9th ANNUAL

William G. Barsan Emergency Medicine Research Forum

North Campus Research Complex
Ann Arbor, MI

April 10, 2024

UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
MICHIGAN MEDICINE

William G. Barsan
Emergency Medicine Research Forum

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SLIDESHARE: http://slideshare.net/U-MDepartmentofEmergencyMedicine

- **Video Recording**

All of today's activities will take place in the dining hall of the NCRC. Upon arrival be sure to check in at the registration desk. If you need any assistance during the event, please visit the registration desk.
All speaker presentations will be recorded for those unable to attend the event. As a courtesy to the videographer, please limit distractions and extraneous noises during all presentations. Photographers and videographers will be present throughout the forum. Photos may be used to populate the website, accompany post-event press releases, and in selected print publications.

- **CME information coming soon.**

Welcome to the Ninth Annual William G. Barsan Emergency Medicine Research Forum

We welcome you to the ninth annual William G. Barsan Emergency Medicine Research Forum celebrating the research mission of our department and our collective endeavor to create the future of emergency medicine through research. Thanks to the dedication and creativity of our faculty and staff, our research mission continues to flourish! Today, we celebrate accomplishments and plant the seeds for continuing leadership.

We are pleased to welcome ***John Vozenilek, MD,*** *Duane and Mary Cullinan Endowed Professor of Clinical Emergency Medicine, University of Illinois and* ***Jonathan Handler, MD,*** *as our invited speakers. Dr. Vozenilek* is the Chief Medical Officer of the Jump Trading Simulation and Education Center at the University of Illinois College of Medicine. He will be presenting, *"From Insight to Action, Medical Simulation for New Value Creation". Dr. Handler* is the Senior Fellow for Innovation at OSF HealthCare and an Adjunct Associate Professor, Northwestern University's Feinberg School of Medicine. He is board certified in Emergency Medicine as well as Clinical Informatics. He will be presenting *"The AI Transformation Coming to Emergency Medicine."*

John Vozenilek, MD

Jonathan Handler, MD

Please use this event to step away from hectic day-to-day activities and to immerse yourself in the innovative work being done by your colleagues. It's a chance to absorb new information and connect with others with similar interests. We invite you use this opportunity to learn about your colleagues' work and explore ways to collaborate as we continue to transform and lead the field of Emergency Medicine.

Here's to a great day ahead!

Robert W. Neumar, MD, PhD FACEP
Professor and Chair, Emergency Medicine

Frederick Korley, MD, PhD
Professor & Associate Chair for Research, Emergency Medicine

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William G. Barsan
Emergency Medicine Research Forum

Wednesday, April 10, 2024 – NCRC Dining Hall

Time	Event
8:00 - 8:30	Registration & Breakfast
8:30 - 8:40	**Welcome & Opening Remarks** Frederick Korley, MD, PhD, Associate Chair of Research
8:40 - 8:45	**Introduction of Keynote Speakers** Frederick Korley, MD, PhD, Associate Chair of Research
8:45 - 9:15	**Keynote speaker** **Jonathan Handler, MD, FAMIA** Senior Fellow for Innovation at OSF HealthCare, Adjunct Associate Professor at Northwestern University's Feinberg School of Medicine, Board-certified in Emergency Medicine and Clinical Informatics. *"The AI Transformation Coming to Emergency Medicine"*
9:15 - 9:25	Questions
9:25 - 9:55	**Keynote speaker** **John Vozenilek, MD** Chief Medical Officer of the Jump Trading Simulation and Education Center, Duane and Mary Cullinan Endowed Professor for Simulation Outcomes, The University of Illinois College of Medicine *"From Insight to Action, Medical Simulation for New Value Creation"*
9:55 - 10:05	Questions
10:05 - 10:20	BREAK
10:20 - 10:30	**Hayley Falk** PhD Candidate *"A Clinical Language Model to Detect Acute Traumatic Intracranial Injury from Free-Text Radiology Reports"*
10:30 - 10:40	**Sam Chao, MD** Chief Resident, EM4 *"Informed Consent Before Educational Ultrasound"*
10:40 - 10:50	**Keith Kocher, MD** Associate Professor, Emergency Medicine & Learning Health Sciences; Research Investigator, Veterans Affairs Center for Clinical Management Research (CCMR); Director of Michigan Emergency Department Improvement Collaborative (MEDIC) *"Emergency Department Based Episodes of Care: A Novel Approach to Understanding Our Value"*

10:50 - 11:00	**Alex Janke, MD** Clinical Instructor, Emergency Medicine *"The Science of Diagnostic Errors and Opportunities in Emergency Medicine"*
11:00 - 11:10	**Prashant Mahajan, MD, MPH, MBA** Professor, Emergency Medicine & Department of Pediatrics; Vice-Chair, Department of Emergency Medicine; Division Chief, Pediatric Emergency Medicine "Clinical Decision Making in the context of the Young Febrile Infant - Decision Rules to Transcriptomics "
11:10 - 11:30	BREAK
11:30 - 12:00	**LUNCH**
12:00 - 1:00	**POSTER SESSION**
1:00 - 1:15	**Awards Presented** William Barsan, MD - Professor, Emergency Medicine
1:15 - 1:25	**Laura Seewald, MD** Clinical Assistant Professor, Emergency Medicine Research Assistant Professor, UM Institute for Firearm Injury Prevention *"Rates and Correlates of Firearm Storage Behaviors among Parents of Teens: Results from a Nationally Representative Survey"*
1:25 - 1:35	**Cemal Sozener, MD** Clinical Associate Professor, Emergency Medicine *"NIH StrokeNet: The MOST Clinical Trial"*
1:35 - 1:45	**Regina Royan. MD** Clinical Assistant Professor, Emergency Medicine *"Disparities in EMS use, prehospital notification, and symptom onset to emergency department arrival in patients with acute stroke"*
1:45 - 2:15	**Fireside Chat with Dr. Neumar** Frederick Korley, MD, PhD, Associate Chair of Research
2:15 - 2:30	**Closing Remarks** Frederick Korley, MD, PhD, Associate Chair of Research

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Emergency Medicine Research Forum

Robert Neumar, MD, PhD FACEP

Professor and Chair, Emergency Medicine

Robert Neumar is Professor and Chair of Emergency Medicine at the University of Michigan Medical School. He is the Chair-elect for the International Liaison Committee on Resuscitation (ILCOR) and the immediate past Chair of the American Heart Association Emergency Cardiovascular Care Committee. He has over 20 years research experience in cardiac arrest resuscitation, with international recognition as an expert in advanced cardiovascular life support (ACLS) and the pathophysiology and treatment of post-cardiac arrest syndrome. His research has focused on mechanisms of brain injury caused by cardiac arrest and the neuroprotective strategies including hypothermic-targeted temperature management.

Frederick Korley, MD, PhD

Professor, Emergency Medicine
Associate Chair, Research

Dr. Fred Korley is an Associate Professor and Associate Chair for research in the department of Emergency Medicine at the University of Michigan. He completed his medical degree and residency in emergency medicine at the Northwestern University where he served as chief resident. He subsequently completed a doctoral degree in clinical investigation at the Johns Hopkins University Bloomberg School of Public Health and was elected to Phi Beta Kappa. He was formerly on faculty at Johns Hopkins University as the inaugural recipient of Robert E. Meyerhoff Endowed Professorship. Dr. Korley's research work is focused on the development of novel diagnostics and therapeutics for traumatic brain injury (TBI). He has two patents for biofluid-based biomarkers for brain injury detection and outcome prognostication. He leads a number of NIH and DOD funded studies validating blood-based biomarkers of brain injury. He also leads clinical trials in emergency care. Dr. Korley is the recipient of the 2021 Society of Academic Emergency Medicine (SAEM) Mid-Career Investigator Award.

