissions. 1,170 (71%) visited multiple system EDs during the study

period. 724(44%) had repeated ED visits in any subsequent 72-hour period and 703(42%) had >3 ED visits in any subsequent 90-day period.

Conclusion: Homeless older adults presenting to the emergency department have a high rate of psychiatric illnesses requiring admission, and are overall high utilizers of ED and psychiatric services. Gaining a better understanding of the medical, psychiatric and social needs of older homeless adults might allow for the delivery of tailored care and services in the ED for this at-risk population.

TF 245 Interactive Online Lung Point-of-Care Ultrasound Course

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Introduction: All emergency medicine residents are required to complete a point of care ultrasound (POCUS) rotation during their residency. Medical students also do the rotation as an elective. While Emory University gives the learners significant hands-on scanning time, there is no robust didactic curriculum that allows learners to gain experience with scanning technique and technology prior to scanning patients. Current interactive online curriculums are high quality but are costly. An online curriculum made by Emory faculty would have the advantage of no ongoing subscription costs and be accessible to all Emory learners. This specific course is on lung ultrasound.

Study Objectives: At the end of this course, learners will: 1) describe the normal sonoanatomy of the lung 2) Be able to perform a lung POCUS on a patient 3) recognize lung sliding and understand its implications 4) identify pleural effusions 5) recognize B lines 6) differentiate the various causes of pathologic B-lines based on their pattern 7) recognize lung consolidations as seen on POCUS.

Methods: An online course using the "Articulate" Web site was created. This is an interactive course that uses videos and imagery to keep learners engaged as they learn about lung ultrasound. The course begins with a normal lung POCUS. There are then separate sub-courses that teach about specific pathology that the learner is expected to recognize by the end of the rotation. These include pulmonary edema, pleural effusion, pneumothorax and pneumonia. After completing all the modules, the learner then takes a quiz to test what they learn. Results of the quiz will be used to guide any additional didactic needs of the learner.

Conclusions: This course will keep the learner engaged as they work through the modules, learning all the requirements for lung POCUS in an interactive way. Keeping the learner engaged will improve retention. Similar courses on other POCUS topics will be built to form a homegrown comprehensive POCUS curriculum that is low cost and can easily be edited as needed.

246 Sonographic Right Ventricular Dysfunction Predicts Acute Heart Failure Outcomes Independent of Current Emergency Department Risk Measures

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Study Objectives: Right ventricular dysfunction (RVD) on ultrasound is one of the strongest predictors of acute heart failure (AHF) risk in inpatient and outpatient studies but has not been studied in the ED. We sought to evaluate the performance of RVD-assessment on emergency physician (EP)-performed point of care ultrasound (POCUS) to predict AHF risk when compared to currently utilized measures of AHF risk stratification.

Methods: Right Ventricular Evaluation in ED AHF (REED-AHF) is an ongoing prospective observational study at two urban-academic hospitals, supported by a grant from the Blue Cross Blue Shield of Michigan Foundation. EP POCUS has been performed in 66 (of planned 123) patients with suspected AHF $\leq$60 minutes after initiation of IV diuresis, vasodilator, or non-invasive positive pressure ventilation. Ten met exclusion criteria (failure to obtain consent within 24 hours of the POCUS, or ED physician indicated that AHF was not suspected by time of disposition), resulting in a 56-person sample thus far. Patients were followed (phone) at 30 days for the primary composite outcome of AHF-readmission, mortality, new onset dialysis, intubation, acute coronary intervention and/or ICU admission. Using logistic regression, tricuspid annular plane systolic excursion (TAPSE) and free-wall RV strain (fwRVLS) were evaluated in separate models as POCUS markers of RVD for prediction of the primary outcome, adjusted for ED measures of AHF risk specified a priori: troponin, age, estimated glomerular filtration rate, ejection fraction, and chronic obstructive pulmonary disease history.

Results: TAPSE and fwRVLS were normally distributed with mean and standard deviation of 20 +/- 6mm and -17 +/- 6 strain units, respectively. Mean age was 62 +/- 13 years, while mean ejection fraction was 31 +/- 13%. The composite outcome occurred in 20 patients (36%). TAPSE was independently associated with the composite outcome (odds ratio [OR]=0.42 per 6 mm increase; 95% confidence interval [CI]:0.20-0.90), while fwRVLS showed a trend towards significance (OR=0.37 per 6 unit improvement; 95% CI: 0.27-1.02). Area under the receiver operating curve (AUROC) for the models of TAPSE and fwRVLS were 0.72 (95% CI:0.58-0.86) and 0.75 (0.61-0.89), respectively. No other risk markers reached statistical significance after adjustment for TAPSE. Further analyses including time to POCUS image acquisition, comparison of TAPSE and fwRVLS cutoffs, and sensitivity analysis for other potential confounders are pending completion of the study enrollment.

Conclusion: TAPSE obtained by EPs on POCUS independently predicted 30-day adverse outcomes. Conversely, pending completion of study enrollment, clinical risk-markers currently used for AHF risk-stratification to predict 30-day outcomes were non-significant after adjustment for TAPSE. Further studies are warranted to externally validate our results, and to assess the most effective and feasible clinical implementation of RV POCUS into a broader strategy of AHF risk-stratification by EPs.

TF 247 The EndoVaginal Ultrasound Module

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Introduction: Ultrasound has become a ubiquitous technology in the emergency department. One specific subset of bedside ultrasound skills that can be difficult to develop, however, is endocavitary ultrasound. This is typically due to unfamiliarity with the probe itself and the invasive nature of the procedure. Oftentimes, this discomfort results in the ordering of radiology-performed scans which can lead to delays in diagnoses and increased costs incurred by the patient. This instructional module was developed to improve emergency medicine resident comfort with image acquisition and interpretation using the endocavitary probe while on their ultrasound rotation.

Study Objectives: The purpose of this instructional module is to improve emergency medicine residents' understanding and knowledge of pelvic anatomy as well as technical skill with using the endocavitary ultrasound probe. It is also to apply knowledge of pelvic anatomy and bedside ultrasound skills to the common situation of appropriately evaluating a woman with first trimester vaginal bleeding.

Methods: The instructional module will begin with a short pre-test including 5 separate clinical scenarios followed by ultrasound images. After this, there is a presentation meant to be reviewed by the learner(s) prior to arrival for the in-person session. Subsequently, the resident will be led through a directly proctored session reviewing handling of the endocavitary probe and how to navigate optimal image acquisition. Finally, there will be a post-test involving both a manikin with abnormal pelvic anatomy and then 10 more clinical scenarios.

Conclusion: After completion of this module, emergency medicine residents will be able successfully obtain images using the endocavitary ultrasound probe. They will also be able to apply the information obtained with these images to patient management when treating a 1st trimester vaginal bleed.

248 Weight-Based Assessment of Sodium Supplements on Ultramarathon Performance

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Study Objectives: Sodium supplements are ubiquitous in endurance running. Their impact on hydration, dysnatremia, and running pace, all independently associated with performance, has been the subject of much debate. The objective of the study was to assess the effect of sodium supplementation normalized to body weight, as a predictor of race performance in ultramarathon runners.

Methods: Prospective observational study during an 80 km (50 mi) stage of a 6-stage 250 km (155 mi) ultramarathon in Chile, Patagonia, Namibia and Mongolia. Finish line hydration status, serum sodium, and questionnaires were gathered to define sodium ingestion categories at 33% and 66% both for weight-adjusted and true total

sodium consumption, and analyzed for significant relationships to dysnatremia, hydration, and impact on race performance.

Results:266 participants were enrolled, with 218 (82%) with complete sodium supplement rate data, with 174 (80%) with finish line sodium, and 161 (74%) with both pre-race weights and total sodium ingestion allowing for normalization of both total amount (mg/hr) and weight-based (mg/hr/kg) rate of ingestion analysis. Participants were stratified as low (<200 mg/hr; <2.79 mg/hr/kg), medium (200 to 360 mg/hr; 2.79 mg/hr/kg - 4.78 mg/hr/kg), or high (>360 mg/hr; >4.78 mg/hr/kg) sodium intake categories. Sodium intake did not impact the pace (0.99), total race time (p=1), quintile rank (p=0.4), incidence of dysnatremia (p=0.74), or quantity of hydration (p=0.7). These outcomes did not change using binary grouping around the 50% ingestion amount, assessed by temperature of race, or when excluding the 34 (27%) dysnatremic runners. When hydration status was controlled by weight-adjusted normalization of sodium intake, dehydration was found to improve performance with faster times [n = 40 (28.1%), pace = 9.4 min / km (± 2.1), time = 12.4 hrs (±2.9)] compared to euhydration [n = 62 (43.8%), pace = 10.6 min / km (± 2.8), time = 13.8 hrs (±3.7)] and overhydration [n=40 (28.1%), pace = 13 min / km (± 3.4), time = 17 hrs].

Conclusion: Sodium supplements in ultramarathon runners did not meaningfully impact ultramarathon performance. Those runners who were most dehydrated were found to have improved performance.

249 The Impact of an Electronic Medical Record Alert on Recognition and Referral of High-Risk Elders in the Emergency Department Setting

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Study Objectives: Older patients frequently utilize Emergency Departments (ED). Multiple comorbidities, polypharmacy, impaired mobility (falls), changes in mentation (delirium, dementia) and poor social support often contribute to ED visits. Traditional assessment tools, such as ISAR, to identify high-risk geriatric patients can be difficult to implement in a high volume, high acuity ED setting. We examined the impact of an electronic medical record (EMR) best-practice alert (BPA), on recognition and referral of high-risk older patients in the Emergency Department (ED) who could potentially benefit from geriatric evaluation.

Methods: Retrospective case control study in a busy academic ED with 67,000 total annual visits, and 24% geriatric (age ≥ 65 y) visits, from October 1, 2019 to May 31, 2020. In the initial program (10/1/19-3/30/20), ED providers were educated about high-risk geriatric conditions and an EMR BPA alerted ED providers to a positive (+) triage delirium screen. Starting 3/31/20, an enhanced BPA used EMR-automated recognition that also included age ≥80y, fall complaint, documented dementia history, polypharmacy (≥ 10 medications recorded), or high ED utilization (>5 visits in 1 year) in addition to the (+) delirium screen. A modified Delphi method was used to select these additional high-risk geriatric characteristics. Frequency of BPA notification and ED or ED-observation unit geriatric consultation (summed as comprehensive geriatric assessment, CGA) are reported for initial and enhanced BPA cohorts. Data was abstracted from the electronic medical record. The difference between initial and enhanced BPA encounters is reported. Analysis used SAS studio (v9.4, Cary, NC). 95% CI and p-values are reported.

Results: 7,718 geriatric patients were seen during the initial program; 1,836 were seen during the enhanced BPA program. Mean age in the initial cohort was 74.9 years (95% CI, 74.7, 75.0) and 75.6 years (95% CI, 75.1, 76.0) in the enhanced BPA cohort (p=0.002). % Female was 53.0% and 52.9%, respectively (p= 0.95). Unenhanced BPA alerts in the initial program averaged 53/month (range 45-67). BPA alerts in the enhanced program averaged 699/month. In the initial cohort, 318 (4.1%) BPA alerts led to 30 CGA. 303 (4.1%) patients for whom the initial BPA did not fire were also referred for CGA. Overall, during the initial period, 333 (4.3%) patients had CGA. The enhanced BPA resulted in 1398 (76.1%) alerts and 82 (5.9%) CGA. 14 (3.2%) BPA-negative patients were also referred for CGA. Overall, during the enhanced-BPA, 96 (5.2%) patients had a CGA. After the BPA enhancement, the proportion of geriatric evaluations increased a relative 21% (4.3% to 5.2%, p=0.09).

Overall CGA referrals averaged 56/month during initial BPA and 48/month in the enhanced period. Of note, due to COVID-19 impact, overall ED volume declined 29% and geriatric ED visits declined 30% during the enhanced BPA period.

Conclusion: This single-site study demonstrates that the EMR can be used to identify high-risk elders. An enhanced automated EMR BPA increased both ED provider alerts and, more importantly, geriatric evaluations in high-risk older ED patients. An EMR-based automated alert can be a useful adjunct to increase referrals and geriatric evaluations in the ED setting for this at-risk population.

250 Factors Associated With Need for Full Admission for Patients With Skin and Soft Tissue Infections in an Emergency Department Observation Unit

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Study Objectives: Skin and soft tissue infections (SSTI) are common and can range from mild disease treatable with oral antibiotics to severe sepsis and gangrenous infections requiring a long hospital stay for treatment. When the Emergency Department (ED) team is unsure whether the patient will need a long hospital stay, they are often placed in an ED Observation Unit (EDOU). Preliminary data suggested that our EDOU had a high admission rate for SSTI patients (45%). As part of a quality improvement effort to decrease our admission rate for SSTI, we aimed to evaluate factors present at the time of the decision to place in observation or admit for inpatient care that could be predictive of need for admission.

Methods: Retrospective review of a quality database of EDOU patients with SSTI from June 2017-December 2018. Charts were reviewed by trained, non-blinded abstractors. Data was collected in an online HIPAA compliant database using standardized forms and a data dictionary; 10% of charts underwent re-review. Exclusion criteria included patients under the age of 18, disposition changing prior to a stay in the EDOU, EDOU time <1 hour before final disposition, eloping or leaving AMA, and patients with another medical condition requiring observational status (ie, CHF, TIA). Data points included demographics, ED vital signs, cause and location of the infection, and planned procedures or consultations. Data were analyzed using univariate regression analysis to identify factors of interest.

Results: Four hundred ten patient charts were included, of which the average age was 47.3 [range 18-95] and 58% were men. The mean length of stay in observation was 14.7 hours and this did not significantly differ between admitted (24.4%, n=100) and discharged patients (75.6%, n=310). Admitted patients had an average total hospital stay of 5.4 days [range 3-16]. Patients requiring a consultation were twice as likely to require admission (odds ratio (OR) 2.37, p<.005). Other potentially significant factors included tachycardia (OR 1.57, p=.08) and hand infections (OR 1.52, p=.18). Factors that decreased likelihood of admission were location on the torso (OR 0.24, p=.01) and a procedure done by the ED team (OR 0.44, p=.10). The cause of the infection (spontaneous, diabetic wound, intravenous drug use, bite, line infection or laceration) was not significantly associated with need for admission.

Conclusions: This study suggests multiple factors to consider prospectively to better guide ED clinicians on whether observation or a full admission is necessary for a patient with SSTI. Patients who required a consultation from a surgical or infectious disease team were more than twice as likely to require admission, while those that were amenable to incision and drainage or other procedure in the ED were significantly less likely to require admission. It may be possible to derive a clinical tool to assist with admission versus observation decisions for patients with SSTI.

251 Peritonsillar Abscess Treatment Within Emergency Departments

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Study Objectives: Peritonsillar abscesses (PTAs) are common polymicrobial deep neck space infections. Current American Family Physicians guidelines and EM literature show PTAs can be safely and effectively managed in the outpatient setting with antibiotics, needle aspiration, and oral steroids. Previous studies demonstrate that patients who receive observation and needle in the Emergency Department (ED) can be safely discharged home. Therefore, the primary purpose of this project was to determine how EDs of five hospitals within a Pennsylvania network adhere to generally accepted guidelines regarding the diagnosis and management of potential peritonsillar abscesses with respect to attempted drainage, appropriate antimicrobial therapy, and initial outpatient management.

Methods: We performed a retrospective chart review to identify patients with peritonsillar abscesses in EDs of five hospitals within a Pennsylvania network during a calendar year. Information pertaining to diagnostic tests, treatment, and airway status was also collected. We used descriptive analysis to assess if EDs were consistent with generally accepted guidelines.

Results: We identified 621 patient records. Of these, 481 were excluded because they did not present to an ED or were not diagnosed with a peritonsillar abscess. Out of 140 patients, 71 (51%) patients were admitted for treatment and 23 (16%) were admitted for observation. Of the 46 (33%) patients diagnosed and discharged from the ED, 28 (61%) received a CT scan and only 18 (39%) had a needle aspiration performed. Out of all patients, 116/140 (83%) received a CT scan for diagnosis and only 22/140 (16%) patients received needle aspiration in the ED. 78/140 (56%) of patients had no needle aspiration and 40/140 (29%) patients had needle aspiration or drainage in the OR by an otolaryngologist. Of the 94 patients admitted for inpatient or for observation, 84 (89%) received a CT scan and only 6 (6%) received a needle aspiration in the ED. Overall, 87 (62%) patients were prescribed a penicillin derivative and 41 (29%) were prescribed clindamycin. 8 (6%) were prescribed a penicillin derivative and another medication and only 4 (3%) were not prescribed antibiotics.

Conclusion: Only one-third of patients with a peritonsillar abscess were managed within the ED, far less than similar studies. Of these patients, over 50% received a CT scan and less than 50% had needle aspiration performed. 83% of our patients received a CT scan in the ED demonstrating that these five hospitals are not adhering to generally accepted guidelines. Only 62% of patients were given a penicillin derivative and 29% were given clindamycin, which has no gram-negative coverage. Possible explanations for these outcomes are that providers are uncomfortable with blind needle aspiration, concerned about airway patency, or are utilizing imaging to rule out other diagnoses. Future recommendations for the network will include provider education and training on PTA management within the ED.

252 A Qualitative Study of the Experience of Abuse by Health Care Workers in the Emergency Department

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Study Objectives: To collect and perform a qualitative analysis on the narrative stories about the experiences of residents and other health care workers (HCWs) in the ED with violence in the workplace. To bring to light the types of abuse that occur in the ED and illustrate the toll it has on HCWs through sharing their narratives.

Methods: This survey research study was performed at a single, large, academic, tertiary care ED in the southeastern United States. The survey gathered demographic information and asked about the prevalence, experience, and reporting of workplace violence via both multiple choice, multiple answer, and open-ended question styles. Descriptive statistics were used to analyze demographic responses as well as the multiple choice and multiple answer responses. Narrative responses were analyzed using thematic analysis.

Results: 80% of the respondents reported at least one incident of verbal assault by a patient in the prior year. Physical assault was reported by 34%. 63% of surveyed health care workers reported feeling unsafe, and 49% reported having been asked to do something within the prior year that made them feel unsafe or uncomfortable regarding their physical or emotional well-being. Of those who experienced assault, 22% reported they felt it was motivated by race or ethnicity, 21% felt it was due to their sex or sex identity, 21% related it to their age, and 2% to their sexual orientation. Of those who had experienced physical assault or violence, 20% filed a formal hospital incident report or police report, while another 19% did not discuss the incident with anyone. Examples of narratives within each theme include the following: Assault/Threats "I was told by a patient that his 'groin' hurts and during GU examination, I was told that his pain would go away if I stroke the shaft of his penis." Feeling Unsafe "A patient became upset related to narcotics and threatened to kill staff. He was escorted out but only to the hospital front door. He was waiting in the ambulance bay when I got off work at 2am and I had to quickly get back inside and call hospital police." Resignation "Workplace violence is unfortunately part of the job. It's concerning that charges can be filed against a health care professional for too much force but nothing can be done when a patient punches, kicks, bites, scratches, pulls hair, or generally assaults you. I'm not here to get beaten up. This culture needs to change before a nurse gets killed by a patient." Impact on care "I've experienced multiple encounters with intoxicated patients being verbally abusive and threatening. It has definitely impacted my ability to provide care."

Conclusion: Together, these narratives provide a glimpse of the experiences of abuse and the personal toll that it takes. Further research is needed on this topic to develop and implement successful measures to reduce the prevalence of violence against HCWs and to mitigate the emotional toll the violence and abuse take on residents and other HCWs.

253 Investigating the Relationship between 72-hour Revisits to the Emergency Department and Initial Emergency Service Index Triage Levels

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Study Objectives: Revisits within 72 hours of discharge are a commonly used indicator of quality care in the emergency department (ED). Patients who revisit the ED within 72 hours potentially received insufficient initial assessment and subsequent treatment, prompting researchers to identify characteristics of the population such as initial triage level. Studies conducted in Singaporean and Taiwanese tertiary hospitals found that most patients in their 72-hour revisit population were Emergency Service Index (ESI) level-3 at triage. This study aims to characterize the relationship between initial triage level and ED revisits within the 72-hour revisit population in a large urban New York medical center.

Methods: Patients who revisited the Long Island Jewish Medical Center (LIJMC) ED within 72 hours of initial discharge were identified using an Allscripts software extension from August 2018 to January 2019. 502 patients were identified, and a retrospective chart review was conducted to identify their initial triage level at their first visit. REDCAP was used to maintain a database of the initial triage levels of the 72-hour revisit population. A chi square test was used to determine the statistical significance of the findings in comparison to the total ED population.

Results: In the 72-hour revisit population 27.3%, 87.5%, and 4.4% of patients were ESI levels 2, 3, and 4, respectively. In 2019, 25%, 61%, and 13% of all patients in the ED were ESI levels 2, 3, and 4, respectively. For each ESI-level (2,3, and 4), a chi square test was conducted comparing the 72-hour revisit population to the general 2019 ED population and a statistically significant difference was found for each ESI-level ($p < 0.01$). These results display a significant relationship between initial ESI-level 3s within the 72-hour revisit population.

Conclusion: The results corroborate the previously demonstrated relationship between ESI-level 3 initial triage levels and 72-hour ED revisits. Future studies may investigate features specific to patients who revisited the ED with and initial triage ESI-level 3 in efforts to prevent unnecessary revisits.

254 Comparing 2017 Medicare Reimbursement of Emergency Physicians by Sex

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Study Objectives: Little is known about variation in services provided to Medicare beneficiaries by male and female emergency physicians. The aim of this study is to compare sex differences in the number of Medicare patients seen, the medical complexity of those patients, the number of services provided per beneficiary, and amount earned per patient encounter.

Emergency Physician Sex	Number of Medicare Beneficiaries	Number of Services/ MedicareBeneficiary	Total Medicare Payment Amount/Service	Total Medicare Payment Amount	Average HCC Risk Score of Beneficiaries
Female	358	1.54	$83.59	$48,708.41	2.15
Male	439	1.72	$79.15	$59,897.14	2.10

Methods: Data used in the study were obtained from the Medicare Physician and Other Supplier National Provider Identifier (NPI) Aggregate Report 2017 from the Centers for Medicare and Medicaid Services Web site. This online interactive dataset provides information regarding the services and procedures provided to Medicare Part B beneficiaries based on claims data organized by NPI and service code. Claims data submitted by emergency physicians in 2017 were analyzed; providers who did not have sufficient data regarding sex, credentialing, or complete claims data were excluded.

Results: Out of 1,088,687 listed health care providers on the dataset, 43,792 were listed as emergency physicians. Of these, 2,031 physicians were excluded because they were not located in the United States or failed to indicate relevant information such as credentialing, sex, number of Medicare beneficiaries, number of services, total Medicare payment amount, and average HCC Risk score of beneficiaries. A final total of 41,761 emergency physicians were included in the study. Of these, 11,537 (27.63%) were women and 30,224 (72.37%) were men. Overall, female physicians saw a number of 358 patients per billing cycle compared to a number of 439 patients seen by men. In addition, female physicians performed fewer services per Medicare beneficiary than their male counterparts (1.54 services vs. 1.72 services). Together, these differences resulted in women billing Medicare significantly less per billing cycle compared to men: $48,708 vs $59,897. Notably, Medicare beneficiaries treated by female physicians had a slightly higher hierarchical condition category (HCC) score than beneficiaries treated by male physicians (2.15 vs 2.10). Female physicians were also noted to earn slightly more than males per service provided ($83.59 vs $79.15).

Conclusion: Based on the data presented, in 2017, female emergency physicians treated fewer Medicare patients, performed fewer services per beneficiary, and received less reimbursement from Medicare than their male counterparts. Female physicians also saw slightly higher complexity patients, as measured by the HCC score, and earned a slightly larger amount per service provided. These difference may be related to patient sex differences in patient selection or practice location, as both of these could contribute to the billing differences seen in our data but cannot be analyzed with the database used here. Future studies are needed to confirm whether these trends have been consistent over time and to determine what factors are contributing to these sex discrepancies.

255 Stethoscope Cleaning Practices and Knowledge Amongst Health Care Providers

Kalra S, Musselwhite C, Peacock WF/University of South Alabama, Mobile, AL; Baylor College of Medicine, Houston, TX

Study Objectives: Stethoscopes have been proven to harbor pathogens, especially in settings with high acuity and rapid patient turnover. CDC has published medical equipment guidelines to minimize risk of transmission for infections. We performed a survey assessing practice patterns for cleaning stethoscopes amongst health care providers working in the emergency department setting.

Methods: This study was a survey which obtained de-identified information from providers assessing their cleaning practices and methods while using stethoscope and their knowledge about stethoscope practices. Surveys were collected in person from providers during EM meetings and in ED of level 1 trauma centers. Data analysis was completed using STATA 12. Descriptive statistics were used for data analysis.

Results: Of the 400 respondents, everyone had cleaned their stethoscope at least once over the last 6 months at the time of filling the survey. 57% (228) providers reported cleaning their stethoscope at the end of their shift. Of the 57% that cleaned their stethoscope, 22%(88) used disinfectant wipes, 62%(248) used alcohol swabs. 96% (384) providers had never taken their stethoscope apart for cleaning. 77% (308) people determined it was time to clean their stethoscope if it looked dirty. No respondent had ever cultured their stethoscope to ascertain the growth of microorganisms. 100% responders acknowledged that stethoscopes are vectors of infection. 44% (176) responders disagreed that disposable stethoscopes were a solution for contamination and 97% (388) reported that the quality of auscultation was poor compared to their primary stethoscope.

Conclusion: Stethoscopes are an integral part of care in emergency department setting. Every provider in the emergency department setting agrees to the fact that stethoscopes are vectors of infection, however there are no guidelines addressing standard of care in stethoscope cleanliness. There was a 20,000% increase between the observed cleaning rate and the self-reported survey rate of stethoscope cleaning. Survey data does not reflect the real time data collected from various studies.

256 Has the COVID-19 Pandemic Adversely Affected Measure of Burnout and Empathy in Emergency Medicine Residents?

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Study Objectives: To determine the levels of burnout and empathy amongst EM residents during a time of pandemic as compared to the previous year.

Methods: In June of 2020, three months into the COVID-19 pandemic and nearing the end of the academic year, EM residents in a suburban 4-year program were surveyed utilizing the Maslach Burnout Inventory (MBI) and the Jefferson Scale of Empathy (JSE). Surveys were presented online utilizing the Qualtrics® online platform. Anonymity was assured. At the time of this survey over 6000 patients had tested positive for COVID-19 in the hospital network. In one of the two hospitals, EM residents manage the care of the patients on the Intensive Care (ICU) service. Many participants had been required to work extra shifts and additional ICU months to cover the increased number of critical patients and to cover residents who could not work due to COVID-19 illness or exposure. These metrics were compared with matched historical data from second and third-year residents completing the survey one year previously.

Results: A total of 54 of 57 residents responded to the survey for a response rate of 95%, however 7 declined to have their data used for research, giving us an analyzable response rate of 83% (28 males and 19 females). A total of 13 first-year, 9 second-year, 12 third-year and 13 fourth-year residents responded. The median age was 31 years (IQR 29-34). There was no difference by PGY year in the JSE score (range 20-140), average 108.0 (IQR: 99-117), $p>0.05$). There was also no difference by PGY year in any of the MBI categories. Emotional exhaustion scores revealed 31.9% high, 29.8% moderate, and 38.3% low levels. Depersonalization scores ranged from 38.3% high, 40.4% moderate and 21.3% low levels. Personal Accomplishment scores which are scored inversely (higher is better) ranged as follows: 19.2% high, 34% moderate and 46.8% low. Males were more likely than females (28.6% vs. 5.3%, $p=0.01$) to have high levels of Personal Accomplishment. Females were more likely than males to have (57.9% vs. 17.9%, $p=0.01$) moderate levels of Personal Accomplishment. Females [111 (IQR 103-123)] and males [106 (97-116)] had similar levels of empathy on the JSE; $p=0.18$. No significant difference was found in any of the four metrics measured when matched with the 15 residents who took the same survey in 2019; $p>0.1$ (see Table).

Conclusion: As measured by commonly utilized metrics, EM residents in all years showed concerningly high or moderate levels of Emotional Exhaustion and

Depersonalization (61.7% and 78.7%). Females and males demonstrated similar levels of empathy but females were less likely than males to have high Personal Accomplishment scores. Although these results, indicating high rates of burnout in EM residents, remain a concern, there is no evidence that the current pandemic has negatively impacted these metrics.

Table. 2019 and 2020 matched data (n=15)

	2019	2020	p-value
Jefferson Scale of Empathy (JSE) (range 20 to 140)median (IQR)	109.0 (99.0-120.0)	110.0 (101.0-117.0)	0.6819
Maslach Burnout Inventory (MBI)			
Emotional Exhaustion (range 0 to 54)median (IQR)	23.0 (19.0-32.0)	20.0 (15.0-28.0)	0.1231
Depersonalization (range 0 to 30)median (IQR)	15.0 (6.0-16.0)	11.0 (7.0-14.0)	0.1309
Personal Accomplishment (range 0 to 48)median (IQR)	37.0 (34.0-42.0)	39.0 (34.0-43.0)	0.3607

257 Are Stethoscopes and Infection Control Enemies?

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Study Objectives: The hands and the stethoscope share the same bacteria. While frequent hand washing is the clinical norm, stethoscope hygiene is rarely performed. The placement of disposable barriers on the stethoscope diaphragm has demonstrated to provide an aseptic point of contact, but their effect on auscultation has not been evaluated. Our purpose was to determine if the placement of an aseptic barrier on the stethoscope diaphragm (DiskCover, AseptiScope Inc, San Diego, CA) interferes with its acoustic capability.

Methods: Using a simulation mannequin and a digital stethoscope (Littmann® 3200, 3M™, Maplewood, MN), we evaluated health care provider's ability to determine 15 seconds of each of 4 auscultation sounds, with and without an aseptic barrier, the presence of which they were blinded. Digital files of sounds were recorded and analyzed on Logic Pro X to generate objective data of sound amplitude. This difference was analyzed using Wilcoxon Rank Sum test. We also compared the accuracy of auscultation between standard disposable stethoscopes to that of the recording stethoscope with a barrier, which was analyzed using McNemar test.

Results: In 800 auscultations, there were no differences in auscultation accuracy by physicians, with (n=400) and without (n=400) a barrier, and no differences in the digital acoustic output tracing (see Table 1). Of 220 auscultations, auscultation mis-diagnosis occurred in 10.9% (n=12/110) of the disposable stethoscope, vs 0% (0/110) with the barrier protected recording stethoscope. Physician's preferences were uniformly for the aseptic barrier on the recording stethoscope.

Conclusion: Aseptic barriers are acoustically invisible and offer a superior, physician preferred, alternative to disposable stethoscopes.

258 Detection of Delirium among Older Adults in the Emergency Department Through the Utilization of 4AT

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Study Objectives: Older adults make more than 20 million emergency department (ED) visits annually, accounting for over 15% of all ED visits. Among older adults, change in mental status or delirium is the frequent cause for presentation to the ED. Delirium accounts for 11-42% of hospitalizations contributing $152 billion to health care expenditures annually in the US. Overall detection of delirium in ED is poor, with ED providers missing delirium in up to 75% of cases. The goal of this study was to assess the detection of delirium among older adults through the utilization of 4AT in a high flow, high acuity ED.

Methods: We conducted a single-center, retrospective chart review in a busy academic ED with 67,000 total annual visits, and 24% geriatric (age $\geq$ 65 y) visits, from 9/24/2019 to 5/24/2020. Prior to the study period, delirium assessment tool-4AT was built into EMR and appropriate workflow was designed. 4AT was performed at the time of triage on patients meeting following criteria: 1) Above age 65 years old with presenting complaint of altered mental status or 2) Above age 80 years old with any clinical presentation. Delirium was defined as: Positive 4AT score regardless of chief complaint to ED. A positive 4AT score was defined as 4 or greater.

Results: A total of 2,680 eligible patients were assessed during the defined study period. 1, 596 patients underwent 4AT and in 1,084 patient 4AT was not performed. A positive 4 AT was found in 300 individuals, regardless of presenting condition. Among individuals presenting with altered mental status (according to the 4AT screening question), a positive 4AT was found in 176 individuals. A positive 4AT was found in 124 individuals not originally presenting with complaint of altered mental status (according to the 4AT screening question). Overall delirium detection rate via 4AT was found to be 18.96%.Utilization rate of 4AT for eligible patients was around 60%.

Conclusion: Previous studies have suggested use of 4AT for rapid delirium assessment in an ED because of its ability to be performed quickly- approximately 2 minutes- and is the only scale affording high sensitivity and specificity in older adults with and without dementia. Although completed in Irish and Canadian studies, validation of the use of 4AT in an US ED environment has not yet been completed. In our study, utilizing 4AT we find a delirium detection of 18.96 %(300) which is consistent with previous studies of rates of delirium among older adults in an ED setting. We also discovered that 7.7%(124) individuals were found to have a positive 4AT despite not originally presenting with altered mental status, indicating cases of delirium that may have been missed if a delirium evaluation (4AT)had not been completed. This study also highlights challenges in implementing delirium screening/assessment in fast-paced ED environment.

259 Correlation of Outpatient Laboratory Values With Acquired Immunodeficiency Syndrome-Defining Events in Older Emergency Department Patients

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Study Objectives: With improvement in antiretroviral therapies, human immunodeficiency virus (HIV) life expectancy is increasing, giving rise to a growing

Table 1. Auscultation accuracy with and without an aseptic barrier

Auscultatory sound	Accuracy with aseptic barrier N (%)	Accuracy without an aseptic barrier N (%)	Digital tracing amplitude difference between with and without an aseptic barrier N (%)	p-value
Normal heart sounds	80(20)	80(20)	0	1.00
Systolic Murmur	100(25)	100(25)	0	1.00
DiastolicMurmur	100(25)	100(25)	0	1.00
Wheeze	120(30)	120(30)	0	1.00

older HIV population. Little is known about management of this population in the emergency department (ED). While CD4 count and Viral Load (VL) determine risk for an acquired immunodeficiency syndrome-defining event (ADE), these values are often unknown in the ED setting. In this study, we aim to correlate outpatient CD4 and VL values with the risk of an ADE diagnosis in subsequent ED visits amongst a group of older HIV patients, and assess which value plays a stronger role in predicting ADE risk.

Methods: This study was a single-center retrospective analysis that investigated a convenience sample of HIV patients who were ≥50 years and seen in an HIV clinic in 2018 with either a CD4 count below 200 cells/mm3 and/or a detectable viral load. The ED visits of these patients at the same institution were reviewed, including emergency presentations between January 2017 and December 2019, to capture a range of dates before and after clinic evaluation. Data regarding patient demographics, CD4 count and VL within 1 year prior to ED visit, ED diagnosis, and inpatient diagnostic workups for ADEs were abstracted and reviewed. Well controlled CD4 was defined as ≥200 cells/mm3, and well controlled VL was defined as <200 copies/mL. 95% confidence intervals were calculated based on binomial distributions.

Results: Of 3,393 HIV clinic patients, 1966 individuals were over the age of 50 years old at the time of an ED visit, and of these patients, 459 had either a detectable VL and/or a CD4 count below 200 cells/mm3 in 2018. Amongst these 459 patients, 609 ED visits were captured. 35 ED visits (5.7%) ultimately led to a diagnosis of an ADE. Figure 1 compares the percentage of ED visits associated with an ADE based on different combinations of outpatient CD4 and VL values. The greatest rate of ADE was seen when both CD4 and VL were poorly controlled (20.0%; P= <0.001). However, when CD4 was well controlled and the VL was not, the rate of ADE was 7.9%, compared to a rate of 5.1% of ADE when VL was well controlled while CD4 was not. This difference was not statistically significant.

Conclusions: In this study of older HIV patients identified to be at risk of AIDS, outpatient CD4 and VL values both correlate with an ADE at the time of an ED visit. This preliminary data may suggest that a high outpatient VL is a more important marker than low CD4 count for an ED presentation that leads to an ADE diagnosis, but larger studies are needed to show statistical significance.

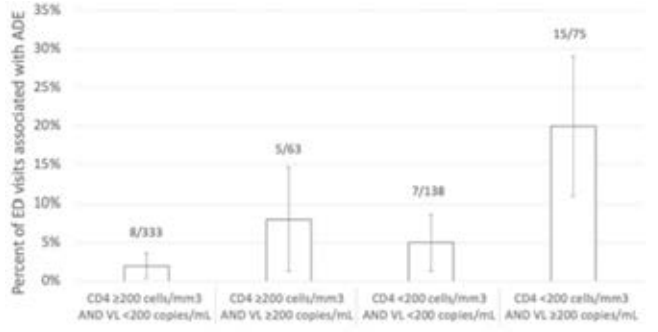

Figure 1. ED visits categorized by outpatient CD4+ and VL values and percent associated with ADE diagnosis. 95% CIs are indicated by the error bars.

web 4C/FPO

260 Risk Factors for Mortality in Emergency Medicine Morbidity and Mortality Cases

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Study Objectives: The morbidity and mortality (M and M) conference is a time-honored educational forum used in Emergency Medicine (EM) training programs to analyze errors and identify quality issues. However, little is known about the content of M and M conferences, and specifically if there are identifiable factors which may place a patient at a higher risk of mortality. We aimed to identify risk factors which may place a patient at high risk for mortality in EM M and M cases.

Methods: This is a retrospective chart review of consecutive M and M cases presented at EM conference at a high-volume suburban EM residency program between March 2011 and April 2019. A literature review identified several risk factors for poor outcomes in EM patients and these risk factors were extrapolated from the charts. Patients who had either a morbidity or mortality were identified. Bivariate analyses were used to examine the association of patient-oriented and nonpatient-oriented risk factors and mortality. Forward variable selection was further employed to identify significant risk factors for the logistic regression model in predicting the presence of mortality.

Results: A total of 138 M and M cases were reviewed and 6 had no morbidity or mortality, resulting in 132 cases used in final analysis. 33 (25%) M and M cases involved a mortality. Results of bivariate analyses show that patient-oriented risk factors, including extremes of age, renal disease, altered mentation, hypotension, hypoxia, and a history of a recent fall, were significantly associated with the increase of mortality risk. Nonpatient-oriented risk factors associated with a significant increased mortality risk included an increased time to provider and a higher ESI score. Tachycardia, lung disease, training level of provider, time of day, repeat visit, and transitions-of-care were not associated with an increase in mortality. A multivariable logistic model further exhibits that renal disease (aOR 4.15, 95% CI 1.23-14.01, p=0.02) and altered mentation disease (aOR 5.37, 95% CI 1.87-15.45, p=0.002) highly predicted the presence of mortality (C-index 0.76, 95% CI 0.67-0.87).

Conclusion: This study identified several risk factors associated with an increased mortality in cases presented at our EM M and M conference. This data highlights the potential utility of the M and M conference to educate residents on identification of risk factors that portend a poor patient outcome in the ED.

Table 1:
Bivariant Analysis of Patient Oriented Risk Factors for Mortality

Patient-Oriented Factor	Overall (n) = 132	P-value	OR	CI (95%)
Age ≥ 65**	47 (35.6%)	<0.001	4.32	1.89 - 9.90
Renal**	18 (13.6%)	0.003	4.95	1.76 - 13.94
Lung	20 (15.1%)	0.26	1.78	0.64 - 4.93
Altered Mental Status**	28 (21.2%)	< 0.001	6.82	2.74 - 16.97
SBP < 100**	24 (18.5%)	0.002	4.05	1.59 - 10.28
Pulse Ox < 93%**	35 (26.7%)	<0.001	5.10	2.15 - 12.08
HR > 100	53 (40.5%)	0.98	1.01	0.45 - 2.27
Recent Fall**	11 (8.3%)	0.03	4.18	1.18 - 14.75

web 4C/FPO

Table 2:
Bivariate Analysis of Non-Patient Oriented Risk Factors for Mortality

Nonpatient-Oriented Factor	Overall n = 132	P-value	OR	CI (95%)
Return Visit	49 (37.1%)	0.25	1.59	0.72 - 3.55
Arrival Shift	60 (45.5%)	0.58	1.14	0.45 - 2.93
Training Level	16 (12%)	0.76	0.66	0.18 - 2.48
Time to Provider in Minutes (mean ± SD)**	30.70 (± 47.92)	<0.001	0.98	0.96 - 0.99
ESI Score 1-4 (mean ± SD)**	2.44 (± 0.71)	<0.001	0.37	0.20 – 0.69
TOC	24 (18.1%)	0.30	1.66	0.64 – 4.33
Weekend	56 (42.4%)	0.42	0.71	0.32 – 1.61

web 4C/FPO

261 Assessment of Emergency Department Staff Awareness of Policy and Expert Opinion Protocol Regarding Active Shooter Event.

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Study Objectives: Workplace violence in the hospital setting is a serious and growing concern in the emergency department (ED). The ED is often by nature and by closed-in design a highly vulnerable location for such workplace violence. This is due to a continuous influx of people in and out of the ED as well as an often closed-in schematic design of the ED itself. Recently, a significantly growing concern is the

threat of an active shooter event and gunfire in the ED. In one study concerning hospital-based shootings between 2000-2011, 154 hospital related shootings were identified with 59% occurring inside the hospital and 29% occurring within the ED environment (Kelen et all, 2012). While active shooter incidents are inherently unpredictable by nature, it is still prudent to be as prepared as possible for these scenarios in order to maximize survival rates. The goal of this study is to assess the level of familiarity of emergency department staff with hospital policy and response protocol in regard to a potential active shooter incident (ASI).

Methods: A survey of ED employees including attending physicians, APRN, emergency medicine residents, nurses, and paramedics was distributed using the Qualtrics® platform via an electronic link. The study was approved by our medical school's IRB.

Results: 44% of the respondents were EM residents, 48% were attendings and 8% were nurses. The majority (84%) had worked at their facilities for 1-5 years. Only 4% had participated in n ASI drill in the past year. Personnel who answered NO to: "To your knowledge, is there a hospital-based emergency action plan for which ED employees know to execute in the event of an active shooter incident (ASI)?" were significantly more likely to feel unprepared for an ASI ($P<0.0001$). Those who did NOT receive training for a hospital-based emergency action plan in any form such as lectures, reading based modules, quizzes, workplace drills, seminars, workshops were also less likely to feel prepared ($P=0.0002$). Partaking in a drill was significantly associated with feeling less unprepared ($P=0.0003$). Many participants provided valuable free text format, including the need for formal ASI training, and lack of awareness of the existence of an ASI policy at their hospital.

Conclusion: Most emergency physicians and nurses in our survey sample reported feeling unprepared to handle an active shooter incident in their emergency department. This study underscores the need to implement regular training on ASIs for ED staff.

262 Don't Let the Monitor Fool You: Pulse Check Variation between Shockable and Non-Shockable Rhythms

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Introduction: Out of hospital cardiac arrest (OHCA) is the leading cause of global mortality. Increasing chest compression fraction improves survival. Current American Heart Association (AHA) guidelines recommend maintaining pulse check times to less than 10 seconds in order to increase the compression fraction. To our knowledge, no study has addressed whether pulse check times vary based on the presenting rhythm. Therefore, we aimed to determine if there was a difference in pulse check times between OHCA patients presenting with shockable vs non-shockable rhythms.

Methods: This was a prospective, observational study at an urban academic hospital. Three resuscitation bays were continuously videotaped to capture resuscitations of OHCA patients. Each OHCA resuscitation was analyzed by two independent observers for standardized metrics as well as the presenting cardiac rhythm. A total of 97 patient videos were collected between 2017 and 2019. Of those, 25 presented with a shockable rhythm (22 with ventricular fibrillation, 3 with ventricular tachycardia). We examined the relationship between shockable vs. non-shockable out-of-hospital rhythms and the duration of the first pulse check. We used a t-test to examine the association between the two cohorts.

Results: Results indicate that the mean first pulse check length is 27% greater (11 vs 14 seconds) in the shockable group, compared to the non-shockable group ($p < 0.10$).

Conclusion: In this prospective, observational study, there was a statistically significant difference in the length of the first pulse check between shockable and non-shockable rhythms. Possible underlying causes may include provider hesitancy to resume compressions with an organized rhythm, self doubt as to palpation of a pulse with an organized rhythm, or not resuming compressions as the defibrillator charges for a shock. Our study serves as an important reminder to keep pulse checks less than 10 seconds no matter the rhythm. Further studies are needed to analyze the reason behind longer pulse checks with shockable rhythms and to troubleshoot the root cause of these delays.

263 Utilizing Telemedicine in a Novel Approach to COVID-19 Management and Patient Experience in the Emergency Department

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Study Objectives: The COVID-19 crisis has highlighted telemedicine as a care delivery tool uniquely suited for a disaster pandemic, where the use of audio and video communication can increase connection while decreasing person to person exposure. Our institution rapidly deployed telemedicine as a tool to improve care inside the Emergency Department: existing telemedicine equipment was redeployed and new equipment purchased to increase connectivity between staff, patients, and patient's families, and also to reduce the duration and frequency of situations that could transmit viral illness person to person.

Methods: Sixteen telemedicine carts (7 re-purposed; 9 newly acquired) were utilized in order to conserve PPE and mitigate risk for both patients and providers by decreasing in-person exposures at NewYork-Presbyterian/Weill Cornell Medical Center (NYP/WCMC) and NewYork-Presbyterian/Lower Manhattan Hospital (NYP/LMH). Carts consisted of a video monitor, speaker, microphone, and either a fixed internet camera or a point-tilt-zoom internet camera. The carts enabled clinical providers and other hospital staff (social work, care management, etc.) to communicate with patients from their workstations by logging into a shared user account via a designated computer, starting a video call, and using a headset. Incoming calls automatically appeared and were answered on the patient's screen, removing the need for patients to physically touch the system or have any knowledge as to how to connect. Carts at NYP/WCMC were allocated specifically for COVID-19 isolation rooms. In our urban community hospital (NYP/LMH), carts remained mobile to allow transport to rooms where COVID-19 patients were located given fewer designated isolation rooms.

Results: This was a dynamic, home-grown initiative. After an initial hands-on encounter with the patient, ED providers and hospital-based teams used the carts to connect with patients to complete interviews and share updates or results without repeated exposure risk and donning of PPE. Admitting teams used the carts to have one team member perform a bedside evaluation while the other team members took part from a distance. With the help of our patient services group, carts were also used for virtual interactions between family members and isolated ED patients. Both patients and their families reported that these video interactions helped to reduce the psychological toll of isolation, which has a major impact on overall patient experience. A limitation of cart use was the need to frequently reboot devices and to alter audio settings for adequate performance.

Conclusion: This initiative increased provider-patient communication and attention to staff safety, improved palliative care and patient support services, lowered PPE consumption, and streamlined clinical workflow. The successful introduction of this program in both academic and urban community hospitals suggests that use of similar devices could be beneficial in a variety of ED settings. In particular, such devices can limit situations that increase the risk for person to person disease transmission and can increase the connection between isolated patients and their care teams and families.

264 Trends and Characteristics of Fentanyl Exposures Reported to the US Poison Centers

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Study Objectives: Overdoses due to synthetic opioids increased by 45% between 2016 and 2017, primarily driven by fentanyl and analogs. Although between 2016 and 2017, more than 5 million prescriptions were dispensed, there is a paucity of nationally representative U.S. fentanyl overdose data. This study aims to examine the national trends in tramadol exposures reported to U.S. poison centers (PCs).

Methods: The National Poison Data System (NPDS) was queried for all fentanyl exposures from 2013 to 2019. We identified and descriptively assessed the relevant demographic and clinical characteristics. Fentanyl reports from acute care hospitals and Emergency Departments (ACHs) were analyzed as a sub-group. Trends in frequencies and rates (per 100,000 human exposures) were analyzed using Poisson regression methods. Percent changes from the first year of the study (2013) were reported with the corresponding 95% confidence intervals (95% CI).

Results: There were 12,843 fentanyl exposures reported to the PCs from 2013 to 2019, with the calls increasing from 1,544 to 2,761 during the study period. Confirmed reports of illicit fentanyl overdoses grew from 3 reports in 2013 to 141 in 2019. The proportion of calls from ACH increased from 64% to 67.4% during the study. Multiple substance exposures accounted for 69.9% of the overall fentanyl calls and 53.4% of the calls from ACH. The most frequent co-occurring substances reported were benzodiazepines (15.5%) and heroin (7.2%). Residence was the most common site of exposure (80.1%) and 73.1% cases were enroute to the hospital when the PC was notified. Tachycardia and respiratory depression were the most frequently demonstrated clinical effects. Naloxone was a reported therapy for 44.1% cases, with this therapy being performed prior to PC contact in most cases. Demographically, 55.5% of cases were males, and the most frequent age groups were 20-29 years (22.5%) and 30-39 years (21.3%). Intentional misuse (41.4%) and suspected suicides (16.8%) were commonly observed reasons for exposure, with the proportion of suicides being higher in cases reported by ACH (22.8%). Approximately 22% of the patients reporting fentanyl exposures were admitted to the critical care unit (CCU). Major effects were seen in 18.2% cases and the case fatality rate was 9.2%, with deaths increasing significantly during the study period (62 deaths in 2013 to 1,184 deaths in 2019). The frequency of exposures increased by 78.8% (95% CI: 68%, 90.3%; $p<0.001$), and the rate of exposures increased by 82.3% (95% CI: 36.3%, 143.9%; $p<0.001$).

Conclusions: PC data demonstrated an increasing trend of fentanyl exposures, which may in part be attributed to the due to increased use of illegally or illicitly made fentanyl. A significant proportion of fentanyl exposures were associated with intentional abuse, suicide and increasing mortality. Fentanyl exposure reports from acute care hospitals and EDs during the study increased.

265 Barriers and Facilitators of De-Implementing Chest X-Rays after Central Venous Catheter Insertion

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Study Objectives: Despite advantages in workflow and timeliness of results using point of care ultrasound (POCUS) compared to chest x-ray (CXR) for central venous catheter (CVC) position confirmation and exclusion of pneumothorax (PCEP), POCUS has had a slow rate of adoption for this indication. As part of a project to facilitate earlier clinical adoption of this evidence-based practice, we convened focus groups to inform the development of multifaceted strategies that address the barriers and facilitators to implementation of POCUS for CVC PCEP and de-implementation of post-procedure CXR.

Methods: We conducted focus groups of critical care and emergency physicians practicing in a large tertiary, academic medical center to discuss current practices in POCUS for CVC PCEP. Guided by the Consolidated Framework for Implementation Research (CFIR) constructs, we explored barriers and facilitators of POCUS for CVC PCEP. We used an iterative process to identify themes that aligned with CFIR constructs and coded them using NVivo software. A comprehensive coding scheme and coding dictionary was developed to include specific definitions of each theme and criteria for good examples.

Results: We conducted five focus groups consisting of 20 participants. All respondents reported using ultrasound (US) to place CVC, but none reported using US alone to confirm CVC placement. The coding dictionary consisted of 19 total codes from the focus group discussion. Eight were deduced to align with CFIR constructs such as POCUS for CVC confirmation knowledge, hospital policy, and capability for change. Eleven codes emerged spontaneously (inductively) within the focus group discussions. Common barriers included inertia, medicolegal concerns, and convenience. One participant commented, "We're just kind of doing extra work for really no advantage. We're just getting chest x-rays [because] that's what we've always done. It would have to take... an entire culture shift... from the physicians and the rest of the staff." Another said "I think you probably have medical-legal jeopardy in the sense that they'll find someone to come in and say, 'Oh, yeah. That's not standard of care.'" Common facilitators included training and education, champions and leaders, and innovation. One participant noted, "If you have people that've done quality improvement and a didactic session on [it] that is very helpful." Another stated, "I think having unit leadership, having the right champions and leaders, and ultrasound unit directors would be important, and nursing leaders."

Conclusion: CFIR constructs guided our qualitative analysis of POCUS for CVC confirmation. The developed codebook from our focus groups demonstrated organizational and personal contexts that influence the implementation of POCUS for CVC confirmation and de-implementation of subsequent CXR. These codes will inform development of multifaceted strategies toward implementation of this evidence-based innovation and de-implementation of chest radiography after CVC confirmation.

266 Perceptions of Target-Based Wait Times between Emergency Department Providers in Australia and the United Kingdom

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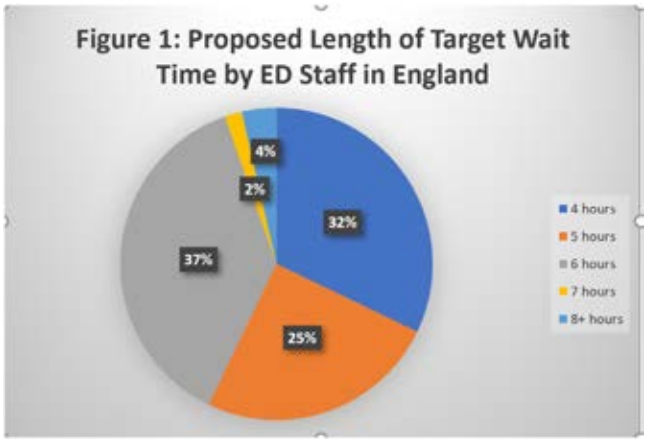
Study Objectives: Maximum wait time targets have been implemented internationally to combat Emergency Department (ED) crowding. Recent qualitative surveys in Australia in 2019 elucidated themes of ED staff perceptions on performance of this metric. The objective of the current study is to determine if these perceptions are persistent across ED staff in the United Kingdom (UK) regarding the National Health Service's (NHS) Four Hour Target.

Methods: Utilizing research done on the Four-Hour Rule in Australia, with three themes—quality/safety of care, access block/crowding, and medical education—were extracted and organized into a fifteen-question survey on a 5-point Likert scale. The survey was then completed by 65 individual health care providers (15 consultants, 18 registrars, 13 house officers, and 19 nurses) in one tertiary care center in Oxford, UK and compared to the trends in the Australian data.

Results: 95% of respondents strongly agreed or agreed that crowding continues to be a major obstacle in the ED. There were mixed reviews on the quality of care to patients, including a qualitative improvement in efficiency but an increase in rate of medical errors. Impact on medical education was rated most negatively by respondents. 68% of respondents believed a target set greater than 4 hours would be more appropriate (see Figure).

Conclusion: Unintended negative consequences on medical training and rate of medical errors appear to be prevalent in multiple international health care systems with target-based wait times. Changes to hospital infrastructure such as increased inpatient bed capacity could improve consistent problems with exit block/boarding.



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EMF 267 The Impact of a Novel, Tailored Firearm Screening and Intervention Tool on Patients' Firearm Storage Safety Practices

Schwimmer HD, Oderkirk SC, Moran TP, Gay S, Rupp J, Hudak LA/Emory University, Atlanta, GA; Navicent Health Baldwin, Milledgeville, GA

Study Objectives: Firearms were responsible for 39,740 deaths in 2018 with 60% attributed to suicide. Firearm-related injury and death continues to be a significant

public health problem, with a notable increase in firearm-related death since 2015. Identifying patients at highest risk for firearm injuries is crucial if providers hope to effectively intervene. This study aims to (1) identify ED patients at high risk for firearm injury and mitigate their risk for injury by modifying access to lethal means using a culturally appropriate, tailored firearm screening and intervention tool, and (2) determine patient acceptability of firearm safety discussions with a range of health care professionals.

Methods: We conducted a prospective randomized control trial using a health care-based firearm perception survey and focused screening tool for an ED population based on lethal means safety counseling and motivational interviewing. Our novel approach leverages multiple educational modalities (auditory, visual, and tactile) to augment patient learning. Patients were recruited from three urban and one rural EDs in Georgia and were eligible if they belonged to a high-risk category and had access to at least one firearm. Participants were randomly assigned to receive tailored counseling (intervention) or standard of care (control) at their index ED visit, and were surveyed at 1-month post-enrollment. Both groups received a firearm safety informational handout. Firearm storage safety practices were quantified using the Firearm Storage Safety Scale (FSSS), a novel 7-point scale (1=most safe, 7=least safe). Categorical variables were described using percentages and 95% confidence intervals. Predictors of outcomes were evaluated using binary and ordinal logistic generalized estimating equations to account for clustering within hospitals. Five complete data sets were imputed using fully conditional specification.