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Keynote Speakers

John Vozenilek, MD works primarily across two wonderful entities in central Illinois; University of Illinois College of Engineering (BioEng) and Health Care Systems Engineering Center https://healtheng.illinois.edu and as Chief Medical Officer for Digital Health and Innovation, leading OSF Innovation and the OSF Jump Center https://jumpsimulation.org. At OSF, the work began as charge to incorporate design and engineering into our healthcare work. Currently, the simulation center allows designers and engineers to observe and characterize "work as performed" for their creative efforts.

As Chief Medical Officer for Digital Health and Innovation, Dr. Vozenilek leads efforts to improve health outcomes; in particular via physician and provider workforce development, in telehealth applications, human centered design work to address disparities in health outcomes due to non-clinical determinants of health, and in the design of interventions addressing cost, quality, patient and provider experience. Under his remit, the "Innovation Discovery Labs" have established key focus areas for healthcare innovation at OSF.

Jonathan Handler, MD, FACEP, FAMIA is the Senior Fellow for Innovation at OSF HealthCare and an Adjunct Associate Professor at Northwestern University's Feinberg School of Medicine. Dr. Handler is board-certified in Emergency Medicine as well as Clinical Informatics. He has previously served as the Chief Deployment Architect at Microsoft's Health Solutions Group, Vice President of Digital Innovation at Baxter Healthcare Corporation, Chief Medical Information Officer at M*Modal, Director of Emergency Medicine Research and Informatics at Northwestern University, Director of Development at the National Institute for Medical Informatics at Medstar Health, and Senior Vice President of Strategy at EmOpti.

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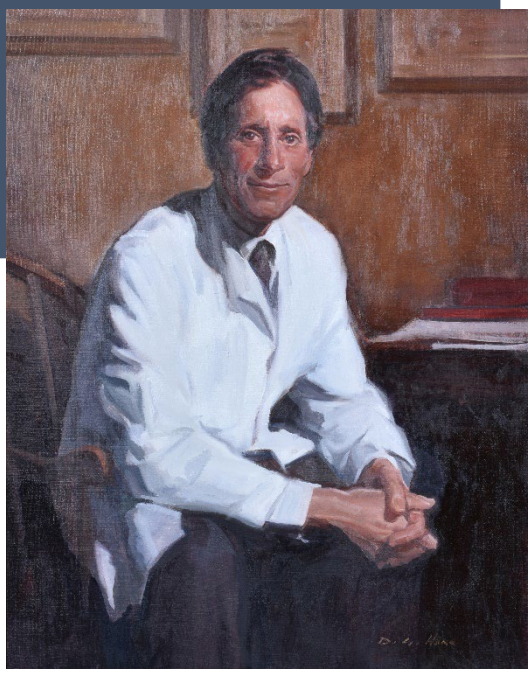
William G. Barsan, MD

Professor, Emergency Medicine



William Barsan is Professor and former Chair of the Department of Emergency Medicine at the University of Michigan Medical School. He led the development of an Emergency Medicine Residency at the University of Michigan and spear-headed the creation of the Department of Emergency Medicine within the medical school in 1999.

Dr. Barsan's initial academic focus was translational research in stroke and neurological emergencies. He was the only emergency medicine investigator in the initial studies evaluating tPA in ischemic stroke and he was part of the team that designed the pivotal NINDS tPA trial as well as the NIH Stroke Scale. Since 2006, he has been the Principal Investigator of the Clinical Coordinating Center for the Neurological Emergencies Treatment Trials Network (NETT). In 2010, Dr. Barsan was also Principal Investigator on the ADAPT-IT (Accelerating Drug and Device Evaluation through Innovative Clinical Trial Design) project funded by NIH and FDA for advances in regulatory science. The ADAPT-IT project has been instrumental in promoting the use of adaptive clinical trial designs in confirmatory phase clinical trials and evaluating the advantages and barriers to adaptive design strategies.

In 2018, Dr. Barsan became the inaugural Principal Investigator of the Clinical Coordinating Center for the Strategies to Innovate Emergency Care Clinical Trials Network (SIREN). This network seeks to improve the outcomes of patients with neurologic, cardiac, respiratory, hematologic, and trauma emergencies. He is currently a Principal Investigator of two NIH funded clinical trials in severe TBI being conducted in the SIREN network, BOOST3 (Brain Oxygen Oxygenation in Severe TBI, Phase 3) and Hyperbaric Oxygen Brain Injury Treatment Trial (HOBIT).

Dr. Barsan is recipient of numerous awards, including Hal Jayne Academic Excellence Award from SAEM, the Peter Rosen Academic Leadership Award from AAEM, the ACEP Award for Outstanding Contributions in Research and the SAEM Leadership Award. Dr. Barsan has served as president for several academic organizations, including the Society for Academic Emergency Medicine, the American Board of Emergency Medicine and the Association for Academic Chairs of Emergency Medicine. He was elected to membership in the National Academy of Sciences Institute of Medicine in 2003.

William G. Barsan
Emergency Medicine Research Forum

Speaker Information

Hayley Falk

PhD Candidate
Department of Computational Medicine & Bioinformatics

"A Clinical Language Model to Detect Acute Traumatic Intracranial Injury from Free-Text Radiology Reports"

Samantha Chao, MD

Chief Resident, EM4
Department of Emergency Medicine

"Delphi on the ethics of education US scans"

Keith Kocher, MD

Associate Professor, Emergency Medicine
Associate Professor, Learning Health Sciences
Research Investigator, Veterans Affairs Center for Clinical Management Research
Director, Michigan Emergency Department Improvement Collaborative (MEDIC)

"Emergency Department Based Episodes of Care: A Novel Approach to Understanding Our Value"

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Speaker Information

Alex Janke, MD

Clinical Instructor, Emergency Medicine

"The Science of Diagnostic Errors and Opportunities in Emergency Medicine"

Prashant Mahajan, MD, MPH, MBA

Professor, Department of Emergency Medicine,
Division of Pediatric Emergency Medicine
Professor, Department of Pediatrics
Vice-Chair, Department of Emergency Medicine
Division Chief, Pediatric Emergency Medicine

"Clinical Decision Making in the context of the Young Febrile Infant - Decision Rules to Transcriptomics "

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Speaker Information

Laura Seewald, MD

Clinical Assistant Professor, Emergency Medicine
Research Assistant Professor, UM Institute for Firearm Injury Prevention

“Rates and Correlates of Firearm Storage Behaviors among Parents of Teens: Results from a Nationally Representative Survey”

Cemal Sozener, MD

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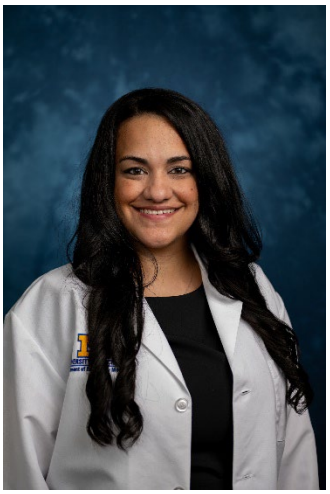
"NIH StrokeNet: The MOST Clinical Trial"



Regina Royan, MD

Clinical Assistant Professor, Emergency Medicine

“Disparities in EMS use, prehospital notification, and symptom onset to emergency department arrival in patients with acute stroke”

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MEDIC
MICHIGAN EMERGENCY DEPARTMENT IMPROVEMENT COLLABORATIVE

Michigan Emergency Department Improvement Collaborative (MEDIC)

Overview

The Michigan Emergency Department Improvement Collaborative (MEDIC) is dedicated to improving the quality of emergency department (ED) care across the state of Michigan. Launched in 2015, MEDIC is an integrated adult and pediatric, emergency medicine-led Collaborative Quality Initiative (CQI) supported by Blue Cross Blue Shield of Michigan and Blue Care Network. We leverage our shared knowledge and experience combined with timely feedback on quality measure performance to improve the care for our patients. Participating EDs submit data to a clinical registry maintained by the MEDIC Coordinating Center, and together we collect and analyze data, identify best practices, and improve our collective performance. The program Coordinating Center is housed at Michigan Medicine.

Goals & Objectives

MEDIC has established several quality improvement initiatives focusing on the care of children and adults:

1. Reduction of CT scan utilization in adults and children with minor head injuries
2. Increased diagnostic yield of CT scans for suspected pulmonary embolism in adults
3. Reduction of chest x-ray use for evaluation of asthma, bronchiolitis, and croup in children
4. Increased safe discharge rate for adults with low risk chest pain
5. Optimizing care for children with uncomplicated asthma
6. Increase distribution of naloxone for patients at risk for opioid harm

Results

Since launching in 2015, MEDIC continues to develop, growing from initially 8 participating EDs within the network to over 40 EDs in 2024. Currently, there are over 9 million ED encounters in the clinical data registry. Partner hospitals are actively engaged in quality improvement efforts, with MEDIC demonstrating year-over-year gains across all active quality initiatives:

QI Initiative	Year Initiated	Baseline Rate	Current Rate*
Increase rate of appropriate head CT **use** in *adult* patients with minor head injuries ⇧	2017	41.4%	60.6%
Decrease rate of **utilization** for intermediate risk head CTs in *pediatric* patients with minor head injuries ⇩	2017	23.6%	15.5%
Increase **diagnostic yield** from chest CTs in cases of suspected pulmonary embolism ⇧	2018	8.4%	8.2%
Reduce rate of chest x-ray **use** in *pediatric* cases of respiratory disease ⇩	2018	46.0%	19.9%
Increase the rate of **safe discharge** for *adult* low risk chest pain ⇧	2020	89.2%	95.2%
Increase the percentage of time that **steroids are administered within 60 minutes** of ED arrival in *pediatric* patients with asthma	2020	44.9%	50.7%
Increase rate of naloxone **distribution (point of care provision, prescribing)** to emergency department patients at risk of harm from future opioid overdose	2023	43.5%	43.5%

For more information on MEDIC: Contact Andy Scott, MEDIC Program Manager, at afscott@med.umich.edu or visit our website at medicqi.org.

For more information on CQIs: Contact cqiprograms@bcbsm.com or visit www.valuepartnerships.com.

M | INJURY PREVENTION CENTER

We are one of nine CDC-funded Injury Control Research Centers in the U.S.

Working with a truly multidisciplinary team, we work to address urgent injury issues with research, education, and outreach.

Opioids & Overdose

Suicide

Older Adult Falls

Motor Vehicle Crash

Concussion

Violence

Global Injury Prevention

Adverse Childhood Experiences

Other Emerging Areas

www.injurycenter.umich.edu

@UMInjuryCenter

734-936-9312

Join our injury prevention community!

With learning activities, engaged members, funding opportunities, a resource-rich website, and collaboration opportunities, the U-M IPC provides a way for Injury Prevention scientists and practitioners to connect and grow.

Michigan StrokeNet

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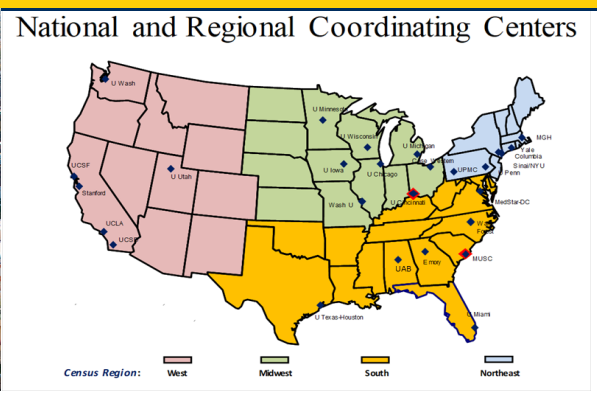
NIH StrokeNet
PREVENTION | TREATMENT | RECOVERY
REGIONAL COORDINATING CENTER



StrokeNet is the primary NIH infrastructure for stroke treatment, prevention and rehabilitation clinical trials - the pipeline for new stroke treatments for both adults and children and fellowship training for the next generation of EM stroke researchers. UM is a founding Regional Coordinating Center member (2013) and funded until 2028 (sites below), the result of 30 years of multidisciplinary stroke collaboration. The National Network encompasses 296 sites, 3 continents and more than 11,000 enrolled patients. It will soon include EMS stroke research in the newly funded StrokeNet Thrombectomy Platform (STEP) platform, utilizing a Bayesian approach to expand endovascular therapy. If interested in emergency neurovascular care, clinical trials, statistics, health equity, EMS or other stroke-related fields, contact us.

Principal Investigators
Phillip A. Scott, MD, Emergency Medicine, phlsctt@med.umich.edu
Devin L. Brown, MD, MS, Neurology, devinb@med.umich.edu

Sites

Michigan Medicine-University Hospital
C.S. Mott Children's Hospital, Ann Arbor
University of Michigan-West, Grand Rapids
Ascension Providence Hospital, Southfield/Novi
Ascension St. John Hospital, Detroit
Ascension St. Mary's Hospital, Saginaw
Bronson Methodist Hospital, Kalamazoo
Detroit Medical Center-Wayne State University, Detroit Receiving, Sinai-Grace and Children's Hospital of Michigan, Detroit
Henry Ford Health System, Detroit
McLaren Hospitals in Flint, Macomb, Bay City, Lansing and Petoskey
Mercy Health St. Mary's, Grand Rapids
Munson Health Heart & Vascular, Traverse City
Norton Pulmonary Specialists, Louisville, KY
Penn State Hershey Medical Center, Hershey, PA
Summa Health System, Akron, OH
University of Kentucky-University of Kentucky Hospital, Kentucky Children's Hospital, Cardinal Hill Rehabilitation Hospital, Lexington, KY
VA Ann Arbor Health System

Trials

ASPIRE Anticoagulation for Stroke Prevention and Recovery after ICH
CAPTIVA and **CAPTIVA-MRI** Comparison of Anti-coagulation and Anti-Platelet Therapies for Intracranial Vascular Atherostenosis
CREST-H Carotid Revascularization and Medical Management for Asymptomatic Carotid Stenosis - Hemodynamics
CREST-2 Carotid Revascularization and Medical Management for Asymptomatic Carotid Stenosis
FOCAS Focal Cerebral Arteriopathy Steroids
I-ACQUIRE Perinatal Arterial Stroke: A Multi-Site RCT of Intensive Infant Rehabilitation
SATURN Statins Use in Intracerebral Hemorrhage
SISTER Strategy for Improving Stroke Treatment Response
SLEEPSMART Sleep for Stroke Management and Recovery Trial, Devin Brown, MD, MPI
FASTEST rFVIIa for Acute Hemorrhagic Stroke Administered at Earliest Time Trial
MOST Mult-Arm Optimization of Stroke Thrombolysis
RHAPSODY Recombinant variant of Human Activated Protein C (APC), in combination with tPA in acute hemispheric ischemic stroke
I-ACQUIRE Perinatal Arterial Stroke: A Multi-Site RCT of Intensive Infant Rehabilitation
TRANSPORT2: TRANScranial Direct Current Stimulation for POst-stroke Motor Recovery A phase II sTudy
VERIFY Validation of Early Prognostic Data for Recovery Outcome after Stroke for Future, Higher Yield Trials

I am a...

physician , **engineer** , **nurse** , **pharmacist** ,

basic scientist *or* **[other]**

...and I need research support.