Results: A total of 105 patients enrolled in the study (56 in the intervention group and 49 in the control group). Patients were predominantly male (85%) and Black/African American (AA) (59%), and these rates differed between the intervention and control groups (male 89% vs. 71%, p=0.02; Black/AA 51% vs 66%, p=0.01). Overall, 32.4% of patients had at least one firearm stored loaded and unlocked (FSSS=7) at the index visit. At the 1-month follow-up there was no effect of the intervention on the FSSS (OR: 0.81 [0.32-2.07], p=0.66). A history of depression was predictive of a higher FSSS score (OR: 3.67 [1.91-7.05], p<.01 at follow-up when controlling for index FSSS. When compared with physicians, patients felt mental health providers were more appropriate firearm safety counselors (OR: 1.34 [1.01-1.79], p=0.05), and nurses and advanced practice providers less appropriate (OR: 0.75 [0.60-0.95], p=0.02 and OR: 0.81 [0.68-0.96], p=0.01, respectively).

Conclusion: In a diverse population with multiple risk categories included, this pilot study is underpowered to determine a true treatment effect. While our novel intervention did not appear to modify patients' firearm storage practices, there may be subgroups of patients, such as those with depression, that respond differently. Patients felt that it is most appropriate for mental health professionals and physicians to provide firearm safety counseling, suggesting that ED patients are receptive to firearm safety discussions. It is unknown what intervention is most effective for improving safety.

268 Comparing Pediatric Head CT Rules Using Outcomes for Acute Lifesaving Intervention

Bezzerides M, Ahluwalia R, Hale A, Shannon C/Vanderbilt University School of Medicine, Nashville, TN; Surgical Outcomes Center for Kids, Monroe Carell Jr. Children's Hospital, Nashville, TN

Study Objectives: Rates of pediatric head CT for mild blunt head trauma (BHT) have not shown improvement while published clinical prediction rules (CDRs) have been available. Outcomes for these CDRs may be too inclusive and set the threshold to scan unreasonably low. We sought to compare the sensitivity of five published CDRs in detecting outcomes limited to the need for acute lifesaving intervention.

Methods: We conducted a retrospective chart review of patients <18 years old presenting to the ED between the years 2006 through 2013 at a single academic Level 1 Pediatric Trauma Center with diagnoses consistent with intracranial injury and who received head CT as part of their management. Patients meeting criteria for mild non-penetrating BHT (GCS 14-15) were screened for the following outcomes indicating a need for acute lifesaving intervention: neurosurgical procedure, intubation due to head injury, and death. The five following CDRs were then assessed for their ability to detect patients with these outcomes: the Pediatric Emergency Care Applied Research Network (PECARN) CT head rule, the Canadian Assessment of Tomography for Childhood Head injury 2 (CATCH2) rule, the Children's Head injury ALgorithm for prediction of Clinically Important Events (CHALICE), the Pediatric National Emergency X-Radiography Utilization Study II (NEXUS II) Head CT Decision Instrument, and the decision rule developed by Palchak et al.

Results: Out of 1,810 patients with diagnosis codes consistent with intracranial injury and that received CT, 1,162 met the criteria for mild non-penetrating BHT and were screened for the outcomes of interest. 21 patients had one or more of the three outcomes, representing 1.8% of those screened. The average age was 4.6 years and the majority (62%) were male. All 21 patients required intubation due to their head injury with 9 receiving a neurosurgical procedure (0.8%) and no deaths. All CDRs displayed 100% sensitivity with each patient meeting at least 1 criterion for each CDR.

Conclusion: All CDRs displayed 100% sensitivity at detecting outcomes indicating a need for acute lifesaving intervention in pediatric mild BHT. Future prospective studies should consider similar outcomes to assess their utility in decreasing unnecessary pediatric head CT.

269 E-Cigarette Use, Attitudes, and Perceptions among Emergency Department Patients

Quenzer FC, Brennan J, Alfaraj D, Bahlawan N, Yadav V, Coyne CJ/UC San Diego, San Diego, CA

Study Objectives: Given increasing reports of vaping complications since the summer of 2019, it is of increasing importance to understand the vaping habits among emergency department (ED) patients. This study seeks to describe patients' e-cigarette (ie, vaping) knowledge, perceptions, and usage habits.

Methods: We conducted a non-consecutive survey of adult ED patients from February 16, 2018, to December 5, 2019. The survey contained 35 questions that investigated patient demographics, attitudes, and perceptions toward vaping, legality, and associated health effects. Descriptive statistics are reported.

Results: Of the 1851 surveyed patients in the ED, 1674 (91%) had at least a general idea of e-cigarette use. Among these patients, 17.4% reported previously using e-cigarettes 1-2 times and 15% >2 times. Most learned about vaping from friends (53.4%), television ads (40.4%), and social media (31.8%). While many (85%) were aware that vaping was legal, only 34.4% correctly answered that vaping was not FDA approved. Most respondents thought that e-cigarettes contained harmful chemicals (79.9%). Approximately 7% (n=125) reported using within the last month (recent users (RUs)). Approximately three-fourths of RUs reported vaping 1-2 times/week, while half reported daily use. 61.6% of these patients were male and 49.6% were Caucasian. The two largest age categories among RUs were 18-24 (36%) and 25-34 (30%). Many of the RUs had recently started vaping (68.8% within the last 1 to 3 years), and most (87.2%) reported using traditional cigarettes prior to vaping. Most RUs purchased their products from vape shops (43.2%), tobacco shops (40.0%), drug stores (23.2%), and the internet (19.2%). Approximately 1 in 10 RUs reported accessing the ED for reasons related to their e-cigarette use, with many reporting coughing (30.4 %), changes in appetite (27.2%), nausea (18.4%) or dizziness (18.4%). Among RUs, 32.8% reported vaping marijuana as well as nicotine.

Conclusion: In general, the ED population appears to have a basic knowledge of e-cigarettes and their health effects, which has been obtained through a myriad of sources, including social media. However, there appears to be an incomplete knowledge of the regulations surrounding e-cigarettes. Finally, nearly 1 in 10 RUs reported an ED visit related to their e-cigarette use, with cough, GI symptoms, and dizziness being the most common complaints.

270 Changes in Treatment of Out of Hospital Cardiac Arrest during COVID-19 Outbreak in Japan

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Study Objectives: On December 31, 2019, China has reported about a cluster of pneumonia cases caused by unknown infection which would later be identified as coronavirus disease 2019 (COVID-19). The first case in Japan was diagnosed on January 28, 2020. On March 11, 2020, COVID-19 was qualified as a global pandemic by the World Health Organization (WHO). It was reported that there was possibility of increased risk of out-of-hospital cardiac arrest (OHCA) in patients with SARS-CoV-2. American Heart Association has issued guidelines to help rescuers treat cardiac arrest patients with suspected or confirmed COVID-19. Physicians had to deal with OHCA patients having no detailed history of COVID-19 during pandemic. This may cause the changes in treatment of OHCA patients and their families. However, little we knew about the changes occurred in Japan. Therefore, our purpose was to investigate and clarify the changes in treatment of OHCA patients.

Methods: This was a Web-based questionnaire survey. We developed a questionnaire to evaluate the changes in OHCA patients care. The questionnaire consisted of two sections and 21 questions. In the first section, we collected data about sex, post-graduate-year (PGY) and specialty. Physicians were also asked to indicate prefectures where they work. In the second part of questionnaire, we asked about the month when they started noticing COVID-19. We also asked them to answer with "Yes" or "No" if they have made changes to "Algorithm," "Personal Protective Equipment (PPE)" and "Patient's family support" for OHCA patients with details of particular changes for each question. In addition, we asked to indicate their stress level from these changes [Likert scale; 1 ～ 10, 1: No Stress, 10: Severe Stress]". We have distributed the questionnaire among Emergency Medicine Alliance (https://www.emalliance.org/) mailing list members (total 3233 physicians registered as of May 23, 2020). The period of responses to questionnaire was from May 22 to June 5 of 2020.

Results: During the study period, 110 physicians (3.4% out of total 3233 registered) with a median PGY of 12 (IQR 7-19) have submitted questionnaires, including 90 male (81.8%), 86 emergency physicians (78.2%), 16 internists (14.5%), 3 intensivists (2.7%) and 5 others (4.5%). Physicians were from the 30 prefectures of Japan (total 48 prefectures in Japan). The rate of answers about changes made to "Algorithm" was 78.2 %, "PPE" - 96.4%, "Family support" - 54.9 %. The stress level due to the changes to "Algorithm" was 7 [IQR 5 - 8], "PPE" - 8 [IQR 6 - 9], "Family support" - 7 [5 - 8.5].

Conclusion: We conclude that the way of treatment of OHCA patients might be changed and physicians might feel stress. We will report our survey results with more details.

EMF 271 Advancing Emergency Department Chest Pain Risk Stratification With Monocyte Chemoattractant Protein-1 and High-Sensitivity Troponin

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Study Objectives: The History, Electrocardiogram, Age, Risk factor, and Troponin Pathway (HEART Pathway) risk stratifies 50-55% of emergency department (ED) chest pain patients as non-low-risk and recommends that they receive observation and stress testing. The objective of this study was to determine if two novel biomarkers, MCP-1 and hs-cTnT, alone or in combination, can achieve ≥ 99% sensitivity and negative predictive value for 90-day MACE among non-low-risk HEART Pathway patients.

Methods: A case-control study was nested within a multicenter, prospective study (STOP-CP). ED patients ≥ 21 years old who presented to the ED with symptoms concerning for acute coronary syndrome who had a HEAR score ≥ 4 or known coronary artery disease (CAD), a non-ischemic ECG, and non-elevated contemporary troponins at 0- and 3-hours were eligible for inclusion. Cases (N=40) were patients with 90-day MACE events (all-cause mortality, myocardial infarction, or revascularization). Controls (N=179) were patients without MACE who were selected based on frequency matching using age, sex, race, and numeric HEAR score or the presence of known CAD. Receiver operator curves were used to assess biomarker performance at various cut-points. Sensitivity and specificity were calculated. The prevalence of MACE in non-low-risk patients in the STOP-CP study was 6.5% (40/618). This was used for determining negative predictive value (NPV) and positive predictive value (PPV).

Results: Among the 40 cases and 179 controls, there was no significant difference in age (p=0.90), sex (p=1.00), race (p=0.91), or HEAR score/presence of CAD (p=0.89). An MCP-1 cut-point of 194 pg/mL resulted in 50.0% (95% CI 33.8-66.2%) sensitivity and 93.1% (95% CI 90.5-95.0%) NPV for 90-day MACE. A MCP-1 measure of 238 pg/mL had a 30.0% (95% CI 16.6-46.5%) sensitivity and 93.5% (95% CI 92.0-94.7%) NPV. A hs-cTnT result of 11 ng/L was 60.0% (95% CI 43.3-75.1) sensitive with a NPV of 95.7% (95% CI 93.8-97.1). At a hs-cTnT cut-point of 19 ng/L, sensitivity was 30.0% (95% CI 16.6-46.5%) with a 94.5% (95% CI 93.3-95.5%) NPV.

Conclusion: These data suggest that MCP-1 is not a useful biomarker for risk-stratifying ED patients with non-low-risk chest pain. Hs-cTnT may be a useful biomarker for enabling additional patients to be classified as low-risk and discharged without lengthy evaluations.

EMF 272 Using Monocyte Chemoattractant Protein-1 to Predict Adverse Cardiovascular Events among Emergency Department Chest Pain Patients

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Study Objectives: Monocyte chemoattractant protein-1 (MCP-1) is an inflammatory biomarker associated with coronary atherosclerosis and adverse cardiac remodeling. It is unclear if MCP-1 is associated with major adverse cardiovascular events (MACE) in emergency department (ED) patients with chest pain. This study seeks to determine if MCP-1 is an independent predictor of 90-day MACE in non-low-risk ED patients with acute chest pain.

Methods: A case-control study was nested within a multicenter, prospective cohort study (STOP-CP). For this analysis, ED patients ≥ 21 years old with symptoms concerning for acute coronary syndrome who had a History, Electrocardiogram (ECG), Age, and Risk factor score (HEAR score) > 4 or coronary artery disease (CAD), a non-ischemic ECG, and non-elevated contemporary troponins at 0- and 3-hours were eligible for inclusion. Cases (N=40) were patients with 90-day MACE events (all-cause mortality, myocardial infarction, or revascularization). Controls (N=179) were patients without MACE who were selected based on frequency matching using age, sex, race, and numeric HEAR score or the presence of known CAD. MCP-1 was assessed at various cut-points, including prespecified 200 pg/mL and 238 pg/mL as well as 194 pg/mL and 281 pg/mL, which were determined with receiver operator curves and the Youden Index. Logistic regression controlling for age, sex, race, hs-cTnT (cut-point <11 ng/L vs ≥ 11 ng/L), and HEAR score or the presence of CAD was used to determine the association between MCP-1 and 90-day MACE.

Results: Among the 40 cases and 179 controls, there was no significant difference in age (p=0.90), sex (p=1.00), race (p=0.91), or HEAR score/presence of CAD (p=0.89). MCP-1 was similar in the cases (median 191.9 pg/mL, IQR 161.8-260.1 pg/mL) and controls (median 196.6 pg/mL, IQR 163.0-261.1 pg/mL) (p=0.48). Logistic regression revealed that MCP-1 was not independently associated with 90-day MACE at any cut-point [194 pg/mL, OR 0.77 (95% CI 0.37-1.60); 200 pg/mL, OR 0.65 (95% CI 0.30-1.35); 238 pg/mL, OR 0.82 (0.35-1.79); 281 pg/mL, OR 0.83 (95% CI 0.33-1.95)].

Conclusion: MCP-1 was not independently associated with 90-MACE in non-low-risk ED chest pain patients.

273 Availability of Pediatric Emergency Care Coordinators in US Emergency Departments in 2018

Boggs KM, Espinola JA, Sullivan AF, Li J, Auerbach M, Hasegawa K, Samuels-Kalow ME, Camargo CA, Jr./Massachusetts General Hospital, Boston, MA; Boston Children's Hospital, Boston, MA; Yale University School of Medicine, New Haven, CT

Study Objectives: In 2007, the Institute of Medicine (IOM) recommended that every ED appoint pediatric emergency care coordinators (PECCs). PECCs focus on improving the quality of pediatric emergency care in their ED, which can include facilitating educational activities. Despite this recommendation, and its endorsement by multiple professional organizations (eg, ACEP), a national survey showed that 16% of general US EDs reported ≥1 PECC in 2015. Our objectives were to determine: the percent of US EDs with ≥1 PECC in 2018, factors associated with availability of ≥1 PECC in 2018, and changes in PECC prevalence between 2015 and 2018.

Methods: In 2019, we conducted a survey of all US EDs to characterize emergency care in 2018. Using the National ED Inventory-USA database, we identified 5,514 EDs open in 2018. We mailed a brief survey to all ED directors up to three times and then contacted nonresponding EDs by phone to complete the survey by interview. Availability of a PECC was obtained with the question: "Do you have identified coordinators for pediatric emergency care in your ED?" Those that reported a PECC were asked to specify if they had a physician, nurse, or another type of PECC. A similar survey was administered to EDs in 2016 and identified availability of a PECC in 2015. Statistical analyses included chi-square and Wilcoxon-rank-sum tests as appropriate, and multivariable logistic regression models to identify factors independently associated with availability of a PECC in 2018 and addition of a PECC in 2018 versus 2015.

Results: Overall, 4,781 (87%) EDs responded to the 2018 survey. Among the 4,764 EDs with PECC data, ≥1 PECC was reported by 1,035 (22%). Specifically, 559 (12%) reported a physician PECC, 721 (15%) a nurse PECC, and 89 (2%) another type of PECC (eg, social worker). PECC prevalence varied widely by state. Three states (Connecticut, Massachusetts, and Rhode Island) had PECCs in 100% of EDs. States with the lowest percentage of EDs with PECCs were Mississippi (1%, 1/76 EDs), North Dakota (3%, 1/36 EDs), and Nebraska (3%, 2/71 EDs). In unadjusted analyses, compared with EDs without a PECC, EDs with ≥1 PECC were more likely to: have an annual total visit volume of ≥10,000, have a separate pediatric ED area, be in the Northeast, be in an urban area, and be academic (all P<0.001). They were less likely to be a freestanding ED or designated a Critical Access Hospital (P<0.001). In adjusted analyses, the factor most strongly associated with availability of a PECC in 2018 was an annual total visit volume of ≥40,000 compared to <10,000 (OR 4.89 [95% CI 3.53-6.78]).Overall, 84% of US EDs responded to the 2015 survey. The national PECC prevalence was higher in 2018 (22% of EDs) compared to 2015 (17%). The states with the greatest increase in the percent of EDs with ≥1 PECC between 2015 and 2018 were Massachusetts (+74%), Rhode Island (+67%), and Connecticut (+63%). EDs in the Northeast and with an annual total visit volume of ≥10,000 were more likely to first appoint a PECC by 2018 (all P<0.05).

Conclusion: Despite the 2007 IOM recommendation that all US EDs appoint PECCs, the availability of ≥1 PECC in EDs remains low (22%), with little increase in national prevalence between 2015 and 2018. New England states report a high PECC prevalence, but more work is needed to appoint PECCs in most other US states. We will continue to monitor changes in PECC prevalence and work on further establishing the benefits of PECCs, including better understanding how PECCs can improve patient outcomes.

TF 274 Doc in the Box Infectious Disease Card Game: Novel Interactive Method to Introduce Broad Topics in Infectious Disease

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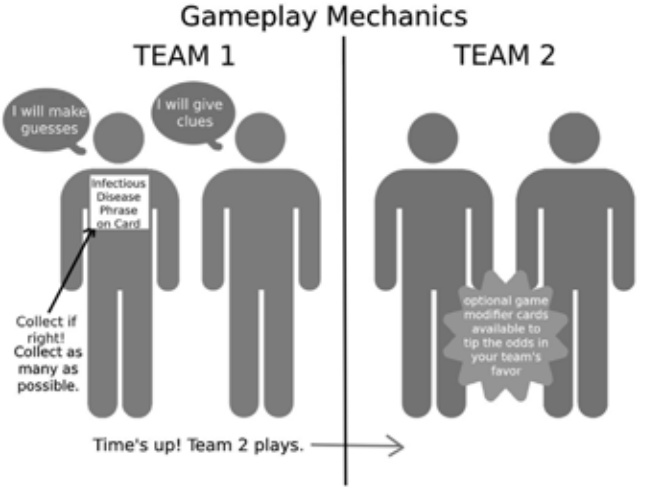
Study Objectives: The current world population is estimated to be over 7.5 billion and growing. This rapid population growth, along with urbanization, migration, globalization, travel make us more interconnected than ever but presents new challenges in infectious diseases. The World Health Organization names communicable conditions among the top 10 causes of death globally. Physicians, especially emergency physicians are likely to be in the front lines of common and emerging infectious diseases as demonstrated during the COVID-19 pandemic. Among US residency specialties offering global health training, emergency medicine ranks amongst the highest of the different specialties. Therefore, knowledge of infectious diseases is important for health care delivery. However, teaching a wide range of topics in infectious diseases is impossible. This novel game is designed to introduce many of the topics to learners of various levels and to supplement their existing learning modalities. Specifically, objectives were: (1) To supplement infectious disease knowledge to what is already provided in a standard curriculum in an interactive and engaging way with a novel card based game, (2) Encourage self-directed learning of otherwise unfamiliar infectious disease topics

Methods: The University of Utah residency uses the foundations of emergency medicine model for the didactic curriculum. The proposed learning modality was implemented in the infectious disease block, during weeks two and four of the block. A survey which employed likert scale responses and open responses was distributed to the residents to assess the game.

Results: After completion of this activity, while this is a small sample of residents, the card game based teaching modality met its objectives. Most residents replied the game was engaging in terms of level of effort. All residents felt the game improved their knowledge from prior to the game. All residents also agreed or strongly agreed the game introduced a variety of infectious disease topics well including esoteric subjects. All residents agreed or strongly agreed that the game stimulated curiosity and learner interest. All residents agreed or strongly agreed that the game allowed for all learners to participate and was appropriate for medical students and residents. Open comments stated that the game was a new fun approach to the topic, that it stimulated conversation, and that a similar modality should be done in other blocks.

Conclusion: The proposed card game is well suited to be implemented as a supplement to lectures. The game was an engaging and interactive method to teach infectious disease topics which encouraged self-learning based on the player's baseline knowledge. More trials should be done with other residency programs, other specialties, and different levels of medical training to further investigate if these findings apply outside our program.



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275 Age and Educational Attainment Predicts Engagement in a MHealth Intervention Conducted at a Safety-net Emergency Department

Treacy-Abarca S, Mercado J, Serrano J, Gonzalez J, Rincon Guerra N, Berumen A, Sanchez A, Hazime D, Raffi L, Burner E/University of California Los Angeles David Geffen School of Medicine, Los Angeles, CA; Keck School of Medicine, University of Southern California, Los Angeles, CA, United States., Los Angeles, CA; Keck School of Medicine, University of Southern California, Los Angeles, CA; University of Southern California, Los Angeles, CA

Study Objectives: Mobile phone (mHealth) based interventions have expanded rapidly to improve chronic disease self-management in a variety of clinical settings, but are limited in in safety-net EDs. In this study, we describe factors related to ED patient engagement in an mHealth chronic disease intervention.

Methods: We analyzed data from the 2017 TExT-MED + FANS social support for diabetes randomized clinical mHealth trial. From a safety-net ED, 166 patients who used text messages, owned a mobile phone, had a Hemoglobin A1C (Hba1c) >8.5% and an available social supporter were enrolled. All patients received an mHealth program; patients' supporters of patients a paper or mHealth based diabetes support curriculum. We surveyed patient technological capacity and frequency of use of different communication modalities at enrollment. We used latent class analysis (LCA) to analyze patient technological capacity and identified a best fitting model with two classes of patient technological proficiency. We compared demographic characteristics between these classes to identify predictors of class membership. Study engagement between classes was assessed via t-test or chi-squared of mean text-messages exchanged, loss to follow-up rates, and request for early termination of program.

Results: Of the 166-patients recruited, 94% were Latino, 70% preferred Spanish, 89% were foreign born. Significant variance was found in technology capacity and frequency of use. LCA classified 75% of patients as "highly technologically proficient" and 25% as "minimally technologically proficient." Minimally technologically proficient patients had comparable text message capabilities and frequency of use, but significantly less capacity and frequency of use for all other modalities (Figure 1). Age ($p<0.0001$) and educational attainment ($p<0.05$) correlated with class membership. Highly technologically proficient patients were younger and had higher educational attainment than the minimally technologically proficient patients (average age 45.74 years old with 90% completed high school or higher vs. 53.64 years old and 18% completed high school or higher, $p<0.001$ and $p=.003$). Highly technologically proficient participants exchanged a mean of 40 text-messages compared to 10 text-messages by minimally technologically proficient patients ($p<.0001$). There

were no differences in follow up rate or early termination of the program between groups.

Conclusion: Capacity varies for different communication modalities, but the majority of patients classify as highly technologically proficient; these highly proficient patients had greater engagement in the mHealth intervention. Lower technologically proficient patients remained in the text-message based program at a similar rate. Diverse safety-net ED patients are equipped and ready for mHealth solutions.

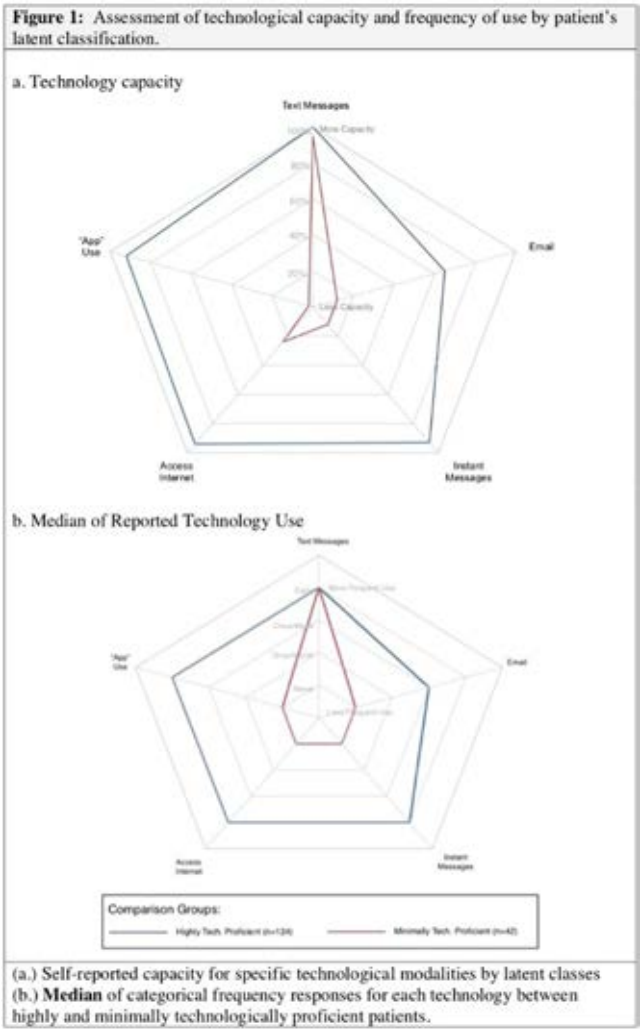

Figure 1: Assessment of technological capacity and frequency of use by patient's latent classification.

(a.) Self-reported capacity for specific technological modalities by latent classes (b.) **Median** of categorical frequency responses for each technology between highly and minimally technologically proficient patients.

276 The Impact of the Medical Education Research Certificate at the Council of Residency Directors in Emergency Medicine Program on Career Development Through the Lens of Social Cognitive Career Theory

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Study Objectives: Lack of expertise and mentorship have been identified as barriers to scholarship in medicine. The Medical Education Research Certificate at the Council of Residency Directors in Emergency Medicine (MERC at CORD) program was created to provide faculty development in education scholarship in emergency medicine. However, its influence on career development remains unknown. The objective of this study was to assess the impact of MERC at CORD on career development through the lens of social cognitive career theory.

Methods: This was a prospective qualitative study using a constructivist/interpretivist paradigm to assess long-term outcomes related to career development. Graduates of MERC at CORD from 2011 to 2014 were eligible to participate. A purposeful randomized stratified sampling strategy was utilized to ensure diversity of representation including sex, region, number of research publications, and project group leadership. Potential subjects were invited by email to participate in a semi-structured phone interview. Thematic analysis by two independent reviewers followed an iterative process until saturation was reached.

Results: Twelve graduates were interviewed. All participants participated in MERC at CORD during their early career and had minimal to no previous education research experience. All participants currently hold leadership positions in medical education. Participants have authored a mean of 19.3 publications (range 9-43). The participants identified several aspects of the program that were valuable to their career development including opportunities for networking and collaboration, mentorship, informational foundation to build upon, and the opportunity to apply theoretical knowledge through experiential learning. Major themes that emerged as to how MERC at CORD impacted career development aligned with the core domains of social cognitive career theory including self-efficacy, outcome expectations, and goals.

Conclusion: The MERC at CORD program positively impacted the long-term career development of emergency medicine participants involving self-efficacy, outcome expectations and goals.

277 Age Is the Only Factor That Affects Survival to Hospital Admission in Video-Reviewed Out-of-Hospital Cardiac Arrest Resuscitations

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Study Objectives: Out-of-hospital cardiac arrest (OHCA) affects more than 350,000 people in the United States each year with a survival rate of approximately 12%. Many factors have been implicated for their role in determining survival. For example, the American Heart Association recommends limiting pulse check time to <10 seconds and maintaining chest compression fraction (CCF) >80%. We utilized data from video-reviewed OHCA resuscitations at an urban academic emergency department (ED) to investigate factors associated with survival to hospital admission.

Methods: Data was gathered on 96 OHCA resuscitations between July 2, 2017 and December 9, 2019. Each resuscitation was recorded in real-time in critical care bays within the ED. Videos were reviewed independently by two emergency medicine residents. The data compiled represents that from video review and retrospective review of the patients' charts. Descriptive statistics (T-/Wilcoxon-Mann-Whitney and Chi-squared/Fishers exact tests) and logistic regression were used to identify the factors associated with the survival to hospital admission.

Results: Overall rate of survival to hospital admission was 29%. Out-of-hospital variables including witnessed arrest, bystander CPR and defibrillator use, and length of out-of-hospital code had no significant effect on survival to hospital admission (all $p>0.05$). Notably, in-hospital variables including length of code, time to monitor placement, time to definitive airway placement, length of pulse checks, and CCF were also not associated with a significant effect on survival (all $p>0.05$). Of the factors investigated, only age was statistically significant ($p=0.035$) with the data suggesting that as age increases, rate of survival to hospital admission decreases ($p=-0.041$).

Conclusion: In our population, variables that have previously been reported to affect outcomes (bystander CPR and defibrillation, length of code, CCF etc.) along with variables unique to video-review cases (time to monitor, time to IV access, length of pulse checks, etc.) had no significant effect on survival to hospital admission.

278 Identifying High Performer Residents in Emergency Medicine Training

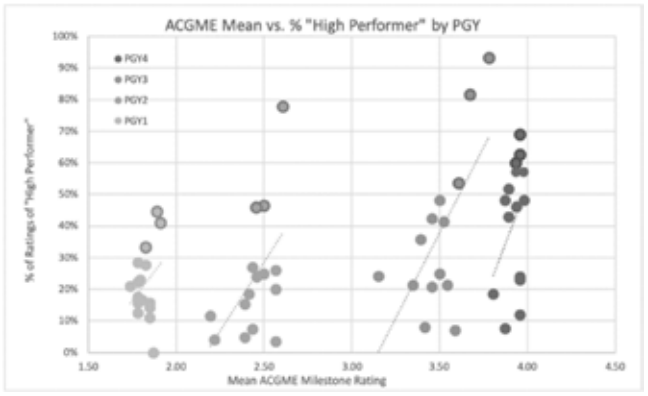
Coughlin RF, Della-Giustina D, Tsyrulnik A, Bod J, Brennan-Wydra E, Ray J, Duke JW, Chandler I, Wong A, Goldflam K/Yale University School of Medicine, New Haven, CT

Study Objectives: To help identify a high performer resident in emergency medicine, and to query whether the clinical competency committee (CCC) evaluation of resident ACGME milestone scores correlated with the majority impression of shift performance by academic emergency medicine (EM) faculty.

Methods: A mobile-friendly survey was created using Qualtrics™ software and was sent to the 49 EM teaching faculty (not involved with the CCC) at a single site of a quaternary care academic emergency department (ED). Resident performance was graded as one of the following: Below Expected, Expected, High Performer, or N/A (not enough contact to evaluate). No definitions of the groups were provided, as we would like to gather qualitative language in future stages of this project. Since the percentage of "high performer" ratings assigned varied drastically by post-graduate year (PGY), the top quartile within each cohort were defined as high performers for this analysis. To validate our method of identifying top performers, we checked for associations between the percentage of "high performer" ratings and previously collected ACGME milestone data from CCC evaluation (mean score across all 23 milestones) using Pearson's correlation. PGY classes were evaluated separately, so that a resident was only compared to their peer class.

Results: Twenty-nine of the 49 (59%) surveys were entirely completed. From the responses, we gathered the percentage of "high performer" ratings by PGY class, and the association between the percentage of "high performer" ratings and ACGME milestone ratings. We found weak-to-moderate positive correlations between the two sources of data: PGY1: +0.302; PGY2: +0.513; PGY3: +0.644; PGY4: +0.362.

Conclusions: All PGY2-4 high performers and most PGY1 high performers had been subjectively identified as such by residency leadership in summative evaluation several months prior to this study's inception. Further study of the identified high performer EM residents is ongoing, including work to further characterize high performers, and to decide what that means for educators. We suspect that high performers likely receive fewer actionable constructive feedback points, and instead receive more generic praise and "great job." We wonder, therefore, if we may be failing our high performers in this way: by missing opportunities for improvement via constructive feedback, specific coaching, and directed practice by the trainee. The overarching goal is that EM educators will be able to appropriately coach this group into superlative physicians and help move medicine forward.



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279 Quantifying Electronic Medical Record Utilization by Emergency Medicine Residents Using Event Log Data

Kim J, Amin D, Cholewinski M, Dickson B, Tovar S/Cook County Health, Chicago, IL

Study Objectives: The Accreditation Council for Graduate Medical Education (ACGME) specifies a 60 clinical hour work limit per week for Emergency Medicine (EM) residents while on shift and no more than 72 total hours worked per week, including didactic conference hours and electronic medical record (EMR) usage time. Per the ACGME guidelines, EMR usage time should include all EMR usage; however, EMR work hours performed outside of scheduled shift hours (whether still on site or at home) possibly goes unreported. Therefore, it is unknown how many true hours per week EM are working and whether this total time exceeds the 72 hour limit.

Objective: To quantify the time spent on EMR outside of scheduled shift times in order to evaluate whether these additional hours leads to a duty hour violation.

Design/Methods: A retrospective study at a public hospital EM PGY 1-4 residency program with greater than 135,000 annual visits where EMR - Cerner (Kansas City, MO) usage was reviewed for 31 residents working in the department in a specified one-month period. These 31 residents were equally composed of PGY1, PGY2, and PGY3 residents, PGY4 data was not able to be obtained. The data was displayed as times of use for every click on the EMR. EMR usage time while on clinical shifts was excluded leaving data of EMR usage when not on shift. EMR usage time intervals were identified using log-on and log-off identifiers. The sum of all-time groupings represents the total time the resident used the EMR outside of assigned shift times. As individual residents worked a different number of shifts in the month, we divided the total time of outside shift EMR usage time by the number of shifts completed to get an average time of outside-of-shift EMR usage per shift. Data analysis was primarily descriptive.

Results: The 31 EM residents working shifts during the month of our study worked a total of 603 eight-hour shifts, or a total of 4824 shift hours. They spent 1202 hours on EMR usage outside of shift hours; this time combined with on-shift hours led to a total 6026 hours worked. The new average shift time including the EMR time outside of clinical scheduled shifts came to approximately 10 hours (9.99). (See Figure 1)

Conclusion: EMR usage outside of clinical shift times adds approximately two additional duty hours to a resident's clinical shift. This varies by categorical year with PGY-1 classes showing longer times spent on the EMR. Only one resident was found to violate duty hours over the one-month period. Further study of EMR use by residents is needed in order to evaluate accurate duty hours and potential violations.

280 Boucebacks during the Covid-19 Pandemic

Perrotta G, Krupp S, Holbrook M, Joyce K, Bissonette A, Dandashi J, Grahf D, Alaka M, Celestia A, Mohammad A, Miller J/Henry Ford Hospital and Wayne State University, Detroit, MI

Study Objectives: During the pandemic, emergency clinicians balanced the growing crisis of limited hospital bed availability with the risks of sending sick patients home. We sought to measure the rates of return visits during the pandemic and assess patient characteristics associated with higher rates of return.

Methods: Cohort study of patients evaluated at 9 EDs within an integrated health system between March 13 and May 20, 2020 with clinical suspicion for Covid-19. We excluded patients who neither had testing for SARS-CoV-2 nor were designated with isolation precautions for Covid-19. We identified and collected data through a central dashboard that was established within the EHR. We defined confirmed Covid-19 cases as those with a positive PCR for SARS-CoV-2 infection. All patients had a minimum follow-up period of 14 days. The primary outcome was a return visit over the first 14 days. The analysis consisted of descriptive statistics and a multivariable proportional hazards model that was limited to patients discharged home on their index visit to assess the association between confirmed Covid-19 and bounceback.

Results: There were 13,367 ED patients with clinical suspicion of Covid-19, of whom 7289 (54.5%) were female, 5225 (39.1%) black, non-Hispanic, and the mean age was 55.7 ±19.9 years. There were 12859 (96.2%) patients tested with PCR for SARS-CoV-2, 508 (3.8%) isolated for Covid-19 but never tested, and 3760 (28.1%) with confirmed Covid-19. The number of patients hospitalized was 7724 (57.8%). Return visits among those that were not hospitalized occurred 436 (7.7%) times within 14 days from the initial encounter and 546 (9.7%) times within 30 days. The median time to a return visit was 7 [IQR 3, 17] days. Of patients with a return visit in 14-days,

Figure 1.

PGY Level	Number of Clinical Shifts	Total Shift Work Hours	EMR usage Outside of Shift (hrs)	Calculated Total Duty Hour Time (hrs)	Adjusted Shift Length (hrs)
1	115	920	344.82	1264.82	10.99
2	142	1136	236.39	1372.39	9.66
3	102	816	192.36	1008.36	9.88

207 (46.1%) were hospitalized on their second visit. Patients who were discharged home that had confirmed Covid-19 had a return rate of 20.0% vs. 3.7% among patients without confirmed Covid-19 (see Figure 1). In multivariable analysis, factors not associated with the primary outcome were race, pulse oximetry, and sex. Factors significantly associated with 14-day returns were age >60 years (HR 1.34, 95% CI 1.03 - 1.67), each 1-point increase in the Charlson comorbidity index (HR 1.13, 95% CI 1.03 - 1.17), and confirmed Covid-19 (HR 5.25, 95% CI 4.29 - 6.42).

Conclusions: Admission rates were high in patients with suspected Covid-19, and return rates over 14 days were 7.7%. Patients with confirmed Covid-19 had a 5-fold greater hazard of a 14-day return compared to those without confirmed Covid-19.

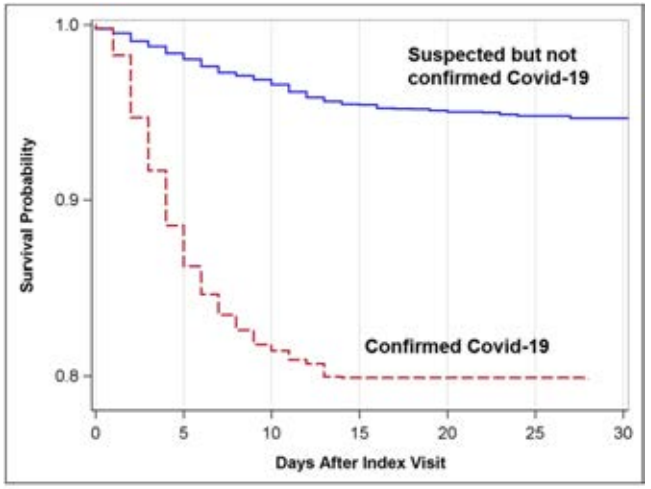

Figure 1. Probability over time of having no ED bounceback

281 Epidemiological Analysis of E-Scooter Injuries among Patients Presenting to the Emergency Department

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Study Objectives: E-Scooters are an emerging part of the urban transportation landscape that intersect with both pedestrian and automotive traffic. Injury patterns are important for numerous reasons including informing scooter design, transportation infrastructure and safety regulations. We sought to characterize the patient demographics and injury patterns associated with e-scooter use that result in an emergency department (ED) visit.

Methods: This retrospective chart review was conducted between March 2017 and June 2019 in a single, urban academic ED with 80,000 annual visits. Inclusion criteria included all patients presenting to ED with an e-Scooter related injury. Automated keyword search method was utilized to identify charts with the word "scooter" and variant. Charts identified in the keyword search were reviewed by trained researchers to abstract key data into a Redcap database using a standard data abstraction form, including patient-centered epidemiologic data, injuries sustained, treatment rendered, and circumstances surrounding the injury. Ten percent of charts were randomly selected for abstraction by a second blinded researcher to assess inter-observer variability. This study was deemed exempt by our institutional review board.

Results: 235 patients were identified that sustained an injury involving an e-scooter, ranging in age from 7 to 89, with a median age of 31 (IQR 24-47) and a 53% male predominance. 64% of injured patients were from the District of Columbia, Maryland, and Virginia while 36% were from outside the region. 82% of patients reported an injury as a result from a fall from the device and only 1.7% reported wearing a helmet during the event. The most common area of physical exam finding occurred in the upper extremity which accounted for 36.2% of all injuries with abrasions (52.3%) and fractures (39.1%) representing the most common type of injury. X-ray and CT scans were performed on 69% and 34.5% of patients respectively. Specialists, most commonly orthopedic and trauma surgeons, were consulted on 28% of cases. 9.4% of patients required hospital admission.

Conclusion: Analysis of injuries related to e-Scooters in our urban ED reveals a high percentage of head injuries and fractures. Further epidemiologic information regarding the circumstances of the injuries including geographic and rider factors would provide a more robust understanding of the events and inform effective policy development.

282 A Comparison of In-Hospital Cardiac Arrests between a United States and United Kingdom Hospital System

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Study Objectives: Resuscitation attempts are deemed a medical decision in the United Kingdom (UK), whereas in the United States that decision most often lies between the patient and family of the patient. Physicians in the National Health System (NHS) in the UK are able to make decisions that may contrast with the patient's written wishes if their assessment reveals that resuscitation will likely be futile and legal frameworks are in place to protect this decision. This research study aims to examine the cardiopulmonary resuscitation attempts per in-patient population between these two hospital systems and describe resuscitation outcomes.

Methods: This was a retrospective analysis of all in-hospital patients who underwent cardiac arrest at NHS Forth Valley Royal Hospital (United Kingdom) and University of Virginia Hospital (United States) between January 2014 and September 2015. CPR incidence was recorded, along with the outcome of the resuscitation attempt. A two-sample test for equality of proportions was performed to assess for statistical significance. Institutional Review Board approval was obtained to utilize the dataset for this research.

Results: The data analysis revealed that for the NHS Forth Valley Hospital, there was an overall 45.1% immediate survival rate of patients who underwent a resuscitation attempt in contrast to a 32.5% survival rate at UVA Hospital. The differences between these two values was statistically significant ($X^2 = 12.93$, $P < 0.001$, CI 8.21-27.6). The incidence rate of resuscitation attempts per cardiac arrests in the NHS Forth Valley Hospital was 94.5%, and 99.9% for the UVA Hospital ($X^2 = 35.2$, $P < 0.001$, CI 16.5-28.1).

Conclusion: The incident rate of resuscitation attempts between the two hospitals was statistically significant, with the UVA hospital undergoing a greater number of attempts but with a lower immediate survival rate. Differences between the legal frameworks, health insurance systems, and interpretations of bioethical principles may explain differences in frequency of resuscitation attempts and subsequent survival rates.

283 Using Google Trends to Determine Perceived Viral Exposure during the Early Phase of the COVID-19 Pandemic in the United States

Pascual KJ, Pourmand A/George Washington University School of Medicine and Health Sciences, Washington, DC

Study Objectives: Public interest in diseases during outbreaks has been previously studied by examining internet activity via Google Trends (Google, Mountain View, California), a tool that measures the popularity of internet searches longitudinally and geographically. Recently, Google Trends has been used as a surveillance and retrospective epidemiological tool to study the impact of COVID-19 in China, Taiwan, France, and Iran. However, studies that focus on the United States are significantly lacking. Using Google Trends, our aim in this study was to assess the extent of the public's perceived exposure to COVID-19 as it relates to disease prevalence during the early phase of the pandemic in the United States.

Methods: We utilized Google Trends to determine the search activity for: "Do I have coronavirus," "How to get tested for coronavirus," "What is coronavirus," "Signs and symptoms of coronavirus" and "How is coronavirus spread." We collected four weeks of Search Volume Index (SVI) data between February 17th and March 16th, 2020. The mean SVIs for the 5 states with the highest and lowest number of COVID-19 confirmed cases (as of March 16, 2020) were calculated for each query. To obtain the number of confirmed COVID-19 cases in the United States, we referred to a

Table 1. This table shows the Google queries and their corresponding SVIs for states that have the highest and lowest number of confirmed COVID-19 cases

Google Queries	States most affected by COVID-19 (# of confirmed cases)	States least affected by COVID-19 (# of confirmed cases)	Mean SVI for top 5 states (SD)	Mean SVI for bottom 5 states (SD)	P-value
"Do I have coronavirus"	New York (732) Washington (643) California (426) Massachusetts 164) Colorado (131)	Oklahoma (7) Hawaii (6) Idaho (5) Missouri (5) Wyoming (3)* Alaska (1)* North Dakota (1)*	76 (7)	54 (11)	0.005
"How to get tested for coronavirus"	59 (5)	38 (14)	0.01		
"Signs and symptoms of coronavirus"	28 (4)	45 (16)	0.05		
"What is coronavirus"	81 (7)	85 (10)	0.48		
"How is coronavirus spread"	56 (7)	65 (13)	0.21		

* For some queries, these states did not yield an SVI due to insufficient data in Google Trends and were therefore not included in the analysis.

tracker provided by Johns Hopkins University. Scatterplots were then created to compare SVI and number of COVID-19 cases on a state level. Pearson correlations were determined to examine the association between SVI and the number of COVID-19 confirmed cases as of March 16, 2020.

Results: Peak SVI for all queries took place on March 12, just a day prior to the U.S. declaration of national emergency. "Do I have coronavirus" (p=0.005), "How to get tested for coronavirus" (p=0.01), and "Signs and symptoms of coronavirus" (p=0.05) were identified as having statistically significant differences in mean SVI between states with the highest and lowest number of COVID-19 cases (Table 1). Mean SVI for "Do I have coronavirus" and "How to get tested for coronavirus" was higher in the states with the most COVID-19 cases compared to the bottom 5 states with the least cases. However, mean SVI for "Signs and symptoms of coronavirus" was higher in the bottom 5 states compared to the top 5 states. There were no statistically significant differences in mean SVI for the remaining queries: "What is coronavirus" (p=0.48) and "How is coronavirus spread" (p=0.21).When looking at all 50 states and the District of Columbia, we found that SVI also positively correlated with the number of confirmed COVID-19 cases for "Do I have coronavirus" and "How to get tested for coronavirus" (R=.387, p=0.005; R=0.367, p=0.008). No statistically significant correlations were found for "How is coronavirus spread" (p=0.45), "What is coronavirus" (p=0.39), and "Signs and symptoms of coronavirus" (p=0.22).

Conclusion: Non-generic queries in Google Trends may yield better insights into health information-seeking behavior. Specifically, queries formatted as "How to get tested for ____" and "Do I have _____" could reflect perceived exposure to a communicable disease on a population level. To our knowledge, our study is the first to use Google Trends to distinguish queries that reflect perceived exposure to COVID-19 from those that are borne out by general interest in the United States. Early access to population health data is crucial and potentially life-saving during outbreaks. Digital tools such as Google Trends may help bridge the gap in knowledge and transparency.

EMF 284 Thromboelastography to Assess Coagulopathy and Glycocalyx Degradation in Sepsis

Tyler PD, Uchimado R, Hippensteel JA, Burke RC, Lindsell CJ, Linhardt RJ, Schmidt EJ, Shapiro NI/Beth Israel Deaconess Medical Center, Boston, MA; University of Colorado, Denver, CO; Vanderbilt University Medical Center, Nashville, TN; Rensselaer Polytechnic Institute, Troy, NY

Study Objectives: Sepsis is a common and deadly clinical syndrome that affects many patients presenting to the emergency department (ED). Sepsis-induced inflammation leads to abnormal coagulation. Additionally, one potential mechanism for abnormal coagulation and organ dysfunction in sepsis is injury to the endothelial glycocalyx; the glycocalyx contains heparans which are released during degradation and may cause mild coagulopathy. We hypothesize that coagulation abnormalities detected by bedside viscoelastic monitoring (VEM), such as thromboelastography, are associated with organ dysfunction and death (suggesting abnormal coagulation as a mediator). We further hypothesize that heparinase R-time, a VEM measurement that may detect glycocalyx degradation, will be associated with organ dysfunction.

Methods: Patients >18 years old with a diagnosis of sepsis were recruited from an urban ED (~55,000 visits per year) as part of an ongoing observational study of a convenience sample of patients. After informed consent was obtained, blood samples are to measure VEM. VEM measurements include the R time, K time, alpha angle, maximum amplitude (MA), lysis percent at 30 minutes (LY30), and change in R time with the addition of heparinase (ΔR). We also collect demographic information, comorbidities, sepsis severity, the information necessary to determine the Sequential Organ Failure Assessment (SOFA) score, and mortality data. We calculated descriptive statistics for VEM measurements, and Pearson correlations between VEM measurements and SOFA score on enrollment and on days 1-3.

Results: We have enrolled 79 subjects thus far (study is ongoing). The baseline VEM parameters, expressed as median (IQR), are as follows: R, 5.3 minutes (4.2-6.4); K, 1.2 minutes (0.9-1.8); alpha angle, 72.0 degrees (65.7-75.8); MA, 68.3 millimeters (63.2-73.5); and LY30, 0.1 percent of maximum amplitude (0-1). The baseline ΔR is 0.4 minutes (IQR, 0.1-55). For patients enrolled to date, ΔR was correlated with day 1 SOFA score ($r = -0.21$, $p < 0.03$). Additionally, K was correlated with SOFA score on day 1 (0.22, $p < 0.02$) and day 2 (0.26, $p < 0.03$). Further results, delayed due to the impact of coronavirus on this project, will be available at the time of the Research Forum.

Conclusion: It is feasible to obtain VEM measurements in patients with sepsis. Our ongoing work will recruit additional patients, measure syndecan-1 levels (a marker of glycocalyx degradation), determine illness severity scores (using Sequential Organ Failure Assessment scores) on days 0-3 and mortality outcomes, and determine whether syndecan-1 levels, VEM measurements, and patient outcome measurements are associated.

285 Deployment of Artificial Intelligence for Radiographic Diagnosis of COVID-19 Pneumonia in the Emergency Department

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Study Objectives: The surge and long tail of patients in acute respiratory distress during the coronavirus-19 (CoVID19) pandemic has inspired new innovations in diagnosing, treating and dispositioning patients during high census conditions with constrained resources. During the first wave of the pandemic, we deployed an artificial intelligence (AI) algorithm for assisted interpretation of chest x-ray for use by radiologists and emergency department (ED) physicians. We report first experiences of physician interaction with this novel AI algorithm designed to enhance physician abilities to identify ground glass and consolidation on chest radiographs.

Methods: Design: We created a fully-automated pipeline into the clinical environment to provide AI augmentation of chest x-rays, utilizing a previously developed deep learning-based AI algorithm. Trained with 22,000 annotations by radiologists, the algorithm overlays X-rays with color-coded maps that indicate pneumonia probability. This was provided alongside standard chest x-ray images for physicians to use in real-time at the point of care with existing imaging software. For

this prospective observational study, we developed a 3-point survey to characterize experiences with the tool regarding ease of use and impact on clinical decision-making.

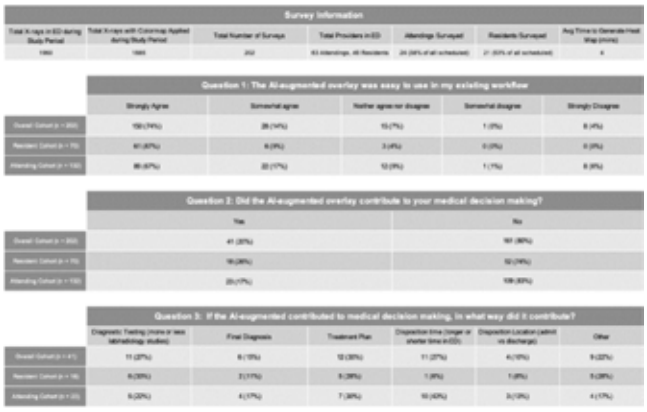
Setting: Surveys were conducted during a one-month period surrounding the projected CoVID-19 surge locally (April 8-May 9) at two academic hospitals in Southern California. A federal declaration of emergency occurred March 13, 2020 and the tool was urgently deployed on March 25.

Types of Participants: Emergency medicine resident and attending physicians surveyed in real time by telephone.

Results: Of the 5,125 total visits and 1,960 chest radiographs obtained in the ED during the study period, 1,855 were analyzed by the algorithm. Among these, emergency physicians were surveyed for their experiences on 202. Real-time computation and delivery of the tool took four minutes on average.

Overall, 86% either strongly agreed or somewhat agreed that the intervention was easy to use in the existing workflow. 20% of all respondents reported that the algorithm impacted their clinical decision making. In general, resident physicians found the AI implementation easier to use than attendings (Mann Whitney U, p=0.005). Descriptive statistics regarding further impact are summarized below (table 1).

Conclusion: This AI technology was rapidly deployed in a large academic health system in the first wave of a global pandemic. Surveyed ED physicians found this implementation easy to use within existing workflows. Twenty percent of physicians reported that the tool changed clinical decision making, and approximately one third of those found that it impacted diagnostic testing decisions and treatment plans. Several physicians reported ordering COVID-19 PCR testing as a direct result of the AI, resulting in positive tests and subsequent quarantining of patients who otherwise might not have been appropriately diagnosed. To our knowledge, this is the first published study evaluating the impact of medical imaging AI on clinical decision making in the ED setting and may prove to be a powerful tool during the pandemic response.



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286 Firearm Injuries: Long-Term Health Outcomes and Health Care Expenditures for Children

Pulcini CD, Goyal MK, Hall M, Gruhler H, Chaudhary S, Alpern E, Fein JA, Fleegler E/ Children's Hospital of Philadelphia, Philadelphia, PA; Children's National Medical Center, Washington, DC; Children's Hospital Association, Topeka, KS; Lurie Children's Hospital, Chicago, IL; Children's Hospital of Boston, Boston, MA

Study Objectives: To evaluate health care encounters and expenditures for children one year before and following firearm injury.

Methods: Cohort study of children 0-18 years identified using ICD-9/ICD-10 diagnosis codes for firearm injury in the ED or inpatient setting from 2010-2016 in the Medicaid MarketScan (IBM Watson, Armonk, New York) claims database. Subjects met inclusion criteria if they were continuously enrolled in Medicaid with data availability one year before and one year after a firearm injury during the study period. We identified index injuries by ensuring that each child did not have a firearm injury diagnosis in the year prior. Outcomes included: 1) difference in health care encounters for one year before and after injury (outpatient visits, physical, occupational and mental health therapy, emergency department visits, and inpatient admissions); 2) difference in health care expenditures pre- and post-firearm injury. Descriptive statistics characterize patient demographics. Health services and expenditures utilized before and after firearm injury evaluated with Wilcoxon Sign Rank Tests.

Results: Of 3,296 children, 83.4% were male (n=2,750), and approximately half were 15-18 years of age (n=1,646) and non-Hispanic African-American/black (n=1,699). Healthy children with low prior health care utilization were the largest subgroup (n=2,823). For the entire cohort there were 109,320 health care encounters during the entire study period (Table 1); 47,660 before the firearm injury and 61,660 afterward (p<0.001). There was a higher rate of inpatient encounters (post-pre=0.9 visits/patient, p=<0.001) and outpatient encounters (post-pre=0.7 visits/patient, p=<0.001) after the firearm injury. Concomitantly, there was an overall increase of $18.5 million in health expenditures for the entire cohort one-year post-firearm injury, 80% of which were for inpatient health care encounters ($14.7 million). Healthy children with low prior health care utilization who were injured by a firearm experienced the largest and most significant increases in inpatient health care encounters and expenditures after their injury.

Conclusion: Children who experience firearm injury show increases in health care encounters and expenditures one-year after the injury. Public health programs that reduce the incidence and impact of childhood firearm injury can also lead to considerable savings in health care expenditures. Future research is needed to more fully elucidate the long-term impact of firearm injuries on children, families, health care utilization, and expenditures.

Table 1. Healthcare resource utilization for children ages 0-18 from on Medicaid one year pre- and one-year post- firearm injury

All subjects (N (subjects)=3,296; n (encounters)=109,320)						
	pre	post	Difference (post-pre)			
	Encounters, n (%)	Encounters, n (%)	Encounters	Mean difference per subject (N)	Median	p-value
Healthcare Encounters	47660	61660	14000	0.7	1	<.001
Outpatient (OP)*	47478 (99.6)	60781 (98.5)	13303	0.7	T1	<.001
OP PCP	5554 (11.6)	6762 (10.9)	1208	0.5	1	<.001
OP Specialists	6001 (12.5)	8374 (13.5)	2373	1	1	<.001
OP ED	2909 (6.1)	6152 (9.9)	3243	1	1	<.001
OP MHSA	20007 (41.9)	18448 (29.9)	-1559	-1.1	0	0.057
Inpatient	182 (0.3)	879 (1.4)	697	0.9	1	<.001
Low Prior Healthcare Utilization (N= 2,823; n=66,461)						
Healthcare Encounters	23582	42879	19297	1.2	1	<.001
Outpatient (OP)*	20779 (88.1)	42227 (98.4)	18645	1.2	1	<.001
OP PCP	4543 (19.2)	5688 (13.2)	1145	0.5	1	<.001
OP Specialists	3716 (15.7)	6170 (14.3)	2454	1.2	1	<.001
OP ED	2229 (9.4)	5044 (11.7)	2815	1.1	1	<.001
OP MHSA	3699 (15.6)	8532 (19.8)	4833	4.9	1	<.001
Inpatient	0 (0.0)	652 (1.5)	652	1.2	1	<.001
High Non-Mental Health Utilization (N=145; n=15,093)						
Healthcare Encounters	7745	7348	-397	-0.3	0	0.999
Outpatient (OP)*	7563 (97.6)	7209 (98.1)	-354	-0.3	0	0.619
OP PCP	550 (7.1)	505 (6.8)	-45	-0.3	0	0.264
OP Specialists	1465 (18.9)	1333 (18.1)	-132	-0.8	0	0.948
OP ED	393 (5)	561 (7.6)	168	0.9	1	<.001
OP MHSA	2914 (37.6)	2389 (32.5)	-525	-4	-1	0.031
Inpatient	182 (2.3)	139 (1.8)	-43	-0.3	-1	<.001
High Prior Mental Health Utilization (N=282; n=27,766)						
Healthcare Encounters	16333	11433	-4900	-2.5	1	0.012
Outpatient (OP)*	16333 (100)	11345 (99.2)	-4988	-2.7	1	0.134
OP PCP	461 (2.8)	569 (4.9)	108	0.5	1	0.001
OP Specialists	820 (5)	871 (7.6)	51	0.2	1	0.015
OP ED	287 (1.7)	547 (4.7)	260	1	1	<.001
OP MHSA	13394 (82)	7527 (65.8)	-5867	-20.8	-17	<.001
Inpatient	0 (0.0)	88 (0.7)	88	1.2	1	<.001

*Also includes outpatient testing, drug & injection, home health, outpatient not otherwise specified, outpatient therapy & treat, durable medical equipment, and dental

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287 Likelihood of COVID-19 Positive Test Results in Patients Who Present to the Emergency Department With Key COVID Chief Symptoms

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Study Objectives: Many COVID-19 testing algorithms in the United States focus on the key symptoms (KS) of fever, cough and shortness of breath. We sought to understand the likelihood key symptoms would be the presenting chief complaint (CC) of a COVID+ patient.

Our objective was to understand the presenting CC of COVID positive patients with regards to KS versus similar symptoms (SS).

Methods: The study population included patients presenting to 19 EDs in the upper Midwest ranging from critical access sites to larger quaternary care hospitals from 2/1-5/4/2020. All facilities utilize a common electronic health record (Epic systems, Verona, Wisconsin) with structured data entry for CCs. Comparisons between the CCs for COVID- and COVID+ patients were performed using two-sided Chi-squared tests. KS are defined as the presence of shortness of breath, fever, or cough. SS are complaints similar to KS, such as flu-like symptoms, respiratory distress, or COVID-19 inquiries. All other complaints are categorized as Not Immediately KS.

Results: A total of 7682 patients presented to the ED during the study time frame. Out of these patients, 166 (2.16%) tested positive for COVID-19. Overall, COVID+ patients were significantly more likely to present with the KS compared to COVID- patients (COVID+: 68.7%, COVID-: 54.0%, $p < .001$), as well as symptoms similar to these KS (COVID+: 7.8%, COVID-: 2.5%, $p < .001$). A patient presenting with KS/similar symptoms tests positive for COVID are 2.5 times higher than the odds that a patient without these symptoms tests positive (OR = 2.50, 95% CI: 1.74 - 3.59, $p < .001$). Table 1 provides a summary of the COVID+ cohort grouped by CC. COVID+ women tend to present more frequently without KS. Furthermore, 41-50 year old COVID+ patients most frequently report CC similar symptoms.

Conclusion: Patients presenting with KS are much more likely to test positive for COVID-19 than patients without KS, which is congruent with recommendations for testing in most algorithms. However, 23.5% of patients testing positive for COVID-19 had non-KS as the CC; in particular, patients in their 40s tended to present with non-KS CCs. Conservative algorithms must understand the variety of CC presentations associated with COVID-19 infection, as missed diagnosis will pose exposure risk to staff and other community members. Future research focused on the likelihood of patients having COVID-19 who present without a CC of fever, cough, or shortness of breath is recommended. This has the potential to further refine testing algorithms, preserve limited resources, and minimize potential exposure.

Table 1. Cohort Characteristics (COVID+ Patients)

	Key Symptoms (N=114)	Similar Symptoms (N=13)	Not Immediately KS (N=39)	P-Value
Age- Median [IQR]	56 [36-68]	47 [39-49]	56 [30-70]	0.98
Age Group- n (%)				
18 or Younger	3 (3%)	0 (0%)	3 (8%)	0.28
19-30	20 (18%)	2 (15%)	7 (18%)	>0.99
31-40	13 (11%)	2 (15%)	4 (10%)	0.85
41-50	15 (13%)	6 (46%)	4 (10%)	0.012
51-60	19 (17%)	0 (0%)	6 (15%)	0.37
Older than 60	44 (39%)	3 (23%)	15 (39%)	0.59
Sex- n (%)				
Male	64 (56%)	8 (62%)	13 (33%)	0.037

Note: P-values generated from ANOVA (age) and Fisher's Exact tests

288 Characteristics and Outcomes of Patients with Ventricular Assist Devices Presenting to a Pediatric Emergency Department

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Study Objectives: Ventricular assist devices (VADs) are being used more frequently in pediatric patients with advanced heart failure. Outpatient management of children with VAD implantations also is becoming more common. However, no study exists that describes Emergency Department (ED) care of these patients. This study aims to identify patient characteristics and outcomes of children with VADs presenting to the ED.

Methods: This is a retrospective descriptive study of all patients ages 0 to 18 years in the Stanford Children's outpatient VAD program who presented to our pediatric ED between 2010 (year of first discharged VAD patient) and 2020. Patient data was abstracted from electronic medical records. Adverse events were defined according to the Advanced Cardiac Therapies Improving Outcomes Network (ACTION) registry guidelines. Adverse events were included if they occurred during the ED visit or associated hospitalization.

Results: A total of 30 children with VAD implantations were transitioned to outpatient care in the study period. All were implanted with continuous flow devices. Among children in the outpatient VAD program, 20/30 (66.7%) had 38 visits to our pediatric ED over 141.5 patient-months. Median age of patients at time of ED visit was 12.5 (range 7.3-17.4) years. Median number of ED visits per discharged child was 1 (range 0-4). The most common complaints on arrival to ED included fever (7/38; 18.4%), abdominal pain or vomiting (7/38; 18.4%), headache (6/38; 15.8%), bleeding from any site (4/38; 10.5%), chest pain (4/38; 10.5%), device malfunction or alarm (3/38; 7.9%), dizziness (3/38; 7.9%), and dyspnea (3/38; 7.9%). Adverse events occurred during 14/38 (36.8%) ED visits or associated hospitalizations, including 3/38 (7.9%) instances each of hypertension, major infection, or right heart failure, 2/38 (5.3%) instances of major bleeding, and 1/38 (2.6%) instances each of hemolysis, renal dysfunction, or device malfunction. Hospital admission occurred in 27/38 (71.1%) of visits, including 10/27 (37.0%) to a cardiac intensive care unit. No patients died during an ED visit or associated hospitalization. Mortality of all children in the outpatient VAD program during the study period was 3/30 (10.0%) including one patient on destination therapy, one with hemorrhagic stroke, and one with multi-system organ failure due to cardiogenic shock.

Conclusion: In a single outpatient pediatric VAD program, patients had high utilization of ED care and had a high rate of hospital admission following ED presentation. The youngest patient transitioned to outpatient VAD care was 7 years old. Fever, abdominal pain/vomiting, and headache were the most frequent initial complaints. The most common adverse events were hypertension, major infection, and right heart failure.

289 Neutrophil to Lymphocyte Ratio and Platelet to Lymphocyte Ratio as Predictive Markers for Pulmonary Embolism

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Study Objectives: Acute pulmonary embolism (APE) is a potentially life threatening condition and a leading cause of mortality worldwide. Due to the urgency of establishing a diagnosis which can alter life-saving management, the concern for APE leads to excessive imaging with CT pulmonary angiography particularly in the emergency department. Neutrophil-to-Lymphocyte ratio (NLR) and Platelet-to-Lymphocyte ratio (PLR) have recently been evaluated as predictive markers for deep venous thrombosis (DVT), however, few studies have explored their application for the evaluation of acute pulmonary embolism. Given that a complete blood count (CBC) is a routinely ordered, easily accessible and inexpensive evaluation of prothrombotic and inflammatory status, it is of great significance to explore the aforementioned ratios as an alternative diagnostic tool when evaluating for APE. The ultimate goal is to gain insight into alternative diagnostic markers for APE and subsequently reduce the number of unnecessary CT Angiograms performed.

Methods: This study evaluated the role of the PLR and NLR in those patients with unprovoked APE, and tested the hypothesis that a "negative" NLR of ≤ 3.4 is effective to rule out APE, while a "positive" PLR of ≥ 260 is effective to rule in APE. In this retrospective analysis, 494 patient encounters from 2012 to 2019 from a community-based hospital setting with confirmed APE were evaluated, and 106 were enrolled in the study. Inclusion criteria included confirmed APE since 2012. Exclusion criteria included surgery within the last 35 days, APE due to discontinuation of anticoagulation, current pregnancy, active chemotherapy or radiation therapy, confirmed DVT during admission, sepsis, or other known hypercoagulable state. APEs were confirmed via CTA chest (98.1%) or V/Q scan (1.9%).

Results: NLR median in our study population was 3.60 (0.520, 27.9), while the PLR median was 132.1 (39.65, 578.3). There was no statistically significant association between NLR or PLR and age, sex, ethnicity, or past medical history. NLR was negative in 55.14% of participants, while PLR was positive in only 14.95% of participants. Using our outlined criteria, the NLR is inappropriate as a screening tool to rule out APE, with a specificity of 44.86%. While PLR may have use in ruling in unprovoked APE, the sensitivity is low at 14.95%.

Conclusion: Although the NLR and PLR have been shown to be predictive for DVT in prior studies, they do not appear similarly efficacious in the evaluation of APE.

Table 1. Demographics

	Metric
Sex (n)	
Men	45 (42.45%)
Women	61 (57.55%)
Age (median, range)	62 (27, 100)
Race (n)	
White, Non-Hispanic	45 (42.86%)
White, Hispanic	9 (8.57%)
Black, Non-Hispanic	45 (42.86%)
Black, Hispanic	3 (2.86%)
Asian	1 (0.95%)
Other, Non-Hispanic	2 (1.90%)
Past Medical History (n)	
Diabetes	17 (16.04%)
CHF	2 (1.89%)
COPD	8 (7.55%)
HTN	6 (5.66%)
HLD	28 (26.42%)
CAD	11 (10.38%)
Prior DVT	7 (6.67%)
Prior APE	5 (4.76%)
Family History VTE	11 (11.58%)
Obesity	44 (41.12%)
OCP Use	11 (10.48%)

Table 2. NLR, PLR Distributions

	Men				Women				t-test	df	p
	Median	Mean (SD)	95% CI	Range	Median	Mean (SD)	95% CI	Range			
NLR	3.958	4.767 (3.386)	3.749, 5.784	0.7146, 17.88	3.401	4.331 (4.064)	3.290, 5.372	0.5204, 27.91	0.5846	104	0.5601
PLR	123.3	155.5 (107.5)	123.2, 187.8	39.65, 578.3	135.7	164.6 (95.39)	140.1, 189.0	50.24, 527.2	-0.4573	104	0.6484

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290 Rural Youth's Exposure to Firearm-Related Injury and Death and Their Attitudes Regarding Firearms

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Study Objectives: In the shadow of recent firearm shootings in schools and other public places and the rise in teen suicides, youth have become leading voices raising concerns about the firearm-related death and injury epidemic. This study's objective was to investigate rural youth's personal experience with firearm-related death and injury, and their attitudes about firearms.

Methods: Attendees of Iowa's 2019 Future Farmers of America (FFA) Leadership Conference were surveyed at the University of Iowa Stead Family Children's Hospital safety booth. Participants were queried about potentially negative personal experiences with firearms, and their personal beliefs about firearm-related issues. Descriptive and comparative analyses were performed.

Results: The survey was completed by 1,382 FFA members who were 13-18 years old. Over one-third (36%) stated they personally knew someone who had been killed or injured by gunfire. Of these, over two-thirds (69%) knew of someone who had died or was injured by a firearm accidentally and 30% knew of someone who was killed or injured on purpose (eg, suicide). Three individuals stated they themselves had been injured by a firearm. Nearly 5% (n=64) reported having personally seen someone threatened by a firearm. These individuals saw the following people being threatened: a family member (32%), a friend (38%), themselves (11%) and others (26%). Nearly all respondents (94%) agreed or strongly agreed that the right to use firearms for hunting and sports shooting should be kept legal. The vast majority (89%) agreed or strongly agreed that a firearm safety course should be required to get a hunting license. Males as compared to females had lower proportions that agreed that a firearm safety course should be required to get a hunting license ($p<0.001$). Three-fifths (60%) strongly agreed, and the vast majority (89%) agreed that there should be a background check required by law before someone can buy a firearm. Those that had hunted had lower percentages that agreed that a background check should be required by law ($p=0.034$). Over three-fifths (61%) agreed or strongly agreed that there should be laws requiring safe storage (locked and unloaded) of firearms in homes. Males ($p<0.001$), 16-18 year olds ($p=0.006$), those living on farms or in the country ($p<0.0001$), those with firearms in their home ($p<0.0001$), those with unsafe firearm storage ($p<0.0001$) and those that had hunted ($p<0.001$) all had lower proportions that agreed that there should be laws requiring safe storage of firearms in homes.

Conclusion: The majority of youth in this study agreed that hunting and sports shooting should be legal, but were also in favor of firearm safety measures such as required training, background checks, and safe firearm storage in homes. Over one-third of FFA members personally knew someone who was killed or injured by a firearm and about 5% had seen someone or been personally threatened with a firearm. Screening at health care visits or in schools may help identify youth with negative personal experiences from firearms who might benefit from mental health intervention.

291 Firearm Presence and Storage in Rural Youth Homes

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Study Objectives: The firearm suicide rate in children/teens has increased 65% in the past decade. Over 80% of youth firearm suicides involve a gun belonging to a family member. Safe firearm storage can be a major factor in preventing these tragedies. The objective of this study was to determine firearm exposure and storage practices in the homes of rural youth.

Methods: Attendees of the 2019 Iowa Future Farmers of America (FFA) Leadership Conference were surveyed at the University of Iowa Stead Family Children's Hospital safety booth. Data was collected regarding the presence of firearms in the home, and their storage. Demographic data obtained included age, sex, race, and where the FFA member lived. Descriptive and comparative analyses were performed.

Results: A total of 1,382 FFA members 13-18 years old completed the survey. Just over half (53%) lived on a farm, nearly two-fifths (18%) lived in the country, but not on a farm, and 29% lived in town. Over four-fifths (84%) of FFA members were aware of having at least one rifle/shotgun in their home, while nearly three-fifths (58%) had at least one handgun. Over one-half (56%) had both rifles/shotguns and handguns at their homes. The proportion of homes with firearms varied significantly by where FFA members lived ($p<0.001$): farm (91%) > country/not farm (86%) > town (70%) for rifles/shotguns; and farm (63%) > country/not farm (57%) > town (50%) for handguns. Caucasians had higher proportions with rifles/shotguns in the home (95%) than those of other races (66%, $p<0.001$). Of those with rifles/shotguns in their home,

over half (51%) stated the they were stored unlocked, 29% stated they were stored loaded, and 17% stated they were stored both unlocked and loaded at least some of the time. For those who reported there were rifles/shotguns unlocked at least part of the time in their home (51%), almost one-half (46%) also had ammunition that was stored unlocked. Higher proportions living on a farm > country/not farm > town reported having rifles/shotguns not properly stored (p=0.019). Of those with handguns in their home, over two-fifths (43%) stated they were stored unlocked, two-fifths (40%) said they were stored loaded, and about a quarter (24%) reported they were stored both unlocked and loaded at least some of the time. For those who reported there were handguns unlocked at least part of the time in their home (43%), 38% also had ammunition that was stored unlocked. Of those who were aware of how both rifles/shotguns and handguns were stored in the home, 82% reported that they had at least one firearm stored either unlocked or loaded at least some of the time.

Conclusion: The vast majority of Iowa FFA members have firearms in their home and a large proportion of them are not stored safely. This puts these adolescents at increased risk for firearm-related suicide. Widespread efforts are needed to educate rural families regarding the importance of proper storage of firearms and ammunition.

292 Feasibility of Portable, Point of Care Magnetic Resonance Imaging in the Acute Emergency Department

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Study Objectives: Recent advances in magnetic resonance imaging (MRI) technology have made this modality portable, affordable, and less restrictive. Utilizing a lesser magnetic field allows the exam to be performed at the patient's bedside. We sought to determine the operational and technical feasibility of using point-of-care MRI in the ED.

Methods: We performed a prospective feasibility study at two large university-affiliated EDs (urban and suburban). This was a consecutive convenience sample of adult patients who presented to the ED with either an acute neurological complaint or acute pain/injury to the foot or ankle. We were limited to those anatomical areas secondary to the availability of MRI coils. Patients weighing more than 400 lb, with contraindication to low-field MRI or inability to consent were excluded from enrollment. Study participants (3 physicians, 2 RA) completed a detailed training session which included guidance for the transport, storage and disinfection of the MRI unit, as well as patient safety, positioning, and acquisition of images.

The outcome measures included physician evaluation of the logistics of transport and storage of the POC Unit, patient positioning for scanning and the technical ease of acquiring images using a 4-point Likert scale (1-strongly disagree to 4-strongly agree). Secondary outcomes included the quality of images obtained (diagnostic acceptability) and barriers to POC performance. Descriptive statistics are reported. The study received IRB approval at both institutions and informed consent was obtained from all patients.

Results: Between June 2019 and February 2020, 67 encounters were included in the study (47 head, 20 foot and ankle). Participants reported favorable responses (agree or strongly agree) in our three main focus areas (Table 1). 90% agreed that it was simple to transport the unit from storage to bedside and back to storage (Aim 1: mode, 3; mean, 2.88-0.41 SD). 89% agreed that it was simple to position the patient into the bedside MRI unit (Aim 2: mode, 3; mean, 2.91-0.47 SD). The MRI control tablet and performance of the exam was considered simple and intuitive in all responses (Aim 3: mode, 3; mean, 3.07-0.25 SD). Of note, the only response that was in strong dissent, for both ease of transport and patient positioning, was related to performing a cranial MRI for a markedly obese patient that required movement into an alternate treatment room and several assistants to position the patient. 30 % of the encounters required patients to be relocated to a different room in the ED. This occurred in the urban ED where it is not uncommon to "double-up" patients awaiting disposition. Finally, the images acquired were deemed "diagnostic acceptable quality" by a third-party reviewer in 89.5% of our studies.

Conclusion: Portable, point of care MRI exams are feasible and allow for rapid acquisition of brain and distal extremity images in the ED. We found that transporting the machine to the bedside, positioning the patient and performing the exam to be easy, efficient, and intuitive. Future research with a larger series of patients to determine the diagnostic characteristics and cost-effectiveness of this technique is warranted.

Evaluation of Logistics

AIM 1.	N (%)
Strongly Disagree	1 (2%)
Disagree	6 (9%)
Agree	60 (90%)
Strongly Agree	0
AIM 2.	
Strongly Disagree	1 (2%)
Disagree	6 (9%)
Agree	57 (85%)
Strongly Agree	3 (4%)
AIM 3.	
Strongly Disagree	0
Disagree	0
Agree	52 (78%)
Strongly Agree	15 (22%)

293 The Dangers of Off-Road Vehicles to Youths: Not Something to Kid Around About

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Study Objectives: Children are not allowed to operate motor vehicles such as cars until they are 16 years old due to the risks associated with the operation of such powerful machines. Yet, the operation of off-road vehicles (ORVs) by youths under 16 years old has been largely normalized in both rural and urban communities, despite the significant safety risks involved. To better understand this issue, the goal of this study was to characterize roadway ORV crashes with youth operators, including riding behaviors and crash outcomes, in a Midwest state.

Methods: This study examined ORV roadway crashes involving operators <16 years of age (115 crashes) that were documented in Iowa Department of Transportation (DOT) records from 2002-2017. Descriptive and comparative analyses was performed using the Statistical Package for the Social Sciences (SPSS).

Results: In Iowa's pediatric roadway crashes from 2002-2017, 63% of victims were male and 81% were 12-15 years old. Females were more commonly passengers than were males (60% vs. 24%), as were younger (<12 years) as compared to older riders (56% vs. 26%). Only a small percentage of victims were helmeted, 24% of operators and 14% of passengers. Additionally, 73% of all roadway crashes involved multiple riders on the ATV, around 40% occurred on paved roads, and 82% occurred in rural areas. Collisions with an object or another vehicle were the mechanism in 65% of crashes. Roads with speed limits over 50 mph were the location of around half (52%) of all crashes. Among pediatric victims, 3.5% were killed in the crash and 46% of the pediatric roadway crashes resulted in either major injury or death. Moreover, a higher proportion of the fatal or incapacitating injuries were observed in adolescents (12-15 years) than in younger children (35% vs. 23%).

Conclusion: Our results illustrate that multiple risky behaviors are common among youth in roadway ORV crashes, including riding on high speed roads, with passengers, and/or without helmets. Adolescents (12-15 years old) are the large majority of pediatric victims, and serious injury or death resulted in almost half of all crashes. Based on these results, it is clear that multiple targeted approaches are needed for youth under 16 years old in order to prevent pediatric fatalities and severe injuries, particularly on the road.

294 Validating an Emergency Department Frailty Assessment Tool

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Study Objectives: The clinical condition of frailty in an aging population refers to the age-related decline across many physiological systems which increases vulnerability

to changes in health from even minor triggers. Frailty portends a higher risk of hospital admission, emergency department visits, falls and mortality. Various frailty tools have been devised to help identify patients who may benefit from additional in-hospital and outpatient services. However, most are time-consuming to complete especially in the fast-paced emergency department setting. Thus, validating a standardized and efficient tool to screen elderly patients for frailty is necessary. The Frail Scale has been put forth as a quick and simple means of identifying at-risk patients although has not yet been validated in a large, urban patient population. The Frail Scale includes 5 questions with the components Fatigue, Resistance, Ambulation, Illness and Loss of weight. This study aims to use a previously-validated 34-question frailty index to validate the Frail Scale as a quick screening tool for frailty.

Methods: The study was performed in a large, county emergency department. Inclusion criteria consisted of age equal to or more than 65. Exclusion criteria included patients who scored less than 21 on the mini mental status exam or those patients who were not able to complete the questionnaire. Consented participants completed both the Frail Scale and Frailty Index. Physicians were asked to document their assessment of frailty and perceived 30-day recidivism on a 10 point Likert scale. The physician likert score for frailty was stratified into low, medium, and high likelihood of frailty. The Frail Scale and Frailty Index were stratified into 3 categories from "not frail" to "frail" based on prior published studies. A weighted kappa was used to determine agreement between scales.

Results: 222 patients were enrolled in the study between March 2018 and December 2019. The average age was 72 years, median age was 70 years and IQR was 8. 48% of patients were men. 30 patients were identified as "not frail," 86 as "pre-frail" and 106 as "frail" by the Frail Scale. The weighted kappa for the Frailty Index and Frail Scale was 0.455 (CI 0.36 to 0.55). The weighted kappa for the Frail Scale and physicians' gestalt for patient frailty was 0.24 (CI 0.13 to 0.34). Recidivism and 30-day mortality data was available for 168 patients. 39 of these patients returned to the ED in 30 days, and 1 patient died within 30 days. There was no association between the Frail Scale or Frailty Index and recidivism.

Conclusion: The Frail Scale is a faster frailty assessment tool and decent substitute to the more time-intensive Frailty Index. From our data, physicians' gestalt for patient frailty is not very accurate when compared to the Frail Scale or Frailty Index. This suggests that a quick, standardized frailty tool such as the Frail Scale may assist with identification of frail patients and provide useful information to Emergency Department providers in regard to triage, disposition, and outpatient follow-up.

295 Roadway to Disaster: Adult All-Terrain Vehicle Crashes on Iowa Roads

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Study Objectives: Each year, U.S. all-terrain vehicle (ATV) crashes result in over 700 deaths and hundreds of thousands of injuries. The majority of these crashes involve operators over 16 years of age. Research shows that roadways are the most dangerous places to ride ATVs, but only a few studies have specifically examined the characteristics and outcomes of roadway-related ATV crashes. The goal of this study was to characterize statewide roadway crashes with adult ATV operators in a Midwest state.

Methods: ATV crashes were identified in Iowa Department of Transportation data (476 crashes, 2002-2017). The study focused on crashes with adult operators ($\geq$18 years). Descriptive and comparative analyses (SPSS, Statistical Package for the Social Sciences) were performed.

Results: There was a steady increase in road-related crashes with adult operators over the study period from 104 in 2002-2005 to 144 in 2014-2017. Crash victims were 77% male and only 8% were helmeted. Almost half of the crashes (47%) involved multiple riders on the ATV, 75% occurred in rural areas, one-quarter were collisions with a roadway vehicle, and 72% were on roads with speed limits >35 mph. Over 60% of crashes occurred on weekends (Friday-Sunday) and the vast majority (94%) occurred in good weather. Among all adult riders in the crash, 9% were killed and together more than half (53%) suffered severe or fatal injuries, with the highest proportion of these deaths and major injuries involving young adults 18-30 years of age. For drivers 18-60 years old, 1 in 5 were impaired by alcohol and/or drugs, whereas only 3% of drivers 60 and older were driving while impaired (p=0.011). Another age-dependent difference was in crash mechanism. The youngest (18-30 years) and oldest (>60 years) operators were more commonly involved in collisions with another vehicle or with an object (63% and 65%, respectively), as compared to middle-aged adults (45%, p=0.006).

Conclusion: Evidence shows that roadway riding is an independent risk factor for ATV-related crashes and injuries. This study further demonstrates that multiple risky behaviors by Iowa's adult ATV operators, including riding on high speed limit roads and operating ATVs while impaired, is contributing to preventable deaths and serious injuries. Our results also suggest a critical need for additional ATV injury prevention strategies, including targeted approaches for different adult age groups.

296 Development of an Artificial Intelligence Deep Learning Algorithm That Utilizes IVC Collapse to Predict Fluid Responsiveness

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Study Objectives: To create an artificial intelligence deep learning (DL) algorithm capable of analyzing inferior vena cava collapse (cIVC) to predict fluid responsiveness among critically ill patients.

Methods: We used Long Short Term Memory (LSTM) DL architecture capable of identifying temporal changes and relationships in real time ultrasound video to build an algorithm capable of interpreting cine loops in real time. The algorithm was pre-trained on a standard human action video database and then trained on a set of inferior vena cava (IVC) videos of spontaneously breathing critically-ill patients undergoing intravenous (IV) fluid resuscitation obtained from two prior studies. We randomly selected 90% of the IVC videos to train the DL algorithm and 10% of the videos to test the DL algorithm's ability to predict fluid responsiveness. Fluid responsiveness was defined as a $>$ 10% increase in cardiac index following a 500 ml fluid bolus, measured by bioreactance. We utilized 212 distinct videos from 175 critically-ill patients; 191 to train the DL algorithm and 21 to test its performance in comparison to POCUS interpreters. Using data augmentation, we increased our sample size from 191 to 3,820 unique videos from the to train the DL algorithm.

Results: Of the 175 patients, 91 (52%) were fluid responders as determined by assessment with a Cheetah bioimpedance cardiac output measurement device in response to standardized fluid bolus administration. The DL algorithm was able to predict fluid responsiveness: AUROC = 0.71 (95% CI .56 to .87), positive likelihood ratio (LR) 4.31 (95% CI 2.23 to 8.34), negative LR 0.07 (95% CI 0.02 to 0.28). POCUS novices performing measurements at the patient's bedside achieved an AUROC of 0.69% (95% 0.69 CI to 0.77). POCUS experts using video review and manual diameter measurement achieved an AUROC of 0.94 (95% CI 0.83 to 0.99).

Conclusions: We demonstrated that it is possible to create and train a DL algorithm capable of reading videos of respirophasic variation of the IVC to predict fluid responsiveness. Our DL algorithm performed reasonably well using a small test sample compared to expert sonologists while slightly outperforming real time measurement results by a more novice group at the patient bedside. Further training and testing of the DL algorithm are needed before clinical implementation.

297 Emergency Nursing Workforce, Burnout, and Work Environments in the United States: A National Sample Survey Analysis

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Study Objectives: Emergency care providers experience higher rates of burnout than colleagues in other specialties. The aims of this study were to: 1) generate national estimates for characteristics of the current emergency nursing workforce in the United States, 2) test differences in factors associated with burnout between emergency nurses and other registered nurses, and 3) ascertain factors associated with burnout among emergency nurses.

Methods: Population estimates using the responses to the 2018 National Sample Survey of Registered Nurses in the United States were analyzed. Descriptive statistics, chi-square for group differences, and unadjusted and adjusted logistic regression were conducted using complex survey sampling design weights.

Results: A total of 50,273 (weighted N=3,957,661) registered nurses completed the survey. A total of 2,134 (4.24%, weighted N= 226,125, 5.2%) emergency nurses were included. Burnout was endorsed by a higher proportion of emergency nurses (0.3825, 95% CI [0.3394, 0.4277]) compared to non-emergency nurses (0.2442, 95% CI [0.2359, 0.2528]) (χ^2=48.22, p<0.001). Factors consistently associated with burnout in emergency nurses in both unadjusted and adjusted analysis were insufficient staffing, stressful work environment, and patient population.

Conclusion: Development and testing of interventions at a national scale to reduce emergency nursing burnout is warranted, including staffing and work environment policies.

298 Impact of Presenting Vital Signs on Outcomes of Patients Hospitalized with Coronavirus

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Study Objectives: Among patients admitted with coronavirus, vital signs recorded at initial emergency department (ED) presentation may inform outcomes. Our objective was to assess the impact of presenting vital signs on discharge after hospitalization, neurological sequelae, and hospital length of stay.

Methods: We conducted a retrospective investigation at Elmhurst Hospital (Queens, New York) recognized as "the epicenter of the epicenter" of the 2020 coronavirus pandemic. Included were 2216 adult patients who tested positive for coronavirus. We studied vital signs recorded upon initial ED presentation including oxygen saturation, respiratory rate, temperature, heart rate, and blood pressure. We used multivariable logistic regression models to test for associations between presenting vital signs and discharge after hospitalization, neurological sequelae (cognitive/sensory/motor changes, new emotional instability, new onset seizures), and hospital length of stay.

Results: Upon abstract submission, data abstraction was still ongoing. Preliminary analysis suggested an association between higher initial oxygen saturation and increased odds of discharge after hospitalization (OR 1.108, 95% CI 1.004-1.223). It also suggested an association between higher initial respiratory rate and increased odds of neurological sequelae (OR 1.156, 95% CI 1.008-1.327). No association was observed between presenting temperature, heart rate, blood pressure, and outcomes.

Conclusion: Among patients hospitalized with coronavirus, initial vital signs obtained at ED presentation provide useful prognostic information on short term outcomes.

299 Pediatric Airway Procedures Skill Retention with Standard Simulation, the Peyton Method, or Self-Directed Learning

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Study Objectives: The optimal method for teaching procedures is not known. For uncommonly performed procedures such as pediatric airway procedures, practical learning is often supplemented with simulation (sim) or digital platforms. In this study, we compare residents' performance of pediatric bag valve mask (BVM) and endotracheal intubation (ETI) after undergoing training using (1) Standard sim, (2) The Peyton method, or (3) Self-directed learning with free access to sim mannikins.

Methods: 32 residents at a single academic program were randomized to one of the three study arms. Residents then underwent a previously standardized pre-test (the ARMY CSC) using a Laerdel infant sim model to assess their current skill set. Residents were tested by a pair of investigators who were blinded to the residents' training assignment. Investigators were trained in the assessment and had standardized assessment sheets with narrative cues for scoring performance. These scores were pooled for each resident. Residents subsequently underwent training sessions according to their randomization. Residents randomized to Peyton method (a method of observation, deconstruction, reconstruction, and operation) were trained by investigators trained in Peyton method working from a standardized script to ensure reproducibility. Residents randomized to standardized sim were oriented to the goal of the sim (running a case of infant respiratory arrest) and then debriefed by an investigator utilizing the check-list from the pre-test to provide feedback from the session. Residents randomized to self-directed learning were provided with online resources and had access to the sim materials, but no other formalized procedural training. Residents were retested at 4-6 months by investigators who were blinded to their training assignment.

Results: Prior to undergoing their training session, residents in each group reported similar prior experience with pediatric BVM and ETI ($p=0.11$ and 0.63 respectively), had similar levels of training ($p=0.82$), and felt similarly familiar with the procedures ($p = 0.24$ and 0.25, respectively). 25 residents were able to complete both study sessions. The remainder had their reassessments disrupted by social distancing measures placed by the IRB. Skill performance on pretest of BVM was similar between groups ($p=0.69$), with a median of 7 on a 10-point scale (IQR 6-8). Performance on ETI was also similar ($p=0.9$), with a median of 6 on a 10-point scale (IQR 4-8). On reassessment after training, there were no differences in resident skill performance on the basis of training group ($p=0.85$ for BVM and 0.20 for ETI). On the whole, however, residents showed retention and improvement in their skills over time with a median score of 9 on BVM (IQR 8-9, $p<0.05$, Wilcoxon Signed Ranks test) and a score of 8 on ETI (IQR 8-9, $p = 0.001$, Wilcoxon Signed Ranks test).

Conclusion: Residents showed improvement in pediatric BVM and ETI skills over a 6-month training period regardless of method used to teach them these skills.

300 Residents' Perceptions of Effective Features of Educational Podcasts

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Study Objectives: Educational podcasts are used by emergency medicine trainees to supplement clinical learning and to foster a sense of connection to broader physician communities. Yet residents report difficulties remembering what they learned from listening, and the features of podcasts that residents find most effective for learning remain poorly understood. We aim to describe residents' perceptions of effective features of educational podcasts.

Methods: We performed a thematic analysis using a constructivist grounded theory approach to explore emergency medicine trainees' perceptions about effective podcast structures. We conducted 16 hour-long semi-structured interviews with residents from three institutions from March 2016 to August 2017. Narrative transcripts were coded line-by-line using constant comparative analysis to organize data into focused codes, key conceptual categories, and then major themes.

Results: We identified 3 major themes with 9 sub-themes (Table 1). In podcast design, residents preferred explicit learning points, focused content, relevance, and repetition. In podcast delivery, residents valued entertainment, multiple perspectives, and storytelling. In podcast production, residents' favored production quality and short segments.

Conclusions: This exploratory study describes features that residents perceived as effective for learning from educational podcasts. While limited by self-assessment, these themes provide a foundation for ongoing research into the most effective ways to structure medical education podcasts and provides guidance to podcast producers about how to create the most compelling and effective listening experiences for trainees.

Table 1. Residents' perceptions of effective features of educational podcasts

Theme	Definition
Design	
Explicit learning points	Residents valued brief statements about the main points of a podcast
Focused content	Residents preferred podcasts that provide information efficiently
Relevance	Residents desired podcasts that were closely aligned with their clinical experiences
Repetition	Residents appreciated when podcasters emphasized key points multiple times
Delivery	
Entertainment	Residents value podcasts that provide amusement and enjoyment
Multiple Perspectives	Residents appreciated dialogue between podcasters that highlighted variation in diagnosis, management approaches, or treatments
Storytelling	Informal and personalized accounts of clinical cases enhanced residents' perceived engagement with podcast content
Production	
Production quality	Residents liked podcasts that appear to have high technical qualities
Short segments	Residents valued short podcast segments

301 Use of Transfer Learning to Improve External Validity of a Machine-Learning Algorithm to Predict Septic Shock in the Emergency Department

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Study Objectives: Machine-learning (ML) algorithms have previously been shown to improve detection of sepsis over traditional models. Transfer learning, a new subset of ML, allows for generalizability of an algorithm at distinct clinical sites, improving external validity. We aim to validate the use of a ML algorithm for the prediction of delayed septic shock of patients with sepsis in the emergency department (ED) at a large university system and then demonstrate the ability of transfer learning to improve external validity at a geographically distinct second clinical location.

Methods: 2 academic hospital systems using patients encounters between 2014 and 2019.

Types of Participants: Over 180,000 adult (age $\geq$ 18) patients who were admitted to the hospital from the ED were evaluated for sepsis. Cases of sepsis (using either "Sepsis 3" international consensus definition or severe sepsis using the Center for Medicare and Medicaid Services (CMS) definition) were identified via automated abstraction. Septic shock was defined as the earliest point a patient met criteria for sepsis and a titratable vasoactive medication was initiated. Patients were excluded if they were discharged from the ED, had an ED length of stay $<$ 3 hours, or developed shock within 4 hours of ED triage. Design: Observational cohort study using data from electronic health record data from ED patient encounters using multiple definitions of sepsis. We used a Weibull-Cox proportional hazards model (the ML algorithm) to predict delayed septic shock at varying prediction windows (up to 36 hours prior to the event) using 40 commonly available input features consisting of vital signs and laboratory results easily available to the end-user. Data from hospital system A (the "development" site) was used for model training and hospital system B (the "validation" site) was used to evaluate the ML algorithm at a second site. During external validation at hospital system B, the pre-trained ML algorithm derived from data at the development site was fine-tuned on the training subset at the validation site, using 20 iterations of a gradient descent algorithm (transfer learning) to demonstrate generalizability of the algorithm.

Results: 18,499 patients met criteria for CMS severe sepsis at the development site and 6,409 at the validation site, of which 364 (4.3%) and 358 (5.9%) developed septic shock at least 4 hours after ED triage. The ML algorithm demonstrated an excellent area under the receiver operator curve (AUCroc) ($>$0.8) at 8 and 12 hours after initial ED triage for identification of patients who developed delayed septic shock at the development site. The use of transfer learning improved the ability to predict delayed septic shock by 12 hours from an AUCroc of 0.778 (sensitivity 0.85, specificity 0.549) to an AUCroc of 0.850 (sensitivity 0.85, specificity 0.678). We found similar results using the definition of sepsis provided by the most recent international guidelines for the diagnosis of sepsis.

Conclusion: Approximately 5% of patients in the ED with severe sepsis progressed to septic shock at least 4 hours after initial triage. Our ML algorithm had an excellent AUCroc ($>$0.8) up to 12 hours for the detection of delayed septic shock up to 12 hours in advance at the development site. The use of transfer learning was able to improve the test characteristics of the algorithm at a second clinical site.

302 Biomarker Profiling for Obstructive Coronary Artery Disease: A PROMISE Substudy

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Study Objectives: Coronary artery disease (CAD) is a prevalent condition, frequently diagnosed by imaging studies. Laboratory-based adjuncts would be useful but currently play a limited role in diagnosis. We hypothesized that a multimarker blood-based panel could exclude obstructive CAD such that further noninvasive imaging would not be required.

Methods: We used banked samples from the randomized PROMISE trial. Patients were symptomatic outpatients without diagnosed CAD referred for noninvasive cardiovascular testing for suspected CAD who were randomized to either coronary computed tomography (CT) or functional testing (exercise ECG or stress echocardiogram or SPECT imaging). Traditional clinical CAD risk factor information was collected including age, sex, race, and a history of hypertension, diabetes, dyslipidemia smoking, or family history of CAD. Baseline blood samples were collected, banked, and tested for a panel of 13 cardiovascular risk biomarkers (high sensitivity troponin I (hsTn), Cystatin C, Galectin-3, NT-pro-BNP, Creatinine, Homocysteine, Beta2, Lipoprotein A, Glucose, Insulin, ALT, Free T3, and Uric Acid) using least absolute shrinkage and selection operator (LASSO) regression analysis with 10-fold nested cross validation to estimate prediction performance. Our endpoint was obstructive CAD as defined by $>$70% stenosis on coronary CT. CT scans were read at a core lab for study purposes. We compared models using only clinical variables to those using all biomarker variables, hsTn alone, or either of these plus clinical variables.

Results: The PROMISE biomarker repository included 1,716 patients who were randomized to and received an evaluable coronary CT, with mean age 60.2 years, 52.5 % female and 87.3% white. On average, patients had 2.4 clinical risk factors for CAD and a ASCVD score of 14. A total of 102 patients had obstructive CAD; these patients were mostly male (71.6%) and smokers (65.7%). A predictive model using only clinical variables had similar negative predictive value (NPV), AUC, and Youden index (sensitivity + specificity -1) compared to a biomarker + clinical model. Similar results were found for hsTn in combination with clinical variables (Table 1). A biomarker-only model and hsTn alone had lower AUC and Youden index, with the former superior to the latter.

Conclusions: In this population of symptomatic outpatients being evaluated for suspected CAD, clinical variables had only modest overall accuracy but good negative predictive value. A biomarker panel of 13 different analytes also had modest overall accuracy but was inferior to clinical factors alone, or hsTN alone. Combining the biomarkers with clinical data did not provide significant incremental accuracy to exclude CAD.

303 Assessing Resident Communication With Faculty from Multiple Specialties in Pediatric Simulation Designed to Provide Multi-Source Feedback

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Study Objective: Communication is critical in health care. The 5C's (Contact, Communicate, Core Question, Collaboration, Close the Loop) is a validated model of communication developed by Kessler et al. Multi-source feedback (MSF) is recommended by the Accreditation Council for Graduate Medical Education (ACGME) for resident assessment. This study seeks to assess the differences of 5C's based communication checklist scores between EM and non-EM faculty for phone calls embedded in a resident-led high-fidelity pediatric (Peds) resuscitation MSF simulation (Sim) case conducted in-situ.

Table 1. Model Performance Summary for Obstructive CAD.

Model	AUC (95% CI)	NPV %, (95% CI)	PPV %, (95% CI)	Youden	Sensitivity %, (95% CI)	Specificity %, (95% CI)
Clinical	0.681 (0.630, 0.732)	88.2% (85.6, 89.3%)	11.1% (10.1, 16.3%)	0.338	66.0% (55.8, 75.2%)	67.8% (65.5, 70.0%)
Biomarkers	0.604 (0.547, 0.662)	85.7% (82.6, 87.0%)	7.2% (6.6, 11.2%)	0.175	70.8% (60.7, 79.7%)	46.7% (44.2, 49.1%)
Clinical + Biomarkers	0.691 (0.64, 0.743)	89.2% (86.6, 90.2%)	10.2% (9.3, 15.8%)	0.347	71.7% (61.4, 80.6%)	63.0% (60.6, 65.4%)
Hs Troponin I alone	0.651 (0.598, 0.703)	85.0% (81.9, 86.5%)	8.8% (8.0, 12.9%)	0.237	62.7% (52.6, 72.1%)	61.0% (58.7, 63.4%)
Clinical + Hs Troponin I	0.695 (0.642, 0.747)	(85.2, 89.0%)88.0%	10.7% (9.8, 16.2%)	0.358	71.4% (61.4, 80.1%)	64.4% (62.0, 66.7%)

Table 1. Communication Behaviors Noted as Completed by Specialty

5 C's Category	Objective Behavior	Tox (n=32[a])	ICU (n=34[b])	p-value
Contact	States Name	28 (87.5)	24 (70.6)	0.0930[c]
	Rank and Service	1 (3.1)	2 (5.9)	1.0000[d]
	Identifies Supervising Attending	0 (0.0)	0 (0.0)	N/A
	Identifies the Name of Consulting Physician	29 (90.6)	32 (94.1)	0.6679[d]
Communication	Presents a Concise Story	32 (100)	33 (97.1)	1.0000[d]
	Presents an Accurate Recount of Information/Case Detail	30 (93.8)	32 (94.1)	1.0000[d]
	Speaks Clearly	32 (100)	34 (100)	N/A
Core Question	Specifies Need for Consultation	3 (9.4)	12 (35.3)	0.0120[c]
	Specifies Timeframe for Consultation	0	4 (11.8)	0.1142[d]
Collaboration	Is Open to and Incorporates Consultants Recommendations	32 (100)	34 (100)	N/A
Closing the Loop	Reviews and Repeats Patient Care Plan	2 (6.3)	34 (100)	<.0001[c]
	Thanks Consultant for Consultation	31 (96.9)	34 (100)	0.4848[d]
Total Score mean ± SD		6.9 ± 0.7	8.1 ± 1.1	<.0001[e]

Data are N (%) unless otherwise stated. [a]Three simulations are missing data from toxicologist consultation. [b]One simulation is missing data from intensivist consultation. [c]Chi-Square test used to calculate p-value. [d]Fisher's Exact test used to calculate p-value. [e]t-Test used to calculate p-value.

Methods: This IRB-approved, prospectively enrolled study of MSF and communication was conducted at a PGY 1-4 EM residency, training 14 residents per year. PGY 2-4 EM residents were eligible to be enrolled to lead a multi-disciplinary team through a single Peds Sim conducted in the Children's ED of an independent academic medical center. The team, including a PGY 1, 2 RN's, and 2 on-site EM attendings, provided MSF on a toxic ingestion resuscitation case. Remote from the Peds ED were both an EM Toxicologist (Tox) and Peds Critical Care (ICU) physician. These faculty were contacted by phone during the case for consultation about management (Tox) and request for admission/transfer of care (ICU). The faculty completed a checklist of 12 objective behaviors based on the 5C's (Table 1). Data were compared across faculty specialty and PGY using Chi-Square, Fisher's Exact, and t-Test (α=0.05). PGY analysis was performed based on date as team leader.

Results: Over 2 academic years, 34 sim team leaders (3 PGY 2, 18 PGY 3, 14 PGY 4) were enrolled. Table 1 denotes significant differences in phone communication between Tox vs ICU in Core Questioning ("Need for Consult," p=0.0120) and Closing the Loop ("Reviews/Repeats Plan," p<0.0001). "Supervising Attending" (Contact) was never identified in any phone call. "Rank and Service" (Contact) and "Timeframe" (Core Questioning) were rarely discussed. Total scores between Tox and ICU varied with significance for the cohort as a whole (Tox 6.9 ± 0.7, ICU 8.1 ± 1.1, p<0.0001) and for PGY 3 (Tox 6.9 ± 0.7, ICU 8.1 ± 1.3, p=0.0021) and PGY 4 (Tox 6.9 ± 0.6 vs ICU 8.1 ± 1.0, p=0.006). Total communication scores did not increase for either Tox or ICU with increased PGY level of training (PGY 2 Tox 7.0 ± 1.0, ICU 8.5 ± 0.7, p=0.1697).

Conclusion: This single-site cohort demonstrates the feasibility of assessing communication during in-situ high-fidelity Peds Sim as a component of MSF. ICU reported significantly greater completion of 5C's based communication tasks than Tox. These differences may be based on specialty. Contact appears to have opportunities for improved communication, though this may be based on the resident running the Peds Sim without clear attending oversight. The artificial nature of Sim may have impacted "Timeframe" communication. It appears from this cohort that residents PGY 2 and greater may be able to appropriately communicate via phone for consultation and admission. Adding communication assessment to Sim could improve program ACGME reporting.

304 The Effect of Weather on Orthopedic Injury Presentation to the Emergency Department

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Background: Predicting patient flow and presentation in the Emergency Department (ED) is difficult. Chief complaints vary and often appear random from an anecdotal perspective. Prior studies attempting to correlate weather conditions with orthopedic injuries have been conflicting. The purpose of this study was to explore associations between weather patterns and orthopedic presentations to the University of Nebraska Medicine ED.

Methods: Retrospective chart review was conducted at a tertiary academic hospital with 64,000 annual ED visits. Utilizing electronic medical records, all patients visiting the ED between 9/1/2012 to 4/30/2019 were included. International Classification of Diseases (ICD10) codes identified patients diagnosed with fractures of upper (distal forearm through wrist) and lower (proximal femur and hip) extremities. Daily weather patterns were obtained through the National Oceanic and Atmospheric Administration, specifically daily temperature, amount and type of precipitation (none, rain/melted snow, ice/snow). Logistic regression was used to determine if weather conditions were predictive of fractures. Results are displayed as odds ratios and 95% confidence intervals. P<0.05 was considered statistically significant.

Results: Over an 80-month period, 373,409 patients were included, with 4,416 fractures identified. Overall, there was a statistically significant association between snow/ice and fractures (p<0.0001), specifically, an increased risk of upper extremity fracture (OR 1.47, CI 1.28-1.69) and lower extremity fracture (OR 1.25, CI 1.02-1.53). The risk of upper extremity fracture further increased when snow/ice accumulation was > 3 inches (OR 2.64, CI 1.91-3.65). Rain/melted snow was not associated with increased fractures.

Conclusions: There is a significant association between upper and lower extremity fractures with snow/ice accumulation, but not rain/melted snow.

EMF 305 Effective Nutritional Analyses as a Predictive Utility for 30-Day Cardiac Recovery

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Study Objectives: Persons consuming a micronutrient rich diet (eg, vitamins) have lower cardiovascular disease risk and there is interest in how the micronutrient environment might influence cardiac recovery post-acute myocardial infarction (AMI). Accordingly, we sought to investigate the relationship between nicotinamide specifically, and micro-nutritional profiles generally and AMI recovery with a goal of identifying plausible biologic targets to improve post-AMI outcomes. Since African Americans (AA) experience the highest rate of mortality and rehospitalization post-AMI, our study focuses on enrolling AA patients.

Methods: Study will recruit 100 patients at emergency departments (EDs) of Detroit Receiving (DRH), Sinai Grace (SGH), and Harper University Hospitals (HUH) with age > 18 and primary diagnosis of AMI defined by 4th Universal

Definition of MI. Comorbidities may alter micronutrient levels, excluding: active chronic alcohol/drug users, hepatic failure, renal failure, HIV; pregnant women, those with metabolic disorders except diabetes, and prisoners. We record 30-day post-AMI cardiac-related rehospitalization and mortality by chart review, phone follow-up, and social security death index.

Procedures include collection of 2mL plasma stored at -80 C prior to micronutrient extraction and profiling. Liquid chromatography-mass spectrometry analysis of vitamins are performed using QTrap 6500 mass spectrometer (AB Sciex, Singapore) with multi-reaction monitoring to detect molecular ion-daughter combinations.

Sample sizes (Table 1) calculation and power analysis (Table 2) were performed using G*Power software. With 100 patients, we anticipate 18 readmissions and 12 deaths, with 0.81 power to evaluate the association of nicotinamide deficiency and post-AMI outcomes with significance of 0.05 (one tail, normal distribution) with R^2=0 and odds ratio=2 in the logistic regression adjusted for age, sex, biomarker data, clinical intervention, and medical history. Broad micronutrient profile and post-AMI outcomes assessed by principal component analysis (PCA). 15 individual micronutrients will be assayed. Patient records will be normalized (mean 0, unit variance within each analyte), and PCA will identify the set of micronutrients responsible for the majority of patient variation.

Results: Our study enrollment is on hold because of COVID-19 since February 2020. With publicly reported AMI readmission and mortality rates from DRH, HUH, and SGH, we estimate 18% AMI patients readmitted and 12% die 30 days post-discharge (prevalence 30%). We assume 50% patients with reduced nicotinamide plasma concentrations, which may make them two times more likely to die than those with greater concentrations. If their nicotinamide level increase one unit, adverse outcomes reduced by 5%.

Conclusions: Micronutrients may contribute to post-AMI outcomes. Our study will be the first to evaluate this in an AA cohort of ED patients. Our hypothesis is that individual variation in micronutrient concentrations will partition study participants into groups. We will examine the prevalence of 30-day outcomes within groupings and identify which micronutrients contribute most robustly to the groupings.

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Prevalence of outcomes	Odds Ratio				
	1.2	1.4	1.6	1.8	2.0
25%	1460	435	227	149	110
30%	1251	375	198	131	98
35%	1120	338	180	120	90

Table 1. Sample sizes estimated with an 80% power and significant level at 0.05, with R^2 = 0.2 in logistic regression

Prevalence of outcomes	Odds Ratio				
	1.2	1.4	1.6	1.8	2.0
25%	0.36	0.51	0.63	0.71	0.78
30%	0.38	0.53	0.65	0.74	0.81
35%	0.39	0.55	0.67	0.76	0.82

Table 2. Statistical power to detect the association between nicotinamide and post-AMI outcomes, with N=100

306 Carbon Monoxide-Oximetry in the Emergency Department

Cooper JS, Miller E, Nichols H, Zeger W/University of Nebraska Medical Center, Omaha, NE; University of Nebraska Medical Center, Omaha, NE; University of Nebraska Medical Center, Omaha, NE

Background: Carbon monoxide (CO) exposure is responsible for up to 50,000 emergency department (ED) visits and 1,200 deaths annually. CO poisoning can manifest as a variety of nonspecific symptoms and is commonly misdiagnosed. Standard pulse oximetry (SpO2) cannot screen for CO exposure, so detection requires blood carboxyhemoglobin (HgbCO) measurement. However, there are now pulse oximeters capable of measuring carboxyhemoglobin (SpCO). We evaluated the effectiveness a CO oximeter to screen for occult CO poisoning in the ED.

Study Objective: To detect occult CO poisoning in patients presenting to the ED.

Methods: Using a quality improvement (QI) framework, we attempted to screen all Emergency Severity Index (ESI) 3, 4, and 5 walk-in patients with co-oximetry while gathering other vitals. Patients with SpCO $\geq$ 12% had HgbCO level drawn for confirmation. For patients with SpCO 5-11%, the treating physician was notified to workup as they felt indicated. Patients with SpCO 1-4% were considered normal. Known or suspected CO exposures were excluded.

Results: 4,003 patients were screened over a 100-day period. 262 patients had a SpCO 5-11%. 22 patients had SpCO $\geq$ 12%. Of these 22 patients, 13 had a normal HgbCO, 8 did not get a HgbCO level, and only 1 had a confirmed elevated HgbCO level.

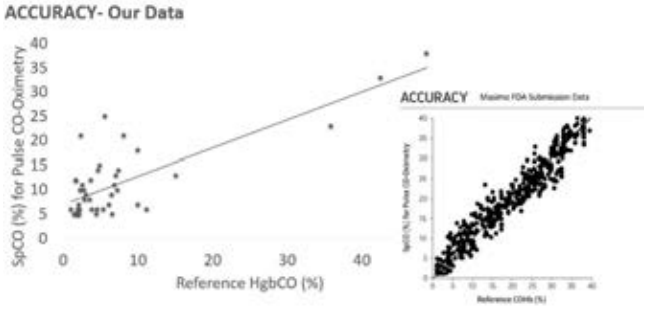
Conclusions: During our QI trial period we only identified one patient who possibly had occult CO poisoning that would have been missed without screening. This puts our incidence at 0.03% of our study population.

There were many limitations to our study that may have skewed our data. Eight of 22 patients (36%) with SpCO $\geq$ 12% did not receive blood HgbCO testing due to human error.

Our CO oximeter frequently had values that were inconsistent with blood HgbCO. This was not expected from prior manufacturer's data and other studies. See figures.

We suspect from other studies that occult CO poisoning has a higher incidence than the 0.02% we found, and believe our study's shortcomings may have masked more cases. Estimates from other studies suggest a rate of about 1% for an undifferentiated presentation and perhaps 4% for vague symptoms which could be due to CO poisoning such as shortness of breath, chest pain, malaise, headache and nausea. However, two studies showed similar rates as we found (0.01% to 0.1%).