The Weil Institute empowers critical care researchers of **all stripes.**

Across the University of Michigan, members of the Max Harry Weil Institute for Critical Care Research and Innovation are transforming critical care through groundbreaking research.

Our unique approach uses multidisciplinary team science, big data analytics, specialized funding sources, and tailored commercialization pathway plans to push research from the bench to real applications in patient care.

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From nurses to engineers, our members are developing hundreds of technologies and therapies to diagnose patients sooner, treat them faster and more safely, and extend care beyond the physical walls of the hospital.

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We turn concepts into realities through our entrepreneurship & commercialization expertise.

Transformative technologies don't get to the patient's bedside by themselves. Our knowledge of IP and the market, and our ability to develop new companies and work with industry partners are key ingredients to saving lives.

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Grant Proposals

Funded Research

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The Max Harry Weil Institute FOR CRITICAL CARE RESEARCH & INNOVATION

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We support our members by providing the guidance and resources they need to take their research from idea to real applications in patient care.

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Proposal Development

Consulting and support services to help multidisciplinary teams collaboratively develop compelling grant proposals.

Data Science

Harnessing data to develop models which predict patient outcomes and analyzing data for new technology insight.

Preclinical Critical Care Lab

Generating high-fidelity large animal models of multisystem disease and injury including ARDS, sepsis, trauma, cardiac arrest, and traumatic brain injury.

Clinical Research

Assisting Weil Institute critical care investigators with patient recruitment, IRB submissions, and data collection and processing.

Commercialization Coaching

Strategically collaborating with Weil Institute PIs and teams to propel products to commercial viability.

Special Events

Hosting member events to promote networking, training, education and funding opportunities.

Weil Institute
FOR CRITICAL CARE RESEARCH & INNOVATION

Weil.Institute.info@umich.edu

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INSTITUTE FOR FIREARM INJURY PREVENTION
UNIVERSITY OF MICHIGAN

DIVERSE PERSPECTIVES, COMMON GOALS

THE INSTITUTE FOR FIREARM INJURY PREVENTION

Firearms were responsible for more than 48,830 deaths across the United States in 2021, and the national crisis is growing more intense every year. As the nation's largest public research university, the University of Michigan is generating new knowledge and advancing innovative solutions to reduce firearm injuries and deaths.

ADVANCING RESEARCH

The Institute generates multidisciplinary, evidence-based research to decrease firearm injuries and deaths, all while respecting the rights of law-abiding citizens to legally own firearms.

ENGAGING COMMUNITIES

The Institute develops and strengthens partnerships with urban and rural communities so that, together, they can implement research-based solutions that spark positive societal change.

BUILDING THE PIPELINE

The Institute educates and trains a diverse, next generation of researchers who can focus their efforts on exploring firearm injury prevention from a variety of diverse disciplines.

AREAS OF RESEARCH

The Institute explores firearm injury across the lifespan in an effort to identify and implement solutions. Its multidisciplinary team is especially focused on reducing firearm injuries caused by:

- FIREARM SUICIDE
- COMMUNITY FIREARM VIOLENCE
- SCHOOL AND MASS SHOOTINGS
- INTIMATE PARTNER FIREARM VIOLENCE
- UNINTENTIONAL OR ACCIDENTAL FIREARM INJURIES
- LETHAL POLICE FORCE

Much more can be done to address this national crisis. Visit firearminjury.umich.edu to learn more about how you can help support firearm injury prevention research at U-M.

Scan to learn more

Clinical Coordinating Center

Cardiovascular and neurological illness and injury, such as strokes, cardiac ischemia, hemorrhagic and neuro trauma, seizures, and cardiac arrest require immediate treatment.

SIREN studies interventions implemented rapidly by paramedics in the field or by physicians in the Emergency Department, and often continued in a critical care unit.

SIREN evolved from the Neurological Emergencies Treatment Trials (NETT) network.

SIREN brings neurologists, cardiologists, emergency physicians, traumatologists, intensivists, and neurosurgeons together with other researchers to learn how to best treat patients with neurological and cardiovascular emergencies.

SIREN allows efficient investigation of treatments in the challenging acute care environment. The network develops and performs multiple simultaneous clinical trials in a large national multicenter network.

SIREN enables exciting opportunities to innovate, learn, and improve emergency care.

SIREN is a collaboration coordinated at the University of Michigan between the NIH and sites around the country

NIH National Institute of Neurological Disorders and Stroke

NIH National Heart, Lung, and Blood Institute

SIREN Emergency Clinical Trials Network

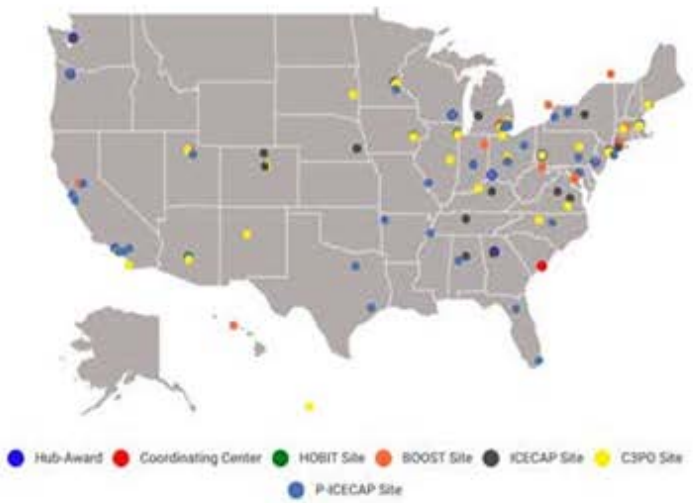
HO$_2$BIT

BOOST-3

C3PO

ICECAP

P-ICECAP



The Specific Aims of the SIREN CCC at the University of Michigan are:

- To diligently recruit, efficiently perform, and widely disseminate the most scientifically and **clinically important trials in emergency patient care**
- To create a **culture of clinical trials that is collaborative**, multidisciplinary, diverse and inclusive through leadership, openness, and engagement
- **To transform the emergency research enterprise** through innovative design, patient stakeholder engagement, better operational strategies

siren.network

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Emergency Medicine Research Forum