Given that even a low rate of uncovering occult CO poisoning may allow prevention of morbidity and mortality (for instance, allowing the identification of a CO source in the home) this non-invasive screening could be well worth the effort in hardware and time. CO oximetry does show promise as a screening tool in the ED and improved utilization may allow us to see its true value.



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307 Descriptive and Retrospective Analysis of a Triggering Tool Used to Identify Emergency Department Patients With Unmet Palliative Care Needs

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Study Objectives: Patients with serious or advanced illness are likely to find themselves in an emergency department (ED) at some point along their trajectory of illness. Identification of appropriate patients as they present to the ED can be a challenge and has been extensively studied. It has been shown that > 50% of inpatient palliative care (PC) consults are generated by ED admitted patients however < 7% consultations originated while in ED . Early PC consults are shown to decrease inpatient length of stay and demonstrate a trend in optimized utilization metrics. Our aim using a novel triggering tool was to understand: 1) volume of ED based palliative medicine consultations, 2) why palliative patients are utilizing the ED, and 3) if this tool could predict patients who subsequently obtained supportive services, or had hospital readmissions, multiple ED visits, critical care admissions, or contributed to hospital mortality over a 1yr period.

Methods: In June 2016, we trialed a simple triggering tool (fig1) completed by ED physicians to help identify patients presenting to the ED with advanced illness and unmet PC needs. A retrospective chart review of the patients identified during the month of June 2016 was then performed to describe health care utilization metrics in a subsequent 1 year period ending June 2017. Specifically, number of ED visits, hospital readmissions, total hospitalized days, critical care admissions, readmission risk score, palliative care consultations, hospice enrollment, and mortality in a subsequent 1-year period ending June 2017 was extracted. Continuous variables were summarized with median and range while categorical variables were summarized with frequency and percent. All tests are two-sided and p-values less than 0.05 are considered statistically significant.

Results: In June 2016, 65 encounters were generated with 58 unique patients; 5 patients had 2 or more ED visits during the month. Patient characteristics at their sentinel ED visit are summarized: median age was 73.5y (Range: 45, 101). The most frequent diagnoses were metastatic cancer (43%),

advanced CNS disease (21%) and CHF (19%). 66% of patients were admitted and 22% to ICU/PCU. 15.8% had a prior palliative consult and NONE of these were admitted to the ICU. 80% of all had more than one noted unmet PC need (Step 2). ED consultants suggested 5 (9%) could avoid the ICU. Of patients' eligible, according to Step 1, 28% (16/58) had more than one life-limiting diagnosis (range1-3). Fifty-two (90%) eligible patients had more than one Step 2 palliative modifier (median 3;Range: 0, 6). The most common were predicted death within 12 months (59%), functional decline (52%), and uncontrolled symptoms (45%). Further investigation revealed that patients who had more life limiting diagnoses also had more palliative modifiers (P=0.031). No life-limiting diagnoses (Step 1) or palliative modifiers (Step 2) were indicative that the patient would be readmitted within 30 days, readmitted within 6 months, and/or die within 1 year of their sentinel visit. Finally, a higher proportion of patients who may have benefited from an inpatient consult died within one year of their sentinel ED visit (P=0.007).

Conclusion: Patients presenting to the ED with life-limiting diagnoses often have unmet palliative care needs and would likely benefit from PC services provided in the ED. We have begun a prospective study using meaningful Step1/Step 2 triggers and hope to suggest more meaningful indications for the ED-based PC consult.

308 The Effect of Point-of-Care Ultrasound on Helicopter EMS Scene Times

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Study Objectives: Point of care ultrasound (PoCUS), specifically the extended focused assessment with sonography in trauma (E-FAST), has become an integral component of surveying trauma patients in the acute care environment. Management of trauma patients begins prior to patients arriving in the resuscitation bay, with evaluation and stabilization by emergency medical services, and in rural settings, helicopter emergency medical services (HEMS). The out-of-hospital E-FAST broadens the HEMS armamentarium, providing real-time information that aids in evaluating the severity of the patient condition and has a direct impact on both out-of-hospital and in-hospital patient management. The HEMS environment is unique and due to its noise and vibration that can render physical exam skills useless. PoCUS lends itself as an ideal tool for this domain. PoCUS use in HEMS can result in expedited time to in-hospital interventions. However, there is limited evaluation of what impact performing field-based ultrasound has on the amount of time at the scene and whether or not this delays transport. Any delay to definitive care could potentially lead to worsened patient morbidity and mortality. This study aims to assess the impact of the implementation of a HEMS ultrasound program on-scene times.

Methods: This is a retrospective review of all missions performed at the Shock Trauma Air Rescue Service (STARS) Manitoba base from January 2018 to January 2020. Missions included scene calls and interfacility transports. Eleven air medical crew (AMC) were enrolled in an ultrasound training program. The program consisted of online didactic lectures, hands on scanning, and examination in image generation and interpretation to perform an E-FAST. AMC performed supervised scanning sessions quarterly to ensure maintenance of skills. AMC log their image interpretation in the patient record and stored all clinical images. These images, interpretations and clinical integration were then reviewed and compared to a gold standard (either CT imaging or operative report) to ensure appropriate interpretation and patient management. All QA was performed by a physician with a fellowship in emergency ultrasound. Scene time information was collected from the patient record for each mission. Scene time was defined from when AMC arrived at the patient to when patient packaging for departure was completed. Secondary outcomes were the accuracy of point of care ultrasound interpretation by AMC compared to a gold standard.

Results: A total of 231 patients were transported and had an ultrasound performed, and 1016 were transported with no ultrasound performed. Mean scene time in the PoCUS group was 25.98 minutes (+/- 3.18 95% CI) compared to 26.99 minutes (+/- 1.44 95% CI) in the non-ultrasound group with no statistical difference (p<0.1336). 174/231 (75%) ultrasound were performed in trauma patients, the remaining were medical. 61/231 (26%) patients were scanned during flight. AMC had a pooled sensitivity of 53.6 and specificity of 98.9. These findings are consistent with E-FAST literature. False-positive/negative scans had no impact on patient care or outcomes.

Conclusion: This study demonstrates that introducing PoCUS to air medical crew into a HEMS program did not result in a delay in scene times. AMC are able to perform appropriate image acquisition and interpretation to a very high level of accuracy, diagnostic certainty and appropriate clinical integration.

309 High Acuity Emergency Department Billing and its Association With Practice Rurality

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Study Objective: The Centers for Medicare and Medicaid Services (CMS) has identified a recent trend of increased high acuity visits in the ED setting as concerning for fraud or higher cost emergency care. Rural hospitals and providers are particularly at risk for lower reimbursements due to recent attempts to control Medicare spending through federal policies. The objective of this study was to use physician-level data from the CMS to study the variation in provider's proportion of high acuity charts (PHAC) and its association with rurality.

Methods: Using the 2017 Medicare Public Use Files (PUF), we performed a cross-sectional analysis of emergency physicians receiving reimbursement for Evaluation &

Table 1. Provider and patient predictors of individual provider PHAC

	Coefficient estimate	Standardized β	P value
Provider			
Rural			<.001
Urban	Ref	Ref	
Large rural city/town	-3.95	-.05	
Small rural town	-3.97	-.03	
Isolated small rural town	-3.93	-.01	
Female	1.79	.05	<.001
Region			<.001
Northeast	Ref	Ref	
Midwest	2.02	.06	
South	3.49	.11	
West	8.02	.20	
Patient			
Average Age	.37	.08	<.001
Percent Female	.21	.05	<.001
Percent Medicaid Entitlement	-.23	-.20	<.001
Percent Non-Hispanic White	-.07	-.09	<.001
Percent with Comorbidity			
Atrial fibrillation	.17	.05	<.001
Alzheimer's Disease/dementia	.12	.04	<.001
Asthma	.10	.02	<.001
Cancer	.10	.02	.006
CHF	.06	.03	.004
CKD	.63	.28	<.001
COPD	.27	.11	<.001
Depression	.13	.05	<.001
Diabetes mellitus	-.17	-.08	<.001
Hyperlipidemia	.19	.10	<.001
Hypertension	-.12	-.02	.004
Ischemic heart disease	.07	.04	<.001
Osteoporosis	-.19	-.04	<.001
Rheumatoid arthritis/osteoarthritis	-.22	-.09	<.001
Schizophrenia/other psychotic disease	.10	.03	<.001
Stroke	.57	.12	<.001

Management (E/M) services in the ED for Medicare fee-for-service beneficiaries. The proportion of high acuity charts (PHAC) coded and billed by the physician was determined to be the sum 'number of services' billed for high acuity codes (99285, 99291) divided by the denominator of the sum 'number of services' of ED-based E/M codes (9928x, 99291). Rurality was defined using the Rural Urban Commuting Area (RUCA) Code, with the physician's practice setting categorized as: urban, large rural city/town, small rural town, isolated small rural town. We used multivariate linear regression models to assess the association of practice rurality with the physician's PHAC, adjusting for physician region and sex, and the characteristics of Medicare beneficiaries that the physician billed for: average age, percent female, percent also with Medicaid entitlement, percent non-Hispanic white, and percent with individual comorbidities.

Results: A total of 37,739 emergency physicians were included in the analysis. Across all emergency physicians, the median observed PHAC was 66.1% (interquartile range [IQR] 54.2 to 75.5%), with 5.8% of physicians practicing in non-urban settings. In comparison to urban emergency physicians, those in large rural city/town (coefficient estimate [CE]: -3.95), small rural town (CE: -3.97, 95% CI -5.28 to -2.67), and isolated small rural town (CE: -3.93, 95% CI -6.58 to -1.29) had a significantly lower PHAC ($P < .001$) (Table 1).

Conclusion: Rurality was associated with a decreased PHAC after adjusting for covariates in emergency physicians caring for Medicare beneficiaries. This may reflect differences in case mix or billing patterns. Future work should explore the use of these differences to better characterize and formulate intensity-based billing for emergency care.

310 Defining a Pediatric Emergency Department: Comparing Characteristics Based on Commonly Used Criteria

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Study Objectives: There have been multiple studies examining differences in care between "pediatric EDs" and general EDs, but these comparisons are limited by ambiguity regarding the definition of a pediatric (children's) hospital or pediatric ED. Definitions have included different cutoffs for the percentage of children seen by the ED, whether the "pediatric ED" is separate or distinct from the rest of the ED, and whether the ED is in a freestanding children's hospital or in a hospital with membership in the Children's Hospital Association. Our goal was to compare definitions across administrative data sets to understand the characteristics of EDs captured by the different definitions.

Methods: We linked data from New York State 2016 AHRQ State Emergency Department Databases and State Inpatient Databases (SEDD/SID) with data from the 2016 National Emergency Department Inventory-USA (NEDI-USA) to examine four definitions of a pediatric ED. The definitions were based on (1) volume of pediatric ED visits ($\geq$70% visits by age <18 years), (2) admission capability (pediatric bed availability), (3) physically distinct pediatric ED area from the American Hospital Association (AHA) definition or from the NEDI-USA survey, and (4) membership in the Children's Hospital Association. We calculated what proportion of EDs would be attributed to a pediatric ED for each definition, and the differences in patient demographics in a pediatric ED depending on the definition used.

Results: Across the four definitions, the proportion of EDs meeting criteria ranged from 0 to 86%. Using AHA hospital identification codes to combine SEDD/SID and NEDI-USA data resulted in merging of some pediatric and adult facilities within the same organization, making it challenging to identify pediatric hospitals from the pediatric-volume-based definitions. Using NEDI-USA data alone, 1-2% of EDs met the volume-based definition. A definition based on having admission capability was met by 86% of EDs, 27-38% of EDs reported a physically distinct pediatric ED area (depending on the data source), and 8% were members of the Children's Hospital Association. Depending on the definition used, the proportion of children with public insurance seen in pediatric EDs varied from 23% to 65%. The proportion of visits by children under 1 year of age who were seen in a pediatric ED varied from 12% to 64% depending on the definition used.

Conclusion: The definition of a "pediatric ED" is not standardized. The number of EDs captured, as well as the characteristics of ED patients seen, differs dramatically depending on definition. A consensus definition is needed to advance research on important quality of care issues. Meanwhile, we encourage researchers and policy makers to be attentive to this ambiguity and how definitions may affect results.

311 Lactate and Lactate Clearance to Predict Mortality in Pediatric Sepsis: A Systematic Review and Diagnostic Meta-Analysis

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Study Objectives: The utility of lactate for predicting sepsis mortality in pediatric populations has not been clearly established. We conducted a systematic review and meta-analysis of the literature to characterize the usefulness of various lactate measures for predicting mortality in pediatric patients with sepsis.

Methods: PubMed, EMBASE, the Cochrane Library and Google Scholar were searched for studies without restriction on publication date or language. We included observational studies or randomized controlled trials that examined the use of lactate level or lactate clearance to predict mortality in septic pediatric patients. Three authors reviewed each article for inclusion. Sensitivities, specificities and areas under the receiver operator curve (AUROC) were extracted whenever available. Outcomes were then pooled in bivariate diagnostic random-effects meta-analysis.

Results: 367 studies were screened and 15 observational studies were extracted, including 4861 pediatric patients. The included studies were published between 1997 and 2019. Studies reported results for lactate level at admission and 24 hours, and for lactate clearance by 6 hours (early) and by 24 hours (late). Compared to lactate level, lactate clearance showed significantly higher summary sensitivity (84% vs 52%, $p = 0.001$), but significantly lower specificity (73% vs 90%, $p < 0.0001$). The AUROC was not significantly different (0.86 for clearance vs 0.89 for level). There were no significant differences in sensitivity or specificity between admission and 24-hour lactate, or between early and late lactate clearance. There was significant between-study heterogeneity for all outcomes.

Conclusion: Overall, lactate clearance by 6 or 24 hours has higher sensitivity for predicting mortality than lactate level at any time, but lower specificity. Lactate clearance may be a useful guide for fluid resuscitation and prognostic marker for mortality; however, given the heterogeneity and small sample sizes, more studies are needed.

312 Effect of Race and Insurance Status on Outcomes of Pediatric Trauma

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Study Objectives: Death from unintentional injury continues to be the leading cause of mortality for pediatric patients, with the CDC estimating 7,217 pediatric deaths from GSW and MVC in 2016. Previous studies, focusing on single year analysis, demonstrated consistently poorer outcomes for the uninsured pediatric population following blunt and/or penetrating trauma. There were mixed conclusions on the effect of race on outcomes. The goal of our study is to evaluate if insurance status or race continues to affect the outcomes of blunt and penetrating trauma on pediatric patients treated at trauma centers.

Methods: We performed an analysis of the National Trauma Data Bank (NTDB) for the years 2007-2016 of pediatric patients 1-17 years of age with blunt or penetrating traumas and Injury Severity Score (ISS) > 8. Excluded were patients with burn injuries, Medicare (given high number of chronic renal pediatric patients), and presentation to non-ACS accredited trauma centers. We extracted the following data for analysis: patient sex, race, ethnicity, payment type (insured, Medicaid, self-pay), ISS, type of trauma, mechanism of injury, receiving hospital ACS trauma designation, and region. Our primary outcome measure was discharge disposition (discharged alive or deceased) and length of stay (LOS). Clinical and outcome data were analyzed using descriptive statistics and chi-square, multivariable logistic regression to test for associations, and we assessed for trends over the years with the Cochran-Armitage trend test, Cochran-Mantel-Haenszel statistic and Jonckheere-Terpstra test.

Results: We identified 165,946 patients with an overall mortality rate of 2.5% across 2007 to 2016. Older age, greater LOS and ISS were each associated with greater

odds of mortality (p<0.0001) after adjusting for other factors in the model; race was also found to be significantly associated with mortality outcome in the multivariable model(p<0.0001); African Americans (AA) had 66% greater odds of death compared to those of Asian race (OR: 1.66, 95% CI: 1.19 to 2.33); White race also had greater odds of mortality compared to Asian race (OR: 1.56, 95% CI: 1.13 to 2.16). Payment type was also associated with mortality outcome after covariate adjustment: those who self-paid had worst odds of death compared to Medicaid patients (OR: 1.81, 95% CI: 1.59, 2.06), and with those of private type of payment having the lowest odds of mortality across all payment groups. Results from multivariable modeling showed that injury type, mechanism of injury, ethnic status, race, sex, payment type, age, ISS were each significantly associated with LOS (p<0.0001) after covariate adjustment. Greater ISS score was associated with greater expected LOS and females had expected longer LOS than males. AA had the longest expected LOS compared to other races. Patients with private or self-pay had shorter LOS compared to those on Medicaid.

Conclusion: NTDB data of the years analyzed has shown that there is a correlation with mortality following blunt and or penetrating trauma for pediatric patients of African American race and those who are self pay.

313 Outcomes for Patients With Congestive Heart Failure and Chronic Kidney Disease Receiving Fluid Resuscitation for Severe Sepsis or Septic Shock

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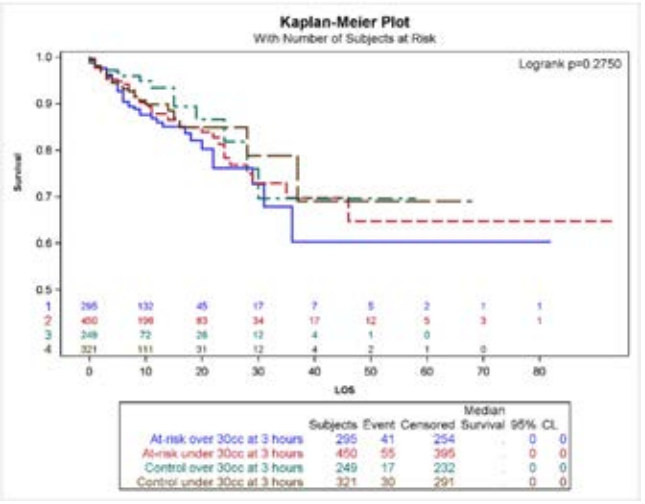
Study Objectives: Sepsis core measures are an integral part of sepsis treatment. Current fluid administration guidelines consist of administering at least 30cc/kg of intravenous fluids (IVF) per ideal body weight (IBW) within the first three hours of sepsis diagnosis regardless of pre-existing comorbidities at risk for fluid overload. This study aims to evaluate the outcomes of patients with a history of congestive heart failure (CHF) and/or chronic kidney disease (CKD) who receive fluid resuscitation for the management of severe sepsis or septic shock.

Methods: We performed a retrospective case-control study of emergency department patients treated for severe sepsis or septic shock between April 2018 and May 2019. Subjects were identified from an electronic medical record query from 3 community hospitals, using ICD-10 codes. We identified subjects with a history of CHF or CKD (at-risk group [AR]) and a sample of patients without a history of CHF/CKD (control group). We performed a structured chart review recording demographics, fluids received, airway interventions required, and outcome. Logistic regression analysis was used to compare the association between the amount of IV fluids received and the outcomes of interest (advance airway management and hospital mortality). Log-Rank test was used to adjust for multiple comparisons in survival analysis.

Results: Our cohort consisted of 745 patients with a history of CHF and/or CKD (AR group) and 570 patients without a history of CHF and/or CKD (control group). The mean age of patients in the AR group was 73.1 (SD 14.14) vs. 64.3 (16.9) in the control group (p-value <0.001). The initial mean lactate was similar in both the AR group= 3.02 (2.32) vs. the control group = 3.12 (2.44) (p-value=0.478). Overall patients in the AR group received less IVFs than the control group at 24 hours (2530.6 vs 3046.7, p-value=0.001). In the control group 50 (9%) vs 126 (17%) in the AR group required BiPAP during their hospitalization. There was a significant association between receipt of >30cc/kg of IVF in the AR group at 3hrs and 6hrs from ED arrival and the need for BiPAP (p-value=0.006, p=0.02, respectively). In-hospital mortality was found in 96 (13%) of the AR group vs 47 (8%) of the control group (p-value= 0.007). There was no statistically significant association between receipt of >30 cc/kg of IVF in the AR group compared to the control group at 3 or at 6 hrs from ED arrival in terms of in-hospital mortality (p-value=0.614, p=0.115, respectively).

Conclusion: We identified a significant association of >30 cc/kg IVF administration and the need for Bi-PAP in AR patients. We identified higher in-hospital mortality in the AR group, but this was not associated with the amount of IVF resuscitation received. Further prospective studies that specifically identify at-risk populations receiving IVF resuscitation can better define the true risk for need for respiratory support.



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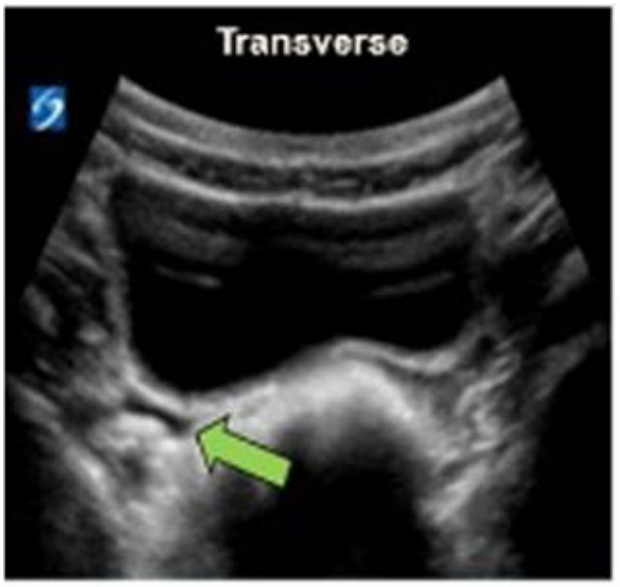
314 Prevalence of Asymptomatic Intraperitoneal Fluid in Children on Focused Assessment With Sonography in Trauma Ultrasound

Wynne ZR, Davis J, Moore S, Kasmire KE/Penn State College of Medicine, Hershey, PA

Study Objective: Focused Assessment with Sonography in Trauma (FAST) exam is a commonly used ultrasound in pediatric patients to assess for abdominal injuries in cases of blunt trauma. The detection of free fluid in the abdomen in these clinical scenarios is presumed to be intraperitoneal bleeding from an intraabdominal injury, however small amounts of fluid can be present physiologically, which causes a dilemma in interpretation of the FAST exam. Classic teaching is that this occurs mostly in menstruating females, though it has also been reported in males and younger children. Information regarding prevalence and amount of physiologic free fluid in different age groups and sexes is not well studied. Therefore, we sought to study the prevalence of free fluid on FAST exams in asymptomatic children.

Methods: A convenience sample of children ages 2 to 18 years presenting to the pediatric emergency department for non-abdominopelvic complaints from August to December 2019 was enrolled. Potential subjects were excluded if they had recent abdominal trauma or surgery or a known medical condition that could predispose to



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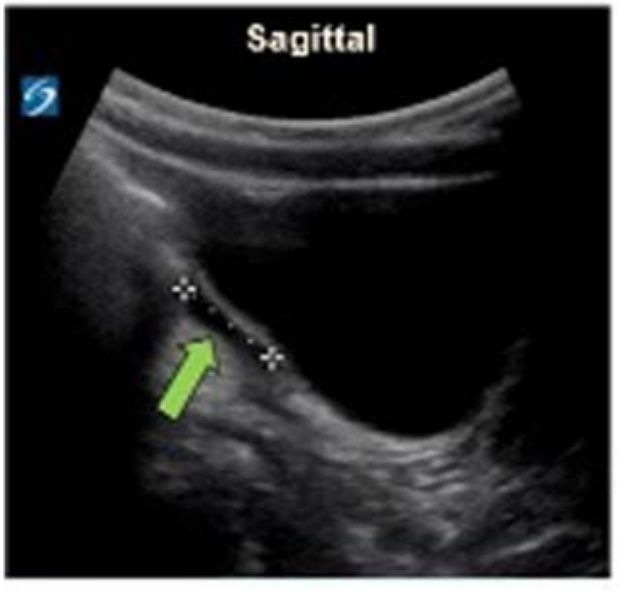
intraperitoneal free fluid. Three FAST exam views (right upper quadrant, left upper quadrant, and pelvis) were obtained using a Sonosite X-Porte (FUJIFILM Sonosite, Inc., Bothell, Washington) with a curvilinear probe to determine presence of free fluid. The amount of free fluid was calculated using the volume function on the ultrasound machine. Presence of free fluid was determined as a prevalence with 95% confidence interval (CI).

Results: We enrolled 52 children, and 50 were included. Two were excluded for incomplete ultrasound examinations. The average age of children enrolled was 10.1 years, the average weight was 21.6 kilograms, and 31 (62%) were male. Free fluid was identified in the pelvis in 8 children (16%; 95% CI 8.3%-28.5%), 5 of whom were male, with an average age of 8.1 years old (95% CI 5.5-10.7 years). The average volume of fluid was 0.6 milliliters with the maximum of 1.6 milliliters. No free fluid was identified in the upper quadrants in any subject.



Conclusion: Small amounts of free fluid is common in asymptomatic children, including in males. Prospective study is warranted in trauma patients to determine if such small amounts of asymptomatic pelvic free fluid are significant in pediatric abdominal trauma.

315 Emergency Medicine and Trauma Physician Awareness of Mental Health Resources during and after Natural and Human-Made Disasters

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Study Objectives: The mental health of physicians is a key issue during the recovery phase of natural and human-made disasters (NHD). During NHDs, physicians must work within devastated health care infrastructures. Profoundly limited and strained resources and surges in acute and chronic care patients lead to prolonged, intense exposure to death, injury, and destruction. Physicians face a triple threat during NHDs - they are exposed to the NHD, are responsible for providing emergent and ongoing care to their community and must cope with complex decisions of delivering care or moving to safe spaces to protect themselves and their families. In non-NHD settings, 54.4% of physicians suffer from burnout. This adversely impacts physician wellbeing, job performance and may result in decreased quality of patient care. NHDs have the potential to exacerbate this effect. While federal law mandates that health care facilities have emergency operation plans in place for disaster preparedness, the accessibility of mental health resources to physicians in these settings has not been characterized. The objective of this study was to examine emergency medicine (EM) and trauma physician knowledge of and access to mental health resources at their institutions during and after NHDs.

Methods: Between February 4, 2020 and March 9, 2020, researchers conducted a national survey among EM and trauma physicians. The survey was developed based on an emergency preparedness questionnaire created by researchers at Harvard T.H. Chan School of Public Health in 2015. Our survey was distributed electronically to the members of the American College of Emergency Physicians (ACEP) and the American Association of the Surgery of Trauma (AAST). The 17-question survey collected information on EM and Trauma surgeon awareness and access to emergency preparedness resources at their institutions.

Results: Of those who participated in the survey (n = 230), 80% were white, 75% were male, 80% were greater than 10 years out of graduate training and 76% worked in a trauma center. 85% of responders were aware of a written emergency response plan for their facility and 51% were aware of ACEP and AAST disaster preparedness guidelines. 20% of responders knew if their institutional emergency response plan included policies that addressed physician mental health needs during and after an NHD. In addition, 31% were aware of the hospital's mental health policies and resources outside the emergency response plan; only 25% knew how to access these resources during and after an NHD. Finally, 10% reported incorporation of these mental health resources during emergency preparedness practice drills at their institution.

Conclusion: In a survey administered to physicians in the period immediately prior to the COVID-19 outbreak in the US, the majority of physicians reported knowledge of emergency preparedness policies; however, significant gaps remain in physician knowledge and access to mental health resources during and after an NHD. As the frequency and severity of NHDs rapidly increase on a global scale, it is critical for health systems to ensure accessible infrastructure and resources to support the mental wellbeing of health professionals. In addition, physicians should be extensively and repeatedly educated regarding the existence of these resources and how to access them during or after an NHD.

316 Emergency Department Benchmarking Alliance Survey: Anatomy and Physiology of an Emergency Department Observation Unit

Wheatley M, Osborne A, Augustine J/Emory University School of Medicine, Atlanta, GA; Wright State University, Dayton, OH

Study Objective: Health care entities can deliver observation services to determine whether or not a patient needs an inpatient admission. Many studies have shown that relative to care in a traditional inpatient bed, managing observation patients in an emergency department observation unit (EDOU), using condition-specific protocols, is associated with shorter hospital length of stays, lower costs, and decreased inpatient admission rates. Because of these advantages, health care entities have been opening

these units more frequently. A 2003, survey found that 1/3 of hospitals in the US had EDOUs, and more were planning on building them. This statistic has been the standard talking point in the growth of observation for more than a decade. Since this original survey, there has been very little published data on the number of EDOUs as well as their operating characteristics.

Methods: We surveyed the members of the Emergency Department Benchmarking Alliance (EDBA) as well as the American College of Emergency Physicians (ACEP) Observation Services Section as to the presence of an Observation Unit at their hospitals. Surveys were sent via email which contained a SurveyMonkey link to the questions. The account is securely maintained by EDBA. The responses were de-identified and entered into an excel spreadsheet for analysis.

Results: Respondents: Ninety sites responded to the survey representing 28 states plus the District of Columbia. Five responses answered only the state of practice and an additional 2 respondents answered only who admits to the OU. Unit Characteristics: Most of the OUs in this cohort were closed units. The median number of beds (IQR) for the respondents of the survey was 12 (10-18). Only 7 units reported not using patient care protocols. Unit Staffing: Emergency medicine admitted patients to 61 (67%) of the OUs, Hospitalist/Internal medicine were the admitting physicians in 5 units and Cardiology in 1 unit. Two sites reported they had hybrid units where EM or IM could admit to the OU. Fifteen of the units (16%) were "open," were any service could admit to the OU. Advanced Practice Providers (APPs) are utilized in the vast majority of sites (69 as opposed to 13 that don't). In terms of physician rounding in the unit, 49 of the sites (54%) utilize an emergency physician who is concurrently working a shift in the ED. Eighteen sites have a dedicated OU physician. One site reported that their NPs function independently with no physician oversight. The most common RN: Patient ratio is 1:5, used in 42 (46%) of the surveyed sites. The highest and lowest RN:Patient ratios are 1:2 and 1:8, respectively. These were each reported by one site. Unit Throughput Median annual volume (IQR) for this cohort is 4,015 (2,676 - 5,475) patients. Median length of stay in the unit (IQR) is 20 hours (17-23). Average conversion to inpatient status is 16%. Patient characteristics: The most common chief complaint seen in OUs in this cohort is chest pain. Other common reasons for observation include abdominal pain, TIA, syncope, asthma and COPD.

Conclusion: Observation units as surveyed in this cohort are mainly emergency department-based and ED managed. Future challenges for these units will be maintaining occupancy in the face of potentially decreasing chest pain cases. Further study needs to be done as to the impact of APPs and role of EM/IM collaboration. Ultimately, a national database of Observation Units and observation patient stays is needed.

317 Barriers to Discharge in Geriatric Long Staying Inpatient and Emergency Department Admissions: A Descriptive Study

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Background: Hospital patient length of stay (LOS) is an important indicator of health care quality and outcomes. In the U.S., hospitals face increasing pressure to house patients because of social or financial issues that prohibit discharge. This study describes long LOS during emergency department (ED) visits and hospital admissions, barriers to discharge, and discharge solutions.

Methods: We conducted a retrospective medical record review of a random sample of 150 ED patients and 150 inpatients with long LOS encounters at a level 1 trauma center in the southeastern United States during 2018. Patients included in the study were age 65 years older at the time of admission. Long ED LOS was defined by LOS >24 hours (96th percentile of the ED's LOS). Long inpatient LOS was defined as non-ED hospitalization of ≥20 days (Center for Medicare and Medicaid Services definition, 2016). Cohorts were characterized by demographics, social determinants of health (eg, health insurance, housing), medical comorbidities at admission, discharge care coordination, and final disposition.

Results: A total of 932 long LOS (368 ED, 564 inpatient) encounters fit the inclusion criteria. Mean age of patients was 73 years with a standard deviation of 7 years. Among patients with a long ED LOS (n=150), the most common reasons for ED presentation were psychiatric (46%), cardiovascular (12%), and oncologic (5%). Among patients with a long inpatient LOS (n=150), the most common reasons for inpatient admission were cardiovascular (22%), oncologic (18%), and psychiatric (7%). In the ED, the average length of stay for patients with psychiatric complaints was substantially longer than for other patient presentations (103 hours vs. 36 hours, $p<0.001$). In the ED, the primary barrier to discharge was inadequate inpatient bed availability (63%). In the inpatient setting, barriers to discharge were predominantly due to a demonstrated medical requirement for continued hospitalization (55%), followed by difficulty with coordinating discharge to a skilled nursing facility or rehabilitation center (22%). The most commonly cited reasons for discharge coordination issues were lack of available beds, financial barriers, and concerns about follow-up care. The primary discharge solution for ED patients were hospital bed availability (50%) and discharge site coordination to another facility (18%). Primary inpatient discharge solutions included resolved medical necessity (49%) and discharge site coordination to another facility (21%).

Conclusion: Among long LOS ED patients, discharge delays were often the result of unavailable inpatient beds and services. Reducing the LOS for ED patients may require further investigation as to which hospital services are most frequently utilized by geriatric patients and structuring inpatient bed allocation to prevent extended patient boarding in the ED. For the inpatient population, after medical necessity, the most common discharge delays were related to non-medical, care coordination delays. Reducing long inpatient LOS may require early identification of high-risk patients and strengthening of relationships with community-based services.

318 Use of Telemedicine Physicians for Telephone Triage of Head Injury Patients

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Study Objectives: Telehealth utilization continues to grow as an emergency medicine resource with the potential to improve both quality of care and resource utilization. In 2019 our academic emergency department (ED) instituted an emergency medicine telehealth program for our large community health system, including physician support for nurse line triage calls. The telehealth provider is available to the triage line nurse and may modify the triage recommendation, including downgrading a recommendation for ED care. The objective of this study was to evaluate nurse triage line calls for head injury and describe the outcomes of patients whose triage recommendation was downgraded by the telehealth physician from ED care.

Methods: We conducted an observational study of patients who received care recommendations from a nurse triage line after sustaining a head injury from January 8, 2019 to April 2, 2020. The electronic health records of all cases where an emergency medicine telehealth physician was consulted and downgraded the initial triage recommendation of "ED care," were reviewed and evaluated for adverse outcomes, defined as: 1 subsequent identification of an intracranial hemorrhage, 2 -hospitalization or 3 -death related to the index head injury within 30 days. We summarized data using descriptive statistics with 95% confidence intervals.

Results: During the study period the nurse triage line received 1,793 calls for head injury; for 1,214 (67.7%) of these calls, the initial recommendation based on the triage nurse protocol was for "ED care." A total of 298 (25%) of calls with an initial triage recommendation of ED care were referred to the telemedicine provider for further review, of which 146 (49%, 95% CI 43%-55%) were downgraded from referral to the ED to non-emergency department outpatient evaluation or home care. Among the patients with a downgraded triage recommendation, 9 (6%) sought emergency care within the next 30 days related to the index injury, and no patients had an adverse outcome as previous defined.

Conclusion: Nearly half of the head injury calls referred to the telehealth physician were subsequently triaged away from ED care without any identified adverse outcomes. These findings suggest that telehealth involvement in nursing triage recommendations resulted in a reduction of unnecessary ED visits, potential imaging and health care costs.

319 Scientific Publications Trend of Emergency Departments of International Federation for Emergency Medicine Members, 2009 to 2018

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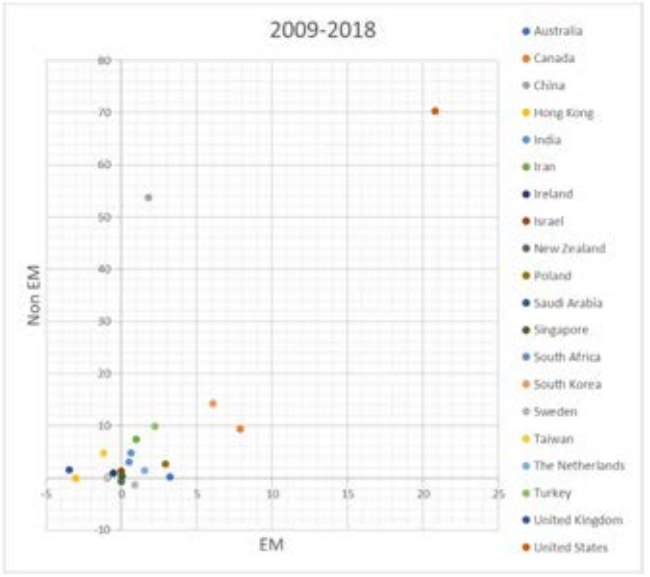
Study Objectives: This study aimed to analyze the publications from emergency departments (EDs) of International Federation for Emergency Medicine (IFEM) member countries in emergency medicine (EM) and non-EM journals from 2009 to 2018 to evaluate the research capacity and national EM evolution milestone.

Methods: All data were retrieved from the SciVerse Scopus database. The member countries of IFEM where EM was recognized as a specialty before 2009 were enrolled.

The EM journals list were adopted from the 2017 Journal Citation Reports. Publications with first author affiliated with EDs were classified according to publishing journal (EM or non-EM journal). Countries with annual publication numbers less than 12 in 2018 were excluded. The slope (β) of linear regression was used to assess the trend of publication numbers and the 95% confidence intervals of the publication trend (β) were calculated. The correlation between the 2009 publication numbers and the trend of publication between 2009 and 2018 was measured by Pearson correlation coefficient (r).

Results: We identified 34,408 publications affiliated with first authors from EDs in 20 countries. The number of publications in both EM and non-EM journals showed an increasing trend in most countries. The trend between 2009 to 2018 in EM journal and non-EM journal of the 20 countries were plotted in Figure 1. 15 out of 20 countries had a greater increasing rate in non-EM journal than in EM journal. Among these 20 countries, the United States is the leading country of increasing rate in EM and non-EM journals. The leading five countries in EM journals were followed by Canada, South Korea, Australia, and Poland; in non-EM journals were followed by China, South Korea, Turkey, and Canada. In total publication number trends, the leading 5 countries were the United States, China, South Korea, Canada, Turkey. The 2009 publication numbers were positively correlated with the publication increasing rate between 2009 and 2018 in both of EM and non-EM journal ($r = 0.853$ in EM journals; 0.905 in non-EM journals, all $p < 0.001$).

Conclusion: This study confirmed that EM is a continuous growing specialty worldwide and identified the leading countries from the perspective of scientific publications. The leading countries' research capacity are not only in EM field but also been accepted and acknowledged by other medical specialties. The publication numbers may predict the publication trend in the following 10 years.



320 Post Cardiac Arrest Care: Does Usual Care Comply With Guidelines and Impact Outcomes?

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Study Objective: Guideline-based post-arrest care includes efforts to determine and treat the cause of arrest while minimizing cardiac dysfunction and brain injury resulting from lack of perfusion. Diagnostic testing such as early head imaging, electrocardiogram and other imaging studies may help determine the etiology of arrest. Mitigating injury to brain and heart involves maintaining adequate blood pressure, targeted temperature management (TTM) and early diagnosis and treatment of seizures with electroencephalogram (EEG). Our institution created a set of evidence-based guidelines for the management of post-arrest patients which, in addition to the above, also recommends early consultation with the neurocritical care service and an early echocardiogram. We aim to examine compliance with the guidelines in a cohort of survivors of out-of-hospital cardiac arrest (OHCA) and related outcomes.

Methods: Retrospective cohort study of patients with OHCA at two urban emergency departments (ED) within a health system between 7/2016 and 7/2018. Exclusion criteria included age < 18 years old and if CPR was terminated upon arrival. Data were extracted from an internal institutional quality improvement database maintained of all resuscitative measures. We abstracted demographic data, Utstein criteria (rhythm, bystander CPR) and time of arrest (day vs night). Quality measures included NCC consultation, cEEG, and computed tomography (CT) of the brain within 6 hours of admission. Descriptive statistics are provided as indicated. Chi-squared and two-sided t tests were used to determine differences in univariate analysis. An alpha < 0.05 was used for statistical significance.

Results: 124 patients presented with OHCA, of which 41 (33.0%) were comatose and survived to admission. Nearly 83% (34 /41patients) of these patients received guideline-recommended TTM:, 15 were targeted to low temperature (34 C) and 19 targeted to higher temperature (35 C). Seventeen patients of 41 (41.4%) received an early head CT in the ED, 17/41 (41.4%) patients were placed on cEEG and 23/41 (56.1%) patients received a NCC consult. Five of these comatose 43 patients (11.6 %) survived to discharge. The presence of a shockable rhythm was associated with a higher likelihood of receiving TTM (p= 0.005), and also higher rates of survival to discharge (p= 0.025). No significant differences were seen in the initiation of TTM when comparing demographics and Utstein criteria, and variation in temperature goal did not affect survival to discharge. Seventeen patients received an early head CT, 17 patients were placed on cEEG and 23 patients received a NCC consult. 5 patients (12 %) survived to discharge. Of these quality processes, only initiation of TTM was associated with survival to hospital discharge. No significant differences were seen in the initiation of TTM when comparing demographics and Utstein criteria, and variation in temperature goal did not affect survival to discharge.

Conclusions: While four out of five survivors of OHCA received TTM, compliance with the other recommendations for the post arrest algorithm was variable. Presence of a shockable rhythm was most associated with TTM compliance and was the strongest predictor of survival to hospital discharge. Further studies are needed to investigate whether better outcomes will result from improving usual care to include compliance with the guidelines.

321 Prevalence of SARS-CoV-2 Antibodies in Pediatric Health Care Workers in Atlanta, Georgia

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Background: The prevalence of antibodies to SARS-CoV-2 in pediatric health care workers (HCWs) in areas with high rates of COVID-19 infection is unknown. Working at the front line, emergency department (ED) HCWs are uniquely at high risk. It is unknown if seropositivity in this population is similar to community levels or is substantially higher as a result of work-based exposure to infectious children who may demonstrate mild symptoms. Further, the experience of pediatric HCWs may be disparate from adult focused facilities because prior to implementation of social distancing, children presented for care at pediatric facilities in high numbers with mild illness. Many were evaluated in pediatric EDs which may have put pediatric HCWs at higher risk during the COVID-19 pandemic before universal personal protective equipment (PPE) utilization became standard practice. The milder nature of COVID-19 in children has also led some to believe that children are not affected, although the emergence of multisystem inflammatory syndrome in children (MIS-C) refutes this notion. However, this belief and the lack of data may result in lax utilization to PPE in pediatric settings. Data describing seropositivity among pediatric HCWs is not yet available.

Study Objective: Determine the prevalence of IgG antibodies to SARS-CoV-2 in pediatric HCWs.

Methods: We performed a cross-sectional study, analyzing data from the baseline visit of a prospective cohort to determine the prevalence of IgG antibodies to SARS-CoV-2 in HCWs at a large pediatric health care facility in April-May 2020. Prior SARS-CoV-2 testing history, potential risk factors and level of anxiety about COVID-19 was determined. Symptomatic or febrile HCWs were excluded. Metrics were analyzed overall and by HCW roles and tested for differences using chi-square

estimates of independence. Prevalence of IgG antibodies were compared in ED vs. non-ED HCWs.

Results: Of 300 HCWs enrolled from April 16-May 18, 2020, their mean age range is 41-50 years, 83% are female and 75% have no comorbidities. HCWs include 33% physicians, 25% nurses 10% respiratory therapists, 7% advance practice providers, and 25% other. Forty-seven percent were emergency department (ED) staff, 13% worked in pediatric intensive care, 40% elsewhere. Half of all HCWs had children in their home, 45% had traveled outside the state, and 47% reported an illness since January. Overall, 28% had a known COVID-19+ exposure. Most participants (90%) believed they were at high risk to develop COVID-19 as HCWs, and 70% reported high anxiety due to the pandemic. The prevalence of SARS-CoV-2 IgG antibody positivity in this cohort is 4.7%. Of the 14 HCWs with positive serology, only 3 (21%) had a history of any prior COVID-19 testing, all of which were positive; 43% (6/14) had no prior flu-like illness or symptoms. Eighty-six percent of antibody-positive HCWs were ED-based staff; SARS-CoV-2 IgG antibodies were identified in 9% of ED HCWs enrolled compared to 1% in non-ED based HCWs, p=0.003.

Conclusions: Overall prevalence of SARS-CoV-2 IgG antibodies is low in pediatric HCWs living in a region with high COVID-19 activity. Most cases were found in HCWs from the pediatric ED, and nearly half were asymptomatic. ED-based pediatric HCWs may be uniquely at higher risk of exposure to children with COVID-19, and particularly may have been at higher risk of infection before awareness of the evolving pandemic; ongoing universal PPE utilization is essential.

322 Hyperglycemia Management Prior to Admission in an Urban Emergency Department

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Study Objectives: The aim of this quality improvement project was to decrease the percentage of ED patients admitted with a blood glucose (BG) >250 mg/dL to <20% in order to reduce mortality and length of stay.

Methods: Currently no consensus exists on the management of hyperglycemia in patients who are being admitted from the ED when not in hyperglycemia crisis. Considering nine out of ten hospitals report some degree of boarding, the need for hyperglycemia management while patients are in the ED is crucial. A workgroup comprised of emergency physicians, pharmacists, and endocrinologists collaborated to standardize the management of hyperglycemia in the ED. Outcome measures for this project include percentage of patients admitted with BG >250 mg/dL, average BG reduction, hospital and ED length of stay, in-hospital mortality, and rate of in-hospital diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemic syndrome (HHS). The process measure is the percentage of times a pharmacist or student pharmacists intervenes on a patient with hyperglycemia. This process measure will determine if the EHR report was effective in capturing patients for the pharmacist to monitor and recommend treatment when needed. The balancing measure is hypoglycemia defined by any BG <70 mg/dL. Multiple Plan-Do-Study-Act cycles were implemented including education, development of an electronic health record (EHR) report to identify and monitor patients with BG >200 mg/dL, and development of an ED-specific insulin order and protocol.

Results: The quality improvement initiative was completed from June 2019 and continued through February 2020. Baseline data from February 2019 to June 2019 revealed that 74% of patients with an initially elevated BG >250 mg/dL were admitted with a BG above 250 mg/dL. Following the initiative, 49.2% of patients were admitted with a BG above 250 mg/dL, resulting in a reduction of 24.8%. The average admission BG was reduced by 65.8 mg/dL (92.9 vs 158.7 mg/dL, reduction range: 89.4-112.4 vs 131.7-220.6 mg/dL), creating a shift towards improved average BG beginning in August 2019. No difference was seen in hospital mortality, hospital LOS, ED LOS, hypoglycemia, or in-hospital DKA or HHS. After the EHR report was released, pharmacists intervened on 42% of patients with hyperglycemia in the ED with the majority including a recommended BG check.

Conclusion: Implementation of a standardized hyperglycemia treatment protocol along with pharmacist interventions reduced average admission BG and the percentage of patients with BG >250 mg/dL on admission. Future steps will include implementation of pharmacist-driven point-of-care BG checks and the addition of insulin sliding scale orders to ED workflow.

323 Selected Septic Patients Can Be Safely Discharged from the Emergency Department

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Study Objectives: "Septic" patients (pts), as classically defined, have at least 2 Systemic Inflammatory Response Syndrome (SIRS) criteria + an infectious diagnosis (inf dx). Some septic pts are deliberately "treated and released" (Tx/Rel) from an Emergency Department (ED), probably based upon "physician gestalt." Prior peer-reviewed studies of septic pts' outcomes have been limited to hospitalized pts; mostly those in an Intensive Care Unit (ICU). Thus, no peer-reviewed literature exists to provide clinical or medicolegal support for any ED "Tx/Rel" strategy, when applied to septic pts. We tested the primary hypothesis that the 95% CI for 7-day (d) mortality (7dMort) & 30d mortality (30dMort) of septic pts Tx/Rel from the ED with an inf dx of Pneumonia (PNEU), Cellulitis or Abscess (SKIN), or UTI or Pyelonephritis (PYELO) includes 0%.

Methods: We performed an 18 mo retrospective study of adults in an urban ED with an annual volume exceeding 80,000 pts. Secondary hypotheses were that short-term outcomes (STO) of 72hr & 30d ED returns related to the first ED visit, and the STO of 7d & 30d ED returns that result in hospital admission, also are very rare events for this pt cohort. Searching the Social Security Death Index (SSDI) confirmed lack of 7dMort or 30dMort. Age, vital signs, chief complaint, white blood cell count & discharge diagnosis data were collected. SIRS scores at least 2 plus a dx of PNEU, UTI, PYELO or SKIN identified the septic group studied. SIRS, not qSOFA defined the septic group; qSOFA score is an ICU-validated PROGNOSTIC tool. A valid PROGNOSTIC tool requires all pts to have a correct dx upon study entry. Principles of evidence-based medicine (EBM) lead inextricably to two justifications NOT to use qSOFA to define sepsis. These include 1) Use of qSOFA for ED diagnostic purposes would require "circular reasoning" & 2) An ED environment differs markedly from ICUs in which qSOFA was validated.

Results: *227 Tx/Rel septic pts included those with SKIN (31), PYELO (38), PYELO (111) or PNEU (47). *The 7dMort and 30dMort were 0/227 (0%) (95% CI 0-1.3%). *33/227 (13.3%) returned to the ED within 30 d with a similar chief complaint, mostly between 72 hr. & 30 d. after the initial ED visit. *4/33 were admitted for inpatient care within 30 d.; only 1 of these 4 patients' admitting diagnosis was related to their initial ED chief complaint.

Conclusion: Prior outcomes studies have overlooked study of septic pts of the type included in this study. ED physicians successfully identified pts with sepsis, as classically defined, to be Tx/Rel from the ED. Low risk existed for 7dMort or 30dMort, or need for admission to hospital for a reason related to the initial visit. Occasional pts will deteriorate or fail to improve, demonstrating that clear "ED return precautions" are important. No clinical strategy is foolproof, but we provide evidence to help support medicolegal defense of physicians who, using a supportable clinical rationale, Tx/Rel a septic pt with an inf dx after an episode of ED care.

324 Perceptions of Emergency Medicine Resident Efficiency after Speech Recognition Technology Implementation

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Study Objectives: The benefits of electronic health records (EHR) are well established, even in the emergency department (ED), but they can be time-consuming. In an academic ED, resident time is at a premium. Each shift residents are trying to balance improving content knowledge, accuracy and efficiency of patient care, and documentation. Emergency medicine (EM) residents agree that time spent on documentation directly reduces teaching time and that more time is spent on documentation than direct patient care. Of the proposed tools to address this problem, speech recognition technology (SRT) has been shown as an effective way to increase overall physician efficiency. The primary objective of this study is to determine EM

attendings' and residents' perception of the impact of using SRT on overall resident efficiency in an academic ED after an 18-month implementation of the technology.

Methods: This is an observational study that aims to examine the perception of SRT use at a community hospital in the southeast, with an annual ED volume of 120,000 patient visits per year. The ED is staffed by 27 EM attendings. The EM residency program is comprised of 6 residents per year, who voluntarily used SRT in the ED. SRT implementation began 18 months before the survey. The attendings and residents completed a 27- and 22-question survey, respectively. It was developed and sent out electronically using Survey Monkey and consisted of Likert scale questions. Data was exported and analyzed in Microsoft Excel.

Results: There was a 70% response rate for both the attending and resident survey with a high percentage of interns and PGY 2 responding to the resident survey. The majority of attendings had more than two years of experience. On average, the attendings report that residents use SRT 45% of the time. The majority of residents use SRT for "History of Present Illness" and "re-evaluation" aspects of the EMR and are highly likely to be used in combination with macros and/or dot phrases. Residents preferred SRT over hand typing and inexperience scribes but prefer experience scribes to SRT. Both attendings and residents perceive that SRT use allows residents to make fewer documentation errors and reduces residents' stress during the shift. Both groups feel that residents are more likely to go home on time and improves overall resident efficiency if residents use SRT. The majority of attendings observe that SRT reduces delays to complete documentation, improves overall ED flow of residents, and are more likely to have charts completed by the patient's disposition. Residents believe they are more likely to write notes in a narrative format, to go home on time with completed notes, improves their job satisfaction, and allows them to spend less time on documentation. Residents feel that SRT use also allows for more attending and medical student educational time during the shift and allows them to see more patients.

Conclusion: In conclusion, this study found that both attendings and residents perceive that using SRT in the ED improves overall EM resident efficiency, reduces resident's stress during the shift, and reduces documentation errors in general. This study provides a springboard for further implementation of SRT in this academic community ED. EM residencies searching for ways to improve resident efficiency and possibly reduce resident stress may be encouraged by the results of this survey to implement SRTs in their particular ED setting

325 Do Sterile Probe Covers Confer Less Infection Than an Alcohol-Cleaned Probe? A Pilot Study

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Study Objectives: Point-of-care ultrasound is an important, economical imaging modality used for emergent diagnostics and procedures in low-resource settings. To prevent nosocomial infections during ultrasound-guided procedures, sterile probe covers are often used, but they may not be feasible in low-resource settings. Sterile gloves have been used when sterile probe covers are unavailable. There are no previous studies to compare sterile gloves and sterile probe covers in terms of infection transmissibility, but it is assumed that they would function the same because both are sterile. Our study assessed whether sterile gloves used as ultrasound probe covers would be an alternative to the traditional sterile probe covers in the prevention of infection transmission during ultrasound-guided procedures.

Methods: Two different study groups were established: ultrasound transducer with sterile glove cover versus an uncovered transducer that was cleaned with 70% isopropyl alcohol. Volunteer subjects' skin was sterilized with 70% isopropyl alcohol prep pads. The linear ultrasound probe was cleaned with alcohol wipes and non-sterile ultrasound gel was applied to the probe. The probe was then covered with a sterile glove with additional non-sterile gel applied to the outside of the glove. The covered transducer was placed on the skin and the probe was then removed. The skin site was again swabbed using a standard cotton-tipped swab and then plated on a bacterial culture plate. The same procedure was repeated but without a sterile glove cover. Samples swabbed from the skin were then plated and incubated for five days at 37°C. A total of 190 samples were plated: 94 plates from the uncovered probe group and 94 plates from the sterile glove group, and two plates of non-sterile ultrasound gel that was directly obtained from the ultrasound gel packet. After five days of incubation, the colonies on the plates were counted for bacterial growth.

Results: No growth was observed on the two non-sterile gel control plates. Seven (7.4%) out of the 94 uncovered probe plates and eight (8.5%) of the 94 sterile glove covered probe plates had growth. Chi-square analyses compared plates from the uncovered probe versus samples from the sterile glove-covered probe. The result, χ^2 (1, N = 188) = 0.072, p = .79, shows that there is no statistically significant difference in bacterial growth at an alpha level of 0.05.

Conclusion: Our study demonstrates that there was no statistically significant difference in bacterial growth after the use of sterile glove-covered ultrasound probe versus an uncovered, alcohol-cleaned ultrasound probe. Our results suggest that during ultrasound procedures there may be minimal additional risk of infection when performed without a sterile ultrasound cover. These findings would be important in resource-scarce settings where there is little or no access to sterile probe covers.

326 Does a Physician Developed Airway Equipment Tray Improve Physician Satisfaction and Speed of Intubation Preparation?

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Background: In the emergency department studied, physicians observed that the current airway equipment tray which was developed by non-physician personnel lacked organization and had excess materials that were rarely used, making it difficult to locate the items necessary for an uncomplicated endotracheal intubation.

Study Objective: The goal for this project was to develop an airway tray that included the minimal amount of equipment necessary for an uncomplicated endotracheal intubation. It was hypothesized that a physician-developed tray would decrease the time to intubation preparedness and increase physician satisfaction.

Methods: Each physician (PGY 1-4 or attending physician) was asked to prepare for an uncomplicated endotracheal intubation in a simulated setting using one of two trays: the current intubation tray that was developed by non-physician personnel, or the proposed intubation tray that was developed by resident physicians. Each physician prepared for intubation with each tray and time was measured from start time to the physician-determined end time. After each preparation, the physician completed a questionnaire about the tray used.

Results: The mean time for intubation preparation was 91.3 seconds for the current tray and 69.2 seconds for the proposed tray. Of the physicians who participated (n=20), 95% demonstrated a decreased time for intubation preparation for the proposed tray. Overall, there was a significant difference in the mean time reduction (22.1 seconds, $p<0.01$) for intubation preparation using the proposed tray. 98% of physicians agreed that the proposed tray had all of the components necessary for an uncomplicated intubation. Only 3% of physicians surveyed were satisfied with the organization of the current tray, compared to 95% of physicians who agreed that the proposed tray was organized well. The overall satisfaction of physicians surveyed also improved from 5% with the current tray to 100% with the proposed tray.

Conclusion: When physicians are directly involved in the development of procedural trays, there is both improved efficacy of the procedure and physician satisfaction of the equipment.

327 The Incidence of Clinically Significant Magnetic Resonance Angiography Findings for Transient Ischemic Attack Patients in the Observation Unit

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Background: A transient ischemic attack (TIA) is no longer considered to be a benign event, rather it is a serious warning for an impending stroke. Studies show that this "transient event" is associated with a 90-day risk of a stroke in approximately 10% of people, with half of these strokes occurring within 48 hours of the inciting event. This critical statistic favors the need for close monitoring and expeditious neurologic workup. With advancements in technology one of the major diagnostic studies for cerebrovascular accident (CVA) is magnetic resonance angiography (MRA). MRA is advantageous as it can detect hyperacute and minute ischemic lesions as well as lesions in the posterior fossa, in addition to aneurysms and arteriovenous malformations. This study serves to evaluate the incidence of clinically significant MRA findings following a TIA, in our emergency department observation unit (EDOU).

Study Objective: To determine if there is a significant amount of patients with clinically relevant findings on MRA that may have otherwise gone undiagnosed. Clinical significance is defined as any finding that warrants further workup or intervention.

Methods: This descriptive study was a retrospective chart analysis of 684 asymptomatic TIA patients admitted to the EDOU, over a 20-month period. Patients were divided by significant or no significant findings for either brain or neck MRA or both.

Results: There were no significant findings for either the brain or neck MRA in 70.8% (n=484) of patients. 9.8% (n=67) had significant findings for only the neck MRA. 12.0% (n=82) of patients had significant findings for only the brain MRA. 7.5% (n=51) had significant findings for both brain and neck MRA. Significant findings included moderate to severe vascular stenosis and/or occlusion of the vertebral arteries, carotid, aneurysms (saccular and fusiform), subclavian steal syndrome, and thyroid nodules. Clinically significant findings were noted in 29.4% of the 684 patients.

Conclusion: With the use of MRA of the brain and neck, we are discovering more clinically significant findings that may have gone years undiagnosed. Based on this data, it seems fitting that the use of MRI of the brain with MRA of the brain and neck should be utilized for evaluation of TIA patients when able, thus replacing prior workups such as, carotid ultrasound.

328 Withdrawn

329 Clinical Utility of Coronary Computed Tomographic Angiography in the Emergency Department at Naval Medical Center Portsmouth

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Study Objectives: The purpose of this study is to determine the effect of coronary computed tomographic angiography (CCTA) on length of stay (LOS) and resource utilization, in the emergency department (ED) of a single military treatment facility, in patients presenting with low risk chest pain. This study was a retrospective chart review of approximately 300 patients who presented to the NMCP ED with chest pain and for whom CCTA was ordered as a disposition strategy.

Methods: This study compared length of stay for patients, age 30-75, who received CCTA for chest pain evaluation versus an equal number of age, sex, and HEART score matched controls, who also presented with chest pain but did not have CCTA evaluation. Additional data was collected regarding primary care (PCM) and cardiology follow-up, and follow-on testing or procedures conducted as a result. The chart review was conducted using electronic medical records (Tsystems & AHLTA) and radiology review software (Synapse - IMPAX). The study examined records from the initiation of CCTA on 01 April, 2017 until 31 May, 2019.

Results: A total of 133 patients were included in the CCTA cohort with 126 patients compared as matches. Across all patients with low risk chest pain, those for whom CCTA was ordered had significantly longer average LOS of 8.8 hours (95% CI 7.9-9.6, P<0.05) versus matched patient avg LOS of 5.8 hours (95% CI 5.3 - 6.4). Subgroup analysis revealed that patients with HEART scores of 3 to 5 did not have statistically significantly different average LOS due overlapping confidence intervals.

Patients who received CCTA in the ED were less likely to have additional outpatient follow-up, both from primary care (32% vs. 38%) and cardiology (38% vs. 50%). Although the CCTA group received fewer follow-on testing or procedures (28% vs. 38%), they received more coronary catheterizations (13 vs. 7 (95% CI 0.71 - 4.78) with a higher non-stent/no disease rate (5.3% vs. 1.6%).

Conclusion: The current implementation of CCTA in the Navy-Wide Low Risk Chest Pain Protocol did not reduce the length of stay in the emergency department at NMCP. Patients who received CCTA less commonly made follow-up appointments and had less follow-on testing. However CCTA patients were more likely to have catheterizations and more likely to have a negative catheterization.

I am a military service member. This work was prepared as part of my official duties. Title 17 U.S.C. 105 provides that "Copyright protection under this title is not available for any work of the United States Government." Title 17 U.S.C. 101 defines a United States Government work as a work prepared by a military service member or employee of the United States Government as part of that person's official duties. / The study protocol was approved by the Naval Medical Center Portsmouth Institutional Review Board in compliance with all applicable Federal regulations governing the protection of human subjects. (Protocol number NMCP.2019.0025) / The views expressed in this abstract reflect the results of research conducted by the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, or the United States Government

330 Preliminary Report of Drive Through COVID-19 Screening Process in a Large Suburban Hospital

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Study Objective: During the COVID-19 pandemic, the volume of patients presenting to the emergency departments (EDs) exceeded ED capacities. Many health systems have implemented drive-through (DT) screening and testing for patients with COVID-19 symptoms for public health screening and to add to surge capacity. The objective of this investigation was to describe both the testing and clinical outcomes of patients evaluated by a hospital system-based DT screening strategy early in the 2020 COVID-19 pandemic.

Methods: This is a retrospective, observational study of patients who were triaged to a DT COVID-19 screening area at one of eight hospitals in the health system between March 12 and April 15, 2020. Patients were evaluated by Advanced Practice Providers (APPs) through a car window, with vital signs, a focused clinical evaluation, and nasopharyngeal swabs for COVID-19 per clinical judgment. Post-evaluation instructions for care were also provided. An electronic medical record search was performed to identify patients' returns to the EDs and their return disposition. Outcomes were return visits, disposition on return, mortality, and results of COVID-19 testing for those tested.

Results: During the study period, we included 7061 patients from all hospitals (Range 12-2660/hospital) of which 58.0% were female, and 48.0% Caucasian. The average age of subjects was 44.1 y/o (Range 0-97). Abnormal vital signs were identified in 1633(23.1%) patients on initial DT. Of those 296(4.2%) had a fever >=100.4 F, 1355(19.2%) had tachycardia (HR>100 bpm), 174(2.5%) had hypoxia (SpO2<94%), 7(0.09%) were hypotensive (Sys BP<90), and 26(0.4%) had tachypnea (R>24). COVID-19 testing was performed for 1407(19.9%) patients during the initial DT screening of whom 381(27.1%) were positive for COVID-19-19.

An in-system ED revisit occurred in 688(9.7%) patients with a median(IQR) time from initial DT evaluation of 4.3(2.2) days. Returning patients were admitted 27.7% of the time (185/668). Revisit rates were slightly decreased when testing was done during the initial drive through (7.9% vs 9.9%, p=0.03). Of admitted patients, 9/668 died during hospitalization.

Conclusion: DT screening for COVID-19 appears to be an effective tool to provide screening and augment surge capacity during this pandemic. Limitations of this work include an early pandemic study population with a high prevalence of disease, and a follow-up method that utilized a single health system which may have underestimated the rate of return visit. However, we identified that a measurable proportion of patients required emergency evaluation, with complications including hospital admission and death. We identify the need for DT screening programs to incorporate outcome measurements into their program.

331 Effect of Emergency Department Hallway Care Location on Patient Outcomes Across 14 Hospitals: Higher Rates of Return to the Emergency Department and Inpatient Admission

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Study Objectives: Crowding in emergency departments (EDs) leads to frequent utilization of hallway beds as part of routine care. Research into the impact of care location on patient outcomes and which patients are triaged to the ED hallway is limited. The primary aim of this study was to evaluate whether hallway care location, compared to non-hallway location, was associated with 7-day and 30-day rates of return to the ED and return with inpatient admission in a network of 14 hospitals. A secondary aim was to describe the demographics and diagnoses of hallway patients compared to those in the non-hallway setting.

Methods: We performed a multisite retrospective cohort study at 14 EDs comparing hallway patients to non-hallway patients. We merged administrative datasets derived from the electronic health record that included all patients evaluated from 1/1/2017 to 8/31/2018. We included patients >=18 years old who had unique identifiers and complete information on disposition. The exposure was if the patient was placed in a hallway or non-hallway bed for greater than 30 minutes during the ED encounter. We describe the relationship between patient variables, hallway exposure, and outcomes with odds ratios [95% confidence intervals].

Results: A total of 941,253 ED encounters were identified; 797,093 nonhallway patients and 25,927 hallway patients met the inclusion criteria. Compared to patients in non-hallway locations, hallway patients had higher odds of 7-day return to the ED (1.4 [1.3, 1.5]), 7-day return with inpatient admission (1.4 [1.3, 1.5]), 30-day return to the (ED 1.2 [1.2, 1.3]), and 30-day return with inpatient admission (1.3 [1.2, 1.3]). Hallway patients had lower odds of 30-day mortality after the index visit (0.6 [0.5, 0.7]).

Placement of patients in the hallway was associated with being male (OR 1.31 [1.27, 1.34]), non-white (OR 1.26 [1.23, 1.30]), having self-pay insurance (1.22 [1.16, 1.28]), and current tobacco use (1.33 [1.30, 1.36]). Hallway patients had lower odds of having a history of CAD (0.73 [0.70, 0.76]), CHF (0.78 [0.74, 0.82]), or prior stroke (0.79 [0.75, 0.84]). The top CCS diagnostic categories for the ED diagnosis in hallway patients were alcohol-related disorders (9.5%), abdominal pain (4.2%), sprains/strains (4.2%), back pain (3.8%), substance-related disorders (3.6%), superficial injury/contusion (3.6%) and non-specific chest pain (3.5%). Among hallway patients discharged from the ED who returned to the ED or required admission within 7 days, "alcohol-related disorders" was by far the most common diagnostic category (26.4%).

Conclusion: Hallway patients have increased odds of return to the ED and inpatient admission within 7 days and 30 days of their index visit. Male, non-white patients are more likely to be placed in hallways, and the largest subset of hallway patients (13.1%) have an ED diagnosis of alcohol or substance use.

Table. Hallway patient outcomes

	Non-Hallway (n=797,093)	Hallway (n=25,927)	Mean Difference (95% CI)	OR [95% CI]
7-day Return to ED	8.1	11.0	-2.9 [-3.3, -2.5]	1.4 [1.3, 1.5]
7-day Return with Admission	3.1	4.2	-1.1 [-1.4, -0.9]	1.4 [1.3, 1.5]
30-day Return to ED	20.6	24.0	-3.4 [-4.0, -2.9]	1.2 [1.2, 1.3]
30-day Return with Admission	9.1	11.4	-2.3 [-2.7, -1.9]	1.3 [1.2, 1.3]
30-day Mortality	1.2	0.7	0.5 [0.4, 0.6]	0.6 [0.5, 0.7]

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332 "They're the Experts. So, How Involved Could I Be?": Patient Perspectives on Oral Anticoagulation Decisionmaking

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Study Objective: Venous thromboembolism (VTE) and pro-thrombotic diseases, eg, atrial fibrillation (AF), have significant mortality and morbidity. Emergency department (ED) physicians vary in the degree to which they involve patients in oral anticoagulation (OAC) decisionmaking. We evaluate patient perspectives on this process.

Methods: Research assistants prospectively identified and consented patients with new AF or VTE, 7am to 11pm, seven days/week at a tertiary care academic ED, Sept 2015-Dec 2016. Patients were interviewed ≤30days of their ED encounter using a semi-structured interview guide, with prompts to examine factors influencing their OAC decisionmaking. Digital recordings were transcribed and analyzed by two methodologists using NVivo software. A qualitative, modified-grounded theory framework was applied to data collection and analysis. Qualitative processes were reviewed using the Consolidated Criteria for Reporting Qualitative Research checklist.

Results: We interviewed 22 patients, 10 with AF and 12 with VTE, with an average age of 57 years (range 29-88), and 10 females. There were no differences in patterns of responses between VTE and AF patients; thus, combined results are presented. Three major themes arose. 1) Patient Education: Patients felt adequately informed, if not "more than I needed"; or resolved remaining questions with other health care providers, eg, pharmacists. 2) Patient Involvement: Without exception, patients stated they were as involved in treatment decisions as they wanted to be. However, the level of involvement ranged widely. Some patients deferred to ED provider decisions because "the doctor knew more than I did". 3) Discussion of Treatment Options: Providers did not often discuss multiple treatment options; a more typical experience was that providers suggested only one treatment. Even though patients described an overall low level of decisionmaking involvement, most did not seek to alter their ED treatment plans except when subsequently concerned about medication costs.

Conclusion: Among our cohort of VTE and AF patients, there was minimal evidence of shared decision making; however, most patients felt adequately informed/included in the decisionmaking process and trusted their physician's expertise. Further research is needed to determine which conditions and settings are more suited for "shared decisionmaking."

333 Improving Burnout With Resident Shift Adjustments: A Wellness Innovation

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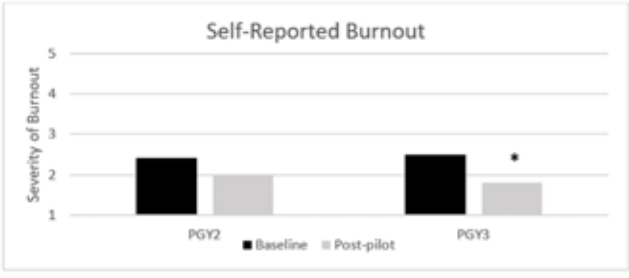
Study Objectives: According to the 2017 National Emergency Medicine (EM) Wellness Survey, 76% of EM residents report symptoms of burnout. Shift work, physician workload, and emergency department (ED) crowding are commonly cited contributors to burnout. At our institution, post-graduate year (PGY) 2s and PGY3s work 10-hour shifts, and arrival data suggest that a single PGY3 covers a large portion of the ED during some of the busiest times of the day. The objective of this innovation is to improve resident self-reported burnout by adjusting the existing staffing models.

Methods: In response to a residency needs assessment revealing concerns over long shift lengths and resident understaffing in certain time periods, a pilot 4-week schedule was created. This initiative reduced PGY2 and PGY3 resident shifts to 9 hours, including a one-hour sign-out overlap. Using arrival data, additional residents were scheduled during historically busier times. De-identified data was collected from all residents via a Qualtrics survey from January through March of 2020. In addition to residency-specific questions regarding shift work, multiple previously validated surveys were administered: the Mini-Z, Professional Fulfillment Index (PFI), Patient Health Questionnaire 9 (PHQ-9), Generalized Anxiety Disorder 7 (GAD-7), Pittsburgh Sleep Quality Index (PSQI), and International Physical Activity Questionnaire (IPAQ). Following the intervention pilot block which ran during the month of February, a repeat survey was sent to those residents who participated in the pilot. Results were analyzed using two-sided t-tests.

Results: The response rate of the initial survey was 77% (46 of 60 residents), and the response rate to the follow-up survey was 59% (10 of 17 residents). Eighty-five percent of residents believed that ten-hour shifts were too long, and 77% believed there was not enough resident coverage in the ED. Baseline survey results revealed that the majority (59%) of residents reported feeling under stress, and an additional 36% reported experiencing true burnout. Following the pilot schedule intervention, there was a significant improvement in self-reported burnout in the PGY3 class from 2.5 to 1.8 on a 5-point scale (p=0.02), although no such improvement was observed in the PGY2 class. Depression and anxiety levels were both initially low, with 84% of residents reporting mild or no anxiety and 89% reporting mild to no depression. Exercise levels met or exceeded the American Heart Association recommendations at baseline, and sleep quality varied widely. There were no significant changes noted in any of these measures.

Conclusions: Resident-centered scheduling changes resulted in statistically significant improvements in self-reported burnout.



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334 A Comparison of Novel Tourniquet Designs

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Study Objectives: Extremity hemorrhage remains a leading cause of preventable battlefield death. In addition, there are approximately 17,000 preventable hemorrhagic civilian out-of-hospital deaths worldwide each year. Tourniquets have improved the survivability of our service members and are increasingly used in the out-of-hospital civilian setting. The Committee on Trauma Combat Casualty Care (CoTCCC) has approved several tourniquets for use. The Combat Application Tourniquet Gen 7 (CAT) and the SOF Tactical Tourniquet Wide (SOFTT-Wide) were previously approved but have undergone design changes since their original validation. In addition, the Tactical Mechanical Tourniquet (TMT) is a newer generation tourniquet that has only recently been approved for use. These tourniquets require evaluation of their efficacy, efficiency and durability during movement and transport of patients.

Methods: This study is a randomized cross-over trial with subjects that were recruited from a pool of active duty United States Navy corpsmen. Each subject applied the tourniquets in a single arm application to the upper extremity and a dual arm application to the lower extremity. The primary outcomes measured were the efficacy of pulse elimination, efficiency of application, and durability during transport. Efficacy was determined by elimination of a pre-marked doppler pulse and efficiency was determined by total time required to place the tourniquet. Durability was determined by assessing pre-achieved pulselessness in the lower extremity after the subject low-crawled prone and was then dragged by a plate carrier supine for 25 feet each. Additionally, subject familiarity and preference for each tourniquet was evaluated by pre- and post-study surveys.

Results: Interim analysis suggests marked differences between the tested devices in efficacy, efficiency and durability. The use of the CAT resulted in a significantly higher rate of pulse elimination and quicker application time when compared to using TMT and SOFTT-Wide. In addition, 54% and 58% of subjects were unable to obtain pulselessness on the arm and leg, respectively, using the SOFTT-Wide and had components of this tourniquet fail during testing. There were no significant differences found between durability of the devices. Surveys suggested that corpsmen were more familiar with the CAT pre study and preferred the CAT overall post study.

Conclusions: Though all three devices are approved for use, our research has discovered significant differences in their functionality that may impact patient survival. To our knowledge, no studies have previously evaluated tourniquet efficacy during patient movement and transport. Future tourniquet research should not only evaluate efficacy, but the durability of the device to function under stress and movement, as tourniquets save lives of our service members and even, our neighbors.

335 HIV Post Exposure Prophylaxis in the Emergency Department: Barriers and Missed Opportunities

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Study Objectives: Antiretroviral post exposure prophylaxis is recommended for people seeking treatment within 72 hours of human immunodeficiency virus (HIV) exposures. Research suggests nonoccupational post exposure prophylaxis (nPEP) is underprescribed when indicated in the emergency department (ED). This study is an assessment of ED providers' attitudes and practices regarding administration of HIV nPEP.

Methods: This was an anonymous survey based on literature review and modified Delphi technique. We approached 153 ED providers at work over a 4-month period from 5 hospital-based and 2 freestanding EDs with an annual census between 35,000-75,000 patients. The EDs are a combination of urban, suburban, and rural EDs. There were 152 completed surveys: 80 attendings, 27 residents, and 44 physician assistants (PA). For analysis of categorical variables separated into two or more groups, Fisher's Exact Test, Chi-Square Analysis, or Spearman's rank correlation was used depending on sample size, distribution of variable, and type of variable.

Results: The majority of those surveyed (133/149, 89.3%) believe it is their responsibility to provide HIV nPEP in the ED. Although 91% (138/151) and 87% (132/151) of respondents are willing to prescribe nPEP to a patient in the ED for IV drug use and unprotected sex, respectively, only 40% (61/152) of participants felt they could confidently prescribe the appropriate regimen. Only 25% (37/151) of surveyed providers prescribed nPEP in the last year. No significant difference was found when comparing the number of years in practice, age, or sex to a provider's confidence in prescribing an appropriate PEP regimen for nonoccupational exposure (Table 1). Respondents considered time (27%), connecting patients to follow-up (26%), cost to patients (23%), patients' perceived interest in HIV counseling (15%), and concern for ongoing risky behaviors (9%) as barriers to prescribing nPEP.

Conclusion: This study identified perceived barriers to administration of nPEP and missed opportunities for HIV prevention in the ED. Although most ED providers were willing to prescribe nPEP and felt it is their responsibility to do so, the majority were not confident in prescribing it. Age, sex, and years in practice did not show a difference in confidence prescribing. In addition, the most commonly cited barriers to prescribing nPEP were time and access to follow-up care. Potential strategies to overcome these barriers could examine establishing protocols for nPEP evaluation, educating providers on nPEP administration, and coordinating care between ED and internal medicine providers.

336 The Pragmatic Use of Industrial Elastomeric Respirators in Health Care Practice during the COVID-19 Viral Pandemic

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Study Objectives: The COVID-19 pandemic has changed the way that we interact with our patients, specifically in regards to the importance of using personal protective equipment (PPE) during all patient interactions. The abrupt onset of the pandemic has created shortcomings, though, in stocks of disposable equipment prompting the use of alternative, often self-provided, PPE. Some practitioners have started to use reusable elastomeric respirator facemasks in lieu of the disposable N95 variety provided in our emergency department (ED). We sought to evaluate how well these masks functioned in terms of repeated fit testing in an emergency department.

Table 1. Provider Confidence in prescribing nPEP

I can confidently prescribe an appropriate PEP regimen for various nonoccupational exposures						
Sex (n [%])	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**p-value**
Male	3 (3.16)	33 (34.74)	17 (17.89)	36 (37.89)	6 (6.32)	0.57
Female	2 (3.51)	22 (38.60)	14 (24.56)	18 (31.58)	1 (1.75)	
Years in Practice (n[%])						
- <5	1 (1.79)	18 (32.14)	11 (19.64)	22 (39.29)	4 (7.14)	0.42
6 - 10	0 (0.00)	9 (52.94)	2 (11.76)	6 (35.29	0 (0.00)	
11 -15	0 (0.00)	3 (27.27)	0 (0.00)	8 (72.73)	0 (0.00)	
>15	2 (5.41)	11 (29.73)	8 (21.62)	13 (35.14)	3 (8.11)	
Age (years ± SD)	41.40 ± 16.00	37.05 ± 9.59	38.68 ± 10.90	40.58 ± 11.11	43.00 ± 13.01	0.388

Methods: We performed a prospective cohort study of ED physicians required to use respirators at an academic, level one trauma center. All investigators performing fit testing reviewed OSHA qualitative fit testing guidelines and training and were familiar with the testing protocol. All subjects had purchased commercial elastomeric respirator masks with disposable filters (N95, P95, or P100) for personal use as PPE due to concerns regarding shortages of disposable surgical and N95 medical masks. All masks have a manufacturer-stated filter life of approximately 40-hours of continuous use specifically in industrial application. All subjects chose their mask size independently with no input from employee health regarding appropriate fit. Per study protocol, subjects were fit tested periodically during clinical shifts over the course of the 8-week study period. Data points collected included the age of the mask, subjective assessment of mask seal quality, and fit test results. The data was analyzed using descriptive statistics. The study was approved by the Institutional Review Board.

Results: 88 fit tests were performed on physicians wearing elastomeric masks during their clinical ED shifts. Only eight tests were performed on masks with filters within the 40-hour lifespan per manufacturer specifications. Eighty fit tests were performed on masks with filters that had been in use for greater than 40 hours. There were no fit test failures in any subjects.

Conclusion: Reusable elastomeric respirators have an extremely low failure rate and may be a worthwhile investment as PPE. Further, the filters likely can be safely used well outside of the manufacturer-stated 40 hours of use in health care practice.

337 Duration of Pulse Checks Using Point-of-Care Transthoracic Echocardiography versus Point-of-Care Transesophageal Echocardiography versus Palpation

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Study Objectives: There has been debate over the optimal method of checking a pulse in cardiac arrest; namely palpation vs point-of-care ultrasound (POCUS) transthoracic echocardiography (TTE). In recent years, transesophageal echocardiography (TEE) has emerged as an increasingly used option. However, there is minimal data comparing these modalities, with prior studies being relatively small and including only ultrasound-trained faculty for TEE. This study includes POCUS TTE and TEE performed by attending physicians, residents, fellows, and advanced practice providers. In this retrospective study, the investigators evaluate the duration of pulse checks when using palpation, TTE, or TEE in cardiac arrest.

Methods: This is a retrospective study comparing the duration of pulse checks using palpation, TTE, or TEE. A quality improvement (QI) database managed by the Hennepin County Medical Center (HCMC) emergency department was used to identify cases of cardiac arrest, in which pulse checks were performed with either transthoracic or transesophageal cardiac ultrasound. The cases often included palpated pulse checks as well, which were also included in analysis. Chart review of the selected patients was performed to assure accuracy of the database and for additional information on each case. The last 100 patients before the use of TEE became standard of care, and the first 100 cases after which had video data available were included. QI data, including pulse check durations, were recorded from video review and used for comparisons.

Results: Data from 200 patients included 973 pulse checks (623 with TTE, 313 with TEE, 37 with palpation). Mean duration of TTE pulse checks was 19.28 seconds (95% CI 17.9 - 20.6). Mean duration of TEE pulse checks was 13.95 seconds (95% CI 12.8 - 15.1). Mean duration of palpated pulse checks was 13.92 seconds (95% CI 10.7 - 17.2). TTE pulse checks were significantly longer in duration than both TEE (difference 5.33 seconds, 95% CI 2.89 - 7.78, $p < 0.001$) and palpation (difference 5.36 seconds, 95% CI -0.61 - 11.33, $p = 0.089$). There was no significant difference in duration between TEE and palpated pulse checks (difference 0.03 seconds, 95% CI -6.16 - 6.10, $p > 0.999$).

Conclusion: To our knowledge, this is the largest study to date comparing duration of ultrasound pulse checks. Its inclusion of trainees, APPs, and attendings without ultrasound fellowship training gives broad generalizability. The data demonstrates no significant difference in duration between palpated and TEE pulse checks. Pulse checks by TTE were significantly longer than both palpated and TEE. In combination with the known advantages of ultrasound over palpation, the data suggests that TEE may be the ideal method of performing pulse checks in cardiac arrest.

338 Pet Friendly: The Role of Animal Care in Patient's Decisions Regarding Atypical Discharge

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Study Objectives: Animal care is frequently listed as a reason patients choose to sign out of the emergency department or hospital against medical advice. However, the frequency of this issue as a decision point in atypical discharges is unclear. We reviewed all atypical discharges for a 12-month period (January 1, 2019-December 31, 2019) from the ED at Veterans Health Administration medical center to determine the degree to which concerns regarding animal care were involved in an atypical discharge.

Methods: The setting is a 28,000-visit high acuity tertiary Veterans Health Administration medical center ED. All patients with a disposition of atypical discharge (Left without being seen, LWBS: eloped, E; against medical advice, AMA) are contacted within 24 hours of discharge by a nurse case manager. Among the data points collected include reason for leaving. All charts of patients with atypical discharge were reviewed for a primary or secondary category of "pet/animal care' under reason for leaving to determine the frequency with which this issue occurs as a factor in patient's decision to opt for an atypical discharge. The lead author conducted all reviews of data obtained by the case management staff.

Results: A total of 1,397 charts were identified as atypical discharges. Of these, the majority (908, 65%) were LWBS, with 297 (21%) leaving AMA and 192 elopements. 1253/1397 (89%) were able to be contacted verbally within 48 hours of their atypical discharge. The most common reason for atypical discharge overall was wait time, which was the primary reason given in 998 (79%) of the cases. However, having an animal that needed care accounted for the primary reason for atypical discharge in 71 (24%) of the patients leaving AMA, and was the primary reason for atypical discharge in 49 (5%) of the elopements and 93 (10%) of the LWBS patients. Additionally, need to provide animal care was listed as a secondary reason for atypical discharge in 313 (25%) of the atypical discharges. 44 of the patients who left AMA went to the ED and were readmitted within 24 hours of leaving AMA after securing animal care

Conclusion: The need to provide animal care was a frequent reason for atypical discharge at our facility, particularly for patients who signed out AMA. A significant number of patients who left AMA returned when they had secured animal care. Lack of animal care is a driver of decisions to leave the emergency department for a significant number of patients in our study.

339 Does Shock Index, Pediatric Age-Adjusted Help Predict Mortality by Trauma Center Type?

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Study Objectives: Pediatric trauma patients can be seen at adult trauma centers (ATC), mixed pediatric and adult trauma centers (MTC), or pediatric trauma centers (PTC). Shock index, pediatric age-adjusted (SIPA) can be used to prospectively identify severely injured children. This study characterized the differences in mortality and hospital length of stay (LOS) amongst pediatric trauma patients with elevated SIPA at different trauma centers types.

Methods: Pediatric patients (1-14 years) were queried from the 2013-2016 National Trauma Data Bank (NTDB). Patients with elevated SIPA (SIPA+) were included for analysis. The primary outcome was mortality. Secondary analyses included hospital length of stay. Unadjusted frequencies and multivariate regression analyses were performed.

Results: Out of 190,569 patients, 33,149 were SIPA+. The initial unadjusted odds ratio for mortality showed no significant difference at ATC OR 0.93 (95% CI 0.75, 1.17) or MTC OR 1.11 (95% CI 0.88, 1.39) when compared to PTC. The

Adjusted Odds Ratios for SIPA+ Patients

Type of Trauma Center	Mortality	Hospital LOS
Adult Trauma Center	OR 0.85 (95% CI 0.63, 1.13)	OR 0.78 (95% CI 0.56, 1.08)
Mixed Trauma Center	OR 1.07 (95% CI 0.77, 1.47)	OR 0.93 (95% CI 0.65, 1.35)
Pediatric Trauma Center	1; Reference	1; Reference

unadjusted mean hospital length of stay was 3.3 ± 6.97 days at ATC, 3.98 ± 7.17 days at MTC, and 3.64 ± 8.17 days at PTC. After controlling for age, race, sex, payment method, mean ISS, hospital teaching status, and number of hospital beds, amongst SIPA+ patients there was no significant difference in mortality at ATC OR 0.85 (95% CI 0.63, 1.13) and MTC OR 1.07 (95% CI 0.77, 1.47) when compared with PTC. There was also no significant difference in hospital LOS at ATC OR 0.78 (95% CI 0.56, 1.08) and MTC OR 0.93 (95% CI 0.65, 1.35) when compared with PTC.

Conclusion: Severely injured children with elevated SIPA have no increased risk of mortality at ATCs or MTCs when compared to PTCs. This finding provides evidence for out-of-hospital systems to determine where severely injured pediatric trauma patients are transported for their initial trauma care.

340 Sex-Based Barriers to the Advancement of Women in Academic Emergency Medicine: A Multi-Institutional Survey Study

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Study Objectives: The number of leadership positions held by women within academic medicine remain stagnant despite an increasing number of women entering medicine and in faculty positions. Exploring the unique experiences and challenges faced by women in emergency medicine may provide a framework in which to support and train future leaders. The objective of this multi-institutional survey study was to identify intrinsic and extrinsic factors that affect the career trajectories of women in academic emergency medicine.

Methods: An IRB-approved, electronic survey was distributed to women faculty members in emergency medicine at eight institutions across the United States. Anonymous responses were collected between November 2019 and January 2020. Survey items assessed five domains: determination, resiliency, career support and obstacles, career aspiration, and sex discrimination. Response options utilized a Likert 5-point scale (1 = strongly disagree; 5 = strongly agree) and analyzed using two-sided t-tests. Responses for each question and category were averaged and deemed significant if the average was greater than or equal to 4 in the affirmative, or less than or equal to 2 in the negative. Additionally, we compared junior faculty (<10 years in practice) and senior faculty (>/=10 years in practice). Demographic questions and others reported as proportions were reassigned into binary format and analyzed using z-score calculations.

Results: Of 109 eligible faculty, 59 participated in the study (54.1% response rate) and 32 were senior faculty members. Years in practice ranged from < 5 years to 35-40 years with a median interval of 10-14 years. Significant findings include a positive categorical average for resiliency, with an average of 4.02. Career obstacles include a lack of confidence during negotiations, with only 27% (16/59) reporting confidence discussing salary, benefits, and promotions. Childbearing and child rearing were not considered significant barriers in career advancement. Of the respondents, 96.6% (57/59) disagreed that being a woman is advantageous in medicine with an average of 2.00. Additionally, 76% (45/59) of participants reported sex discrimination by colleagues or supervisors, and 15% (7/45) of those individuals also reported at least one sexual assault and/or battery by colleagues or supervisors during their careers. Senior faculty were more likely than junior faculty to relocate to advance their careers (p=0.010), to sacrifice career advancement for family (p=0.040), to have been PI of a research study project (19 vs. 7), and to have received a grant (11 vs 7).

Conclusion: In this multicenter survey of women emergency medicine faculty, high levels of resiliency likely contribute to career advancement. Difficulty with negotiation and sex discrimination are experienced commonly. Senior faculty women were more likely to make personal sacrifices to advance their careers and had more experience directing research. Further research is warranted to identify interventions that improve negotiation and research skills of women faculty, enforce safe work environments, and facilitate better work-life balance.

341 Changes in Atypical Discharges before and during the COVID-19 Pandemic

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Study Objectives: Many emergency departments outside of zones of major outbreaks during the COVID-19 pandemic saw ED volumes decrease substantially during the pandemic. The pandemic both changed volume and acuity in many departments. We sought to review how this has affected our atypical discharge rates: left without being seen (LWBS), against medical advice (AMA), and eloped (E). The setting is a 28,000 visit Veterans Health Administration emergency department.

Methods: We reviewed ED records from the period beginning March 14, 2020 (the day shelter at home restrictions and cancellation of elective procedures began in our state) through May 14, 2020. Prior to the outbreak of the COVID-19 pandemic, all atypical discharges (AMA, LWBS, and E) were contacted by a case manager within 24 hours of leaving the ED, and this process was continued during the pandemic. Information collected included age, sex, acuity (ESI), type of atypical discharge (AMA, LWBS, E), and available outcome information (seen by provider/ED, admitted, problem resolved). This data was then compared to the 2-month period prior to the COVID-19 pandemic.

Results: Average weekly volume during the pandemic period were lower than pre-pandemic levels (pandemic 336, range 290-367; pre-pandemic 556, range 532-575). Acuity was higher during the pandemic period, with average daily admit rates of 34% (range, 25%-44%), compared to a pre-pandemic average of 21% (range 18-29%). The atypical discharge rate was lower during the pandemic period (average 3.1%, range 0-5.5%) compared to the pre-pandemic period (average 7%, range 3,7-9.5%). The type of atypical discharges was different; during the pandemic period, AMA discharges comprised the vast majority of atypical discharges. There was a total of 89 atypical discharges during the 8-week pandemic period, of which 67 (75%) were AMA, 14 (16%) were LWBS, and 8 (%) were elopements. The top reasons for leaving AMA were fear of contracting COVID (29, 43%); animal care (16, 24%), and multiple/miscellaneous (22, 33%). The majority of LWBS were COVID concerns (10, 71%), with remainder related to wait time. The patients who LWBS left quickly (mean time from registration to LWBS, 14 minutes, range, 3-75). Pre-pandemic, there were 154 atypical discharges in that 8-week period, with the majority (89, 58%) LWBS, 34 (22%) elopements, and 31 (20%) AMA. The mean time from registration to departure for LWBS in the pre-pandemic period was 89 minutes (range, 23-159).

Conclusion: ED volumes were lower, with higher acuity. Atypical discharges in the pandemic period were lower as well, with the majority being AMA, as opposed to the pre-pandemic period, where the majority were LWBS. This information may be helpful for planning staffing and anticipating barriers to admission during a pandemic.

342 Efficacy of Empiric Antibiotic Management of Septic Prepatellar Bursitis Without Bursal Aspiration

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Study Objectives: Practice guidelines frequently recommend that bursal aspiration with fluid analysis be performed in patients with suspected septic prepatellar bursitis

prior to initiation of antimicrobial therapy. However, there is a paucity of clinical evidence to support this recommendation. Our study objective was to describe outcomes associated with empiric antibiotic therapy with or without aspiration of the bursa.

Methods: We conducted an observational cohort study of adults presenting to a quaternary care academic ED from March 2011 to January 2019 who were treated for prepatellar bursitis. We collected patient demographics, management in the ED and outpatient settings, and complications within 6 months. We minimized bias in the coding process by double extracting 20% of the charts and rectifying discrepancies. Patients dismissed from the ED on antibiotics for treatment of suspected septic prepatellar bursitis comprised the primary cohort of interest. We defined an uncomplicated resolution as resolution of bursitis without need for subsequent aspiration of the bursa, other procedure, or hospitalization. We summarized data with descriptive statistics and 95% CIs.

Results: During the study period, 164 ED patients treated for prepatellar bursitis met inclusion criteria. 137 (84%) patients were dismissed home from the ED or ED observation unit, of these, 66 (48%) were dismissed on oral antibiotics for suspected septic bursitis and comprised the primary cohort of interest. Median age was 51 years (IQR 34-63) and 77% were men. Among these 66 patients, 63 (95%) did not undergo aspiration of the bursa in the ED. All three patients who underwent aspiration of the bursa in the ED had an uncomplicated recovery. Among the 63 patients treated empirically with antibiotics without aspiration in the ED, 49 (78%) (95% CI 66-86%) had an uncomplicated resolution. A total of 10 (16%) had a complicated resolution with 5 patients undergoing subsequent aspiration alone, 3 patients requiring subsequent hospitalization alone, and 2 patients who had both a subsequent aspiration and hospitalization. Four patients were lost to follow up.

Conclusion: Overall, 78% of ED patients dismissed from the ED with suspected septic prepatellar bursitis had an uncomplicated resolution with empiric antimicrobial management in the absence of bursal aspiration. These findings suggest that empiric antibiotic therapy without aspiration may be a reasonable approach to initial outpatient management of suspected septic prepatellar bursitis.

343 Motivational Factors That Influence Adoption of Innovations

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Study Objectives: While the world of medicine is constantly changing, it has been difficult to persuade physicians to do the same, which may threaten patient care quality and safety. In the face of overwhelming evidence of utility, why do certain physicians adopt some innovations, but not others? What factors influence physicians' decision to learn new skills? There are many studies that evaluate the barriers and facilitators of continuing professional development (CPD); however, understanding physician motivation to learn a new skill is less well understood and even more difficult to predict. Understanding the "why" and motivations behind such varying adoption behavior in physicians remains paramount in designing effective CPD programs that align physician behavior with evidence-based medicine. The purpose of this study is to explore the motivational factors that influence adoption of innovations in practicing emergency physicians (EPs) and to develop a framework to further CPD.

Methods: Point-of-care ultrasound (POCUS) is an example of the incomplete adoption of an innovation despite evidence of its efficacy and is used as the anchor point of study. This was a sequential mixed methods study in an urban academic center using practicing EPs the study population. Subjects were first sorted into adopter categories from Rogers' diffusion of innovations theory based on their scores on the Evaluation Tool for Ultrasound Skills Development and Education (ETUDE) survey. Subjects were then purposely sampled based on their adopter category to undergo semi-structured interviews, which were then professionally transcribed. We used constructive grounded theory for thematic analysis until thematic saturation.

Results: We found that EPs were represented in all adopter categories, in a close to normal distribution. 5 themes were induced via that discriminate between the adopter categories: 1. professional identity 2. formative experiences 3. perception of influence 4. mentorship and feedback 5. logistical barriers.

Conclusion: We conclude that EPs who have had a formative experience with POCUS, which reinforces their professional identity, were more likely to adopt that technology. Development of mentorship networks and programming which engage elements of professional identity (such as diagnostic skill and teaching expertise) may promote the adoption of new technology.

344 The Accuracy of Point-of-Care Hemoglobin Testing in Acute Gastrointestinal Bleeds and its Implication in the Emergency Department

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Study Objectives: Gastrointestinal bleeding (GIB) can be a life-threatening condition if not quickly triaged and treated in the emergency department (ED). Studies have been performed about the accuracy of hemoglobin point-of-care testing but have not evaluated the impact in the ED. In this study we were interested in determining if point-of-care hemoglobin testing would decrease ED triage timing, total ED treatment time and effect overall ED disposition.

Methods: A retrospective cohort study was performed involving ED patients with a complaint of GI bleeding, who presented to a large, urban, academic, Midwest ED from 2013-2018. Patients were selected for review if they had an end ICD 10 diagnosis related to GI bleeding and if they had both a HemoCue and a subsequent venous hemoglobin performed. Patients were excluded if they were less than 18, if the final diagnosis was not related to GI bleeding, or if they did not have both CBC and Hemocue testing. Using Bland-Altman plots, patients' venous hemoglobin and Hemocue were compared to assess agreement between the two methods. Patients were then divided into different arrival groups (EMS vs Ambulatory), Disposition groups (discharge or Admit). These groups were then compared to see if a difference was presents between door to room, door to MD time, overall length of stay. For univariate analysis, a Wilcoxon two sample T test was used, for multivariate analysis a robust regression model was used.

Results: A total of 7214 patients were reviewed and 324 patients were selected. Hemocue and venous hemoglobin were found to have a concordance correlation coefficient of 0.84 with 95% confidence interval of 0.82, 0.88. Patient who had a Hemocue performed were roomed faster by 4.1 minutes, but there was no overall change in door to doc time, overall length of stay for both admitted or discharged patients.

Conclusion: Overall, we found that the point-of-care hemoglobin testing seems to positively correlate with venous hemoglobin findings. This test did slightly decrease the arrival to room time by 4.1 minutes. However, there was no significant difference seen in door to MD time, overall length of stay of either or admitted or discharged patients.

EMF 345 Positioning Public Health Surveillance for Observational Studies: The St. Louis Hospital-Based Violence Intervention Program Data Repository

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Study Objectives: Firearm injuries are a public health epidemic in the United States, yet a comprehensive national database for patients with firearm injuries does not exist. Here we describe the methods for a study to develop and query a new regional database of all patients who present to a St. Louis level I trauma hospital with a violent injury, the St. Louis Hospital-Based Violence Intervention Program Data Repository (STL-HVIP-DR). We hypothesize that the STL-HVIP-DR will facilitate identification of patients at risk for violent injury and serve as a comparison population for participants enrolled in clinical trials.

Methods: The STL-HVIP-DR includes all patients who present with violent injury to level I trauma hospitals in St. Louis, Missouri between January 1, 2010 and December 31, 2019. Two health systems representing the four participating hospitals executed a data sharing agreement to aggregate clinical data on firearm injuries, stabbings, and blunt assaults. Dataset variables include

Table 3. Visit Demographics for Assaults and Firearm Injury Subsamples

Demographic	All Assaults (n = 39,378)	Firearm Injuries (n=18,336)
Age		
Mean (SD)	30 (14.7)	28.7 (12.5)
IQR	20-40	20-35
Sex, n (%)		
Male	26,710 (68)	15,901 (87)
Female	12,664 (32)	2,424 (13)
Unknown	4 (<1)	10 (<1)
Race, n (%)		
Caucasian	9,123 (23)	2,250 (12)
African-American	28,854 (73)	15,545 (85)
Other	805 (2)	238 (1)
Unknown/refused	596 (2)	303 (2)
Ethnicity, n (%)		
Hispanic/Latino	576 (1)	212 (1)
Other	38,642 (98)	18,051 (98)
Unknown	160 (1)	73 (<1)

demographic information, hospital information and timestamps, medical information, and insurance information.

Results: A preliminary cross-sectional query of the STL-HVIP-DR reveals 121,955 patient visits among the four partner level I trauma hospitals for a violent injury between 2010 and 2019. This includes over 18,000 patient visits for firearm injury.

Conclusions: The STL-HVIP-DR is among the first registry of its type in the US to allow for data sharing in pursuit of linking ED and hospital trauma data among multiple hospital and health systems at the regional level. This repository fills a critical gap regarding identification and outcomes among individuals who are violently injured, especially those with non-lethal firearm injuries.

346 Mortality Due to Sepsis in Open Pelvic Fractures: Rare but Lethal

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Study Objectives: Pelvic fractures cause high morbidity and mortality. The purpose of this study was to examine mortality in the setting of open pelvic fractures. We hypothesized that in open pelvic fractures infection is rare but that mortality caused by sepsis is significant.

Methods: Patients with isolated open pelvic fractures (ICD-9L 808.2x-808.9x) were analyzed in the National Trauma Data Bank (NTDB) from 2011 - 2014. Patient demographics, condition upon arrival, mechanism of trauma, need for angioembolization (ICD-9: 39.79) and injury severity scores (ISS) were analyzed. Patients with polytrauma and infections from non-pelvic causes were excluded. Multivariate logistic regression analysis was performed to identify factors independently associated with increased infection and mortality.

Results: 97,116 patients with isolated pelvic fractures were studied.

Bivariate analysis showed that patients with infection had a higher percentage of penetrating injury (11.4% vs 5.3%; p<.001), lower SBP (112.9±37.4 vs 127.9±36.8; p<.001), higher ISS (25.4±14.7 vs 13±11.4; p<.001), greater percentage of open pelvic fractures (13.5% vs 4.5%; p<.001), unstable pelvic fractures (25.8% vs 10.8%; p<.001) and required 4 times more angioembolization (8.5% vs 2.1%; p<.001).

1358/97116 (1.4%) patients with either closed or open pelvic fractures developed infection. Of those with infection, 184/4460 (4.12%) had open fractures and 85/4460 (1.9%) became septic. 30/85 (35%) patients did not survive. Mortality from sepsis in open pelvic fractures was 30/4460 (0.67%).

On multivariate analysis, sepsis is an independent factor for mortality (OR 4.608 = 1/0.217) and open pelvic fractures are not (p = .739).

Conclusion: Pelvic stability is an independent factor affecting mortality in patients but the presence of open pelvic fractures is not. While the mortality rate from sepsis is high (35%), the risk of sepsis (1.9%) and the subsequent mortality from sepsis is minimal (0.67%). In the acute setting of open pelvic fractures, patient stability should remain the primary priority.

Table 1. Comparisons between non-survivors and survivors (N=97116)

	Non-survivors (N=4955)	Survivors (N=92161)	*p*-value
Age	43.5±44.4	40.2±45.6	<0.001*
Age>65 (N, %)	1674 (33.3%)	28569 (31.0%)	<0.001†
Penetrating injury (N, %)	217 (4.4%)	4985 (5.4%)	0.002†
SBP in ED (mmHg)	105.1±48.1	128.9±35.8	<0.001*
SBP<90mmHg (N, %)	1521 (30.7%)	6975 (7.6%)	<0.001†
GCS in ED	7.8±5.7	13.0±4.7	<0.001*
ISS	28.9±18.4	13.0±11.4	<0.001*
Open pelvic fracture (N, %)	359 (7.2%)	4101 (4.4%)	<0.001†
Unstable pelvic fracture (N, %)	969 (19.6%)	9720 (10.5%)	<0.001†
Need for angioembolization (N, %)	389 (7.9%)	1758 (1.9%)	<0.001†
Infection (N, %)	215 (4.3%)	1143 (1.2%)	<0.001†

Variables are Mean ± SD

* Student T test † Chi-square test

web 4C/FPO

Table 2. Independent factors and associated odds ratio of survival in patients with pelvic fractures

	p-value	Odds ratio	95% CI.	
			Lower	Upper
AGE	<0.001	0.997	0.996	0.998
Penetrating injury	0.003	1.279	1.087	1.504
Open pelvic fracture	0.739	-	-	-
Unstable pelvic fracture	<0.001	1.192	1.094	1.309
Shock (SBP<90mmHg)	<0.001	0.578	0.535	0.624
GCS	<0.001	1.104	1.098	1.109
ISS	<0.001	0.951	0.949	0.953
Need for angioembolization	<0.001	0.485	0.427	0.552
Infection	<0.001	0.540	0.458	0.636

web 4C/FPO

Table 3. Comparisons between patients with and without infections (N=97116)

	Infection (+) (N=1358)	Infection (-) (N=95758)	*p*-value
Age	42.9±25.1	40.4±45.8	<0.001*
Age>65 (N, %)	218 (16.1%)	30025 (31.4%)	<0.001†
Penetrating injury (N, %)	155 (11.4%)	5047 (5.3%)	<0.001†
SBP in ED (mmHg)	112.9±37.4	127.9±36.8	<0.001*
SBP<90mmHg (N, %)	268 (19.7%)	8228 (8.6%)	<0.001†
GCS in ED	11.2±5.3	13.6±12.2	<0.001*
ISS	25.4±14.7	13.0±11.4	<0.001*
Open pelvic fracture (N, %)	184 (13.5%)	4276 (4.5%)	<0.001†
Unstable pelvic fracture (N, %)	351 (25.8%)	10338 (10.8%)	<0.001†
Need for angioembolization (N, %)	116 (8.5%)	2031 (2.1%)	<0.001†

Variables are Mean ± SD

* Student T test † Chi-square test

web 4C/FPO

Table 4. Independent risk factors and associated odds ratio of infection in patients with pelvic fractures

	p-value	Odds ratio	95% CI.	
			Lower	Upper
AGE	0.007	1.002	1.001	1.004
Penetrating injury	<0.001	2.028	1.664	2.475
Open pelvic fracture	<0.001	1.629	1.350	1.964
Unstable pelvic fracture	<0.001	1.529	1.335	1.751
Shock (SBP<90mmHg)	0.017	1.209	1.035	1.412
GCS	0.754	.998	0.987	1.010
ISS	<0.001	1.042	1.038	1.045
Need for angioembolization	<0.001	2.125	1.732	2.608

*Multivariate logistic regression

web 4C/FPO

347 Sex Evaluation and Numeric Distribution in Emergency Medicine Residencies

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Study Objectives: While females make up more than half of medical school matriculants, they only comprise about one-third of emergency medicine residents. We sought to determine to what extent emergency medicine residents feel that sex distribution within a program is an influential factor in 1) choosing a residency program and 2) perceived quality of education.

Methods: We identified 171 accredited emergency medicine residency programs in the United States with cohorts entering between 2014-2017. We emailed programs to confirm accuracy of publicly available data collected from program Web sites. A prospective, cross-sectional, online survey was used to determine which factors influenced residents' decisions in creating rank lists as fourth-year medical students and had a perceived effect on residency education.

Results: Of the 171 programs, 143 (83.6%) had publicly available data on resident and program leadership and were included. Of 5,211 residents, 3,371 (64.7%) were male and 1840 (35.3%) were female. The overall male to female ratio was 1.83:1. Individual program ratios ranged from 0.85-8.0. Only 8 (5.6%) had a female-predominant ratio. Surveys were sent to 758 residents in 17 programs, and 138 responded (18% response rate).

The most important factors in making rank lists were: location (97%), experience at the program (96%), and personality of the residents in the program (96%). Factors related to sex showed influence on rank lists in: sex of residents (39.9%; 95% CI: 31.6%-48.5%); sex of attending physicians (30.4%; 95% CI: 22.9%-38.8%), and sex of program director and assistant program directors (23.9%; 95% CI: 17.1%-31.1%). Sex composition of residents was more important than sex composition of program directors (p=0.004).

The least important factors to affect residency education were: program length, program reputation, and compensation. Personality of residents had the highest median Likert scale score. Factors related to sex affecting education followed an identical pattern as in creating rank lists. Using >50%, >60%, >70%, >80%, or >90% to describe a faculty or residency as male or female predominant, respondents had a broader interquartile range for considering female predominance (>50% to >70%) compared to male predominance (>60% to >70%). When responses were stratified by sex, female residents placed higher importance on subcategories specifically related to sex (Table 1).

Conclusion: Surveys to quantify the importance of sex in residency selection showed that other factors such as location, personality of residents, and educational experiences were rated as much more important than sex differences within a program. However, factors influencing rank list creation and residency education differ in perceived importance depending on whether the resident is male or female.

Table 1. Statistically significant responses stratified by sex.

	Female		Male		
Question	**Yes**	**No**	**Yes**	**No**	**P-value**
Factors influencing rank list					
Experience on interview day	81	0	51	5	.006
Patient demographics	67	14	37	19	.025
Sex composition of residents	43	38	12	44	.000
Sex of PD and APDs	27	54	6	50	.002
Sex of attending physicians	34	47	7	49	.000
Ethnic diversity of fellow residents	39	42	17	39	.037
Factors affecting residency education					
Sex of PD and APDs	45	35	15	41	.001
Sex of attending physicians	50	30	23	33	.014
Ethnic diversity of PD and APDs	44	36	18	38	.008

Pearson chi-square tests, degrees of freedom = 1.

348 Emergency Physician Learning Curve on Transesophageal Echocardiography Simulator

Lin J, Kurbedin J, Khordipour E, Haines L, Nguyen A, Grbic M, Hoffman T, Carr M, Gupta S, Likourezos A, Aghera A/Maimonides Medical Center, Brooklyn, NY

Study Objectives: To assess the learning curve of non-ultrasound fellowship-trained emergency physicians (EPs) on the performance of transesophageal echocardiography on a simulator and to determine the number of scans needed for proficiency.

Methods: This was a prospective observational study of non-ultrasound fellowship-trained EPs. The EPs attended a one-hour TEE workshop and practiced TEE views on a 3D Systems TEE Training Simulator. All participants were asked to return for repeat sessions several months after the module to perform the TEE Standardized Direct

Observational Assessment Tools (SDOTs). During each evaluation session a participant could complete up to three SDOTs. EPs were scored on a previously constructed SDOT scoring system. The passing cutoff score was determined using the Angoff method. The study analysis was descriptive of the distributions of SDOT over time. Competency was achieved when a participant reached two consecutive passing scores on two separate evaluation sessions. SDOT Scores for each session and time until a participant reaches two consecutive passing scores on two separate sessions were summarized using medians and IQR.

Results: A total of 33 non-ultrasound fellowship trained EPs participated in the study. 33 EPs completed SDOT #1, 30 completed SDOT #2, and 27 completed SDOT #3. 90% of EPs (27 out of 30) required a refresher and could not perform SDOT #1. A passing score of 80 or above was reached by 31% (10 out of 32) of participants on SDOT #2. A passing score was reached by 30% (8 out of 27) of participants who performed SDOT #3. The median time for performing all TEE views decreased over time from a median [IQR] of 259 [180-453] sec on SDOT #1, to 81 [64-126] sec on SDOT #2, and 67 [51-95] sec on SDOT #3.

Conclusion: After a TEE workshop, 30% of participants were able to pass the 2nd or 3rd TEE SDOT. Time to completion of TEE views decreases over time as participants continue testing on the transesophageal simulator.

349 The Physical Examination Is Unreliable in Determining the Location of the Ankle Physis in Healthy Children

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Study Objectives: Pediatric ankle injuries are a common presentation to the emergency department (ED). The Salter-Harris classification defines a type 1 fracture of the distal fibula as tenderness overlying the physis of the distal fibula without radiographic evidence of a fracture. Our primary objective was to establish the reliability of physical examination performed by pediatric emergency physicians in determining the location of the physis of the distal fibula as compared to a criterion standard using ultrasound.

Methods: This was a prospective, observational, single-site study of a convenience sample of pediatric patients aged 4 to 10 years old. It was performed at an urban academic pediatric ED between March 2019 and April 2020. Otherwise healthy children presenting to the ED for reasons other than lower extremity injury were eligible to participate. A pediatric emergency physician or fellow performed a physical examination of the patient's distal fibula and marked the location of the physis based on his or her examination with a marker. After this, the study investigator (an ultrasound fellow) scanned the distal fibula, established the location of the physis on ultrasound, and used an invisible ink pen to mark the location of the physis. Using an ultraviolet light, the investigator measured the distance between the clinician's estimated position and the actual sonographic position of the physis. Because the distal fibular physis measures only 3 mm on average, a clinically accurate position was defined a priori as a marked point located within a 5 mm distance of the sonographic marking. We compared the accuracy rate of physical examination to ultrasound landmarking using proportions as well as means with 95% confidence intervals (CI). Using a simulation assuming the participation of at least 15 physicians assessing multiple patients, we calculated a sample size of 90 patients to detect a difference in 70% versus 50% physician accuracy with at least 80% power.