Poster Session

Poster Number	Presenter	Project/Poster Title
1	Emily Ager	Perceptions of a Novel EMS-Based Naloxone Distribution Program Among People who Use Drugs
2	Emily Ager	Experiences with A Novel Leave-Behind Naloxone Program Among Emergency Medical Services Personnel
3	Emily Ager	Emergency Department Visits For Early Pregnancy Complications: A Statewide Registry-Based Study
4	Brandon Cummings	External Validation and Comparison of a General Ward Deterioration Index Between Diversely Different Health Systems
5	Brittany Baur	Evaluating the Performance of Predictive Clinical AI/ML Tools After Deployment
6	Sardar Ansari	Monitoring Dataset Shift in Clinical AI/ML Models during the Post-Deployment Phase
7	Sardar Ansari	Strategies for Deploying Artificial Intelligence to Complement Physician Diagnoses: An Application to Acute Respiratory Distress Syndrome Diagnosis
8	Lauren Bonnett	Descriptive Abstract for OGBA Research ctled “Bridging the Oral-Gut-Brain gap: Development of in vitro oral biofilm model & its implications on neurodegenerative disease
9	Abigail Bretzin	Narrative Review of Mechanism of Injury in Men and Women’s Soccer and Lacrosse among Ivy League Schools: Preliminary Findings from the Ivey League Big Ten Epidemiology of Concussion
10	Abigail Bretzin	Sleep symptomology and concussion recovery: Findings from the Ivy League-Big Ten Epidemiology of Concussion Study
11	Shannon VanAken	Adjuvant Heat treatment for catheter salvage in central line associated bloodstream infection (HEATSAVE)
12	Rachael Tesorero	Behavior Cuing in Student Assessments Improves Feedback Concordance
13	Alexis Davis	Development of an Ultrasound-based Flow-Pressure Index for the Assessment of Cerebrovascular Autoregulation
14	John Greco	Implementation of a quality improvement toolkit and incentive program is associated with decreased chest x-ray utilization for asthma, bronchiolitis, and croup in a statewide emergency department network
15	Nate Haas	Glycemic variability following traumatic brain injury: utilizing a continuous glucose monitor in the golden hours to improve patient outcomes
16	Lisabeth Hernandez	The Role of the Gut Microbiome in Traumatic Brain Injury

17	Jake Hirschl	An Unexpected Cause of Generalized Weakness
18	Yashashree Marne	Evaluating a Simulant Overdose Definition Based on EMS Record Test Using Linked EMS-Hospital Data from Two ann Arbor, MI Hospitals
19	Heather Molvik	Emergency Medicine Residency Ultrasound “Bootcamp”: Advancing the Proficiency and Confidence of First-Year Residents
20	Shoshana Rudin	Creating Leaders from Within: Development of a Longitudinal Leadership Curriculum for Emergency Medicine Residents
21	Florian Schmitzberger	Dose-Dependent Effect of Intranasal Insulin in Humans Using Functional MRI
22	Laura Seewald	Rates and Correlates of Firearm Storage Behaviors among Parents of Teens: Results from a Nationally Representative Survey
23	Jordan Sell	Emergency Department Ultrasound Guided Regional Anesthesia—Experience with 155 Nerve Blocks
24	Zachary Sharpe	Automated Analysis of Arterial Waveforms and Diastolic Blood Pressure During Cardiopulmonary Resuscitation in a Swine Cardiac Arrest Model
25	Phillip Stallworth	Rates and factors associated with risky firearm carriage and discharge among young adults presenting to four urban emergency departments
26	Keara Sullivan	Using Near Real-time Data to Enhance Coordinated Community Responses to Opioid Overdose in Genesee County, MI
27	Ina Prevalska	A cross-sectional survey to identify the state of point-of-care ultrasound in rural emergency departments in Michigan’s Upper Peninsula
28	Ina Prevalska	What's the Bug? An Unusual Case of Bacterial Ameningitis in a patient with history of transsphenoidal surgery
29	Ina Prevalska	High-flow nasal cannula vs non-invasive ventilation as initial treatment in acute hypoxia: A propensity score matched study
30	Shalini Kota	Evaluation of Low-Field MRI use in the ED to Improve Patient Accessibility to Diagnostic Imaging

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1. Perceptions of a Novel EMS-Based Naloxone Distribution Program Among People Who Use Drugs

Emily Ager, Ella Purington, Megan Purdy, Brian Benenati, Jessica Baker, CJ Schellack, Graham Smith, Nate Hunt, Eve Losman

Background: Access to naloxone, a key harm reduction tool to reverse opioid overdoses, remains variable. After an opioid overdose, interactions with Emergency Medical Services (EMS) personnel may be the only contact point with the healthcare system for people who use drugs (PWUD), particularly for patients who decline transport to a health care facility. Therefore, novel EMS-based leave-behind naloxone (LBN) programs that allow EMS personnel to distribute and provide naloxone training at the scene of an opioid overdose provide an important avenue for harm reduction. No studies describe the acceptability of LBN programs among PWUD. Our objective was to explore the experiences of PWUDs with LBN programs using qualitative methods.

Methods: We conducted semi-structured telephone interviews using purposive sampling among residents of local recovery housing. Participants were compensated with anonymized Visa gift cards. The interview guide was developed using the Consolidated Framework for Implementation Research. During interviews, participant responses were paraphrased and quotes were transcribed verbatim. Data were analyzed using a rapid assessment method that included inductively coding data immediately following each interview. Five reviewers evaluated the responses to identify patterns; a sixth reviewer reconciled discrepancies. The primary outcome was stated support for LBN programs.

Results: Eleven interviews were conducted. Eight participants reported experiencing or witnessing an opioid overdose in the previous 90 days; four stated 911 was called. Common reasons for not seeking emergency care were fear of law enforcement presence and criminalization of substance use, or an individual recovered after a bystander gave naloxone. All but one participant supported LBN programs being implemented in the community, would feel comfortable receiving naloxone training from EMS personnel, and agreed LBN programs were a good strategy to increase naloxone access. The majority of participants felt “very comfortable” administering naloxone and had previously administered naloxone.

Conclusion: This study provides the first evidence of the acceptability of and support for LBN programs among PWUD. EMS and harm reduction communities should support the expansion of LBN programs across the US. Expansion of “Good Samaritan” laws can help mitigate fear of legal consequences at the scene of drug emergencies.

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2. Experiences with a Novel Leave-Behind Naloxone Program Among Emergency Medical Services Personnel

Emily Ager, Ella Purington, Megan Purdy, Brian Benenati, Jessica Baker, CJ Schellack, Graham Smith, Nate Hunt, Eve Losman

Background: Leave-behind naloxone programs (LBNP) are a novel strategy for Emergency Medical Services personnel (EMSP) to distribute naloxone to patients or bystanders after an opioid overdose. For patients who decline transport, this may be the only contact point with the medical system. EMSP engagement is critical to an LBNP's success. Prior studies show positive attitudes toward LBNP among EMSP before implementation, but none describe their direct experiences. Our objective was to assess EMSP experiences with LBNP, including facilitators and barriers to naloxone distribution, as well as interest in related education, using qualitative methods.

Methods: We conducted semi-structured telephone interviews using purposive sampling among full-time paramedics at a single EMS agency. Participants were compensated. The Consolidated Framework for Implementation Research was used to develop the interview guide. For the data analysis, a rapid assessment method was used. Interviewers paraphrased participant responses and transcribed quotes verbatim, then inductively coded data following each interview. Responses were analyzed by five reviewers to identify patterns; a sixth reviewer reconciled discrepancies. The primary outcome was perceived barriers to naloxone distribution.

Results: There were 18 participants; 16 had distributed a naloxone kit after an opioid overdose. The majority of participants were aware of their LBNP, agreed EMS agencies should have LBNP, and felt well-trained to provide naloxone teaching. Barriers to distribution included forgetting, patient acuity, patient declining a kit, and perceived liability if misused. Several participants stated providing naloxone encourages opioid use. Facilitating factors included having a clear protocol, well-packaged and easily accessible kits, and minimal documentation burden. Half of participants expressed interest in learning more about addiction and harm reduction for substance use.

Conclusion: This novel study identified several modifiable barriers to the success of LBNP, such as EMSP forgetting to leave a kit. Several participants expressed a negative bias toward naloxone and substance use. Optimistically, there was a moderate degree of interest in learning more about harm reduction, which may lead to decreased bias. Future studies should focus on strategies to eliminate modifiable barriers to naloxone distribution by EMSP.

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3. Emergency Department Visits For Early Pregnancy Complications: A Statewide Registry-Based Study

Emily Ager, Alex Janke, Kristian Seiler, Rachel Solnick, Vanessa Dalton, Keith Kocher, Chris Fung

Objectives: Emergency Department (ED) visits during pregnancy are common. Legal changes in June 2022 reduced access to family planning and abortion services in the US. As a result, ED visits for miscarriage or other early pregnancy complications (EPC) may increase. This may be especially true for states that maintain abortion access, such as Michigan (MI), due to increased number of patients traveling from out of state. We hypothesized that MI ED visits for EPC would increase after June 2022 due to increased visits by non-MI residents.

Methods: This retrospective study used the MI Emergency Department Improvement Collaborative (MEDIC) database, a statewide quality improvement registry. We identified ED visits for female patients with any EPC-related ICD-10 code at continuously enrolled sites from 7/2021 to 6/2023. The primary outcome was the rate of EPC-related visits in the year before and after 7/1/2022, stratified by state residency status (determined by ZIP code associated with the patient's home address). We also described sociodemographic risk factors (age, insurance, race/ethnicity) for revisits and admission using adjusted odds ratios (OR) and 95% confidence intervals (CI).

Results: There were 6,120 ED visits by 5,338 female patients at 26 EDs with an inclusion ICD-10 code during the study period (168 per 100,000 visits). Visit rates among non-MI residents were similar in the year before and after 7/1/2022 (2.05 and 2.84 per 100,000, respectively [95% CI of the difference -0.02 to +0.18]). Overall ED visit rates before and after 7/1/2022 were similar (161 and 176 per 100,000, respectively [95% CI of the difference +0.6 to +2.3]). Across the study period, 11.7% of visits led to a revisit and 28.4% led to admission. Revisits were more likely among patients with Medicaid compared to private insurance (OR 1.17 [95% CI 1.00-1.38]) and Black compared to white patients (OR 1.31 [95% CI 1.09-1.57]). Admission was more likely among older (30-39 years; reference category 18-29 years) (OR 1.28 [95% CI 1.13-1.44]) and Black (OR 1.14 [95% CI 1.00-1.30]) patients.

Conclusion: There was no difference in the rate of ED visits for EPC among non-MI residents in the year after national changes to abortion policy. Publicly insured and Black patients were more likely to have repeat ED visits, which could indicate an increased reliance on the ED for perinatal care. Future studies should explore EPC-related ED visit trends at the national level.

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4. External Validation and Comparison of a General Ward Deterioration Index Between Diversely Different Health Systems

Brandon C. Cummings, Connor J O'Brien, Joseph M. Blackmer, Negar Farzaneh, James D. Glassbrook, Michael D. Roebuck, Michael W. Sjoding, Kevin R. Ward, Sardar Ansari

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Introduction: Dataset shift is one of the most formidable last-mile challenges when implementing a predictive model into a new clinical environment. Changes in clinical practice, data acquisition, or electronic health record (EHR) implementation (among many others) can impact the model's ability to generalize outside its home institution.1-2 These often subtle differences make external validation a key step when moving a model to a new hospital.3-4

To demonstrate, we applied PICTURE, our previously-described model for predicting deterioration in general ward patients,5 to a previously unseen dataset from a second institution with a significantly different patient population. PICTURE was originally designed to predict events such as ICU transfer or cardiac arrest in a large, academic, tertiary-care hospital (Hospital 1). However, as this is not the setting in which most of the US population receives their healthcare,6 we partnered with a local community hospital (Hospital 2) to better understand PICTURE's performance in this group. At both hospitals, we benchmarked our performance against the Epic Deterioration Index (EDI) and the National Early Warning Score (NEWS).7-9

Methods: Both PICTURE and NEWS were applied to all inpatients at both hospitals who were 18-89 years old and had EDI scores. This resulted in 44,202 encounters at Hospital 1, and 11,083 encounters at Hospital 2. Inputs to the model included vital signs, laboratory results, and demographics, and targets were death, unplanned ICU transfer or accommodation, mechanical ventilation, or cardiac arrest within 24 hours of the prediction time. In addition to a direct comparison of the models, performance across demographic groups as well as a simulation of alert threshold selection demonstrates how differences between the institutions can yield differing interpretations of the model outputs.

Results: PICTURE performed consistently between hospitals, with an encounter-level AUROC (95% CI) of 0.870 (0.861-0.878) and 0.875 (0.851-0.902) at Hospitals 1 & 2, respectively, It also outperformed both the EDI and NEWS at both locations (Table 1). Demographic makeup, most notably race and biological sex, was drastically different between the two hospitals, with 19.7% of patients at Hospital 1 identifying as non-White, compared to 49.1% at Hospital 2. PICTURE again performed consistently across racial groups at both hospitals, while all three models performed slightly better in females than males (Table 2). Figure 3 demonstrates the need for adapting alert thresholds between institutions, as the balance between capturing deteriorations (sensitivity) and alarm fatigue (PPV) can change with event rate and other factors.

Conclusion: Dataset shift is a major last-mile challenge when implementing a predictive model outside its original clinical environment. Our model was successfully able to generalize to another hospital with a very different population and practice patterns but required fine-tuning the alert thresholds.

Granularity	Metric	PICTURE		EDI		NEWS	
		Hospital 1	Hospital 2	Hospital 1	Hospital 2	Hospital 1	Hospital 2
Observation	AUROC (95% CI)	0.813 (0.812–0.815)	0.844 (0.841–0.848)	0.769 (0.768–0.770)	0.776 (0.771–0.780)	0.751 (0.749–0.752)	0.777 (0.773–0.781)
	AUPRC (95% CI)	0.077 (0.075–0.078)	0.094 (0.089–0.098)	0.051 (0.050–0.052)	0.060 (0.056–0.063)	0.040 (0.039–0.041)	0.056 (0.053–0.059)
	Prevalence	0.8%	0.6%	0.8%	0.6%	0.8%	0.6%
Encounter	AUROC (95% CI)	0.870 (0.861–0.878)	0.875 (0.851–0.902)	0.830 (0.821–0.840)	0.835 (0.808–0.863)	0.817 (0.806–0.827)	0.819 (0.792–0.851)
	AUPRC (95% CI)	0.298 (0.275–0.320)	0.339 (0.281–0.398)	0.201 (0.182–0.218)	0.231 (0.180–0.276)	0.171 (0.154–0.184)	0.233 (0.180–0.281)
	Prevalence	4.5%	2.5%	4.5%	2.5%	4.5%	2.5%

Table 1: Head-to-Head Evaluation of PICTURE, EDI, and NEWS. Each of the three analytics are evaluated at both Hospital 1 (large academic medical center) and Hospital 2 (community hospital) using AUROC and AUPRC at two levels of granularity. Under the observation-level metrics, predictions are made every 15-20 minutes, and each individual prediction is evaluated independently (e.g. did the patient deteriorate in the next 24 hours?). For encounter-level, the maximum prediction value (prior to deterioration, if present) is compared to the ultimate outcome of the encounter (e.g. did this patient decline during their hospital stay?). Precision (and thus AUPRC) is adjusted to the prevalence at Hospital 2 (0.6% and 2.5% on the observation and encounter-level, respectively). 95% CIs are computed via bootstrap with 1,000 replications to compute pivotal CIs, and are blocked across encounters to ensure randomization between patients.