Results: Enrolment was stopped early due to the novel coronavirus pandemic, so we were unable to recruit our target sample size of 90 participants. We enrolled 71 patients, of whom 52 (73%) were male. The mean age was 6.7 years and the mean weight was 25.5 kg. Participating pediatric emergency physicians included 18 staff physicians and 2 fellows. The assessments were performed by staff physicians in 60 (85%) patients and by fellows in 11 (15%) patients. Each physician examined a mean of 3.6 patients (range 1-15). The physis of the distal fibula was correctly identified in only 24 patients, yielding an accuracy rate of 34% (95% CI 23%-46%). The mean distance between the physician's estimated position of the physis and the sonographic position was 7.4 mm (95% CI 6.4-8.4 mm). In a sensitivity analysis where the remaining 19 patient examinations would have all been accurate, the probability of accurate identification was 48% (95 CI 37%-59%).

Conclusion: We found that pediatric emergency physicians were only 34% accurate with their physical examination in identifying the physis of the distal fibula. This calls into question the utility of the definition of a type 1 Salter-Harris fracture given that the physical examination is unreliable in identifying the location of the physis of the distal fibula.

350 Patterns of End-of-Life Care as Measured by Emergency Department Visits among Cancer Patients in Puerto Rico

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Study Objectives: Community palliative care services are scarce in Puerto Rico (PR). Therefore, patients with advanced cancer commonly visit the emergency department (ED) at end of life. Identification of these patients and their palliative care needs can help in care coordination. Recognition of patients with limited life expectancies and palliative care needs may improve the end of life trajectory of these patients. Our objective was to characterize ED visits of advanced cancer patients at the end of life by examining, for the first time, the patterns of ED visits in PR using the PR Central Cancer Registry-Health Insurance Linkage Database (PRCCR-HILD).

Methods: Data was obtained from the PRCCR-HILD, which links nearly 90% of cancer cases diagnosed in PR with insurance claims files. We included patients diagnosed between 2011 and 2016, aged $\geq$18 years with primary invasive cancer, that died between 2011 and 2017, with a recorded date of death, who died from cancer, and who had insurance claims during their last three months. End-of-life care indicators were ED visits, ED death, and hospice use. We used logistic regression models to examine factors associated with end-of-life care.

Results: The study cohort included 10,812 cancer patients. We found that 49% had at least one ED visit, 20% had $\geq$2 ED visits, and another 9.7% died in the ED. Only 9.4% of patients in the cohort were enrolled in hospice. Of those, 46% used hospice within 30 days of death and, 9% enrolled in hospice within three days of death. According to the bivariate analysis, there was an association between having $\geq$ 2 ED visits and the variables of age group, type of cancer, and stage at diagnosis (p-value$<$0.05). Likewise, there is an association with death in an ED and sex, age group, and type of cancer (p-value$<$0.05).

In the adjusted model, patients $\geq$ 80 years were 44% less likely to have $\geq$ 2 ED visits (aOR: 0.56, 95% CI: 0.46-0.68) compared to patients aged $<$50 years. Patients with distant stage are more likely to have $\geq$2 ED visits (p-value$<$0.05). Also, results of the multiple logistic model showed that significant predictors of death at ED were: ages 65 to 79 (aOR, 0.71; 95% CI, 0.58 to 0.87) and ages $\geq$80 (aOR, 0.43; 95% CI, 0.33 to 0.56). Female patients were found to be significantly less likely to die in an ED setting.

Conclusion: ED visits at end of life can be interpreted as a poor-quality cancer care. Awareness among ED staff of the potential of ED-initiated palliative care is needed. This study demonstrates the potential of the PRCCR-HILD as a resource to further investigate the quality of care among advanced cancer patients at the end of life. Further studies are warranted to improve the quality of care and to mitigate disparities at end-of-life care in PR. Stakeholders need to commit to palliative care as a public health priority in PR, implementing education, planning services, and mobilizing community resources.

351 The Diagnosis of Carotid and Vertebral Artery Dissections by Emergency Physicians is Rare

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Study Objective: Carotid and vertebral artery dissections are rare events. The most frequent symptoms are head and neck pain and neurological deficits, but these are common emergency department (ED) chief complaints and other diseases causing these occur much more often. Furthermore, about one-third of patients have no headache, one-third have no neck pain and over 10% have no neurologic deficits. For these reasons, diagnosing dissections is challenging. We wished to quantify the magnitude of this problem in a large ED database. Our goal was to determine the number of total ED visits for every carotid and vertebral artery dissection diagnosed by ED physicians.

Methods: Design: Multicenter retrospective cohort. Setting: 27 suburban and urban New York and New Jersey EDs with annual visits between 20,000 and 119,000. Participants: Patients seen by ED physicians in the four-year period from 11-1-2015 through 10-31-2019. Observations: We identified carotid and vertebral artery dissections using ICD-10 codes. We then calculated the number of ED visits for every carotid and vertebral artery dissection, along with 95% confidence intervals (CIs).

Results: From a database of 6,223,499 ED visits, we identified 115 carotid artery dissections and 97 vertebral artery dissections. The median ages (with interquartile ranges) and percent female of carotid and vertebral artery dissection patients were 54 years (41, 64), 47 years (38, 63), 55% and 51%, respectively. Of the total ED visits there was one carotid artery dissection for every 54,117 (95% CI 45,089 to 64,953) visits and one vertebral artery dissection for every 64,160 (95% CI 52,599 to 78,261) visits.

Conclusion: The diagnosis of carotid and vertebral artery dissections by ED physicians is rare. An ED physician seeing 3,000-4000 patients a year would diagnose one carotid artery dissection every 13 to18 years and one vertebral artery dissection every 16 to 21 years.

Row Labels	Count of Billed ICD Description	Number of visits for each diagnosis
Dissection of carotid artery	115	54117.38
Dissection of renal artery	2	3111750
Dissection of vertebral artery	97	64159.78
Extradural and subdural abscess, unspecified	72	86437.49
Intraspinal abscess and granuloma	126	49392.85
total visits	6223499	
	27 hospitals	

352 Minimum Weight for Effective Chest Compressions and Alternative Methods for Smaller Rescuer Cardiopulmonary Resuscitation

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Background: The quality and quantity of chest compressions determine blood flow in cardiopulmonary resuscitation (CPR). Efficacious chest compressions rely on body mechanics such that the weight of the resuscitator matters; very small people have insufficient weight to generate sufficient downward chest compression force.

Study Objective: The purpose of this study is to investigate how a resuscitator's weight affects chest compression efficacy; and to determine the minimum weight required to perform adequate chest compressions. For those below this minimum weight (such as in children or smaller-bodied rescuers), we investigate alternative means to perform chest compressions.

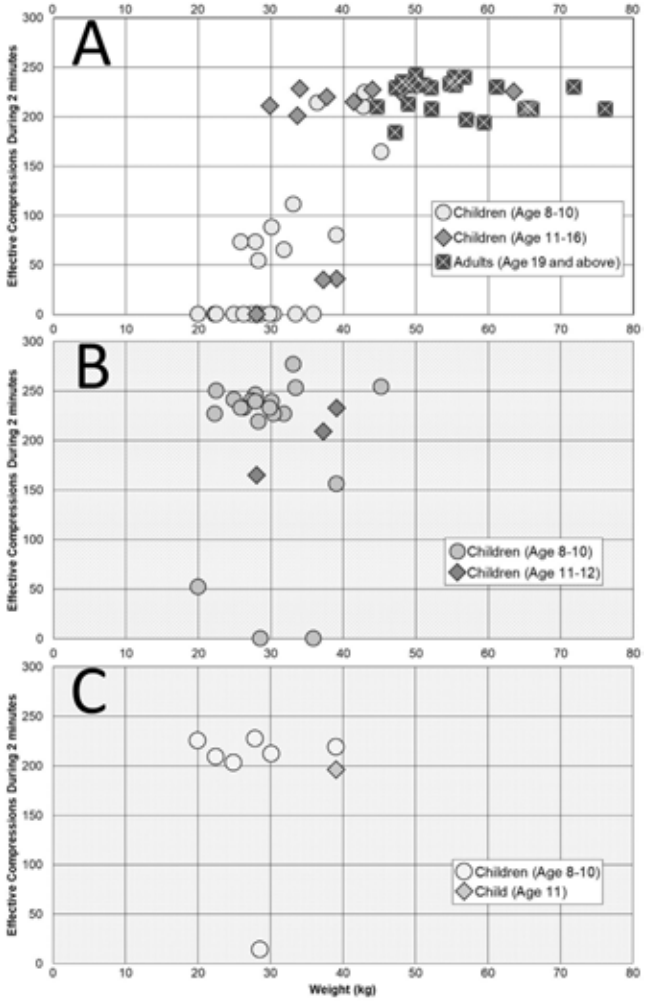
Methods: We enrolled volunteers age 8 years and above to perform video-recorded, compression-only CPR on an audible click-confirming chest compression manikin with background music to facilitate the chest compression rate for 2 minutes. All volunteers were provided with brief training, practice, and rest sessions prior to the recorded session. For all subjects, weight, height, age, sex, and CPR certification status were recorded. Subjects who failed to meet the criteria for efficacious chest compressions proceeded to two alternate chest compression modalities. In the first, subjects jumped up and down on the lower sternum while holding on to a horizontal support bar for balance. In the second, subjects used a squat-bounce method: sitting directly on the chest and using their legs, arms, and body weight to give compressions. Videos were reviewed to determine chest compression depth, rate, position, and recoil. An effective compression was one in which all four criteria were met.

Results: We enrolled 57 study subjects ranging from weights of 19 kg to 76 kg, which included 23 adults. Effective standard chest compressions declined at weights below 40 kg and no effective standard compression sessions occurred at weights below 29 kg (Figure 1). Adequate standard chest compressions declined at heights below 145 cm and no effective standard compression sessions were given at heights below 137 cm. For the 23 subjects who failed standard chest compressions, 19 (83%) were in the age group 8-10. There was no significant difference in the percentage of effective chest compressions with regard to sex in any method. Of the 23 subjects who failed, only 1 (4%) subject had taken a CPR certification course.

Of the 23 subjects who failed standard chest compressions, 20 (87%) delivered effective compressions using the jumping modality. For 8 subjects who failed standard chest compressions, 7 (88%) delivered effective compressions using the squat-bouncing modality.

Conclusions: Standard chest compression efficacy declines below 40 kg and cannot be performed adequately below 29 kg. For small resuscitators unable to perform standard compressions, jumping and squat-bouncing modalities resulted in sufficient chest compressions the majority of the time in this model; however, there are concerns regarding chest recoil and the potential for injury to the chest and abdomen.

Figure 1. Effective chest compressions using three methods (A=conventional, B=jumping, C=squat-bouncing) by body weight in the 3 age groups.



353 Point-of-Care Ultrasound in the Evaluation of Rattlesnake Envenomation

Adhikari S, Effron Z, Acuña J, Amini R, Situ-LaCasse E, Wilson B, Stea N, Bach M, Yarnish A, Shirazi M/University of Arizona, Tucson, AZ

Study Objectives: To our knowledge, no prior studies investigated the role of point-of-care ultrasound (POCUS) in the evaluation of rattlesnake envenomation. The objective of this study was to determine the utility of POCUS in the management of rattlesnake envenomation in the emergency department (ED).

Methods: This was a retrospective review of patients presenting to an academic ED with rattlesnake bite and received a POCUS examination after initial clinical assessment. Proximal progression of symptoms and signs in the affected extremity was monitored clinically and repeat POCUS examinations of the extremity were performed. POCUS findings were collected from ED POCUS database. Medical records were then reviewed for history, physical examination findings, laboratory results, additional diagnostic testing, and disposition. The proportion of patients whose treatment plan was altered by the addition of POCUS findings was determined.

Results: A total of 21 patients (mean age 48 years ± 15 (SD); 14 males, 7 females) were included in this study. All patients presented with pain, swelling and tenderness at the site of bite (16-lower extremity, 5-upper extremity). On initial POCUS examination, all patients except one case were noted to have subcutaneous edema at the location of snake bite. Twelve patients were also noted to have cobblestoning on initial POCUS. Myokymia was visualized on initial POCUS in 2 patients. On repeat assessments, POCUS demonstrated subcutaneous edema and cobblestoning more proximally than what was determined and marked by treating emergency physicians in 16 patients. Four patients received additional doses of antivenom based on POCUS findings. The one patient who did not have any sonographic findings on initial POCUS was eventually determined to have dry bite by the toxicologist. Patients with myokymia had a complicated hospital course with thrombocytopenia and deterioration of hemodynamic status.

Conclusion: Despite limited numbers, our study suggests that POCUS can be a useful adjunct in the evaluation of patients with rattlesnake bite. Ultrasound appears to be more sensitive than clinical assessment in detecting proximal progression of effects of venom and can potentially guide management. Our ongoing prospective study will further define the role of POCUS in the treatment of rattlesnake envenomation.

354 Diagnostic Utility of Point-of-Care Ultrasound in the Evaluation of Necrotizing Soft Tissue Infections

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Study Objectives: Necrotizing soft-tissue infections (NSTIs) are potentially life-threatening medical emergencies that require rapid identification and aggressive treatment. Emergency physicians are utilizing point-of-care ultrasound (POCUS) for a wide variety of applications. The objective of this study was to determine the diagnostic utility of POCUS in the evaluation of patients with suspected SSTI in the emergency department (ED).

Methods: This was a retrospective review of ED patients presenting to an academic center with symptoms suspicious for NSTI and received a POCUS. POCUS findings were collected from ED POCUS archiving database. Medical records were then reviewed for history, physical examination findings, laboratory results, additional diagnostic testing, operative intervention, disposition, and final diagnosis. POCUS findings were compared with LRINEC scores and operative findings.

Results: A total of 65 patients (15 females, 50 males; mean age, 55 years +/- 13.6) were included in this study. Patients presented with pain (46/65), swelling (33/65), redness (28/65) and open wound (21/65). Most common symptomatic sites were feet (27%) and upper arm (21%). Nineteen patients reported injection drug use. In triage, 53% patients were tachycardiac and 5 patients were hypotensive. Pain out of proportion was documented in 3 patients. Based on operative findings, 38% (25/65) patients were found to have NSTI. All patients with final diagnosis of NSTI had sonographic findings (hypoechoic fluid tracking along the deep fascial layers, fluid accumulation $>$ 4 mm in depth along the deep fascial layers, air in the soft tissues) indicating NSTI on POCUS. In addition, POCUS demonstrated abscess (28%), cellulitis (62%), pyomyositis (2.9%) and superficial Fasciitis (27%). Subcutaneous gas was noted in 11 patients. Early surgical consultation was obtained in these eleven patients prior to laboratory results and additional imaging studies. Six patients with LRINEC Score $<$ 6 were found to have NSTI and all 6 patients had sonographic findings suggestive of NSTI on POCUS. Only one of these patients had abnormal vital signs in triage.

Conclusion: Our study suggests that POCUS can be a useful adjunct in the evaluation of patients with NSTI. Integration of POCUS findings into LRINEC Score could improve risk stratification.

355 Unheard Victims: Multidisciplinary Incidence of Violence among Emergency Department Staff at an Academic Medical Center

McGuire S, Clements C/Mayo Clinic, Rochester, MN

Study Objectives: Workplace violence is four times more common in health care settings than in private industry according to the US Department of Labor's Occupational Safety and Health Administration. Previous research has focused on violence experienced by emergency department (ED) nurses and physicians; however, there is a lack of research evaluating the incidence of violence experienced by other team members. We sought to identify the incidence of verbal abuse and physical assault among staff at our academic ED over a six-month period, including clinicians [attending and resident physicians, and advanced care practitioners], nursing, care team assistants (CTAs), patient care assistants (PCAs), electrocardiogram (ECG) and radiology technicians, phlebotomists, registration staff, and security officers.

Methods: An anonymous REDCap survey was sent to ED staff, asking whether respondents had experienced any of the following forms of verbal abuse in the ED over the prior six months: threatening tone of voice, abusive language/statement, harassment (eg, racial, sex, sexual), or verbal threats. Respondents were also asked to indicate whether they experienced physical assault over the same time period including: assault with weapons, bodily fluids, or other types of assault. Staff were asked whether they had reported any of these incidents. Those working in the department less than six months were excluded from analysis. Descriptive statistics and Chi-square comparison was used to analyze the results. This study was deemed exempt by Mayo Clinic Institutional Review Board.

Results: Two-hundred and forty-two responses were received from security officers (n=40), nursing (n=80), clinicians (n=49), PCAs (n=10), CTAs (n=11), registration (n=4), ECG/radiology technicians (n=24), and phlebotomists (n=24). Overall, 208 (86.0%) respondents indicated being verbally abused in the preceding 6 months, and 91 (37.6%) reported being physically assaulted. Security officers had the highest incidence of verbal abuse (97.5%), followed by nursing (95.0%), PCAs (90.0%), clinicians (89.8%), phlebotomists (75.0%), CTAs (72.7%), registration staff (50.0%) and ECG/radiology technicians (50.0%). Security officers had the highest incidence of physical assault (72.5%), followed by nursing (48.8%), PCAs (30.0%), clinicians (24.5%), phlebotomists (16.7%), and ECG/radiology technicians (12.5%). Neither CTAs nor registration staff revealed any physical assault. Security personnel were more likely to formally report incidents to leadership (56.4% reporting verbal abuse and 82.8% physical assault) compared to non-security personnel victims (only 8.3% reported verbal abuse and 25.8% reported physical violence). This difference was statistically significant ($p < 0.001$).

Conclusion: Our results indicate that violence in the ED affects more than just nurses and doctors. The lack of staff reporting leaves blind spots in our understanding of the broad impact across disciplines. As health systems seek to improve the safety of their employees in violence-prone areas including EDs, it is imperative that they direct initiatives to the entire health care team as no one group is immune.

356 Workplace Violence in the Emergency Department: Staff and Law Enforcement Disagreement on Reportable Crimes

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Study Objectives: Violence in the emergency department (ED) is a common and serious threat to staff and remains underreported. According to a recent survey at our institution, 37.2% of ED staff experienced physical assault in the 6-months prior, with only 26.2% of non-security staff victims indicating they had formally reported the incident. Incident reporting processes can be cumbersome, and staff often may not

know what acts constitute reportable violence. To identify barriers in reporting, we hypothesized that ED staff may not fully understand reportable crimes and their understanding may differ from those of law enforcement officers (LEO).

Methods: An anonymous REDCap survey with four hypothetical case scenarios (Table 1) was sent to ED staff at our academic medical center, as well as LEO at the local police department. Respondents were asked to indicate whether they considered any of the scenarios to be reportable as a crime if it occurred in the ED. Chi-square analysis was used for comparison. The study was deemed exempt by Mayo Clinic Institutional Review Board.

Results: 77 LEO and 261 ED staff completed the survey. Both groups were equally likely to believe that a reportable crime occurred in scenario 1 (LEO: 26.0%, ED: 32.2%, p =.37) and in scenario 2 (LEO: 97.4%, ED: 95.4%, p = .65). However, the two groups differed in scenarios 3 and 4. In scenario 3, only 20.8% of LEO believed it represented a reportable crime, compared to 43.7% of ED staff (p <.001). Similarly, more ED staff believed that a reportable crime occurred in scenario 4 compared to LEO (LEO: 66.2%, ED: 81.2%, p =.009).

Conclusion: There was disagreement between ED staff and LEO on what actions in the ED constitute a reportable crime. Additionally, there was variability among both groups' answers in three of the four scenarios. While the scenarios were hypothetical, they are not unrealistic in our specialty. Improvement interventions could be targeted at ED staff around the law and for LEOs to understand the unique environment of the ED and patient responsibilities. As health systems seek to improve workplace safety, it is important to consider the barriers to reporting violent incidents, including staff understanding of what acts may even constitute a crime.

Table 1. Case scenarios

Scenario 1: An 85-year-old man with known dementia is transferred to the ED from his nursing home for back pain and is not oriented to the year or his present location. He becomes agitated and punches a nurse attempting to obtain his vitals.
Scenario 2: A 25-year old man is brought into the ED by EMS with the complaint of broken teeth after getting into an altercation and he appears to be intoxicated. He spits blood-tinged saliva into the face of the phlebotomist performing venipuncture.
Scenario 3: A 70-year-old female comes into the ED for abdominal pain. After a lengthy workup and prolonged stay, she begins showing signs of delirium and makes threats to find her doctor's house upon discharge and harm him.
Scenario 4: A 1-year old is brought into the ED by his parents for a fever, rash, and upper respiratory symptoms. Upon hearing that a viral infection is the likely culprit and no further diagnostic studies will be ordered or antibiotics prescribed, the mother becomes increasingly angry and eventually throws a chair in the room, narrowly missing the medical student.

357 Leukocytes, Platelets, and Positive SARS-CoV-2 Results in Admitted Emergency Department Patients

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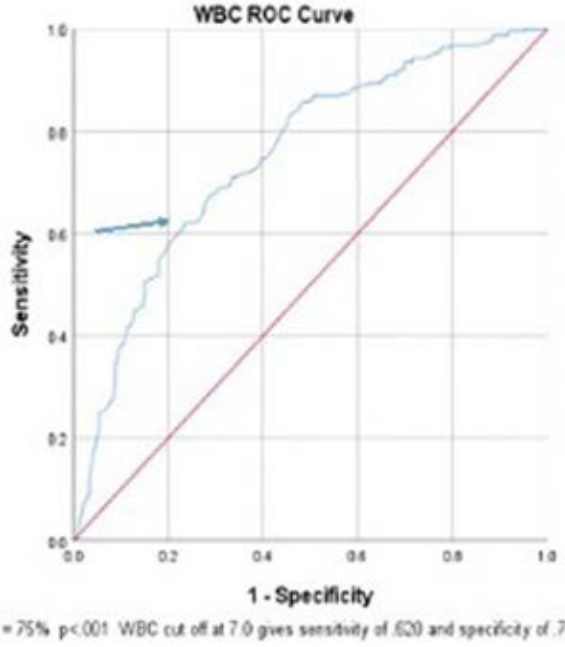
Study Objectives: Since the first few cases of Coronavirus disease 2019 (COVID-19) were reported in December 2019, the pandemic has affected over four million patients worldwide with over 250,000 deaths as of early May, 2020. As testing for COVID-19 is a limited resource, increasing its efficacy will play a critical role in managing this pandemic. Early reports have indicated an association between blood cell count and COVID-19. The objective of this study is to determine whether or not white blood cell and platelet count at presentation can guide clinical decisionmaking regarding management of persons under investigation (PUIs)

Methods: Retrospective electronic medical record review (EMR) over one month from 3/15/2020 to 4/15/2020. Data was collected from three community emergency departments (ED), all sites of a single emergency medicine residency program. Included were all ED patients tested in the ED for SARS_CoV-2 and admitted to the hospital. Excluded were patients less than 18, cardiac arrests, and missing data. Abstracted data include demographics, admission diagnosis, ED vital signs, white blood cell (WBC) count, platelet (PLT) count, and result of COVID-19 testing. With power set at 0.80 and significance set at 0.05, a sample size of 340 patients would detect at least 15% differences among the variables related to positive SARS_CoV-2. ROC analysis was used to define cut off points for prediction of Covid result based on WBC and Platelet counts. Sensitivity, specificity, positive and negative likelihood ratio, all with 95% CI are reported.

Results: 484 cases met inclusion/exclusion criteria. The mean age was 67.9 years (SD: 16.6) with 39.9% females. SAR-CoV-2 virus was detected in 245 patients (50.6%). COVID-19 positive patients had significantly lower WBC (7.2 versus 11.2; p<.001) and platelet counts (211 versus 239; p<.001). ROC analysis of both WBC and PLT were significant with area under the curve of 75% and 64.5% (p<001). At a white count of 7.0 or less, sensitivity was .624, specificity was .766, positive likelihood ratio 2.65 (95% CI: 2.06 to 3.40), and negative likelihood ratio 0.50 (95% CI: 0.42 to 0.59). At a platelet count of 200 or less, sensitivity was .543, specificity was .716, positive likelihood ratio 1.91 (95% CI: 1.51 to 2.41), and negative likelihood ratio 0.64 (95% CI: 0.55 to 0.75). When combined, lower WBC plus lower platelets gave a sensitivity of .437, specificity of .849 with positive likelihood of 2.90 (95% CI: 2.08 to 4.04) and negative likelihood of .66 (95% CI: .59 to .75).

Conclusion: In this multi-center community study of ED patients admitted over one month with suspected SARS-CoV-2 infection, both the initial white cell count and platelet counts were significantly lower in SARS-CoV-2 positive patients. Patients with both initial WBC less than 7.0 and Platelets less than 200 had increased odds of positive SARS-CoV-2 by a factor of three.

Figure 1: ROC Analysis for WBC



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358 Emergency Physician Tele-medicine Hours Associated With Decreased Reported Burnout Symptoms

Chang BP, Heravian A, Kessler D, Olsen E/Columbia University Medical Center, New York, NY; Columbia University Irving Medical Center, New York, NY

Study Objectives: Whereas 45% of the 1 million physicians in the U.S. report symptoms of burnout (ie, emotional exhaustion, depersonalization, and reduced

personal accomplishment), an astonishing 70% of ED physicians report burnout symptoms. Emergency department (ED) crowding and related factors has been found to increase psychological stress in not just patients but also emergency physicians, potentially increasing one's risk for the development of adverse professional and psychological outcomes such as clinician burnout. Telemedicine may offer a unique complement to this practice environment, allowing providers to administer care in a more controlled environment without many of the other existing acute environmental stressors. We hypothesized that physicians working more telemedicine hours would be associated with lower rates of clinician burnout compared to physicians not working telemedicine.

Methods: We conducted a prospective cohort study of emergency physicians who performed telemedicine shifts. Burnout survey was the Maslach Burnout Inventory. Demographics and teleshift hours worked were also collected

Results: 50 emergency providers participated. 18 individuals did telemedicine shifts and 32 individuals did not do any telemedicine. Overall, no differences in sex, age or years of practice were found between physicians performing tele-medicine and those. Tele-medicine providers performed on average 9.7±4.5 hours of tele-health weekly. Individuals in the tele-health group had significantly lower scores on burnout measures (emotional exhaustion subscale) compared to the non-tele-health group (8.4±2.2 vs 11.4±3.5; t=2.64, p<.05). A multiple regression model, adjusted for age, years of practice and sex, found that hours of telemedicine per week significantly predicted emotional exhaustion (beta: -.35, t=-2.22, p<.04)

Conclusion: In addition to improvements in patient outcomes, telemedicine may also improve provider psychological well-being. Future work exploring the integration of telemedicine shifts into clinical scheduling may be associated with improvements in provider well-being and career longevity.

359 Evaluation of Insulin Infusion Rates for the Treatment of Diabetic Ketoacidosis in the Emergency Department

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Study Objectives: There is currently minimal literature to support the dosing rate for the initiation of intravenous (IV) insulin therapy in DKA. We sought to assess descriptive characteristics for IV insulin prescribing for DKA management within the emergency department. A predictive regression model was applied to test if predefined lab values influenced the starting insulin infusion rates. Clinical and safety outcomes were evaluated based on starting insulin infusion rate.

Methods: A retrospective cohort study was conducted within an academic emergency department and included patients who received continuous infusion regular insulin with an ICD-10 code for DKA during the same encounter between January 2016 and January 2019. Descriptive analysis was completed for baseline population characteristics. Chi-squared test was used to analyze categorical variables and the student's t-test or kruskai wallis for continuous data using SAS. Data was analyzed based on both DKA severity (mild, moderate, or severe) and starting insulin infusion rates <0.07 units/kg/hr, 0.07-0.099 units/kg/hr, 0.1-0.139 units/kg/hr, and ≥0.14 units/kg/hr. Hypoglycemia and hypokalemia were defined by documented ICD-10 codes within 0 to 48 hours of starting insulin therapy.

Results: 347 patients met inclusion criteria with 92 (26.5%) patients in the <0.07 units/kg/hr cohort, 123 (35.4%) patients in the 0.07 to 0.099 units/kg/hr cohort, 123 (35.4%) patients in the 0.10 to 0.139 units/kg/hr cohort, and 9 (2.6%) patients in the ≥0.14 units/kg/hr cohort. Patient demographics and outcomes are shown in table 1. After adjusting for baseline lab values, glucose was the only significant predictor of the initial infusion rate (p<0.05). For every 100 mg/dL increase in the baseline glucose value, the initial infusion rate increased by 0.005 units/kg/hr. A higher anion gap was correlated with a higher initial infusion rate and a higher bicarbonate and pH were correlated with a lower initial infusion rate, though not statistically significant.

Conclusion: There is a wide range of starting insulin infusion rates utilized. Glucose levels significantly influenced the insulin starting infusion rate, with no identified differences in adverse effects or clinical outcomes between starting infusion rate cohorts.

Table 1: Demographics and Outcomes

Characteristic	<0.07 units/kg/hr (n=92)	0.07-0.099 units/kg/hr (n=123)	0.10-0.139 units/kg/hr (n=123)	≥0.14 units/kg/hr (n=9)	P-Value
Sex, N (%) Male Female	51 (55.4%) 41 (44.6%)	70 (56.9%) 53 (43.1%)	65 (53.3%) 57 (46.7%)	5 (55.6%) 4 (44.4%)	0.864
Mean Weight, kg	90.7 ± 31.9	75.4 ± 20	68.4 ± 16.7	69.1 ± 9.2	<0.05
Mean infusion rate, units/kg/hr	0.04 ± 0.03	0.09 ± 0.02	0.11 ± 0.02	0.13 ± 0.03	<0.05
Mean infusion duration, hours	38.2 ± 43.2	48.7 ± 56.5	48.9 ± 46	41.8 ± 32.2	0.153
Total hospital Length of Stay, Days	1.18 ± 0.38	1.09 ± 0.29	1.07 ± 0.26	1 ± 0	0.13
Arrhythmia, n (%)	12 (14%)	22 (17.9%)	20 (16.3%)	3 (33.3%)	0.42
Hypoglycemia, n (%)	5 (5.4%)	10 (8.1%)	18 (14.6%)	1 (11.1%)	0.13
Hypokalemia, n (%)	30 (32.6%)	25 (20.3%)	28 (22.8%)	0 (0%)	0.055

360 Student Satisfaction Towards an Academic Research Program

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Study Objectives: The emergency department is a unique environment that co-exists within a larger organization where a wide range of medical issues are treated. As a means to reduce costs and increase visibility for prospective physicians, departments will frequently use voluntary undergraduate student support. The University of California, San Francisco Fresno Emergency Department's (UCSFF) Academic Research Associates (ARA) program was evaluated to help guide volunteer placement decisions for future implementation. The evaluation measured each volunteer's relationship within the organization, personal gain, and satisfaction with the program based upon the student's grade point average (GPA). To measure volunteer satisfaction in a psychometrically sound way, Galindo-Kuhn and Guzley (2001) developed the Volunteer Satisfaction Index (VSI). Responses are recorded using a seven-point Likert Scale. Satisfaction and other volunteering aspects are measured through participant responses. The purpose of this study was to investigate volunteer satisfaction in a level 1 trauma emergency department within a teaching hospital. Furthermore, this study sought to determine best practice for program placement; satisfaction of volunteers based upon their GPA.

Methods: Participants included 40 (55% female, SD=0.28) undergraduate students enrolled in Natural Science 110 at California State University, Fresno during a period of three semesters from Spring 2019 to Fall 2019. Of those participants, 95% were majoring in pre-medical studies. The initial assessment of each student contained basic demographic questions including GPA and sex. VSI questionnaires were administered to students. Participants indicated relationship within the organization, personal gain, and relationships with peers. Responses were used to identify satisfaction. Volunteers use a seven-point Likert Scale where 1 (very dissatisfied) to 7 (very satisfied) to indicate their level of satisfaction. Utilization of the VSI identifies specific problems experienced by volunteers. The survey scores of the top one-third of GPA will be compared against the students in the bottom-third of GPA during the course of four semesters.

Results: All the students participated in the survey. Of those participants, 95% were majoring in pre-medical studies. Their responses were averaged and their responses were tested against various variables such as sex, and major. A reliability analysis was carried out on the perceived task values scale comprising 26 items. Cronbach's alpha showed the questionnaire to reach acceptable reliability, $\alpha = 0.94$. All items appeared to be worthy of retention, resulting in a decrease in the alpha if deleted. There was no significant difference in satisfaction based on students who were paired versus students who worked individually. These variables did not show any significant variation. However, Pearson's correlation was computed to assess the relationship between GPA and volunteer satisfaction, r (18) =-.559, p=.005. There was a strong negative correlation between GPA and volunteer satisfaction. An increase in GPA correlates with a decrease in volunteer satisfaction.

361 Use and Utility of Health-Related Social Needs Screening in an Urban Adult Emergency Department

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Study Objectives: Previous studies have introduced social determinants of health (SDOH) screening and interventions in many clinical settings. To our knowledge, no study has done so utilizing provider-based screening in the emergency department (ED) without substantially adding to or altering routine care. Our objective was to use provider-level screening to identify the most frequently documented SDOH and to assess associated patterns of ED use and support provided.

Methods: This was a retrospective cohort study conducted in the ED of an urban, academic institution from April to July of 2019. An electronic medical record-based screening tool was utilized. ED patients with 1+ SDOH identified were included as cases and compared to a random sample of patients with no SDOH. Chart review was performed to collect patient-level factors, including frequency of health care utilization and extent of social support provided. Support included the following measures: met with psychosocial support provider; offered educational material or physical resources at discharge; provided assistance with arranging follow-up. These factors were compared between cases and control patients.

Results: 170 encounters were identified for the SDOH cases. 170 randomized encounters without SDOH were used for comparison. The most frequently identified SDOH were the following domains: drugs and addiction, housing and homelessness, and alcohol abuse, comprising 72% of all documented needs. Among the SDOH group, 124 (59.9%) needs were met with social support, compared to 70 (41.2%) patients who were provided social support in the comparison group (P<.001). A SDOH was more frequently met with support if it was related to the patient's primary diagnosis or included in the provider note, compared to those not mentioned in either (P=.008). Patients with documented social needs were twice as likely to be high-frequency ED visitors than comparison group patients (P=.01).

Conclusion: A health-related social needs screening tool can be implemented in an urban adult ED and can be utilized to assess patterns of ED use, gaps in social support, and the needs of a given ED's patient population. Widespread implementation of mandatory SDOH screening may lead to providers' better understanding of their patients' sociocultural environments, improved provider-patient relationships, and enhanced health outcomes.

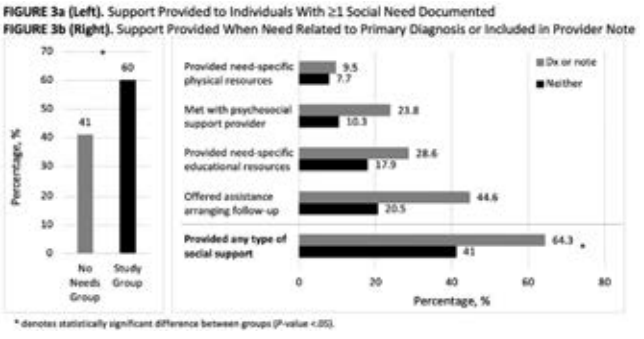

FIGURE 3a (Left). Support Provided to Individuals With ≥1 Social Need Documented
FIGURE 3b (Right). Support Provided When Need Related to Primary Diagnosis or Included in Provider Note

* denotes statistically significant difference between groups (P-value <.05).

362 The Effect of Geriatric Consultation on Admission Rates of Older Patients in the Emergency Department

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Study Objectives: Emergency departments (ED) are frequently utilized by older patients with a correspondingly high admission rate. We examined the impact of a geriatric consult program, either in the ED or within an ED observation (obs) sub-unit (Geriatric Care Unit, GCU) on admission rates for older ED patients.

Methods: Retrospective case control study in a busy academic ED with 67,000 total annual visits, with 24% geriatric (age ≥ 65 y) visits, from 6/1/2019-8/31/2019 (pre-program) and 9/24/2019-1/31/2020 (post-program). Geriatric consults were made available in the ED and mandatory in the GCU for high risk elders (age ≥80 y, positive delirium screen, falls, dementia, polypharmacy, or provider concern). Admission rates for ED visits are reported for pre- and post-program cohorts. Results are also reported for the patient subset that received a geriatric consult (intervention). Data was abstracted from the electronic medical record. Continuous measures (median [Q1, Q3]) and categorical variables (frequency) are reported. The difference between pre- and post-intervention encounters was analyzed with Kruskal Wallis tests for continuous variables and Pearson's Chi-square test for categorical variables. Probability of admission was analyzed using a mixed effects logistic regression model. Age at encounter, sex, recent visit, Charlson Comorbidity index (CCI), referral to ED obs, and geriatric intervention were all included as predictors. Analysis used SAS studio (v9.4, Cary, NC). 95% CI and p-values are reported.

Results: 9,663 geriatric ED encounters occurred, with 4,042 occurring pre-program and 5,621 occurring post-program. Overall, probability of admission was significantly associated with age, decreasing 2% with every additional year of age (OR 0.98, 95% CI 0.97-0.99, p<0.001); male sex (28.8% higher odds for admission [OR 1.29, 95% CI 1.17, 1.42, p<0.001); and CCI (each additional CCI count, admission odds increased 46.7% (OR=1.47, 95% CI 1.42, 1.52], p<0.001). Overall ED admission rates were similar pre- (44.8%) and post-program (43.9%) (p=0.39). However, pre-program ED obs patients had higher odds of being admitted than post-program patients [OR=1.686, 95% CI 2.215, 3.339). 18 (0.45%) patients received a geriatric consult pre-program compared to 243 (4.3%) post-program (p<0.001). 61.3% (149/243) of these geriatric consults occurred in the GCU. Overall admission rates post-program with geriatric intervention were significantly lower compared to pre-program (23.4% v 44.9%, p<0.001). Post-program GCU admission rates were significantly lower than pre-program ED obs admission rates (14/149, 9.4%, v 111/477, 23.3% p<0.001). In the logistic regression model, odds of subsequent admission for ED obs patients were significantly increased when geriatric consult was not available (pre-program v GCU intervention; OR 3.76, 95% CI 1.99, 7.06). Summed ED plus observation unit time (LOS) was higher in the GCU group by 149 minutes (1369.0 minutes [1117.0, 1587.0] v. 1220.0 minutes [936.0, 1459.0], p<0.001).

Conclusion: In this single site study, admission rate were significantly lower in the geriatric consult cohort. This persisted when controlled for age, sex, comorbidities and ED obs placement. ED obs LOS increase was acceptable. This model may allow health care systems to decrease hospital admission rates in older ED patients.

363 A National Survey of Workflow Efficiency Education among Emergency Medicine Residency Training Programs

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Study Objectives: Patient volumes in United States (U.S.) emergency departments (EDs) have been on the rise. Medical directors and employers seek emergency medicine (EM) physicians who have strong workflow efficiency (WFE) to help address high ED volumes without compromising patient care. Although WFE is a skill that EM residents should learn prior to graduation, it is not an Accreditation Council for Graduate Medical Education (ACGME) core competency, and there is no standard approach to measure and teach this skill during residency. Additionally, no studies have examined whether EM residency program leaders believe efficiency should be formally taught in EM residency programs. We sought to gain further insight into whether explicit teaching of WFE is important to EM residency program leadership, and the manner in which WFE is currently measured and taught to EM residents.

Methods: We conducted a cross-sectional survey of all allopathic ACGME-accredited EM residency training programs in the U.S. The survey was conducted using SurveyMonkey® in the Fall of 2019. We invited all allopathic EM residency programs to voluntarily participate in the study, primarily by emailing their program directors (PDs). Assistant/associate program directors were invited subsequently if there was no response from the PD. We performed descriptive statistics on all survey data using SurveyMonkey® software.

Results: We received a total of 133 responses out of 190 total programs (response rate 70%) with proportionate representation from 3 & 4-year programs and all regions of the U.S. When asked "To what extent teaching efficiency should be a priority compared to other educational goals," 65% of program leaders responded with

"significant" or "moderate" priority. Most EM programs collect WFE data on their residents, either by tracking patients-per-hour (78%) or by written evaluations (59%). The top three methods for providing WFE data to residents were: individual data provided along with de-identified rank (35%), data provided only during private feedback meetings (26%), and no data or rank provided to residents (16%). Regarding targeted WFE teaching to residents, 88% reported utilizing general on-shift teaching, 48% reported teaching WFE during formal didactics, and 45% during dedicated private feedback sessions. WFE-focused simulations (15%), workshops (7%), and one-on-one observation shifts (14%) were uncommon.

Conclusion: This national study of allopathic U.S. EM programs suggests that most EM program leaders value WFE teaching. However, we found no consistent approach among programs for tracking or distributing resident WFE data, and many programs lack a formalized way to teach efficiency to their residents. Given the importance of WFE to the clinical practice of EM, programs may benefit from devoting greater resources to teaching and tracking this essential skill set.

364 Feasibility Study of Emergency Department Resuscitative Endovascular Balloon Occlusion of the Aorta in Medical Cardiac Arrest

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Study Objectives: Resuscitative endovascular balloon occlusion of the aorta (REBOA) is a hemorrhage control technique involving the intra-vascular occlusion of the thoracic aorta using a balloon catheter and may help to increase coronary and cerebral perfusion during out-of-hospital cardiac arrest (OHCA) by blocking blood flow to the lower body.

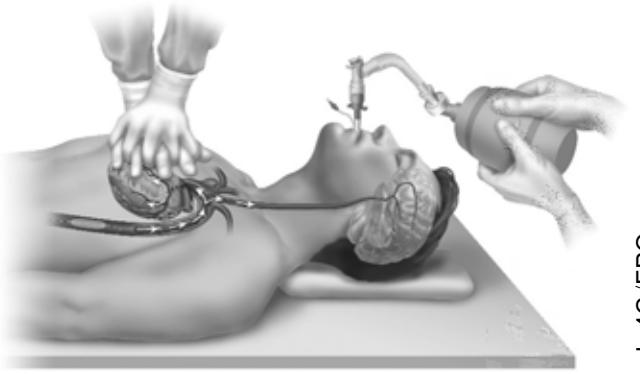
Primary Objective: The primary objective of this study is to assess the feasibility of an emergency medicine (EM)-initiated multi-disciplinary protocol for REBOA in non-traumatic OHCA.

Secondary Objectives: Secondary objectives are procedural outcomes (eg, attempts required for common femoral access), hemodynamic outcomes before and after aortic occlusion (end-tidal carbon dioxide, diastolic blood pressure), and rates of return of spontaneous circulation (ROSC) and survival to hospital discharge with a favorable neurologic outcome.

Methods: This single-arm early feasibility study of REBOA initiated in the emergency department (ED) for OHCA uses an investigational device approval with a community exception from informed consent. Subjects under 80 years of age with witnessed OHCA and down time under 45 minutes are eligible. On arrival to the ED, an emergency physician obtains common femoral access using a 7Fr introducer sheath while the REBOA catheter is prepared and subsequently advanced by an interventional radiologist (IR).

Results: Two patients were enrolled between January and February 2020, with a temporary pause in enrollment due to the COVID pandemic from March - August 2020. To our knowledge, this is the first trial of ED-initiated REBOA involving emergency physicians for non-traumatic OHCA (two similar recent reports exist in the anesthesia and critical care literature). Our initial patient was a 77-year-old man who presented in refractory ventricular fibrillation. The emergency physician placed the common femoral sheath on the first attempt using ultrasound guidance under chest compressions and the REBOA catheter was then advanced by the interventional radiologist. After inflation of the aortic balloon, investigators noted immediate improvements in mean arterial pressure (MAP) (37 to 50 mmHg) and end-tidal carbon dioxide ($ETCO_2$) (35 to 50 mmHg), with transient non-sustained ROSC. The second patient, a 63-year-old man, underwent successful REBOA placement with similar improvements in MAP (22 to 50 mmHg) and $ETCO_2$ (33 to 43 mmHg). Unfortunately, both patients were in refractory ventricular fibrillation and despite multiple defibrillation attempts and antiarrhythmics they did not survive to hospital admission.

Conclusion: REBOA has been hypothesized to improve outcomes in OHCA by blocking blood flow to the lower body and redirecting it towards the heart and brain, improving the perfusion of these vital organs. In both cases, REBOA was temporally associated with improved hemodynamics during chest compressions with transient ROSC in one case. Performance of REBOA by a multi-disciplinary team for OHCA in the ED was feasible in these initial two cases. Future research will examine the feasibility of REBOA catheter advancement by the emergency physician and further quantify the hemodynamic effects associated with aortic occlusion.



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365 Effectiveness of Fast Assessment and Triaging by ER Doctor or Faster in Patient Flow Management in an Emergency Department in the Philippines

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Background: Over the years, the demand for emergency care has progressively exceeded the ability of hospitals to provide adequate services. The burden of increasing patient visits has caused longer waiting times and ED length of stay (LOS) and poor patient flow. One important factor affecting LOS is the time to assessment by an ED doctor (door to provider), which in turn is dependent on the triage classification of patients. Given this focus of strategy, Fast Assessment and Triaging by ER Doctor (FASTER) was conceptualized. This fast track model is a modification of the previous system where nurses provide most of the triage duties, as in majority of the hospitals in the country.

Study Objectives: To determine the effectiveness of Fast Assessment and Triaging of ER doctor (FASTER) in shortening the processing times and length of stay of patients at SLMC-QC ED.

Methods: FASTER is a system composed of 1 EM consultant with 2 nurses and 1 ward clerk, managing the triage area for 10 hours daily, between 12 noon to 10 PM. Patients normally triaged by a nurse were instead managed earlier by a triage doctor. Data registration for May to October 2019 (FASTER period), including door to provider, door to disposition and ED length of stay of discharged (Phase 1) and admitted (Phase 2) patients were collected and compared to data from May to October 2018 (Nurse Triage Period).

Results: In total, there were 22,974 patient registrations for FASTER and 23,052 for Nurse Triage period. Over 79% (18,000) received FASTER interventions. There was a significant reduction (16%) in average LOS of phase 1 patients from 140 minutes to 117 minutes ($p=0.0018$). The largest difference was seen in average door to provider times of phase 1 from 15 minutes to 7 minutes (53%) and phase 2 from 30 minutes to 21 minutes (30%) during FASTER. More phase 1 patients were discharged to home after assessment and treatment within the recommended LOS (150 minutes) compared to Nurse Triage, 76% vs 64% ($p=0.0043$).

Conclusion: Processing times and overall length of stay of phase 1 in the ED were effectively reduced by FASTER.

TF 366 Ultrasound-Guided Regional Anesthesia

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Introduction: Providing pain control in the emergency department can often be complicated. Opiates are not always ideal and procedural sedation can be a time and resource consuming process that is not without risk. For many years now point-of-care ultrasound has been a core part of emergency medicine training. With the use of

ultrasound, regional anesthesia procedures can be performed safely and quickly while providing the patient a more complete level of analgesia. Therefore US-guided regional anesthesia is considered a core application within our US curriculum for our residents.

Study Objectives: After completion of this curriculum, learners will be able to 1) determine the appropriate patient and injury pattern that would benefit from regional anesthesia, 2) demonstrate proficiency in performing the procedure and selection/dosing of appropriate anesthetic and 3) predict, recognize, and treat any complications of said procedure.

Methods: This training application is developed for emergency medicine interns. During their orientation month the learner will receive 2 hours of computer slide-based lectures which describe the pertinent anatomy and procedure. The didactic portion is split between two presentations, upper and lower extremity regional anesthesia. This will be immediately followed by 3 hours of practicals. This will include identifying the specific nerves on live models with ultrasound. The learner will then practice the procedures on "phantom" models. All of this will be under direct supervision of ultrasound faculty. During the second half of the year the learner will revisit this learning application on two separate occasions- splitting it between upper and lower extremity. They will be directed to review one of the previous video-recorded lectures in preparation for a 2-hour hand on session that will take place during their weekly didactic. During this practical the learner will be shown an injury. On a live model they will then have to name and identify the relevant nerve under US. Then they will describe the technique for blocking it and then finally, they will then have to demonstrate this on a "phantom."

Evaluation: After their orientation month the residents will have the opportunity to perform these procedures on patients in the department. Until they have performed 25 US-guided regional anesthesia procedures, they will need to be under direct supervision of their attending physician. This will allow real-time evaluation and feedback. They will also receive feedback through overreading of their images. When the resident performs the procedure, they will submit the pertinent images and clips to be reviewed on Q-path. They will then fill out an accompanying worksheet describing the indication, any complications, and the overall success of the procedure. These images and worksheet will then be reviewed by ultrasound faculty who will then provide feedback through a QA worksheet rating the overall quality and accuracy. They will also be evaluated directly during the second practical session.

Conclusion: By incorporating US-guided regional anesthesia into an emergency medicine ultrasound curriculum, learners will be prepared to manage painful conditions with an alternative technique that is both safe and convenient. This lecture series combined with hands on training provides the learners with the tools they need to gain proficiency in performing this procedure.

TF 367 Bilevel Positive Airway Pressure Basics for the Emergency Medicine Resident

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Study Objectives: By the end of this activity, residents will 1) Understand indications for appropriate bilevel positive airway pressure (BiPAP) use and will be able to identify when contraindications exist. 2) Demonstrate understanding of appropriate BiPAP settings and realize when adjustments are necessary.3) Set up BiPAP machine for use without assistance which includes equipment set up, understanding function of machine interface and physical application to patient.4) Demonstrate ability to adjust BiPAP settings to specific respiratory pathologies through successful completion of table simulation scenarios.

Methods: This curriculum was designed during the COVID-19 pandemic and therefore administered virtually through use of the Zoom video conference platform. Due to the virtual nature, this presentation was created using PowerPoint that was then shared for all learners to view in real-time. This presentation requires approximately 1 hour to deliver the entirety of the material. This lecture was originally administered on April 29, 2020 during Thomas Jefferson Hospital's Emergency Medicine residency weekly conference. The lecture relies on audience participation for the majority of the slides and involves case presentations with tabletop simulations. The evaluation strategy was structured to measure Kirkpatrick level 2a outcomes by assessing the learners' modification of attitude and perception regarding personal BiPAP skill level. Learners received a 3-question, Likert-style survey prior to the start of this course and then immediately following the course's completion.

Results: There were 35 emergency medicine residents who experienced the implementation of this lecture. Of this number, 33 residents completed the pre-survey and 28 residents completed the post-survey. The surveys were conducted anonymously with an open-ended portion in the post-survey to allow for specific feedback.

Prior to this session, 33% of residents disagreed with the statement, "I am confident that I could independently set up a BiPAP machine for a patient who is in acute respiratory distress." and following the session, this shifted to 100% of residents agreeing with the statement. Resident responses to the statement, "I am confident that I would know how to adjust the IPAP and/or EPAP setting if a patient did not improve after the initial settings" shifted from 52% disagreeing to 100% agreeing following completion of this course.

Conclusion: Overall, this curriculum promoted improved confidence with residents and how they perceive their abilities when it comes to managing BiPAP. Prior to this course, there was variation with whether residents agreed or disagreed regarding their confidence pertaining to BiPAP. However, the post-survey demonstrated a total shift to the "agree" statements.

This course originally was designed to occur in-person and included hands-on practice with actual BiPAP machines loaned from the emergency department. Due to the nature of the pandemic, this portion was removed; however, once quarantine restrictions are lifted, it would likely be beneficial to incorporate this back into the presentation. Other considerations to broaden this curriculum set would be to also include education with pediatric BiPAP as well as an overview of how to troubleshoot various alarms. Due to time restrictions, there was not time to include these components but would be an interesting addition for the future.

368 Efficacy of Continuous Use Disposable N95 Masks in Clinical Practice in the Emergency Department

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Study Objectives: During the 2020 COVID-19 pandemic, many emergency departments (EDs) in the United States initiated continuous use of N95 disposable respirators rather than disposing of respirators after each patient encounter in order to conserve personal protective equipment. This study investigates the efficacy of wearing disposable n95 respirators continuously throughout an ED shift using qualitative fit testing as a measure of appropriate mask seal and function.

Methods: This is a prospective cohort study at a single level I trauma center of ED staff required to wear respirators continuously throughout their shifts during the COVID-19 pandemic. Subjects were doctors, nurses, and technicians, and enrolled in the study on a voluntary basis over the course of the 6 week duration. Subjects were previously fitted for their assigned respirator by employee health per hospital policy, and personnel that failed this initial testing were excluded from the study. Investigators enrolling subjects were trained to perform qualitative fit testing using OSHA guidelines. Subjects were fit tested periodically throughout their shifts by investigators. At any time a mask failed, it was replaced. Investigators filled out a questionnaire for each subject enrolled noting the type of respirator and hours of continuous wear that shift, as well as subjective sense of seal security. As subjects were working clinically, no attempt was made to modify their on-shift behavior regarding taking breaks or donning/doffing for nourishment or hydration. Data were analyzed using descriptive statistics. The study was approved by the institutional review board.

Results: One hundred thirteen disposable N95 respirators were evaluated using qualitative fit testing while on shift in the ED, with 23 failures at first testing. These masks were not retested, and the subjects received new masks. Twenty-seven masks passed at the start of a shift (time zero) and did not have repeat testing during the course of the shift. These were excluded from further analysis. Seventeen masks passed testing after several hours of continuous wear, but only had a single fit test done partway or at the end of a shift. These were assumed to have passed if tested at shift start, and were assigned as "passes" for continuous use. Forty-six disposable N95 masks had an initial pass and were evaluated for continuous use, of which 6 subsequently failed fit testing later in the shift, giving a fail rate with continuous use of 9.5%. Of the 29 failed fit tests, the subjects documented that they believed their seal was adequate in 20 cases (69%).

Conclusion: Continuous use of disposable N95 masks throughout an ED shift is reasonable during a PPE shortage if wearers are assured of fit at the start of their shift, as most failures occur on initial testing. However, passing on initial fit testing is not a guarantee of ongoing fit maintenance. Mask wearers have little insight into adequacy of fit.

369 Modified ESI versus PACS Triage Pediatrics

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Study Objective: Triage is an important tool for ED. Various emergency triage tools exist and each have variable reliability and validity. In Singapore, the PACS has been used across most institutions for many years. Recent literature shows that the ESI may be a better triage system to be used in ED as it considers the patient's utility of ED resource.

A previous study within our department demonstrated better utility of modified ESI (mESI) compared to PACS in adult ED patients which has led to our departmental adaptation of mESI for adult triage. However, literature comparing both scores in the paediatric population is lacking. This study is conducted as part of the department's evaluation of the ESI as an alternative pediatric triage tool in place of PACS.

We aim to compare the reliability and construct validity of PACS and mESI in children presenting to the ED.

Methods: This is a prospective study of 299 <16-year-old patients presenting to Sengkang General Hospital ED from 1st Sep 2019 to 31 Dec 2019. Institutional review board waiver was obtained for this study.

Patients were triaged using both PACS and mESI. PACS ratings were entered into system as per usual departmental practice. Additional data including mESI rating, nurse seniority and resources predicted were entered on a form filled in concurrently by the staff triaging the patient.

All triage nurses underwent a 12-day general triage course at the start of clinical posting in the ED that covers all aspects of triage including the mESI and PACS.

For reliability analysis, the triage ratings were compared to consensus ratings of PACS and mESI. Consensus rating refers to rating performed by 2 nurse clinicians (NCs) via retrospective review of triage information. The NCs were blinded to the original triage nurse ratings as well as outcomes of the patients.

For construct validity analysis, the utility of PACS compared to ESI in predicting the primary outcome of actual resource was analysed.

Results: Reliability: Reliability was moderate ($\kappa = 0.341$, p=0.00) when using PACS to triage pediatric patients but poor with mESI ($\kappa = 0.037$, p=0.10).

Construct Validity: Using PACS, both triage ($r_s = -0.157$ p=0.007) and consensus ratings ($r_s = -0.153$ p=0.008) showed equally poor correlation with resource utilised. Using mESI, consensus ratings ($r_s = -0.216$ p=0.00) have better correlation with actual resources compared to triage ratings($r_s = -0.268$ p=0.00).

Conclusion: Our study shows that when PACS and mESI are applied to the Pediatric ED population in the real-world setting, reliability of PACS is better. This may be because of familiarity with PACS which has been used to triage for many years. In contrast, mESI has only been implemented for triage of adult patients in our department for 2 years but not yet in pediatric. Conversely, construct validity appears better in mESI when compared to PACS despite lack of familiarity mentioned. In mESI, consensus ratings performed better than triage ratings. However, the construct validity of both mESI and PACS when applied in children were not on par with other studies including our study in adults which showed $r_s = -0.609$ for ESI and $r_s = -0.609$ for PACS. Less experience with paediatric population among our staff and lack of familiarity with the ESI may be the reasons for this.

Before department-wide implementation of mESI, more comprehensive training of triage staff with regards to its application in the pediatric population and repeat evaluation of their performances will need to be carried out.

TF 370 Teaching Toxicology to Emergency Medicine Residents: A Flipped Classroom Approach

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Study Objectives: Poisonings are relatively rare presentations to the emergency department (ED), but knowledge of how to treat the poisoned patient is crucial for emergency physicians. Emergency medicine (EM) residents often learn toxicology via a lecture-based format. While this presents necessary information that residents need to learn, retention can be limited due to lack of interaction with the material. Current residents are more likely to turn to Free Open Access Meducation (FOAM) resources such as blogs, podcasts and online videos, rather than textbooks, to supplement lecture-based learning. The objective of this curriculum is three-fold. By the end of this curriculum, EM residents will be able to 1) assess and manage poisoned patients, 2) evaluate FOAM resources, and 3) design modules to teach various topics to both peers and faculty.

Methods: EM residents will be assigned to one of three groups. This curriculum has six sessions spread over a three-year period. One month before each session, topics will be assigned by the Didactics Director to each group. Groups will be provided with a list of resources, including Web sites/blogs, podcasts, videos, etc to learn about their assigned topics, but are not limited to this list. It is expected that each resident will spend approximately two hours prior to didactics learning about their assigned topics, and residents will receive two hours of Individualized Interactive Instruction (III) credit for their preparation. Each of the six sessions will be two hours long. During the first 45 minutes, groups will meet to discuss their topics and plan a module to present their assigned topics to the larger group of residents and faculty. Each group will then have 20 minutes to present their topics.

Results: At the end of each session, residents will be asked to list the FOAM resources used and provide ratings in the following categories on a 5-point scale: learner engagement, readability or audiovisual quality, and usefulness of information presented. After each session, residents will receive a quiz based on that session's topics. Annually, residents will be assigned a toxicology-based quiz from a commercially available board review course. Residents will be asked to evaluate each session immediately after the session, providing feedback to both the Didactics Director and each individual group, and to evaluate the entire curriculum on the annual program spring survey.

Conclusion: After completing this curriculum, residents will have a deeper understanding of toxicology in emergency medicine. In addition, residents will learn how to identify useful FOAM resources and how to present information in different ways to adult learners.

371 Ovarian Torsion versus Ruptured Ovarian Cyst: Emergency Department Presentation and Outcomes

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Study Objectives: As the fifth most common gynecologic surgical emergency, ovarian torsion is a diagnosis that emergency physicians need to consider, as early diagnosis is key to restore blood flow to the ovary and avoid permanent damage. Ruptured ovarian cysts can present similarly with sharp, sudden onset of pelvic pain. This can result in difficulty distinguishing between ovarian torsion and ruptured ovarian cyst on history and physical exam. This study will evaluate similarities and differences in clinical presentation or outcomes of patients presenting to ED with ovarian torsion or ruptured ovarian cyst.

Methods: This five-year retrospective study at two community teaching EDs includes all patients with a chief complaint of abdominal pain and a primary final discharge diagnosis of ovarian torsion or ruptured ovarian cyst. Excluded are pregnant patients and patients with no imaging studies in the ED. Descriptive statistics are reported as medians or percentage and statistical testing done with either Mann-Whitney or Fisher Exact as appropriate. Significance was set at p=0.05.

Results: 91 cases meet inclusion/exclusion criteria; 26 (28.6%) had ovarian torsion while 65 (71.4%) had ruptured ovarian cyst. The initial vital signs were all unremarkable. No one was febrile, the highest heart rate was 105 and there was only one hypotension (84/53). 78.0% (71/91) had ultrasound studies while in the ED, 53.8% (49/91) had CT abdominal scans, and 33.0% (30/91) had both done while in the ED. Patients with ovarian torsion were significantly older (34.5 years versus 27.0; p<0.001). However, there were no differences in time from pain onset, days from last menstrual period, history of vaginal bleeding, or prior history of ovarian cysts. All of the torsion patients were admitted to the hospital and 88.3% had surgery, while 13.8% of ruptured cysts were admitted and 9.2% had surgery.

Conclusion: In this five-year retrospective study, aside from slight age differences, there were no differences in the clinical presentation of patients with ovarian torsion or ovarian cyst rupture. However, 88.3% of patients with torsion required emergent surgical intervention while only 13.8% of ruptured ovarian cyst required surgical intervention. As there are no distinguishing characteristics between ovarian torsion and cyst rupture, suspected patients should have expeditious and appropriate imaging studies while in the ED.

Table 1: Comparison of Ovarian Torsion and Ruptured Ovarian Cyst

	All (91)	Torsion (26)	Rupture (65)	p-value*
Median Age	31.0	34.5	27.0	<.001
Pain onset (median hrs.)	38.6	49.3	14.0	0.734
LMP (median days)	17.5	21.0	17.0	0.241
Vaginal bleeding	11.0%	7.7%	12.3%	0.718
History prior cyst	30.8%	26.9%	32.3%	0.802
Admitted	38.5%	100.0%	13.8%	<.001
Surgery	31.9%	88.3%	9.2%	<.001

*Mann-Whitney or Fisher Exact

372 Visual Estimation of Blood Loss

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Study Objectives: Blood loss is a major cause of morbidity and mortality in trauma. Blood loss estimation in the surgical literature is well studied, but there is limited data outside of the operating room. However, blood loss in trauma mostly occurs at the scene of the injury, in the transporting vehicle, and where they are initially treated in the hospital, which is usually the emergency department. Instead, oftentimes an estimate of blood volume that has been lost is made purely by visual estimation alone. The literature is limited in regard to overall emergency personnel evaluation, isolating variables, and assessing the abilities of different emergency personnel. To evaluate the ability of attending emergency physicians (EPs), paramedics, and residents to estimate volumes of simulated blood.

Methods: To evaluate this, we showed EPs, paramedics, and residents four, premeasured volumes of simulated blood, in a randomized order, on a non-absorbent, flat, white surface, in a relatively uniform circle. Exclusion criteria for EPs was being less than 5years out of residency, and residents with prior surgical, out-of-hospital, or military experience. Participants were asked to give their estimations of the amount of simulated blood, write them down, and were unable to change their responses once they had moved on to the next station.

Results: Findings showed no statistical significance of the primary outcome in the ability to estimate blood based on provider role (p=0.27). Two of the secondary outcomes showed statistical significance. One was, within the residency cohort, Family Medicine residents were more accurate at volume estimation than both Emergency Medicine and Psychiatry residents (p=0.000). The other being in which order the simulated blood volumes were encountered (p=0.01). Overall, the participants in the study consistently underestimated the volumes of simulated blood, with underestimations increasing in volume as the actual volume increased.

Conclusion: These data suggest that emergency medicine personnel are inaccurate at estimating volumes of blood visually, with a propensity to underestimate the volume, and increasing inaccuracy with larger, clinically significant volumes.

373 Emergency Physicians Can Safely Treat and Release Selected Influenza, Pneumonia and Pyelonephritis Patients With Sepsis

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Study Objectives: Some patients (pts) with "sepsis", as classically defined, are nonetheless "treated and released" (Tx/Rel) from the emergency department (ED). ["Sepsis" means at least 2 "SIRS" criteria with an infectious diagnosis (dx)]. Careful ED physicians (EDPs) probably use "physician gestalt" to identify septic pts for this strategy. Prior peer-reviewed outcomes studies of septic pts have included only those hospitalized. Thus, no peer-reviewed literature exists to support an ED "Tx/Rel" strategy for any septic pts. We tested the hypothesis that the 95% CI for 7-day (d) mortality of septic pts Tx/Rel from the ED with a dx of pneumonia (PNEU), influenza (INF) pyelonephritis (PYELO), Urinary Tract Infection (UTI) or undifferentiated sepsis (SEP) includes 0%.

Methods: We tracked the short term outcomes (STO) of 7-d & 30-d mortality, & 7-d & 30-d returns for ED care. Search of the Social Security Death Index verified a lack of short-term (<30 d) mortality among pts who did not return to our ED for any subsequent care. SIRS scores, not qSOFA scores, plus one of these 5 infectious dx, were used to identify the study group with sepsis, because qSOFA score is a prognostic tool, validated in an Intensive Care Unit (ICU) setting, & because a valid prognostic study requires all pts to have a correct dx upon study entry. Thus, qSOFA is a tool unsuitable for identifying septic pts in the ED, because: 1) Use of qSOFA for diagnostic purposes would require "circular reasoning" & 2) An ED environment differs from ICUs where qSOFA was validated.

Results: *Between 1/1/2017 and 12/31/2018, 2677 patients were Tx/Rel from a busy tertiary hospital ED (2018 pt volume 59,788) with a dx of PNEU, INFL, PYELO, UTI or SEP. Of these, 1067 patients were "SIRS-positive" at ED arrival. *The 7-d and 30-d mortality of these 1067 pts was zero (95% CI 0-0.28%). Thus, these pts were safely Tx/Rel. 4/1067 returned to the ED within 30d for an unrelated reason. 17/1067 returned with a chief complaint (CC) apparently related to the 1st visit, but without evidence of decline of clinical status; 13/17 within 7d. All 17 were again Tx/Rel. 23/1067 pts returned to the ED within 30d due to evidence of decline or failure to improve as expected, of whom 1 returned beyond 7d. All 23 had a change in the therapeutic plan implemented, such as administration of oxygen and/or change of antibiotic. 13/23 were admitted to hospital at time of the 2nd ED visit, none to an ICU, & 12/13 within 7d. 10/23 were again Tx/Rel. Characteristics (Age, Sex, Dx, SIRS & qSOFA scores of those 23 with objective evidence of need to return to the ED will be presented at the Forum. Only 9/1067 SIRS+ pts had initial qSOFA scores of 2 or 3.

Conclusion: ED physicians can safely Tx/Rel selected septic patients, apparently via "physician gestalt," with very low risk of short-term mortality. Occasionally, septic pts Tx/Rel from an ED will deteriorate or fail to improve after discharge, demonstrating a need for clear "ED return precautions."

374 Parenteral Sedation, Physical Restraints and Acute Alcoholic Agitation in the Emergency Department

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Study Objectives: Acute alcohol intoxication associated with agitation is an increasingly common clinical scenario seen in emergency departments (ED). One study estimated that 7.9% of patients presenting to EDs in North America were clinically intoxicated. ED staff are potentially at risk of harm if agitated intoxicated patients are not quickly and adequately sedated and/or restrained. This often require rapid parental medications. This retrospective study reviewed adult intoxicated patients requiring parental sedation to determine safety and efficacy.

Methods: Two-year retrospective electronic medical record (EMR) study at two community emergency departments (ED). Included are all adult patients presenting to the ED with documented blood alcohol level (BAL) greater than 80mg% and requiring parental sedation prior to discharge from the ED. Excluded were all cases of major trauma, patients absconded or leaving against medical advice, incomplete medical records. Data abstracted included BAL, associated drug toxicology, dose and type of parental sedative given. The primary outcome measures included use of physical restraints, use of one-to-one "sitter," and occurrence of physical injury to patient or staff. Secondary outcome included adverse effects from sedation.

Results: 166 ED patient met all inclusion and exclusion criteria. The mean age was 39.8 years (SD: 12.3) with 66.9% (111) males. The mean alcohol level was 294 (SD: 94.0). 21.1% (45) had a positive toxicology screen with 7.2% (12) having more than one drug on board. The top three drugs were cannabinoid (13.8%), cocaine (11.4%), and amphetamine (1.8%). 86.1% received parental benzodiazepine, mostly Lorazepam (82.5%). In addition, 56.0% received parental Haloperidol, 6.6% received parental Ziprasidone, and 3.6% received parental Ketamine. The mean ED LOS was 671 minutes (SD: 255). 34.9% of the patients (58) required physical restraints and 4.2% (7) required a "sitter." The mean restraint time was 109 minutes (SD: 96). There were four staff injuries recorded during this study, two occurred before any sedation or restraints, one occurred after sedation but before restraints, and one occurred after both sedation and restraints. There were five medication adverse effects. Four patients had systolic BP <90 after parenteral sedation while one patient had systolic BP >200 after sedation. All five were treated without further incidents.

Conclusion: In our two-year retrospective analysis of 166 agitated intoxicated patients, while a variety of parental medications were utilized, and no significant adverse effects were identified, four staff members were injured regardless of medications or restraints. Even the availability of parental medication and restraints did

not eliminate the possibility of injury. Emergency Physician and staff must be on constant vigilance with these patients.

Figure 1: Patient Outcome

375 Withdrawn

376 Crowding is the Strongest Predictor of Left Without Being Seen Risk in a Pediatric Emergency Department

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Study Objectives: Emergency Department (ED) patients who leave without being seen (LWBS) are associated with adverse safety, medico-legal, patient experience, and financial consequences. While patient-level risk of LWBS has been previously tied to demographic and acuity-related factors, there is limited research linking this to ED crowding scales in the pediatric setting. The objective of this study was to determine the association between LWBS risk and two crowding scales, the National Emergency Department Overcrowding Score (NEDOCS) and occupancy rate, in the pediatric ED setting.

Methods: We performed a retrospective observational study on administrative and electronic health record (EHR) data for the ED of a single quaternary care children's hospital. The hospital saw just over 50,000 ED visits in 2019 and is verified as a Level 1 Trauma Center. All patients who presented during the 14-month study period (March 2, 2018 through May 2, 2019) were included. NEDOCS and occupancy rate were calculated for each 15-minute interval and matched to patient arrival time. We performed multiple logistic regression analyses to demonstrate the relationship between patient-level LWBS risk and NEDOCS, as well as LWBS risk and occupancy rate, controlling for demographic and acuity-related characteristics drawn from the pre-arrival state. We performed a dominance analysis using McFadden's pseudo-R^2 in order to determine the relative importance of our crowding metrics in the logistic regression models.

Results: A total of 54,890 patient encounters were included in this analysis, 1.22% of whom LWBS. Odds ratio for LWBS risk per 10-point increase in NEDOCS at individual time of arrival was 1.30 (95% CI 1.27-1.33). Odds ratio for LWBS per 10% increase in occupancy rate at individual time of arrival was 1.23 (95% CI 1.21-1.25). Area under the curve was 86.8% (95% CI 85.6%-87.9%) for the NEDOCS model and 86.6% for the occupancy rate model (95% CI 85.4%-87.8%). There was no statistically significant difference between the AUC of the two models (p-value 0.19). Dominance analysis revealed that in each model, the most important variable out of 11 studied was its respective crowding metric; NEDOCS accounted for 55.6% of predicted variance in LWBS rate in the first model while occupancy rate accounted for 53.9% of the predicted variance in LWBS in the second model. Time of day, emergency severity index, and insurance type were the next most important variables for both models, representing 10.7%, 10.2%, and 9.7%, respectively, of predicted variance in LWBS in the NEDOCS model.

Conclusion: In this single-center study, ED crowding was the single most important factor that determined a patient's likelihood of LWBS in the pediatric ED, accounting for over half of predicted variance. This highlights the importance of mitigating operational stress in the ED in order to deliver safe and reliable care. Previous studies have attempted to determine which crowding metric is best suited to measure operational stress in the ED; here we offer additional evidence that the simple measure of occupancy rate is non-inferior to NEDOCS, at least in the pediatric setting. Because occupancy rate and NEDOCS are available in real time, both could serve as a monitor for individual LWBS risk.

377 Impact of a Provider in Triage on Performing Service and Timing of Lower Extremity Ultrasounds Performed on Emergency Department Patients

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Study Objectives: Many institutions have implemented a provider in triage (PIT) to expedite patient care in the emergency department (ED). The impact of this triage model on the timing and performing service of ultrasounds has not been well studied. Our goal was to determine whether the PIT program at our institution impacted the number of emergency physician-performed ultrasounds, as well as the timing of studies. We evaluated lower extremity vascular studies, the most common triage-ordered ultrasound at our institution.

Methods: All adult patients who underwent a lower extremity venous ultrasound in the ED, both emergency physician-performed and radiology-performed, during three separate three-month blocks were identified by current procedural terminology code. The three-month blocks were chosen to represent the time when the PIT program was piloted (March - May 2016), then one and two years later (March - May 2017 and 2018). Patients who had a history of vascular surgery in the imaged leg were excluded. If a patient had both a radiology-performed and emergency physician-performed ultrasound during a single visit, only the study that was performed first was included. There were two outcomes of interest: the percentage of studies performed by ED physicians (vs. radiology-performed), and the time from arrival until the study was performed.

Results: There were 1108 studies included in our analysis, 403 performed in 2016, 324 performed in 2017, and 381 performed in 2018. The percentage of studies that were ordered by PIT and radiology-performed rose from 2% in 2016 to 11% in 2017 to 24% in 2018 ($p<0.001$). No emergency physician-performed studies were obtained in triage. During that same period, the percentage of studies that were performed by ED physicians at bedside declined significantly (28% in 2016 vs. 23% in 2017 vs. 8% in 2018, $p<0.001$). Radiology-performed venous ultrasounds were performed on average 326 minutes after the patient arrived in triage, whereas emergency physician-performed studies were performed an average of 146 minutes after the patient arrived in triage ($p <0.001$). Of radiology-performed studies, those that were ordered by PIT were performed more quickly than radiology studies that were ordered after the patient was roomed (237 minutes vs 342 minutes, $p = 0.04$), however still significantly later than ED physician-performed bedside studies ($p <0.001$).

Conclusion: The implementation of a provider in triage led to a decrease in the percentage of lower extremity vascular studies performed by ED physicians at bedside. While studies ordered by PIT were completed more quickly than the same studies ordered by the ED physician after the patient was roomed, studies performed by ED-physicians at beside were performed sooner than any radiology-performed ultrasounds.

378 Expanding HIV Testing to Regional Emergency Departments Identifies Community HIV Cases

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Study Objectives: In the United States, the Centers for Disease Control and Prevention (CDC) estimates that 1.1 million people aged 13 and older are currently living with an HIV infection, and approximately 14% of these were undiagnosed and unaware of their HIV infection (2016 estimate). Expanded testing programs, including those provided in the emergency department (ED), may lead to earlier detection and further reduction in the transmission of HIV. CDC and United States Preventative Services Task Force (USPSTF) 2013 guidelines recommend screening for HIV in adolescents and adults aged 15-65 as well as younger adolescents and older adults at high risk. The ED is a frequent health care access point for underserved, at-risk populations at high risk for HIV infection, and these populations utilize ED services for evaluation of sexually transmitted

diseases. Our aim was to see whether increasing system-wide access to efficient HIV testing in the ED would improve detection of HIV in the community setting.

Methods: Starting in January 2020, our health system in northeast Ohio expanded availability of rapid lab-based HIV testing from beyond the urban main campus to 11 community hospital EDs. Collaboration with laboratory medicine and infectious disease permitted these EDs to offer rapid lab-based HIV testing patients presenting with STIs or other clear HIV risk factors. For each preliminary positive test, a confirmatory test was reflexively run using blood samples obtained from the initial draw. Data was collected through an EMR query using a series of EPIC lab order codes for all ED encounters in the health system between January 1 and May 2, 2020 for which a rapid HIV test was ordered in the ED. Data query included test results, patient demographic information, ED location, and time of patient arrival to ED. Proportions and p values (Chi Square) are reported.

Results: There were a total of 326 distinct ED encounters in which a rapid HIV test was performed across the 12 health system EDs. The mean age of patients was 29.9 years (SD = 11.7), and 172 (52.8%) were male. Overall, there were 11 reactive tests (3.4%). 234/326 (71.8%) of encounters with a rapid HIV test occurred at community EDs, with a median of 18 tests (SD: 11.8) being performed over the study period at each location. There was no difference in the prevalence of HIV positive tests between community and urban settings (7/234; 3.0% positive tests community vs. 4/92; 4.3% positive Main Campus urban tertiary care center, X^2 (1, N = 326) = 0.36, p = .54).

Conclusion: Expanding rapid HIV testing to community EDs in a regional health system identified additional previously unrecognized patients who tested positive for HIV, with a similar proportion of positive tests at the urban main campus ED as community EDs.

ED	Distinct ED Encounters	Rapid Test Reactive Results
1 (community)	12	1
2 (community)	3	0
3 (community)	36	3
4 (community)	23	1
5 (community -pediatric ED)	12	0
6 (community)	9	0
7 (community - pediatric ED)	14	1
8 (community)	23	0
9 (community)	42	0
10 (urban tertiary care center)	92	4
11 (community)	22	0
12 (community)	3	0
13 (community)	24	1
14 (community)	11	0
Total	326	11

379 Accuracy of an Emergency Department Clinical Protocol for Early Identification of Coronavirus Infection

Bonadio W, Bonadio W, Jackson K, Gottlieb L/Mount Sinai Medical Center, New York, NY

Study Objective: We assessed the efficacy of an emergency department [ED] protocol to cohort admitted ED patients utilizing clinical parameters. These parameters were used to distinguish likelihood of novel coronavirus disease 2019 [COVID-19] in patients presenting with acute respiratory symptoms prior to testing results.

Methods: An prospective ongoing chart review was performed during April of the 2020 pandemic in a several busy urban ED on admitted, but boarding, ED patients who presented with acute respiratory symptoms clinically suspicious for COVID-19 infection. Each patient's chart was reviewed for an assessment of five clinical parameters in patients who were felt by the attending physician to have COVID-19: presence of fever, cough, hypoxia, and shortness of breath; and chest radiograph evaluating for bilateral pulmonary infiltrates. Chart reviews were performed prior to result of COVID-19 testing. All received performance of NP COVID-19 PCR testing.

Results: Of 225 patients studied, 190 [84%] were PCR+ and 35 [16%] PCR-. The manifestation of all 5 positive clinical parameters was present in 136 patients [61%]. The rate of manifesting all 5 positive clinical parameters was significantly greater in PCR+ [70%] vs PCR- [9%] patients [$p < 0.0001$]. For PCR+ outcome, the presence of all 5 positive clinical parameters had a specificity of 92%, positive-predictive value of 97%, and positive likelihood ratio of 8.1.

Conclusions: Utilizing an ED protocol assessing 5 clinical parameters in patients suspected of COVID-19 infection accurately distinguishes risk of infection with COVID-19 prior to PCR test results and can be used to guide early patient management decisions.

TF 380 Mixed Asynchronous/Didactic ECG Curriculum to Increase Resident Competency

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Introduction: Emergency physicians are considered experts in the acute interpretation of the ECG. This occurs during shifts, and most commonly as an interruption during care on other patients. In some departments, interruptions in patient care can occur as often as once every 6 minutes. Our newer graduates routinely report anxiety regarding interpreting ECGs in this context. There are very few formalized ECG curricula available, the decision was made to design a mixed asynchronous and flipped classroom model to better equip residents to interpret ECGs during a shift.

Study Objectives: This curriculum is being developed to increase the ability to successfully interpret ECGs by the residents. After completing the course, the resident would be eligible to take a "credentialing" exam to be able to sign ECGs for patients. Successful completion of the course would be obtaining a score of >80% on the credentialing exam.

Methods: The learners will initially watch one ECG video a month, then have an interactive in-class discussion of similar ECGs one week later. After one to two weeks, an online quiz will be given to assess their retention of the information presented. This lecture series will be a longitudinal experience, occurring once per four-week block. This will take approximately 2 hours per 4-week block, with 13 blocks per year. After completing the full course, the resident would be allowed to take a 1-hour ECG "credentialing" quiz. If they score greater than 80% on the examination, and without missing any STEMI designations, they would then be allowed to sign ECGs during shift. At time of initiation of this curriculum we will have 2 years of credentialing data which we could then compare to the trainees' scores that undergo our curriculum.

Results: At the completion of a longitudinal one year mixed asynchronous and in class didactic training program on ECGs, the residents will successfully complete a "credentialing" examination to be able to sign ECGs during shift with attending oversight. Prior to the initiation of this curriculum, the entire residency was given the "credentialing" exam with a 28% (9/32) pass rate. Most of the residents that passed were seniors at the time and have graduated the program.

Conclusion: This process should increase the comfort of signing ECGs as well as increase the overall ability to interpret the ECG in the correct clinical setting.

381 Effectiveness of Preventive Measures in Neuronal Cell Under Hypoxia

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Study Objectives: Many patients are admitted to the emergency department (ED) due to major trauma. These patients may suffer from massive hemorrhage, respiratory failure, and progress to hypovolemic shock state. It will lead to over-expression of inflammatory responses, malfunction of the immune system, homeostasis failure, and, eventually, multi-organ failure. Of the shock patient treatment, airway maintenance and oxygen supply are essential and of paramount importance. During the early stage of respiratory failure and shock state, the influence of hypoxia on a cellular level is not clearly known. This study aimed to investigate the effects of preventive measures (various medications) in a neuronal cell under hypoxia.

Methods: The experiments were performed with SH-SY5Y cells. MTT viability assay, Cell apoptosis assay, Reactive oxygen species were done to measure the effectiveness of preventive medications, pentoxifylline (PTX), dexamethasone (DEXA), hypertonic saline (HTS).SH-SY5Y cells were treated with the above medication treatments before hypoxia (1% O2) and after hypoxia.

Results:1. Apoptosis a. Pre-hypoxia: PTX, Dexa, and HTS treatments were effective in decreasing apoptosis. b. Post-hypoxia: Only Dexa was effective in decreasing apoptosis.2. ROS a. Pre-hypoxia: PTX, Dexa, and HTS treatments were effective in reducing ROS production. b. Post-hypoxia: Only Dexa was effective in decreasing ROS production.3. MTT viability None of the medications showed significant effectiveness.

Conclusion: Our previous work showed PTX plays an essential role in minimizing damage to a neuronal cell under hypoxia. And we wanted to see if PTX and other medications may be useful in preventive measures. The experiment exhibited a possibility that PTX alone and with other medications may be effective preventive measures in shock patients.

382 The Effect of Advanced Practice Provider Discharge on Patient Throughput in an Emergency Department Fast Track

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Objective: To determine if advance practice providers (APP) would be able to safely identify patients who do not require nursing care thereby decreasing time to disposition.

Methods: The study site is New York Presbyterian Queens, an urban, ACS verified level 1 trauma center in Flushing, Queens that has 120K annual visits with 25K seen in the Fast Track area. This is a retrospective chart review of all patients who presented to our Fast Track area during the months of February 2019 and February 2020. For the month of February 2020, patients who the APP felt did not require nursing care were seen and discharged by the APP after the patient was triaged and evaluated. This was communicated to the nurse by changing the patient's team assignment to grey. This "grey team" represents the intervention group. These patients were compared to a similar cohort of fast track patients from February 2019 using comparable ESI levels and final diagnosis. Data was collected regarding patient length of stay. 72-hour return rates for the study period were compared to evaluate for safety.

Results: In February 2020, 2,291 patients, 79 a day, were seen in our fast track area. The turnaround time (TAT) was 214 minutes for discharged patients. Of those, 528 were designated as grey team and not seen by a nurse in our fast track area. Patients on the grey team, discharged by the APP, had a turnaround time of 163 minutes. In February 2019 1,960 patients, 70 a day, were seen in our fast track area. The TAT was 143 minutes for discharged patients. We compared TAT for three diagnoses seen by the grey team in 2020 and seen in EDS in 2019. For suture removal/wound care the TAT was 56 minutes in 2020 vs 64 minutes in 2019 ($p=0.155$), for contusion the times were 145 minutes vs 154 minutes ($p=0.106$), and for cellulitis was 81 vs 184 ($p=0.024$). There was no significant difference in return rates, with 3.2% returning in the grey team and 2.5% returning in the overall fast track cohort with grey team patients removed.

Conclusion: Despite having increased volume, APP's were able to safely identify patients who did not require nursing care and expedite their throughput and discharge from the ED. Only one cohort reached statistical significance; however, the trend was for quicker turnaround in all groups. The unstated benefit of this workflow is that it saves nursing time and allows them to focus care on patients who require it in the area.

383 Withdrawn

384 Does a Peripheral Eosinophil Count Predict Low Risk for Mortality in Patients With Clostridium Difficile Infection?

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Study Objectives: Clostridium Difficile infections (CDI) are the most common nosocomial infections in the United States with mortality rates reaching nearly 25% within 2 months after initial infection. Currently, guidelines are in place for the management of CDI once systemic symptoms are present but little research has been conducted to determine disease severity on initial diagnosis. One previous human study demonstrated a correlation between more severe CDI with peripheral loss of eosinophils. Further exploring the relationship between peripheral eosinophil count and CDI mortality risk in humans may guide treatment of patients in the emergency department (ED) with CDI. The aim of this study was to determine if patients with peripheral loss of eosinophils have increased morbidity and mortality as compared to those with non-zero peripheral eosinophil counts.

Methods: A retrospective multihospital cohort study was conducted from 06/01/2018 to 09/01/2019. Charts were reviewed to determine the patient's eosinophil count during ED evaluation and the clinical course. Charts were reviewed to determine if the patient was admitted to the hospital, the length of stay in the hospital, whether they were put on pressors or required surgery, and whether the patient died. Exclusion criteria included patients who were already on treatment for clostridium difficile infection, patients younger than 18 years of age, and patients with no documented peripheral counts. Differences between groups and 95% confidence intervals (CI) were calculated.

Results: A total of 326 patients met inclusion criteria: 56 patients had eosinophil counts of 0.0 cells/μL, and 270 patients had eosinophil counts greater than 0.0 cells/μL. There were no differences in average age (69.2 vs. 65.2) and sex (42% vs 43% male) between the two groups. Patients with eosinophil counts of 0.0 cells/μL have a higher rate of admission (87% vs 57%, Difference 31%, CI: 17, 44, $p<0.001$), have a higher mortality rate (16% vs 6%, Difference 11%, CI: 3, 18, $p<0.01$), and a longer length of hospital stay (7.1 days vs 3.4 days, Difference 3.7 days, CI: 2.1, 5.3, $p<0.001$). There were no differences in whether patients were treated with pressors (11% vs 6%, Difference 4%, CI 11, -3, $p=0.24$) or required surgery (7% vs 9%, Difference -2%, CI: 6, -10, $p=0.62$).

Conclusion: Patients with CDI who had a peripheral eosinophil count of 0.0 cells/μL had a higher rate of admission, a longer length of hospital stay, and a higher mortality rate as compared to patients with non-zero peripheral eosinophil counts. This study confirmed increased mortality as the previous study had shown; however, our study did not show a similar increased need for surgery or pressor use. This data may help guide ED treatment and disposition of patients with CDIs.

385 External Validation of a Massive Transfusion Protocol App-Based Algorithm in Military Combat Casualties

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Study Objective: The most common cause of preventable death in US Military Service members is hemorrhagic shock, which is managed with tourniquets, blood administration, and damage control surgery. Administration of resuscitative blood products has been done by military providers since WWII and has since become common place in civilian hospitals. In the setting of limited resources while deployed, the use of a clinical decisionmaking calculator can help mitigate and expedite the decision of activating the massive transfusion protocol (MTP). The purpose of this research was to externally validate the ability of an app-based MTP algorithm developed by Mena et al. to predict the need for a massive transfusion (MT) in a military combat casualty dataset.

Methods: Using casualty data from Operation Enduring Freedom (OEF), the Mena et al. MTP algorithm calculated the predicted probability of the need to receive a MT and was evaluated by calculating the area under the receiver operating characteristic curve (AUROC), specificity, and sensitivity.

Results: The AUROC for predicting MT was 0.84 (95% CI: 0.80-0.88) with specificity of 0.96 and sensitivity of 0.25 when assuming moderate and high categories ($Pr > 0.070$) is positive for MT. Using OEF casualty data, the MTP algorithm correctly categorized 96.4% of non-MT casualties "very low" or "low" and 3.0% moderate and 0.7% as high probability of MT. Alternatively,24.5% of MT casualties were categorized as "high" or "moderate," with 31.6% and 43.9%categorized as "low" or "very low" probability of MT.

Conclusion: The algorithm showed moderate ability in predicting the need for MT in combat casualties. With a specificity of 0.96, it is particularly useful in categorizing and ruling out the need for MT. With a sensitivity of 0.25, the algorithm lacks identification of those who will need MT, categorizing 76% in "very low" and "low" probabilities who ultimately required MT. The results suggest that especially with adjustments to mechanism of injury to aid in better prediction of the need for MTP.

Abstract Disclaimer: The contents of this publication are the sole responsibility of the author(s) and do not necessarily reflect the views, opinions or policies of Uniformed Services University of the Health Sciences (USUHS), The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., the Department of Defense (DoD), the Departments of the Army, Navy, or Air Force. Mention of trade names, commercial products, or organizations does not imply endorsement by the U.S. Government.

386 Cardiac Testing of Patients Ruled Out for Acute Myocardial Infarction Using a Rapid High Sensitivity Troponin I Algorithm, but Not Discharged

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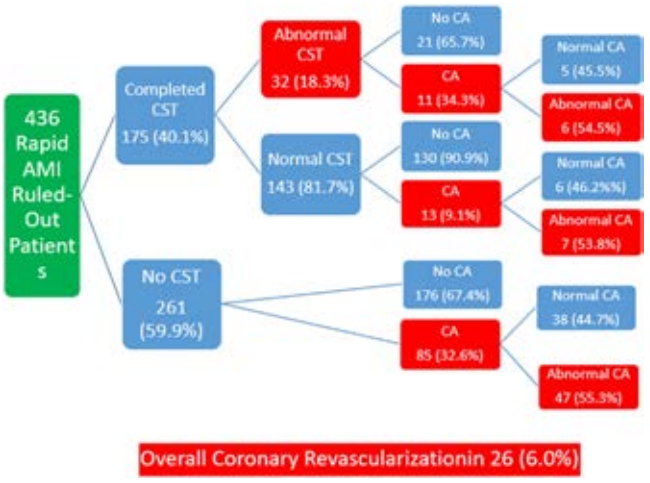
Study Objectives: The multicenter High Sensitivity Cardiac Troponin I (hs-cTnI) in the United States (US) study (HIGH-US) reported a 1-hour hs-cTnI algorithm that ruled out acute myocardial infarction (AMI) in 1020 (42.7%) patients (negative predictive value 99.7%, sensitivity 98.7%). Of these 436 (42.7%) were not discharged from the emergency department (ED). Our purpose was to describe the cardiac testing and interventions that were completed in this AMI ruled-out group placed in an observation unit and/or admitted to the hospital (OBS/ADM).

Methods: 2113 consenting adults presenting with any symptoms suspicious for AMI were enrolled (2015-2016) in 29 US medical centers. Baseline and 1-hour plasma samples were analyzed using the Siemens Atellica hs-cTnI assay (99th %, 47.0 ng/L). AMI diagnosis was independently adjudicated by a combination of cardiologists and ED physicians using local contemporary troponin assays and all 30-day available clinical data. All cardiac stress test (CST), coronary angiogram (CA) and coronary revascularization (CR) reports for the OBS/ADM patients were analyzed.

Results: Of the 436 hs-cTnI AMI ruled out AMI ruled individuals but placed in OBS/ADM after contemporary clinical assessments, none had an AMI/death while in the hospital. At 30-days 1 AMI and 1 death (2 or 0.5%) had occurred. No deaths or AMIs occurred in the 436 patients rapidly ruled out for AMI while they were in the hospital. 175 (40.1%) patients received a CST and 261 (59.9%) did not. 32 (18.3%) CSTs were abnormal and 143 (81.7%) normal. For patients who had a CST CA was done in 11 (34.3%) of those with abnormal and 13 (9.1%) of patients with a normal CST result. Of those without an initial CST 85 (32.6%) had CA and of these 47 (55.3%) were abnormal. Overall coronary revascularization was done in 26 (6.0%) patients (25 percutaneous coronary interventions and 1 coronary artery bypass). The overall cardiac evaluations and resulting therapeutic interventions for the OBS/ADM patients are shown in the figure. The mean length of stay (LOS) was longer in the OBS/ADM group compared to those discharged from the ED (2.0 $\pm$ 2.2 v 0.6 $\pm$ 0.2 days, $p < 0.001$).

Conclusions: 436 (42.7%) patients in the HIGH-US study who ruled out for AMI had an OBS/ADM disposition based on contemporary practice. The use of a hs-cTnI algorithm to rapidly rule out AMI in this patient group would have identified individuals who might have been alternatively managed resulting in shorter LOS, receiving less urgent CSTs, CAs and CR procedures. Our findings, along with recent evidence that CR without AMI does not reduce AMI/death, demonstrate that in the implementation of a rapid AMI rule-out hs-cTnI algorithm has the potential to safely reduce the contemporary OBS/ADM rates. Prospective studies are needed to verify an alternative approach to the management of these patients.



387 Dispositions for Patients Ruled Out for Acute Myocardial Infarction Using a 1-Hour High Sensitivity Troponin I Algorithm: Home or Hospital?

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Study Objectives: The multicenter High Sensitivity Cardiac Troponin I (hs-cTnI) in the United States (HIGH-US) study has reported a baseline/1-hour emergency department (ED) hs-cTnI algorithm with an acute myocardial infarction (AMI) rule-out rate of 50.4% (negative predictive value 99.7%, sensitivity 98.7%). In the ruled-out patients the 30-day AMI/death rate was 0.2%. Our objective was to describe any differential clinical characteristics of the AMI ruled-out patients placed in observation/inpatient beds (OBS/ADM) compared to those with an ED discharge (EDD).

Methods: 2113 consenting adults with any symptoms suspicious for AMI were enrolled from 2015-2016 in 29 US medical centers. There were no exclusion criteria for enrollment. Baseline and 1-hour plasma samples were analyzed using the Siemens Atellica hs-cTnI assay (99th % = 47.0 ng/L). AMI diagnosis was independently adjudicated by cardiologists and ED physicians using local contemporary troponin assays and all following 30-day clinical information available. Patients were placed in OBS/ADM or EDD according to local practice during the study period. Step logistic regression modeling was used to determine which of 25 clinical patient characteristics were associated with OBS/ADM disposition decisions.

Results: 1020 (48.3%) individuals were ruled out for AMI at 1 hour. Of these, 584 (57.3%) were EDD and 436 (42.7%) were placed in OBS/ADM. No AMI/deaths occurred in the latter group while they were in the hospital. The frequency of patients having an EDD rather than being placed in OBS/ADM varied significantly (0.0% - 94.1%) amongst the participating sites. 30-day AMI/death rates in these 2 groups were not significantly different (0.0% v 0.5% {2 patients, days 7 and 28}, p=0.185). The highest Hs-cTnI values were very low in both groups (mean 3.1 and 2.3 ng/L in the OBSD/ADM compared to the EDD patients). The clinical variables significantly associated with a decision to place a patient in OBS/ADM (table) were generally risk factors for the development of coronary artery disease.

Conclusion: Of the many potential factors that could influence the decision for an extended length of stay for patients at very low risk for AMI/death, those with a personal and/or family history of coronary artery disease, stroke, no prior heart failure hospitalizations, hypertension, or having an abnormal ECG were likely to be placed in OBS/ADM for further cardiac evaluations. Considering their excellent prognosis and recent evidence (ISCHEMIA Trial) showing revascularization in the absence of AMI does not reduce AMI/death compared to medical therapy, reliance on clinical variables should be judiciously considered and systems developed to reduce the frequent decisions for extended stay for rapidly ruled-out for AMI patients.

Variables associated with OBS/ADM placement

OBS/ADM versus EDD variables	p-value	Odds ratio estimate	95% CI lower limit	95% CI upper limit
History of CAD	<0.001	2.940	1.999	4.325
Previous stroke	0.002	2.742	1.460	5.148
No prior HF hospitalization	0.019	2.2022	1.1121	3.647
History of hypertension	<0.001	1.895	1.361	2.638
Abnormal ECG	<0.001	1.766	1.292	2.413
Family history of CAD	0.035	1.399	1.024	1.912

web 4C/FPO

388 Patient-Provided Medication List Verification in the Emergency Department: Improving Compliance and Enhancing Teamwork

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Background: Compliance with medication history verification and reconciliation in the ED is required by Joint Commission standards. The ED is a unique health care environment with patients often presenting with complex medication histories where accurate representation of home medications is necessary to facilitate care. Recent evaluation of Patient Provided Medication List Verification (PPMLV) compliance data reveals an opportunity to improve patient safety and the practice. The current PPMLV process is not consistent, causing workflow issues and risk of medication errors. Historically, nursing has been the primary role responsible for medication review. Our team attempted to include ED care team assistants (CTAs) to augment the process.

Study Objectives: To improve compliance with PPML verification, and to develop a standardized, sustainable process for the electronic health record transition to EPIC®.

Methods: This study occurred at a large quaternary care hospital in the Midwest. The pilot ran for a 6-week period (Oct-Dec 2017) in a designated acute area of the ED. ED CTAs were educated regarding the elements and steps of conducting a medication history. ED Pharmacists and RN staff provided at the elbow support and guidance, as needed. Feedback was gathered on a daily basis regarding positive experiences, barriers, teamwork, and communication. In addition to monitoring ED compliance with PPMLV completion rate, a manual chart review of random patients' PPMLV of patients admitted to the hospital was completed to evaluate the quality of the PPMLV with regard to completion rate, number of changes made to the PPMLV, accuracy (as defined by changes made by the inpatient floor pharmacist) and ED role of the individual completing the PPMLV. The review was completed by a multidisciplinary group (ED Clinical Pharmacy Specialist, ED Resource RN, ED Operations Supervisor (of CTAs). Data were expressed as means (SD) or medians (range), for parametric and non-parametric variables.

Results: During the study period, there were 1112 patients in the selected acute area of the ED. The PPMLV completion rate increased from a baseline of 50-60% to 905 (81%) in this area for all ED patients, of which CTAs completed 646 (71.4%). A manual chart review completed on 99 PPMLVs (8%) revealed that 91 (99%) were completed. The majority [80(81%)] were completed by a CTA. They made changes to 47 (47%) of the PPMLVs they reviewed, with a median number (IQR) (range) of 2 (3.5) (1-11). For admitted patients [27(27%)], the completion rate was [23/27 (85%)], of which 11 (48%) had subsequent changes to the PPMLV compared to a baseline historical inpatient subsequent change rate of approximately 90-100%.

Conclusions: Using a multidisciplinary approach with training and inclusion of CTAs, our ED increased in a sustainable manner the PPMLV compliance rate from a baseline of 50%-60% to 81% for a general population of acute care ED patients, and similarly (85%) for admitted patients. The improvement in completion and accuracy rates we observed may be related to the time CTAs were able to dedicate to complete the task.

TF 389 Targeted Cross-Over Education for Flight Nurses in Transition from Dedicated Pediatric and Adult Teams to Generalist Flight Teams

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Study Objectives: Our aeromedical program based in Washington State has historically employed pediatric critical care trained nurses and adult critical care nurses; however, in recent years we have moved to a generalist model for all out-of-hospital and most interfacility flights resulting in the need for cross-over education. This one-day course is part of a larger continuing education curriculum and is designed to review the most common adult and pediatric pathologies transported by this flight program, as well as protocols and resources that can be used during flight. This overall curriculum was based on data from a one-year quality improvement chart review which identified common knowledge deficits. During this one-day course, the participants 1) learned to manage common and complex pediatric and adult complaints including traumatic brain injury, stroke, diabetic ketoacidosis, neonatal emergencies and shock; 2) developed the ability to interpret 12-lead EKGs; 3) utilized and reviewed current protocols and resources for patient care.

Methods: This course is a one-day (8 hours) didactic session, based on knowledge gaps that were discovered during routine quality improvement chart review over the preceding year. It is part of a one-year educational cross-over plan, which includes simulation scenarios, skills review with task trainers, airway management hands-on education with anesthesiologist in the operating room, and targeted topics during quarterly education days. The course included interactive lecture-based learning, small group EKG review and interpretation, and a resource "scavenger hunt" during which participants located and interpreted protocols, medication dosing and equipment guides in our program's internal smart-app and tablet based resources, which are available to all crew members. This course was taught by the three medical directors and two nursing educators employed by our flight program, all of whom have been involved in the larger one-year curriculum development and are considered experts in their content areas. Educational objectives were measured by continuing quality review with specific quality indicators developed over the previous year including appropriate management and specific pathologies, documentation of EKG interpretation and adherence to formulary and protocols. In addition, feedback and evaluation of the educational course was obtained from participants and reviewed.

Results: After completion of this one-day educational cross-over course, flight nurses overall reported feeling more comfortable with common pediatric and adult pathologies cared for by our flight program. Through continued qualitative chart review, specific therapies and protocols for traumatic intracranial injury, blood pressure management and stroke were noted to be documented more frequently in qualitative chart review.

Conclusion: Targeted education based on historical chart review is a potentially useful educational tool for continuing flight nurse education.

390 Withdrawn

391 Adverse Effects Associated With the Use of Electronic Vaping Products on Adolescents and Young Adults

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Study Objectives: Despite the increasing prevalence of the use of electronic vaping products (vapes) among adolescents and young adults, few studies have examined the clinical symptoms associated with vaping. The goal of this study was to examine the prevalence of vaping, to identify symptoms that may be associated with vaping, and to understand beliefs about vaping that may contribute to its growing prevalence.

Methods: A questionnaire was administered to a convenience sample of subjects aged 12-23 years presenting for medical care to Penn State Hershey Medical Center in central Pennsylvania. The questionnaire focused on use of vapes, presence of clinical symptoms during the previous six months, and perceived beliefs associated with vaping. Stratification was performed to compare subjects who used vapes frequently (at least once a month) and those who were infrequent/non-users (never tried or tried one time).

Results: Data analysis was performed on 498 completed questionnaires. The mean age of subjects was 17 years old and 56% were female. 80% (n=396) of subjects were considered infrequent/non-users and 20% (n=102) were considered frequent users. When stratified by frequency of use, frequent users were more likely to report the following symptoms in the last six months compared to infrequent/non-users: headache [67% (95% CI: 57-76) vs. 55% (95% CI: 50-60), P=.04], nausea [61% (95% CI: 51-70) vs. 42% (95% CI: 38-47), P=.0009], cough [54% (95% CI: 44-64) vs. 38% (95% CI: 33-43), P=.004], sleep disturbances [53% (95% CI: 43-63) vs. 38% (95% CI: 33-43), P=.006], dehydration [51% (95% CI: 41-61) vs. 35% (95% CI: 30-40), P=.003], weakness [47% (95% CI: 37-57) vs. 28% (95% CI: 23-32), P=.0002], racing heart [46% (95% CI: 57-76) vs. 27% (95% CI: 23-32), P=.0002], chest pain [40% (95% CI: 31-50) vs. 28% (95% CI: 24-33, P=.02], tremors/shakiness [27% (95% CI: 19-37) vs. 15% (95% CI: 11-19), P=.002]. There were no significant differences in reported dizziness and abdominal discomfort between the two groups. In respect to perceived beliefs about electronic vaping products, 53% of respondents believed that they "can help someone quit smoking," 36% believed that they "are safer than cigarettes," 30% believed that they "are less addictive than cigarettes," and 27% believed that they "are just for fun."

Conclusions: Based on our preliminary data, 20% of respondents use electronic vaping products at least once a month. Frequent users were more likely to report headache, nausea, cough, sleep disturbances, dehydration, weakness, racing heart, chest pain, and tremors/shakiness. The perceived beliefs about vapes could be related to their growing use among a younger population.

392 Seasonal Presentation Patterns for Congestive Heart Failure Within a Cohort of Southern Coastal US Emergency Department Patients

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Study Objectives: Seasonal differences in disease occurrence may inform adjustments to therapeutic regimens. A previous study of emergency department (ED) visits in New Jersey for congestive heart failure (CHF), showed a marked increase in the colder months (35% higher in December compared to August). The authors speculated that this was due in part to increased catecholamine release in response to cold weather. We hypothesized that less harsh winter temperatures in the southern coastal U.S. region might blunt this effect, resulting in a smaller winter-summer difference than the authors observed in New Jersey.

Methods: We conducted a retrospective cohort study utilizing data from 287 emergency departments within the southern coastal U.S. region. Patients with a primary diagnosis of CHF or pulmonary edema from 01/01/07 to 08/05/19 were included. We aggregated data electronically from medical records and tabulated the number of visits by month, correcting for the length of month. We utilized chi-square to assess for non-uniformity in distribution of visits by month. We calculated the relative difference between the month with the most and least visits along with the 95% confidence interval (CI).

Results: There were 285,561 visits for CHF during the study period. Of these, 52% were female and the mean age was 69 +/-16 years. Chi-square rejected uniformity for CHF visits by month ($p<0.0001$). There were more CHF visits in the colder months. There were 34% more visits in January the peak month versus August the month with the least (95% CI 32% to 36%, $p < 0.0001$).

Conclusion: Contrary to our hypothesis we found a similar winter-summer difference in the southern coastal US region as that in New Jersey. It is unclear why this difference persists despite the fact that winters in the southern coastal region are less harsh than in New Jersey.

393 Routine Laboratory Screening for Toxic Ingestion in Psychiatric Patients is Ineffective

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Study Objectives: Medical screening of psychiatric patients in emergency departments prior to psychiatric admission typically includes laboratory screening protocols which can vary significantly between institutions. Such protocols may include serum acetaminophen and salicylate levels to screen for surreptitious ingestion. We hypothesize that the diagnostic yield of screening psychiatric patients for ingestion in the absence of specific clinical concern is extremely low.

Methods: This is a retrospective, multi-center cohort study of three Veteran's Administration (VA) hospitals (Milwaukee, WI; Madison, WI; and North Chicago, IL) that care for a diverse population of veterans and active-duty service members. These three facilities have emergency departments which see a combined ~60,000 patients per year and screen all potential psychiatric admissions with laboratory testing protocols which include salicylate and acetaminophen levels. The VA Corporate Data Warehouse was queried for all salicylate and acetaminophen assays performed in the above three emergency departments on patients between 6/1/2009 and 6/1/2019. Physician abstractors reviewed all charts of patient encounters wherein test results were positive as well as a random selection of negative result charts to determine the indication for testing.

Results: 16,968 acetaminophen assays and 16,720 salicylate assays were performed on 10,478 unique patients during the study period. A total of 108 assays were elevated (61 acetaminophen, 47 salicylate). Excluding assays sent for trending purposes there were 43 elevated acetaminophen assays and 11 elevated salicylate assays (one patient had elevated levels of both). While 5 of the elevated assays were sent for screening purposes in psychiatric patients, none of those results were clinically significant, ie, leading to a diagnosis of acetaminophen or salicylate toxicity, administration of antidotal therapy, or a change in disposition. Based on sampling of negative results for testing indication, we estimate that approximately 27,000 negative screening assays were performed on psychiatric patients during the study period.

Conclusion: Screening psychiatric patients for surreptitious ingestion in the absence of history suggesting ingestion did not change management in this large, diverse patient cohort. Laboratory testing for drug toxicity should be guided by clinical concern rather than protocol.

394 The Effect of the COVID-19 Pandemic on the Pediatric Emergency Department Flow

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Study Objectives: This study sought to determine the trends in pediatric emergency department (PED) visits and utilization of resources during the Coronavirus-2019 pandemic.

Methods: We performed a cross-sectional study of PED visits at a free-standing community-based children's hospital during January through April in 2016-2020. The 2020 data was reported through April 24. Data aggregation was performed for each month per year, and included total counts of PED visits, emergency department severity index (ESI) categories, dispositions (admission, discharge, death, left without treatment, and transfer), chief complaints, and average patient age (months), time from 1st Provider to Disposition (PTD) and PED length of stay (PED-LOS). Total visits for April 2020 were approximated to the entire month for comparison to prior years. Total PED visits, percentage of ESI categories, age, PTD time, PED-LOS, and percentage of admissions for the same month were averaged from 2016-2019 and compared with the same month in 2020 using ANOVA. A p-value <0.01 was considered statistically significant.

Results: In total, 67,290 visits were reported for January through April from 2016 to 2020. There was a significant decrease ($p<0.001$) in PED visits in March (2,732) and April (972) in 2020, compared to the same time period in prior years. April 2020 had a significantly shorter average LOS (from 161 to 124 minutes, $p<0.01$) (Table 1) and increase of admissions (from 8% to 13%, $p<0.001$). Cases based on ESI showed a trended decrease in ESI 4-5, and a relative increase in ESI 1-3, albeit not statistically significant. There was no difference in average monthly PTD time. Fever and cough chief complaints were significantly higher in March 2020 vs 2016-2019 (40% vs 30%; SD 1.5%, $p=0.01$).

Conclusion: During the Coronavirus-2019 pandemic, patient flow in the PED was affected. There was a decrease in PED visits and a parallel decrease in overall LOS. These may be linked, but changes in protective practices and other processes to address the pandemic should be explored to clarify contributions. There was an increase in admission rate that may be related to higher acuity at presentation to the PED. This could be elucidated by further study focusing on specific diagnoses and markers of acuity. By understanding the interaction between hospital processes and patient factors during a pandemic and other public health emergencies on PEDs, we are able to anticipate and better allocate resources in the future.

Table 1. Comparison of the flow metrics within the Pediatric Emergency Department.

Mean ± SD (SEM)	Jan –Feb			Mar – Apr		
	2016-2019 (N=28,669)	2020 (N=6,927)	P-value	2016-2019 (N=28,095)	2020 (N=3,506)	P-value
Door to First provider	57 ± 253 (1.5)	52 ± 65 (0.79)	0.06	52 ± 72 (0.43)	39 ± 316 (5.4)	0.000
Door to bed	41 ± 47 (0.28)	41 ± 46 (0.24)	0.33	36 ± 40 (0.24)	23 ± 38 (0.64)	0.000
First provider to disposition	81 ± 64 (0.40)	83 ± 89 (1.1)	0.005	82 ± 65 (0.40)	79 ± 81 (1.4)	0.04
Disposition order to depart	31 ± 53 (0.32)	31 ± 55 (0.67)	0.91	31 ± 43 (0.26)	30 ± 46 (0.91)*	0.08
PED-LOS	163 ± 94 (0.56)	159 ± 100 (1.2)	0.004	161 ± 92 (0.55)	135 ± 94 (1.6)	0.000

SD= Standard deviation; SEM= Standard error of the mean; PED-LOS= Pediatric Emergency Department Length of Stay.
*Only available through March 2020 due to utilization of outdoor tent triage

web 4C/FPO

TF 395 Interactive Problem-Based Learning: Does the Use of a Novel Web Application Improve Medical Student Preparedness for Clinical Clerkships?

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Study Objectives: For medical students, the transition from pre-clinical years to clinical clerkships is dramatic and anxiety-provoking - requiring familiarization with topics such as inpatient admissions, the medical team structure, and utilizing an

electronic health record (EHR). Preparation for this transition is best represented in problem-based learning (PBL), where patient-centered scenarios (depicting realistic clinical encounters) guide discussion. We elected to augment this feature of PBL by developing a novel, Web-based application incorporating a simulated EHR interface alongside PBL case content that featured these process elements. Our primary objective was to assess whether this novel Web-based application helped prepare students for their clinical rotation and provide them with an experience of patient autonomy. Our secondary objective was to assess whether the application had an impact on student performance through comparison of clerkship scores.

Methods:The application was integrated into the PBL curriculum at McGovern Medical School in September, 2019.

Fig-1: The i-PBL application mimics an EHR, offering result-reporting, interactive data display and a knowledge base supplying supporting educational materials.

After completion of the i-PBL application, learners were directed to a survey to evaluate their perceptions of the application, their experiences related to perceived stress associated with starting clinical clerkships and their sense of patient ownership compared to traditional PBL cases. All 248 1st-year medical students at McGovern Medical School participated in the i-PBL curriculum and survey data was available for 214 students (86.2%). Qualitative and descriptive research methods were employed alongside natural language processing sentiment analysis to evaluate student survey responses. Second, we will evaluate impact on clinical educational outcomes through comparison of clerkship scores before and after the incorporation of i-PBL.