Demographic Group	Hospital 1					Hospital 2				
	n (%)	PICTURE	EDI	NEWS	Prevalence	*n* (%)	PICTURE	EDI	NEWS	Prevalence
Total	44,202	0.870 (0.859–0.880)	0.830 (0.819–0.841)	0.817 (0.805–0.828)	4.5% (1,998/44,202)	11,083	0.875 (0.848–0.902)	0.835 (0.805–0.864)	0.819 (0.789–0.850)	2.5% (278/11,083)
Race										
Asian	855 (2.0%)	0.845 (0.773–0.917)	0.843 (0.771–0.916)	0.817 (0.740–0.893)	5.5% (45/855)	18 (0.2%)	NA	NA	NA	0% (0/18)
Black	5,575 (12.6%)	0.862 (0.834–0.889)	0.802 (0.771–0.833)	0.820 (0.789–0.850)	5.1% (282/5,575)	5,044 (45.5%)	0.887 (0.850–0.924)	0.857 (0.816–0.897)	0.834 (0.792–0.877)	2.6% (133/5,044)
White	35,480 (80.3%)	0.871 (0.860–0.882)	0.835 (0.822–0.847)	0.816 (0.803–0.829)	4.4% (1,561/35,480)	5,641 (50.9%)	0.863 (0.824–0.903)	0.815 (0.771–0.859)	0.801 (0.755–0.846)	2.4% (135/5,641)
Other	2,292 (5.2%)	0.878 (0.835–0.920)	0.830 (0.783–0.878)	0.824 (0.775–0.872)	4.8% (110/2,292)	380 (3.4%)	0.865 (0.720–1)	0.804 (0.638–0.969)	0.867 (0.721–1)	2.6% (10/380)
Ethnicity										
Hispanic/ Latino	1,196 (2.7%)	0.908 (0.870–0.952)	0.823 (0.766–0.891)	0.821 (0.756–0.888)	3.9% (47/1,196)	258 (2.3%)	0.703 (0.426–1.00)	0.698 (0.496–0.912)	0.732 (0.506–1.00)	1.6 (4/258)
Non-Hispanic/ Latino	42,210 (95.5%)	0.868 (0.859–0.877)	0.830 (0.820–0.840)	0.816 (0.807–0.826)	4.5% (1,910/42,210)	10,776 (97.2%)	0.878 (0.856–0.902)	0.838 (0.812–0.869)	0.821 (0.793–0.855)	2.5% (271/10,776)
Other	652 (1.5%)	0.885 (0.821–0.972)	0.815 (0.731–0.911)	0.809 (0.729–0.909)	4.9% (32/652)	49 (0.4%)	0.989 (0.979–1.00)	0.883 (0.765–1.00)	0.648 (0.506–0.795)	6.1% (3/49)
Sex										
Female	21,592 (48.8%)	0.885 (0.870–0.899)	0.850 (0.833–0.867)	0.838 (0.821–0.855)	3.8% (829/21,592)	6,000 (54.1%)	0.899 (0.864–0.935)	0.869 (0.830–0.909)	0.859 (0.818–0.900)	2.2% (131/6,000)
Male	22,610 (50.5%)	0.855 (0.842–0.869)	0.811 (0.796–0.827)	0.802 (0.786–0.817)	5.2% (1,169/22,610)	5,083 (45.9%)	0.850 (0.810–0.889)	0.803 (0.760–0.846)	0.786 (0.741–0.830)	2.9% (147/5,083)

Table 2: Comparison of PICTURE, EDI, and NEWS across demographic groups. The encounter-level AUROC of PICTURE, EDI, and NEWS is compared across divisions of race, ethnicity, and biological sex. The sample size and proportion of each group is reflected, as well as the prevalence of deterioration outcomes in each population (percent and fraction of encounters). AUROC is reported as NA if no patient in the

subgroup met a deterioration outcome. 95% CIs are calculated via blocked bootstrap as in Table 1. PICTURE performed consistently across all racial subgroups in our cohort, with no significant differences (α=5%) between groups. This was also true among ethnicities at the first institution, but there were too few deteriorations among Hispanic/Latino patients at Hospital 2 to reliably estimate performance (4/258 encounters)

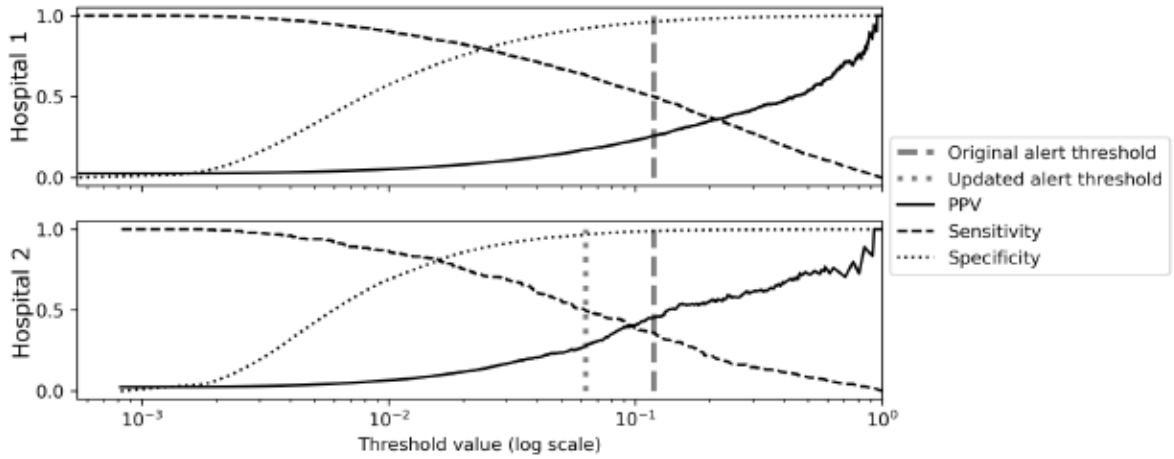

Figure 1: Alert Threshold Calibration. The alert threshold of 0.118 was selected by choosing a sensitivity of 0.50 at Hospital 1 (top panel, dashed vertical line), and resulted in a PPV of 0.257. However, if this same threshold is transposed to Hospital 2 (bottom panel, dashed vertical line), the performance characteristics are different - the sensitivity drops to 0.360 while PPV increases to 0.452. This impacts the experience of clinicians using the model, as it alters the balance between capturing deteriorations (sensitivity) vs. alert fatigue (PPV). Instead, new thresholds should be selected for Hospital 2 that give consistent performance. For example, a threshold of 0.062 (bottom panel, vertical dotted line) yields a sensitivity of 0.50 and PPV of 0.279 - much closer to the original values.