Results: Student perceptions of application usability, engagement and contribution to perception of clerkship preparedness were highly positive (average rating 8.4/10 on Likert scale). Further, 75% of learners noted a greater sense of patient ownership compared to traditional PBL. Sentiment analysis performed on free-text comments was similarly positive with an average sentiment of +5.6 (highly positive).

Conclusion: Learner responses suggest that i-PBL satisfies important and otherwise-neglected needs related to medical student preparedness for clinical clerkships. While awaiting data on clerkship performance, the i-PBL program has been expanded to multiple pre-clinical blocks adding longitudinal exposure to realistic clinical activities in additional settings including outpatient, pre- and post-operative, and inpatient care.

web 4C/FPO

396 Withdrawn

397 Using Point-of-Care Creatinine Testing as a Vehicle to Expedite Patient Care

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Study Objectives: Static modeling at our institution has identified long turnaround times for CT image acquisition as a major disrupter of emergency department (ED) flow. A subcomponent of this is the time it takes for a creatinine value to result in lab, which is required at our institution for the majority of contrast enhanced images. The use of point-of-care (POC) creatinine testing in patients requiring contrast enhanced CT imaging therefore has the potential to improve ED flow and expedite patient care. Surprisingly, literature regarding POC creatinine testing mainly revolves around screening for kidney disease, accuracy of testing, and potential outpatient uses. To our knowledge, only one study has evaluated the time effect of POC creatinine testing in ED patients. The objective of this study is to evaluate the utility of POC creatinine testing in helping to decrease ED disposition time in patients requiring contrasted enhanced CT imaging.

Methods: This is an IRB-approved process improvement pilot designed as a non-randomized pre-post interventional study. It is a one arm study looking at the incorporation of POC Creatinine testing into nursing workflow for patients presenting to our tertiary care ED between August and December 2019 with a chief complaint of chest pain, abdominal pain, or shortness of breath. The pre-intervention (control) arm is composed of all consecutive patients triaged to the low and medium acuity areas of the ED who had a lab creatinine obtained prior to contrast enhanced CT imaging. The post-intervention (study) arm is composed of all consecutive patient triaged to a medium acuity area of the ED who had a POC creatinine obtained prior to CT imaging. A non-parametric test for central tendencies was used to analyze 1597 patients captured in this study. While patients are not equally distributed between the two arms, the study is statistically powered to detect a difference.

Results: The ED door to disposition time was 308.4 minutes in the study arm versus 349.2 minutes in the control arm, nearly 41 minutes shorter. Secondary analysis showed that creatinine order to result turnaround time was 15.5 minutes in the study arm versus 67.0 minutes in the control arm, a difference of 51.5 minutes. Both of these results were statistically significant (p value <0.005). See figure below for details.

Conclusion: ED flow is a highly complex process with multiple interconnected elements. Strategies to improve flow include, but are not inclusive of, staffing model changes, clinical care pathways, appropriate use metrics, electronic medical record functionality, and throughput analyses. While these efforts are broad and multivariable, there remains potential for simple changes to impact patient care. Our study suggests that the use of POC creatinine testing is a viable option to significantly improve ED flow, throughput, and by virtue, patient care. It also adds to the growing literature in support of POC testing.

Comparative Analysis of Median Door to Disposition and Creatinine Order to Result Time

	Laboratory Testing Control Arm	POC Testing Study Arm	Difference	P-value
ED Door to Disposition	349.2 min (n=1488)	308.4 min (n=110)	40.8 min (95% CI: 11-57)	0.004
Creatinine Order to Result	67 min (n= 1488)	15.5 min (n=48)	51.5 min (95% CI: 44-57)	<0.001

398 Racial Disparities in Cardiac Arrest Resuscitation Efforts: A Cross-Sectional Study of Out-of-Hospital and Emergency Department Code Duration

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Study Objectives: The body of literature casting light on health disparities continues to grow. Socioeconomic factors such as race have been associated with suboptimal care and worse patient outcomes, ranging from pain management to overall life expectancy. We hypothesized cardiac arrest resuscitation duration would be shorter for our black patients in comparison to our white patients.

Methods: This was a single center retrospective cross-sectional study of emergency department (ED) patients who ultimately died after receiving advanced cardiac life support (ACLS) for cardiac arrest in a two-year period from 2016-2018. We reviewed electronic medical records at our urban, academic, tertiary care ED. The primary data included total duration of out-of-hospital and ED resuscitation until time of death, recording patient age, sex, race, and cardiac rhythms. Exclusion criteria were insufficient documentation of data points of interest, >3 separate resuscitation attempts, overdose, thrombolytic administration, and do not resuscitate orders. We used Microsoft Excel to perform two-tailed t-tests and calculate 95% confidence intervals for mean resuscitation time, first using composite out-of-hospital plus ED code duration, then again using ED code duration alone.

Results: Our study reviewed 228 charts and included 115 patients who presented to the ED from 6/1/2016 through 5/31/2018. Average age was 65, patients were 58% male

and 42% female, 31% white and 69% black, and 38% shockable rhythm with 33% in white patients and 40% in black patients. T-testing revealed a statistically significant racial disparity for both composite out-of-hospital plus ED resuscitation duration (p<.001) and ED-alone resuscitation duration (p=.032). Mean combined out-of-hospital-ED resuscitation time was 42 minutes for white patients (CI: 37-48) and 32 minutes for black patients (CI: 29-35). Mean ED resuscitation time, excluding out-of-hospital time, was 18 minutes for white patients (CI: 13-24) and 13 minutes for black patients (CI: 11-15).

Table 1. Patient Demographics

	White	Black	Total
Age Mean (years)	67	64	
Men	23	44	67
Women	13	35	48
Total	36	79	115

Table 2. Resuscitation Duration & Shockable Rhythm Rates by Race

	White	Black	
Total Code Mean (minutes)	42 (CI: 37-48)	32 (CI: 29-35)	p<.001
Total Code Median (minutes)	41	33	
ED Code Mean (minutes)	18 (CI: 13-24)	13 (CI: 11-15)	p=.032
ED Code Median (minutes)	13	11	
Shockable Rhythm	33%	40%	

Conclusion: In this study, black patients have significantly shorter resuscitation attempts than white patients, with time of death called sooner for our black patients. The study was limited by confounders such as medical comorbidities or other social determinants of health, the number of variables collected, transport distance, and sample size. Further research could explore variables in more depth and seek modifiable contributors.

399 Prolonged Pauses in Chest Compressions during Emergency Department Application of the LUCAS Device

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Study objectives: Chest compression fraction (CCF) is an important metric for the quality of CPR, and minimizing breaks in chest compressions is an essential component of cardiac arrest survival. The LUCAS ® automated CPR device was designed to provide continual chest compressions while preventing compressor fatigue. However, literature thus far fails to demonstrate any significant difference in outcomes when using the LUCAS® device compared to traditional manual CPR. One hypothesis for this finding is that the time allotted to place the device may reduce the overall CCF and negatively affect patient outcomes. The purpose of this study is to implement a LUCAS® training initiative for emergency department staff and determine the subsequent efficiency of LUCAS® device application.

Methods: A short video (6 minutes, 40 seconds) was developed by the study team that demonstrates a "high performance" two-person method of LUCAS® device application (Figure 1). The video was shown to emergency department staff of an academic level 1 trauma center which had already been utilizing the device for approximately 2 years, but without a formal training program for the device. Staff then took part in video-recorded simulated codes. The CCF was measured and notes were made by the study team regarding whether the instructed technique was used and if not, how participants deviated from the technique. In order to standardize the CCF given that each group took a different total time to apply the device, a two-minute standardized CCF was calculated using the assumption that chest compressions would be continuous after application of the device. This study was completed with approval from the Institutional Review Board.

Results: A total of 102 RNs, techs, and paramedics participated in video recorded code simulations using the LUCAS® device. Only 16 staff applied the device correctly. The overall average chest compression fraction was 71.8%. Among those that applied the device correctly, the average CCF was 86% (91% standardized 2-minute CCF) and the average time without compressions was 10.4 seconds. Among those that did not correctly apply the device, the average CCF was 69% (80% standardized 2-minute CCF) and the average time without compressions was 24.4 seconds. The two leading causes of incorrect application were failure to turn on the device prior to application and failure to provide a countdown prior to application (Figure 2). When comparing groups that applied the device correctly to those that applied the device incorrectly, there was a statistically significant difference in time without compressions, CCF, and standardized 2-minute CCF (p= 0.005, 0.0007, and 0.005, respectively).

Conclusion: There existed prolonged pauses in chest compressions during simulated application of the LUCAS® device by emergency department staff following a formal training video.

Figure 1. "High Performance" method of LUCAS® Device Application.

Countdown ("3-2-1") is done prior to completion of each step. Chest compressions are continued during step 4. Device is turned on prior to step 4. During step 5, one team member lowers the plunger while the other simultaneously presses the "start" button.

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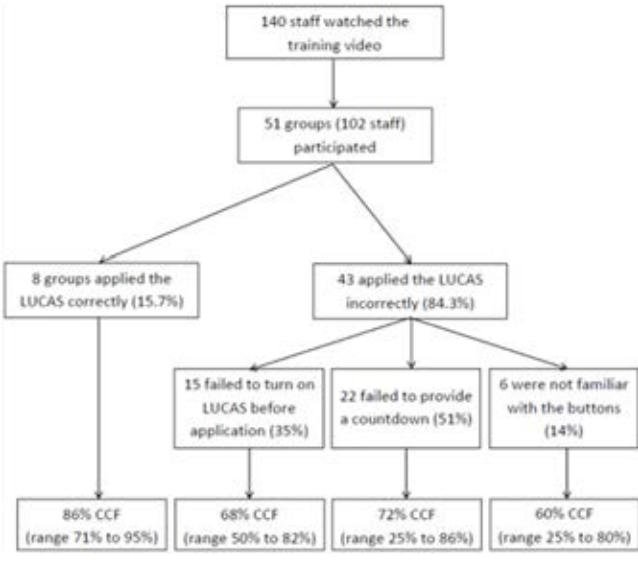
Figure 2. Chest compression fraction per studied group



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400 Feasibility of Focused Cardiac Ultrasound during Cardiac Arrest in the Emergency Department

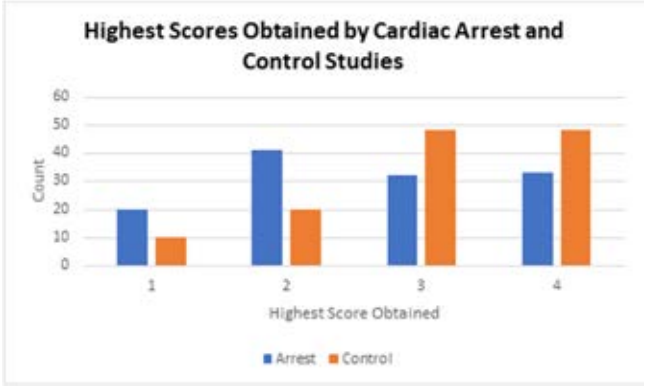
Balderston JR, You A, Evans DP, Taylor L, Joyce J, Gertz ZM/VCU, Richmond, VA; VCU Medical Center, Richmond, VA

Study Objectives: Transthoracic focused cardiac ultrasound (FOCUS) can aid in evaluation and management of patients with cardiac arrest. The quality of imaging in this population has been questioned. The inclusion of only patients with satisfactory imaging may have biased previous research. Widespread adoption of this technology requires some understanding of its feasibility in routine use. The goal of this study was to determine how often adequate imaging can be obtained in cardiac arrest patients.

Methods: All patients in a six-month period who presented to the emergency department (ED) in cardiac arrest or who had cardiac arrest while in the ED were prospectively identified as part of a quality improvement initiative to improve ultrasound documentation. Cardiac arrest was defined as anyone who was found to be pulseless and underwent at least one round of cardiopulmonary resuscitation by Emergency Medical Services or in the ED. Patients who had achieved return of spontaneous circulation before arrival to the ED and who were purposefully moving upon arrival were excluded. FOCUS images were obtained by resident or attending physicians as part of routine clinical care. Patients with images obtained were paired with age- and sex-matched controls who underwent FOCUS for another clinical indication during the study period. All studies were scored by two blinded reviewers for quality using the following scoring system: 0 = no image obtained, 1 = only cardiac motion detected, 2 = chambers and valves grossly resolved with the left ventricle and posterior epicardium visible, 3 = endocardium and wall thickness seen but incomplete, and 4 = greater than 90% of endocardium and valve motion seen. When a disagreement between scorers was present, a score by a third reviewer was obtained. Studies including at least one image with a score of $\geq$2 were considered adequate.

Results: There were 137 consecutive cardiac arrests, 121 out-of-hospital and 16 in-hospital, during our study period. FOCUS was attempted in 133 (97%) patients, with images recorded in 126 (92%). Of the 7 attempts without saved imaging, 6 patients had documentation that images were adequate, and in 1 patient images could not be obtained. Of the FOCUS studies performed with images recorded, 97 (77%) were obtained during advanced cardiac life support while 29 (23%) were obtained once return of spontaneous circulation was achieved. The average age of cardiac arrest patients was 58 years, and 45% were female. The controls were similar. Of the 126 cardiac arrest studies with recorded images, 106 (84%) were rated adequate, compared to 116 (92%) in controls (p = 0.08). When compared to control FOCUS studies, the scores given to studies of cardiac arrest patients were lower than controls (Figure 1, p = 0.001). Inter-rater reliability between the two study reviewers was substantial (linear weighted Kappa:0.66; 95% CI 0.60-0.72).

Conclusion: Transthoracic FOCUS can reliably be used during cardiac arrest to obtain images adequate to answer clinical questions and guide therapies.



401 Worthy Investment: The Need for a Business and Administrative Curriculum for Emergency Medicine Residents

Cozzi NP, Jarou Z, Thomas Y, Stark N, Sarker A, Tseng P, Rodos A, Messman A, Seamon J, Jones J/Spectrum Health / Michigan State University, Grand Rapids, MI; University of Chicago, Chicago, IL; Baylor University College of Medicine, Houston, IL; University of California - San Francisco, San Francisco, IL; New York University, New York City, NY; Ohio State University, Columbus, OH; University of Illinois - Chicago, Chicago, IL; Wayne State University, Detroit, MI

Study Objective: Many believe that business principles related to the practice of EM should be taught during residency, and that many residency programs may not currently equip graduates with this essential knowledge. Until now, no national needs assessment survey has been performed to test these hypotheses, or to assess the current learning environment and identify the needs and preferences of learners and other stakeholders as recommended by Kern's model of curriculum development.

Methods: A prospective, online, cross sectional needs assessment was distributed to EM residents (via unique links to EMRA members) and attendings (via invitations shared on 40 departmental listservs, ACEP engagED, CORD, and 3 ACEP chapters).

Results: 253 attendings (81.3% academic faculty) and 207 PGY1-4 residents from 191 programs responded. 89.3% of overall respondents indicated that learning about business and administrative topics during EM residency is important or very important (no difference between residents and attendings, p=0.78). 51.4% of residents rated their knowledge of these topics as below average. Overall, 61% of residents stated their residency program does not prepare graduates for EM administrative challenges, though residents at programs with administrative electives feel more prepared than those at programs without electives, 47.2% vs 18.6% respectively (p<0.01). "Lack of time" was the top barrier identified by both residents and attendings, 57.8% and 39.7% respectively. The second largest barrier identified by attendings was "lack of faculty expertise" (32.9%); however, residents were significantly less likely to cite this as a barrier (10.2%, p<0.01). The most preferred learning method for residents was "self-paced online learning" (24.8%), followed by "administrative case discussions" (17.0%).

Conclusions: Learning business and administrative topics is regarded as very important during residency, yet the majority of residents report low levels of knowledge and preparation even if their program offers an administrative elective, and many faculty do not feel like they have content expertise. Based upon this targeted needs assessment, there is an opportunity to create a national, self-paced, online, case-based curriculum.

402 The Effect of Patient Demographics on the Odds of Restraint Use for Agitation in the Emergency Department

Ohuabunwa EC, Whitfill T, Ray JM, Bernstein SL, Taylor RA, Wong AH/Yale University, New Haven, CT

Study objectives: Agitated patient encounters in the Emergency Department (ED) are on the rise, with a recent estimate of 1.7 million events per year and a 2.6% prevalence. To protect staff and prevent self-harm, physical restraints are sometimes used. However, these are associated with safety risks and the potential for stigmatization of a vulnerable population. We aim to determine factors that are associated with odds of being restrained in the ED.

Methods: We conducted a retrospective cohort analysis of all patients ($\geq$ 18 yo) placed in restraints during an ED visit to three hospitals within a large tertiary health system from Jan 2013-Aug 2018. We undertook descriptive analysis of the data and created a generalized linear mixed model with a binary logistic identity link to model restraint use and determine odds ratios for various clinically significant demographic factors. These include sex, race, ethnicity, insurance status, alcohol use, illicit drug use, and homelessness. Our model accounted for patients nested across the three EDs and also accounted for multiple patient visits.

Results: In 726,417 total ED visits, 7,090 (1%) had associated restraint orders. Restrained patients had an average age of 45, with 64% male, 54% Caucasian and 29% African American. 17% had private insurance, 36% endorsed illicit substances, 51.4% endorsed alcohol use and 2.3% were homeless. Using logistic regression, we found that African Americans had statistically significant odds of being restrained compared to

Caucasians with adjusted odds ratio (AOR) of 1.14 (1.08,1.21). Females (AOR 0.75 [0.71, 0.79] had lower odds of being restrained compared to their male counterparts while patients with Medicaid (AOR 1.57 [1.46, 1.68]) and Medicare (AOR 1.70 [1.57, 1.85]) had increased odds compared to the privately insured. Furthermore, illicit substance use (AOR 1.55 [1.46, 1.64]), alcohol use (AOR 1.13 [1.07, 1.20] and, homelessness (AOR 1.35 [1.14, 1.16], portended increased odds of restraint use.

Conclusion: To our knowledge, this is the first study of its kind to show statistically significant effects of patient demographics on odds of restraint use in the ED. The increased odds based on race, insurance status, and substance use highlight the potential effects of implicit bias on the decision to physically restrain patients and underscores the importance of tools that facilitate a more objective assessment of these patients. Using such tools could assist providers in avoiding further marginalization of an already vulnerable population.

Table 1: Variables of Interest by Restraint Use and Adjusted Odds Ratios.

	Restraint Use		Odds of Restraint Use	
	No N=719,327 (%)	Yes N=7,090 (%)	Adjusted OR (95% CI)	p-value
Gender				
Male	321,706 (44.7)	4,597 (64.8)	Ref	--
Female	397,620 (55.3)	2,494 (35.2)	0.75 (0.71, 0.79)	<0.001
Age, mean (SEM)	49.61 (0.02)	45.63 (0.22)		
Race				
Asian	7,106 (1.0)	36 (0.5)	0.77 (0.55, 1.08)	0.134
Black or African American	202,943 (28.2)	2,041 (28.8)	1.14 (1.08, 1.21)	<0.001
White or Caucasian	383,979 (53.4)	2,852 (54.3)	Ref	--
Other	125,299 (17.4)	1,161 (16.4)	1.10 (0.98, 1.23)	0.096
Ethnicity				
Hispanic or Latino	120,325 (16.7)	1,042 (14.7)	0.79 (0.70, 0.88)	<0.001
Non-Hispanic	593,822 (82.6)	5,981 (84.4)	Ref	--
Unknown	5,180 (0.7)	67 (0.9)	1.80 (1.39, 2.33)	<0.001
Insurance status				
Private	238,742 (33.2)	1,251 (17.6)	Ref	--
Medicaid	248,958 (34.6)	3,486 (49.2)	1.57 (1.46, 1.68)	<0.001
Medicare	156,041 (21.7)	1,548 (21.8)	1.70 (1.57, 1.85)	<0.001
Self-pay	3,661 (0.5)	80 (1.1)	1.65 (1.30, 2.10)	<0.001
Other	71,925 (10.0)	725 (10.2)	1.46 (1.33, 1.62)	<0.001
Illicit substance use				
No	526,439 (73.2)	3,905 (55.1)	Ref	--
Yes	106,809 (14.8)	2,604 (36.7)	1.55 (1.46, 1.64)	<0.001
Not Asked	86,089 (12.0)	581 (8.2)	1.12 (0.99, 1.27)	0.070
Alcohol use				
No	391,708 (54.5)	3,067 (43.3)	Ref	--
Yes	268,727 (37.4)	3,641 (51.4)	1.13 (1.07, 1.20)	<0.001
Not Asked	58,892 (8.2)	382 (5.4)	0.90 (0.77, 1.04)	0.155
Homeless				
No	716,521 (99.6)	6,926 (97.7)	Ref	--
Yes	2,806 (0.4)	164 (2.3)	1.35 (1.14, 1.16)	<0.001

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403 Are You Comfy? Comparing Success Rates of Lumbar Puncture Positions

Patel R, Amlicke M, Steele F, Kusulas M/Cohen Children's Medical Center, Queens, NY

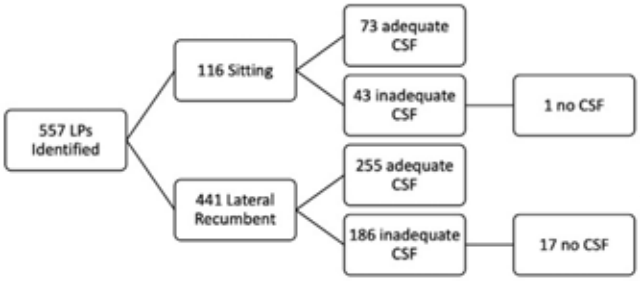
Study Objectives: A lumbar puncture (LP) is commonly performed in the pediatric emergency department for diagnostic purposes; unsuccessful or traumatic LPs can complicate decision making. The sitting position has a larger interspinous space compared to lateral recumbent and is safer in sick neonates at risk for cardiac and respiratory instability. However, few studies have compared the effect of position on LP success and complication rates. The objective of our study was to determine if position affects success rates when performed in infants <3 months old.

Methods: This is a retrospective chart review in infants aged <3 months who had a LP performed in a pediatric emergency department over a 35-month period. The primary outcome was the rate of successful LPs, defined as obtaining adequate CSF to send for studies. The secondary outcome was the rate of traumatic LPs, defined as >500 RBCs. Summary statistics were calculated and associations were examined using the Wilcoxon rank-sum and Fisher's exact tests.

Results: A total of 557 charts were reviewed, with 116 in the sitting position and 441 in the lateral recumbent position. The primary outcome of adequate CSF fluid collection was not significantly different between groups (63% sitting position versus 58% lateral recumbent position; $p = 0.22$). In addition, the rate of traumatic LPs showed no significant difference (28% sitting position versus 27% lateral recumbent position; $p = 0.84$). In secondary analysis (Figure 1), there was a decreased number of LPs with no CSF in the sitting position (0.9%) versus the lateral recumbent position (3.9%), though not statistically significant ($p = 0.10$).

Conclusion: Positioning during a LP in infants <3 months likely does not affect success rates or rates of traumatic LP.

Figure 1 – Flow Chart of CSF Collection



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404 Emergency Department Tablet-Based Screening Tool for Elder Abuse

Jubanyik KJ, Choo E, Pantalon MV, Dziura J, Edwards C, Gill T, D'Onofrio G, Abujarad F /Yale University, New Haven, CT; Oregon Health and Science University, Portland, OR; Yale University, New Haven, CT

Study Objectives: The emergency department (ED) is a unique point of care where elder abuse (EA) victims have an opportunity to be identified and get the needed help. EA is a national health problem and the vast majority of cases are left unidentified. For many older adults experiencing abuse, current methods of screening tend to miss less obvious forms of EA and may discourage older adults from disclosing EA due to either a lack of understanding of what constitutes EA or fear of retaliation from the perpetrator.

Methods: Our approach shifts the focus of EA identification to the older adults themselves through an automated digital health tool. Our tablet-based tool includes interactive multimedia components designed to enhance the screening process. Patients who screen positive are guided through an automated Brief Negotiated Interview (BNI) utilizing motivational interviewing to assist in self-identification or self-disclosure. In the process of tool development, we conducted a qualitative study to evaluate the perceived value and likelihood of adopting a tablet-based digital health approach to facilitate screening of EA in the ED. We held focus groups with stakeholders, including 24 adults 60 years or over, 2 social workers, 2 caregivers, and 2 ED clinicians. Two focus groups involved only older adults, with the third attended by all stakeholders. We used the findings from the focus groups and the user-centered design approach (UCD) to develop the screening tool. We then tested its usability and acceptability with 14 older adults.

Results: Focus group participants supported use of a tablet-based tool to screen for EA in the ED. On a 7-point Likert scale ranging from "1=Very Comfortable" to "7=Very Uncomfortable," older adults scored 2.8 on average for whether they would feel comfortable using a tablet-based tool to screen for EA. Participants suggested using a female voice for the tool narrator, larger font size, more multimedia in the form of animations and video, headphones for privacy; and having someone available during screening for assistance if needed. Stakeholders indicated that it is difficult for older adults experiencing EA to ask for help and that any type of abuse screening would be helpful. Participants of the usability evaluation rated the tool a mean score of 86.6 (median= 88.8, iQR =18.1) on the System Usability Scale (SUS) which measures a system's acceptability, far above the average benchmark SUS score of 68. These findings were backed by three older adult community co-researchers representing the target population. They were a part of the research team and contributed extensive revisions to match the needs and comforts of the end user.

Conclusion: Shifting the focus from the ED-provider to the older adult has potential to encourage self-disclosure of EA by addressing major barriers to traditional screening processes. In summary, this study supported the use of self-administered automated digital health screening tool for EA. Stakeholders generally believed that the use of digital health tools to facilitate the screening process would be beneficial in the ED setting.

405 Crisis Stabilization Unit Reduces Admission Rates for Suicidal Patients in a Midwest Emergency Department

Kim AK, Vakkalanka J, Tate J, Himadi E, Lee S/University of Iowa Hospitals and Clinics, Iowa City, IA

Study Objectives: In an attempt to improve patient care and hospital operations, our institution implemented a crisis stabilization unit (CSU) to provide psychiatric stabilization and treatment in a setting other than the emergency department (ED). After initial evaluation and medical clearance by an emergency medicine provider, patients transfer from the ED to the CSU. The CSU aims to decrease the time, space, and monetary burdens on the ED, and to preserve the limited inpatient psychiatry beds for patients who truly need admission, as patients may discharge home from the CSU. The purpose of this study is to determine the effect on hospital admission rates for suicidal patients in the emergency department after the opening of the CSU in a rural academic medical center.

Methods: We performed a before-and-after analysis of introducing the CSU within a Midwestern tertiary referral center. We evaluated study periods of November 15, 2017 to May 15, 2018 and November 15, 2018 to May 15, 2019 to examine patients pre- and post-CSU implementation. Adult patients presenting with suicidal ideation or suicidal attempt were included. The primary outcome was difference in proportion of inpatient psychiatric admission of suicidal patients presenting to the ED. Secondary outcomes compared were changes in proportion of any admission, use of code greens (code activated in cases where patient poses a threat, requiring immediate attention by psychiatry and security), incomplete admission (a bed request is made but the patient leaves prior to admission), restraint use, scheduling of follow-up within 30 days of discharge, ED returns within 30 days, and mean difference in ED boarding hours. We performed a descriptive analysis of patient visit characteristics presenting before and after CSU implementation. Association between categorical outcomes was determined to estimate relative risks (RR) and 95% confidence intervals (CI). Continuous outcomes were examined as the mean difference (MD) by time period.

Results: There were 962 patients presenting with suicidality (n=435 pre-CSU, n=527 post-CSU). There were no differences in population during the two study periods by age, sex, race, homelessness, or insurance. Compared to the pre-CSU period, there was a reduction in psychiatric admission (RR: 0.48; 95% CI: 0.40-0.56), any admission (RR: 0.65; 95% CI: 0.58-0.73), discharge after bed request (RR: 0.22; 95% CI: 0.11-0.43), 30-day return to the ED (RR: 0.74; 95% CI: 0.56-0.98), ED boarding time among admitted patients (MD: -9.0 hours; 95% CI: -13.5, -4.6) and incomplete admissions (MD: -12.5 hours; 95% CI: -21.3, -3.7). There was no significant difference in restraint use or code green use in the ED. There was a 60% increase in a 30-day follow-up being scheduled (RR: 1.60; 95% CI: 1.40-1.82).

Conclusion: This study showed that the rate of any inpatient admission, discharge after bed request, 30-day ED return, and ED boarding time decreased after the implementation of the CSU.

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406 A RASHonal Approach to the Diagnosis of Dermatologic Emergencies

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Introduction: Dermatologic complaints are common presentations to the emergency department. Though most causes of rash are benign, it is critical that emergency physicians be able to recognize the dermatologic manifestations of critical illness. In 1984 Lynch et al proposed an algorithmic approach to the identification of dermatologic processes, and since then several modified Lynch algorithms have been developed and expanded. This learning module will introduce learners to an established series of algorithms designed to organize and narrow the differential diagnosis of serious rash. Learners will be challenged to sort the classic rashes of many dermatologic diseases using this approach and will practice recognizing the classic rashes of many dermatologic emergencies. This module is intended for medical students and both junior and senior learners in emergency medicine and is designed to be presented at didactic conference.

Study Objectives: By the end of this learning module, the learner will be able to: 1.) apply a systematic approach to the evaluation of acute dermatologic disease; 2.) categorize the classic rashes of many dermatologic emergencies, utilizing a visual diagnosis approach; 3.) develop pattern recognition in the identification of dermatologic emergencies; 4.) discuss the etiology, presentation, examination, complications, diagnosis and treatment of patients with various dermatologic diseases.

Methods: This module is a modified team-based learning session. Learners will complete a preparatory self-directed module prior to attending didactic conference that will review the approach to an undifferentiated rash, key elements of the history and physical exam, history/physical red flags, and rash morphology. This will be followed by a short Individual Readiness Assurance Test (IRAT). At the beginning of the didactic session, teams of 5-7 learners with participate in a Team Readiness Assurance Test (TRAT). For the application exercise, pictorial examples of many serious dermatologic conditions will be presented, and teams will compete to correctly identify them. Rashes will be classified into one of four categories (petechial/purpuric, erythematous, maculopapular, and vesiculobullous) and sorted into diagnostic algorithms. The exercise will focus on visual examples in order to develop pattern recognition. Learners will be evaluated by an IRAT, a TRAT, and by a short post-module survey to assess the learner's subjective ability to identify and manage dermatologic emergencies.

Conclusions: Recognizing potentially life-threatening dermatologic disease is a critical skill for the emergency physician. This educational module will provide learners with the tools to promptly recognize the most critical rashes, and to ensure that life-threatening conditions are not overlooked.

407 Just in Time to Stop Bleeding: Comparing an Improvised Tourniquet Out of Common Items to a Commercial Tourniquet Using Simulation-Based Training

Engberg A, Winkelman RD, Noeller TP/Case Western Reserve University School of Medicine, Cleveland, OH; Case Western Reserve School of Medicine, Cleveland, OH; MetroHealth Simulation Center, The MetroHealth System, Cleveland, OH

Study Objectives: The purpose of this study is to assess health care and non-health care individuals' ability to apply an improvised tourniquet using commonly available items. The objectives were as follows: 1) to compare the efficacy of an improvised tourniquet made of common items to a commercial tourniquet in stopping a simulated hemorrhage; and 2) assess whether a simulator-based training program can improve the ability of individuals to stop an arterial hemorrhage with an improvised tourniquet. We hypothesized that common items could produce similar effectiveness in hemorrhage control when compared to a commercial tourniquet.

Methods: This was a prospective cohort study of 80 individuals who volunteered for a brief tourniquet training program at an urban teaching hospital in Cleveland, OH. All study subjects were health system employees and included both health care and non-health care professionals. Participants were informed that they would be performing three trials in which to demonstrate successful control of a simulated hemorrhage on the HapMedTM Leg Tourniquet Trainer (CHI systems) using a combat application tourniquet (CAT) and improvised tourniquets (see Figure 1). In the first tourniquet trial, no further instruction beyond 'improvise a tourniquet' was given. For the second tourniquet trial, learners were instructed to place a CAT based on just-in-time training. The final iteration required learners to reattempt an improvised tourniquet. The primary outcome was to determine the subject's ability to achieve hemorrhage control within two minutes for each of the three simulated bleed trials.

Results: Thirty-two percent of subjects were able to stop simulated hemorrhage on the initial improvised tourniquet trial compared to 94% subjects using CAT trial and 68% subjects on final improvised tourniquet trial. Participants were significantly more likely (+63%, 95% CI: 50- 73%, $p < 0.001$; see Table 1) to control hemorrhage using CAT compared to initial improvised trial. Performance using improvised tourniquets after simulator-based training was significantly improved (+38%, 95% CI: 23-51%, $p < 0.001$; see Table 1). In subgroup analyses, health care professionals had a significantly higher success rate at stopping the bleed in the initial improvised (47%) and final improvised (82%) tourniquet trials compared to non-health care professionals (Table 1). Subjects with prior tourniquet training had a significantly higher success rate at stopping the bleed in the initial improvised tourniquet trial (64%) compared to subjects who had no prior training experience, but there was no difference between these two groups in the final tourniquet trial.

Conclusion: This simulation-based program significantly improved the effective application of improvised tourniquets. Improvised tourniquets may be a reasonable

alternative when CATs are not readily available and should be included in national bleeding control curricula.

Table 1. Tourniquet Effectiveness Data by Trial and Subgroup

	Initial Improvised Trial	CAT Trial	Final Improvised Trial	% Risk Difference (% quartile range)	p-value*
Tourniquet Effectiveness by Trial					
Initial Improvised vs. CAT				[illegible]	<0.001
Initial Improvised vs. Final Improvised				38% (23% - [illegible])	0.000
CAT vs Final Improvised				24% (13% - 35%)	0.001
Tourniquet Effectiveness, n (% overall)					
Prior Tourniquet Training	14 (64%)	22 (100%)	18 (82%)		
No Prior Tourniquet Training	12 (21%)	51 (91%)	35 (63%)		
% Risk Difference (% quartile range)	42% (18% – 61%)	9% (-7 – 19%)	19% (-4 – 36%)		
p-value*	**0.001**	0.329	0.119		
Healthcare Provider	18 (47%)	38 (100%)	31 (82%)		
Not a Healthcare Provider	8 (20%)	35 (88%)	22 (55%)		
% Risk Difference (% quartile range)	27% (6% - 45%)	13% (1% to 26%)	27% (6% to 44%)		
p-value*	**0.014**	0.057	**0.014**		
Pressure applied, mmHg, median (quartile range)	473 (397 – 614)	492 (449 – 560)	543 (457 – 659)		
Time to Complete, sec, median (quartile range)	73 (49 – 81)	48 (38 – 63)	49 (44 – 75)		

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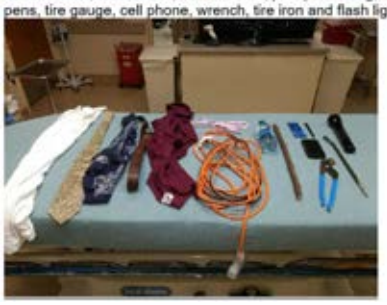
Figure 1. Presentation of common items displayed in order from left to right: towel, silk tie, handkerchief, leather belt, cotton t-shirt, pink pant string, electrical cord, 16oz water bottle, stick, pens, tire gauge, cell phone, wrench, tire iron and flash light.



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408 The Impact of Driving on Podcast Knowledge Acquisition and Retention among Emergency Medicine Resident Physicians

Gottlieb M, Riddell J, King A, Cooney R, Fung C, Sherbino J/Rush University Medical Center, Chicago, IL; University of Southern California, Los Angeles, CA; The Ohio State University, Columbus, OH; Geisinger Health System, Danville, PA; McMaster University, Hamilton, Ontario, Canada

Study Objectives: Emergency medicine (EM) residents use podcasts as part of their learning process, often listening while driving. It is unclear how the rapid task switching required of driving while listening to a podcast impacts knowledge acquisition and retention. This study evaluated the knowledge gained from listening to podcasts and driving versus undistracted listening.

Methods: This was a multicenter, randomized, crossover trial among postgraduate year (PGY) 1-4 EM residents at four institutions. Residents were block randomized by site and PGY level to listen to podcasts while driving first or sitting undistracted in a room first. Within one hour of listening, they completed a 15-question test. They subsequently crossed over to the alternate intervention, serving as their own controls, and completed a second 15-question test. Each of the podcasts were professionally recorded and based on five EM-relevant journal articles that were uncommonly discussed and had not been covered in journal club at any of the institutions. At one month, participants completed a delayed recall test. Questions were derived and validity evidence was collected prior to use. Data were compared using a paired-sample t-test and ANOVA.

Results: 80 residents completed the initial recall tests and 63 residents completed the delayed recall test. There was no statistically significant difference between the driving and seated cohorts for the initial recall (75.9% versus 75.7%; $p = 0.883$) or delayed recall (55.1% versus 52.5%; $p = 0.207$).

Conclusion: Driving while listening to a podcast does not affect knowledge acquisition or retention when compared with undistracted podcast listening among EM residents.

409 Residency Applicant Communication Preferences

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Study Objectives: To better understand communication preferences amongst emergency medicine applicants.

Background: Communication preferences are changing amongst providers and patients in the era of electronic messaging technology. Prior literature within Emergency Medicine demonstrated that applicants felt that post-interview, but prior to rank list submission, communication was appropriate; however, 39% felt that contact by phone was either "always inappropriate" or "usually inappropriate." Other studies have shown that post-interview communication can be distressing for a variety of reasons . Even though asking for preferences at the outset of applications may not address all prior identified issues, we sought to better understand communications preferences amongst our interviewing applicants in hopes of improving their application process experience.

Methods: This was a cross sectional survey study at a single academic emergency medicine program during the 2019-2020 application cycle. All interviewing applicants were invited by email to complete the internet-based, confidential survey, which consisted of multiple choice and free response items. Descriptive statistics were calculated and reported.

Results: 130 applicants were interviewed and 120 (92.3%) completed the survey. Respondents represented all four regions of the US including 48 (40.0%) from the West, 32 (26.7%) from the Northeast, 21 (18.5%)from the Midwest, and 19 (15.8%) from the South. The preferred method of communication was email (98/120; 81.7%), followed by text (21/120; 17.5%) and phone (1/120; 0.8%). No applicants selected postal mail as the preferred communication method.

Conclusion: The preferred method of communication for interviewed applicants in this study was email followed by text. This information may inform communication practices of emergency medicine programs.

410 Higher Nursing Care Level Is Associated with Higher Incidences of Blood Culture Contamination in Emergency Department

Shigeno A, Homma Y, Yokoi T, Tanaka S, Onodera R, Yamagata R, Numata K, Mizobe M, Takahashi J, Norii T, Funakoshi H/Tokyo Bay Urayasu Ichikawa Medical Center, Chiba, Japan; University of New Mexico, Albuquerque, NM

Study Objectives: Blood culture contamination leads to unnecessary intervention, inappropriate antibiotic use, and excess cost. The American Society of Microbiology recommends keeping the contamination rate under 3%. Previous research showed that blood culture procedures and techniques such as skin sterilization or puncture site were associated with blood culture contamination; however, the researches focused on patient factors are limited. Our hypothesis is that higher nursing care level is associated with higher incidences of blood culture contamination.

Methods: We conducted a single-center, case-control study to investigate the association between the nursing care level and blood culture contamination in an emergency department (ED). Contamination was defined as the observation of a normal skin organism in a single blood culture obtained from two or more punctures. We adopted the definition of nursing care level defined by the Japan ministry of health, labor and welfare. These levels are based on their general condition including activities of daily living (ADL) and cognitive function. This staging is divided into 7 levels, and social support is decided according to the level. Level 6 or higher is defined as higher nursing level. We included patients aged over 20 years and obtained information on patients age, nursing care level, consciousness (Glasgow Coma Scale), housing status, arrival time period and ambulance usage from the medical chart. We used Fisher's exact test for univariate analysis and logistic regression analysis for multivariate analysis.

Results: From April 2018 through March 2019, 686 positive blood culture episodes occurred in 5,165 patients. 39 were determined to be contaminated (case group), and 78

were randomly chosen from a non-contaminated group (control group). The median age of our sample was 75 years (interquartile range, 62 to 85 years). In multivariate analysis, patients with higher nursing care level (odds ratio [OR], 5.24; 95% confidence interval [CI], 1.47-18.70) had higher incidences of blood culture contamination.

Conclusion: In this retrospective analysis, higher nursing care level is associated with higher incidences of blood culture contamination in the ED. Especially in geriatric medicine, careful procedure is required for patients with higher nursing level to avoid blood culture contamination and achieve accuracy of test result.

Nursing care level in Japan

Level	General Condition
1	Need partial support for daily activity and care.
2	Need support for walking or standing.
3	Add to level2, cognitive dysfunction or problematic behavior.
4	Need help for eating or excretion.
5	Cannot stand up and move by oneself.
6	Cannot excrete by oneself, severe dementia.
7	Cannot eat by oneself.

Japan ministry of health, labor and welfare

411 Casualties of a Marathon in a Tropical Climate: A 4-Year Review of Patient Presentation Characteristics and Injuries Sustained

Poh J, Hao Y, Anantharaman V/Singapore General Hospital, Singapore, Singapore

Study Objective: To provide descriptive information about burden of injuries at the Singapore Marathon, in order to aid medical planning for similar mass running events and improve participant safety.

Methods: We conducted a retrospective review of data of the Singapore Marathon race casualties from 2013 to 2016. Patient Presentation Rates and Transport to Hospital Rates were correlated with heat index. Information about presenting complaints was also reviewed. Basic demographic information of casualties was summarized across year of event and compared by type of competitions using one-way ANOVA for continuous variable (age) and Chi square test for categorical variables. Negative binomial model was performed to investigate impact of heat index adjusted by types of competition on the incidence of casualty.

Results: The number of casualties treated ranged from 407 in 2013 to 3346 in 2016. In total, there were 5967 casualty records analyzed. There were more male than female casualties every year. The mean age of casualties was 36.9 (SD 10.7). There were more casualties from the full marathon than the half marathon and the 10 km race, except in 2014. The PPR was from 8 to 69 per 1000. The TTHR was 0.3 to 0.68 per 1000.

Patient Presentation Rate (per 1000) and Transport to Hospital (TTH) Rate

	2013	2014	2015	2016
Casualty numbers	407	1036	1178	3346
Participant numbers	49900	48822	47226	48000
PPR (per 1000)	8.16	21.22	24.94	69.71
TTH number	15	18	32	27
TTHR (per 1000)	0.3	0.37	0.68	0.56
TTH as percentage of casualties (%)	3.6	1.7	2.7	0.8

Casualties were classified into light, moderate and severe categories. The majority of casualties presented for light injuries, such as cramps and musculoskeletal injuries. There were 2 cardiac arrest cases in 4 years, both male.

Proportion of Injuries by Year and Severity

	2013	2014	2015	2016
Severe	54	168	93	91
Moderate	0	3	3	4
Light	353	865	614	2275
Total	407	1036	710	2370

Negative binomial regression showed significant impact of heat index on incidence of casualties. Incidence rate ratio (IRR) was 1.39 with 95% CI (1.23, 1.56), which indicated that every 1 unit increase in heat index resulted in increase of casualty rate by a factor of 1.39.

Negative binomial model: number of casualty ~ heat index + type of competition

	Incidence rate ratio (IRR)	95% CI_L	95% CI_U	P value
Heat Index	1.39	1.23	1.56	< 0.001
Half Marathon	3.13	1.65	5.93	< 0.001
Full Marathon	7.35	3.88	13.91	< 0.001

The medical tent at the end point saw the most number of serious casualties.

Conclusions: For a popular race like the Singapore Marathon, participant safety and wellbeing should be a top concern for race organizers. It is critical to study the medical response plan and make improvements to reduce morbidity, especially with regard to the heat factor. More resources should be allocated to the latter half of the route. Information from this study should enable organizers to refine the logistics and manpower staffing for each sector of the race.

412 A Survey of the Perception of Emergency Medicine Residents and Attending Physicians on the Effect of Sign-Out on Safety and Efficiency

Tran T, Obando M, Franke E, Chu F, Marra E, Slesinger T/Aventura Hospital and Medical Center, Aventura, FL

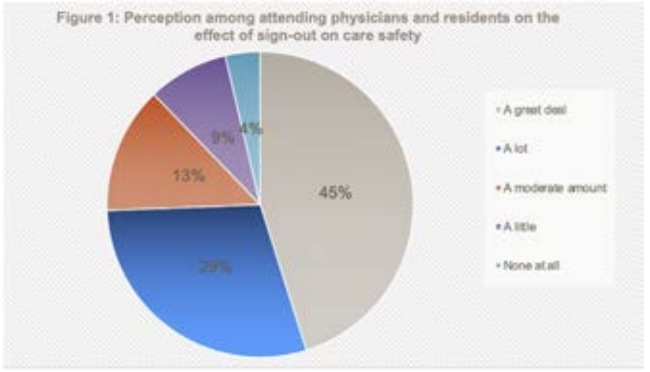
Study Objectives: A significant number of ED programs do not have a standardized sign-out process. Implementation of a standardized sign-out protocol in the ED was shown to lead to a decreased length of stay and increased frequency of ED bedside rounding. The question that has yet to be asked is: how does residency training affect one's perception of sign-out on safety and efficiency?

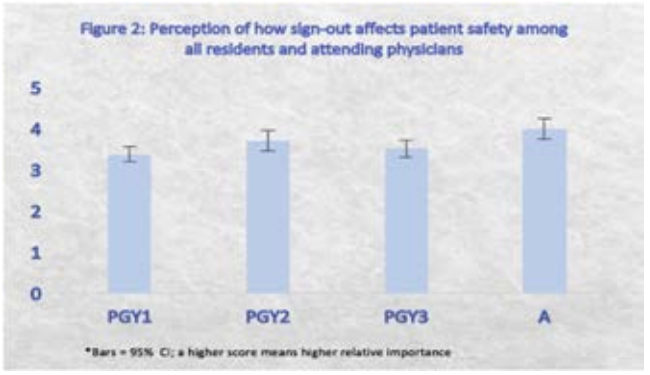
Methods: Investigators surveyed attending physicians and residents of five EM programs via email and paper surveys. 85 survey samples were completed, with 31 PGY-1s, 16 PGY-2s, 19 PGY-3s, and 18 attending physicians. Descriptive statistics and t-test for comparison of items on a Likert scale were obtained. The measured outcome is the participants' perception of the relative importance of sign-out as a contributor to patient safety and care efficiency.

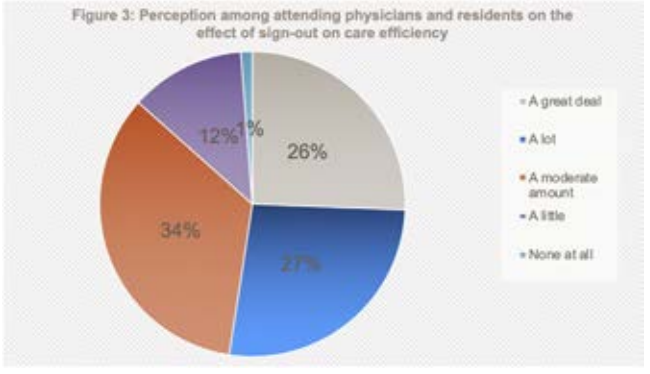
Results: 30% of respondents (38%, 38%, 21%, 22% PGY-1, 2, 3 and attending) never received any training on proper sign-out. 13% considered sign-out as having "little effect" or "no effect" on patient safety and care efficiency. 74% thought sign-out affected safety "a great deal" or "a lot," with 53% similar answers on care efficiency. PGY-1 residents' perception on the relative importance of sign-out on care efficiency is lower than that of attending physicians' ($p<0.05$), but this difference disappears between groups (ANOVA, $p>0.05$). There is no statistical difference between groups ($p>0.05$) in the perception of the relative importance of sign-out on patient safety.

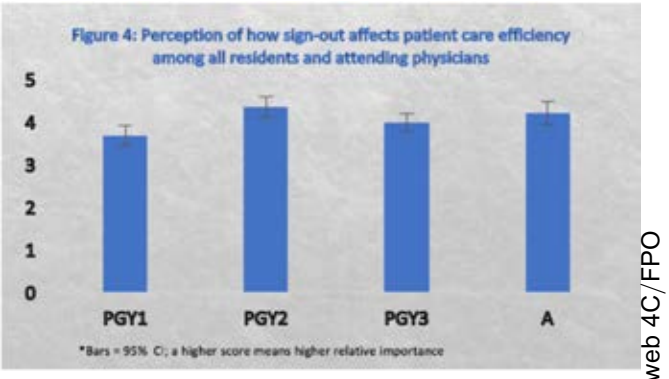
Conclusion: The results of this survey suggest that training enhances residents' perception of the effect of sign-out on patient care efficiency and efficiency. Current research points out that standardized sign-out in the ED can result in lower LOS and

reduce rate of adverse events. It suggests that greater efforts should be emphasized on sign-out education in the emergency department and the implementation a standardized sign-out protocol.









413 Out-of-Hospital Use of Ketamine for Agitation and Subsequent Emergency Department Intubation: A Retrospective Study

Coffey SK, Vakkalanka P, Wallace K, Harland K, Ahmed A/University of Iowa Hospitals and Clinic, Iowa City, IA; University of Iowa Hospitals and Clinics, Iowa City, IA

Study Objectives: Ketamine is a commonly accepted treatment for excited delirium by out-of-hospital providers. When a novel treatment, previous research quoted intubation proportions between 57-63%. We investigated the emergency department (ED) intubation proportion after out-of-hospital ketamine administration for excited delirium in our system.

Methods: Retrospective cohort study of adult patients receiving ketamine in the out-of-hospital setting for excited delirium transported to a Midwestern 60,000-visit Level 1 trauma center ED between January 2017- October 2019. We conducted descriptive analyses of patient-level clinical conditions and out-of-hospital and ED vital signs. The primary outcome was proportion of patients intubated.

Results: Of the 48 patients receiving ketamine in the out-of-hospital setting, 65% were male, 88% were white, and the mean age was 38 years. Approximately 25% of patients had a history of depression, 15% had bipolar disorder, and 10% had schizophrenia. Twenty-five (52%) patients were admitted with 23% of them to the intensive care unit. Overall, 15% (95% CI: 6.1-27.8%) of patients were intubated, and indications included agitation (n=3), airway protection NOS (n=3), and respiratory failure (n=1).

Conclusion: Endotracheal intubation after out-of-hospital ketamine was uncommon in this cohort of excited delirium patients. Previous studies have noted higher proportions of subsequent intubation after out-of-hospital administration of ketamine for excited delirium. In our study population, we found a substantially lower proportion of intubation, which may be due to differences in studied population, improved provider awareness of ketamine effects, or other factors not measured.

414 Going Vertical: A Prospective Comparison of Extraction Times for Priority Patients Identified by Triage Tags versus Colored Flags in a Simulated Mass Casualty Incident

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Study Objective: Triage is the process of sorting patients based on illness severity and is used during mass casualty incidents (MCIs) for prioritizing treatment and transport. On average, 10% of MCI patients are identified as priority (Immediate/Red). Outcomes for these patients are highly dependent on rapid identification, treatment, and transport. Several methods exist to mark [priority] patients for rapid extraction to a casualty collection point, but there is no gold standard. We hypothesized that identifying MCI patients with a vertical cue, triage flag (TF), would result in faster extraction times than those with a wrist triage tag (TT) alone.

Methods: BDLS-trained first-year medical students were recruited for this prospective randomized cross-over study. Two 1,568 square-foot fields (TTs or TTs plus TFs) were each arranged with 32 randomly placed, triaged, pre-marked manikins (10-red, 17-yellow, 5-black). The total time for participants to report the TT barcode number via radio of only the priority manikins, a proxy for the extraction process, was recorded.

Results: Eighty-two students participated. The average (SD) completion times for the "tags" and "flags" arms were 94.5s (16.4) and 70.7s (13.2), respectively, with an average decrease of 23.8s ($p<0.0001$), or a 25.2%-time reduction, favoring the "flags" arm.

Conclusion: Using a vertical cue, such as a triage flag, may decrease the time to extract high priority patients. A portable, rapidly deployable, and visually apparent triage marker may allow faster identification, by extraction teams, of specific patients across a field of multiple victims of varying injury severity, than a flat horizontal triage tag.

415 Withdrawn

416 Withdrawn

TF 417 Climate Change and Human Health for the Practicing Clinician

Lou V/University of Rochester Medical Center, Rochester, NY

Introduction: In 2016, the American College of Physicians (ACP) published a position paper that identified tackling climate change as an opportunity to dramatically improve human health. It states that physicians should support efforts to mitigate and adapt to the effects of climate change and engage the public, their colleagues, community, and lawmakers about the health risks posed by climate change. However, many medical students and physicians feel that they have minimal understanding of the linkages between climate change and human health. A 2013 survey found that 34-40% of each year's graduating medical students between 2009-2013 believed that their instruction in environmental health was inadequate. This curriculum aims to address this educational gap by leading all graduating 4th year medical students in a planetary health module.

Study Objectives: 1) Explain how shifts in climate, natural resources, technology, economy and demography may affect the provision of health care in the future; 2) Apply critical appraisal and science communication skills to describe climate health risks; 3) Apply systems thinking and multidisciplinary perspectives to develop strategies to promote health service sustainability; 4) Advocate for planetary health values in physicians groups and national conversation.

Methods: All 4th year medical students graduating from the University of Rochester take a month-long course called "Successful Interning." The planetary health module will be held as part of this course. Students will have prerequisite reading to complete before starting the course. There will be a 1-hour Power Point lecture outlining the basic principles behind climate change and the link to human health. Following this, the students will gather in small groups based on the region they will be in for their residency for a 2-hour workshop. Faculty mediators will facilitate discussion on how each region will be affected by climate change, assist students in outlining exposure pathways, and help students discover what their specialty should expect in terms of patient experience and health effects stemming from these changes. At the end of the workshop, each group will briefly present the following: How the region they are practicing, and their patients will be affected by climate change, and a strategy for climate adaptation/mitigation. Course evaluation will be conducted by pre- and post-course REDCap surveys determining self-perceived knowledge. At the end of their intern year, students will be emailed a follow-up survey asking how relevant they feel the course content is to their current practice. Due to changes in course scheduling related to COVID-19, this course could not be carried out as planned. A one-hour lecture on planetary health for the practicing clinician was substituted, with the intent to return to the original full-length format next spring.

Conclusion: The goal of this curriculum is to provide future physicians with the background and skills to tackle climate change in order to improve human health and avoid dire environmental consequences. Participants will learn strategies for climate adaptation and mitigation specific to their region and future practice population.

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Abstracts will be peer reviewed in a blinded manner for presentation at the 2021 Research Forum. Abstracts that are judged to be scientifically valid with important information that has potential to directly impact patient care will be scored more favorably.

Notification letters will be emailed on or before July 1, 2021. We regret that we cannot give notification by information by telephone.

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Presenters will be evaluated in real time by members of the ACEP Research Committee. Based on presentation quality, research methodology, and potential clinical impact, recipients of the following will be selected:

1. **Best Abstract Award**
2. **Best Young Investigator Award**
   Assistant professor or instructor level within first five years of faculty appointment
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Abstracts must meet the following submission criteria:

1. Abstracts should represent original research that has not been published in manuscript or abstract form. Case reports or subject reviews are not considered original research.
2. Abstracts submission instructions will be available on ACEP's Web site beginning in March, 2021. **Abstracts must be submitted electronically by 4:00pm Central Time, Friday, May 21, 2021.**
3. Abstracts must adhere to the *Annals of Emergency Medicine format with the following subheadings:* title, study objectives, methods, results, and conclusion.
4. Abstracts are limited to 3000 characters not including spaces. Accepted abstracts will be published as received; no copy editing will be performed.
5. A small table or figure will be accepted. Figures must be black and white with at least 300 dpi and counts as the 3000 character limit.
6. Authors should not be identified in any way on the page containing the abstract.

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