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5. Evaluating the Performance of Predictive Clinical AI/ML Tools After Deployment

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Introduction: Early warning systems (EWS) that predict impending patient deterioration are increasingly being used to make clinical decisions. Predicted events often include outcomes such as unplanned ICU transfer, cardiac arrest, or death. The goal of these models is to provide a timely alert to clinicians so they can intervene and prevent these outcomes from occurring.

However, it is difficult to evaluate the performance of an EWS after it has been deployed. For example, if the model correctly predicts a deterioration event, the clinician may take actions to prevent the patient's predicted deterioration. If the clinician's actions are successful, the deterioration is averted and the label against which the model is tested will become negative. This is despite the fact that the model's positive prediction was correct. Without the context of the clinician intervention, the model will be evaluated as if it was wrong. Overall, the better the model is at improving outcomes, the worse the performance is going to appear.1,2 This is known as confounding medical interventions (CMI).

Methods: We propose a causal inference framework based on marginal structural models (MSM) to estimate the causal effect of EWS models on deterioration, which in turn allows us to estimate performance metrics such as sensitivity and positive predictive value (PPV). The MSM is used to calculate the causal effect of the model predictions on the deterioration outcomes by controlling for the confounding variables. To our knowledge, no method has been developed to estimate the model performance in the presence of CMIs that is generalizable to any clinical prediction model.

We evaluated our approach using a simulation based on a real, pre-deployment patient cohort. Each patient received a deterioration score based on a previously trained and validated model.3,4 The ground truth for deterioration and intervention labels were determined using the true causal effect and PPV. We then simulated the use of the model post-deployment by varying model alert usage and subsequently increasing intervention frequency and simulating its impact of deterioration frequency. This was done by simulating different levels of clinician trust in the model, intervention frequency, and intervention success. We compared the observed sensitivity and PPV (without adjustment using causal inference) to the same metrics estimated using the proposed MSM.

Results: We found that at different levels of clinician trust, intervention frequency, and intervention success, we can estimate the PPV and sensitivity reliably (Figure 1). As expected, observed PPV and sensitivity drop as more clinicians trust the model and intervene, and with greater success. Since our simulation is based on real patient data, we can estimate the true PPV and sensitivity based on the

model scores and deterioration outcomes. Our solution is able to estimate the PPV and sensitivity using MSM that is closer to the model's actual performance.

Conclusions: Our method can reliably estimate the true performance of the model in the presence of CMI, particularly when the clinicians' trust in the model, intervention frequency and intervention success are high, and the observed performance decreases significantly.

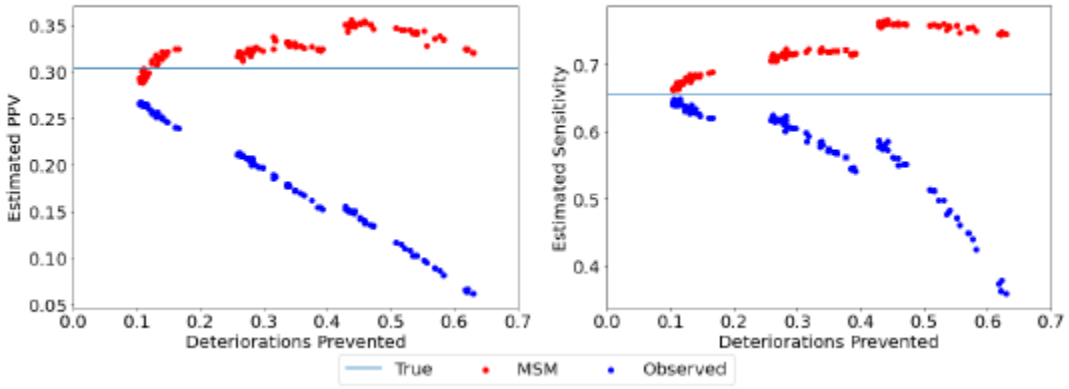

Figure 1: Our causal inference approach estimates model performance at varying levels of clinician trust, intervention frequency, and intervention success. Red – Marginal Structural Model, Blue – Observed PPV and sensitivity without adjustment for interventions.

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6. Monitoring Dataset Shift in Clinical AI/ML Models during the Post-Deployment Phase

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Introduction: Machine learning is being increasingly adopted in clinical workflows as it presents enormous potential in enhancing healthcare delivery and patient outcomes1-4. However, when models are integrated into clinical workflows, there is often a discrepancy between the data the model was trained on and the data that the model is applied to in real-time.5 This phenomenon, called dataset shift or drift, may cause a decline in the models' predictive power and lead to flawed clinical decisions.6-8

While data drift has been studied in non-clinical settings, there is currently a lack of functional research on implementing drift monitoring in clinical settings. Monitoring for data drift for clinical AI/ML models is complex, as drift may be driven by changes in technology, clinician behavior, patient populations, and emergent health risks9. To address the issue of clinical data drift monitoring, we developed a framework to identify, quantify, and diagnose data drift in clinical AI/ML models.

Approach: We measure data drift using both statistical tests and distance metrics. For either approach, we compare the distribution of a baseline data, such as the model test data before deployment, to new data, which is typically the latest production data. Table 1 presents several categories of clinical data shift, describing implementations of each category and providing examples of their utility. We devised these categories to cover the common causes of data shift in clinical settings. We selected nine metrics for evaluating drift between numerical distributions based on prior research, as outlined in Table 2 which details the implementation of each metric.

To evaluate the best metrics for quantifying clinical data drift, we developed ten simulations to demonstrate common scenarios that can lead to dataset shift in clinical settings. The simulations were based on how data drift occurs in practice: we do not know when data drift begins, which patients are impacted, which variables are affected, and the magnitude of drift. Our simulations mimic these characteristics, applying randomness to several parameters to emulate realistic data drift scenarios.

Results: We assessed the performance of each metric across the simulations using the receiver operating characteristic (AUROC) curve, evaluating the ability of each metric to discriminate between simulation runs with and without drift. While the Z-test, KS-test, and Wasserstein distance outperform the other metrics, the results were not consistent across different clinical scenarios. Figure 1 provides the AUROCs for individual simulations. For some simulations that impacted both extremes of the input variables, e.g., simulations 3 and 4, none of the metrics were able to identify drift accurately. This is due to the non-linear nature of the drift.

Conclusion: Our framework for data drift in clinical AI/ML models highlights the crucial role of distance metrics selection. Our study indicates that there are no metrics that outperform others in all scenarios, and some types of drift cannot be detected with any of the metrics. Therefore, more sophisticated drift

detection techniques such as domain classifiers may be required for effective post-deployment monitoring of AI/ML models.

Variable Impacted	Source of Data Shift	Example Scenarios
Model Inputs and Outputs (covariate drift)	Missingness	Changes in the mappings to the data elements in the Electronic Health Record (EHR)
	Distribution	Use of a new lab equipment with different reference ranges
	Outliers	A global pandemic
Model Targets (prior probability or concept drift)	Missingness	Change in the coding of the variables or unit designations in the EHR
	Distribution	Increase in the admission of subset of patients with higher risk
Patient Characteristics	Demographics	Change in the types of insurance the healthcare system accepts
	Comorbidities	
	Socioeconomic status	
Practice Patterns	Encounter length	New clinical evidence impacts clinical practice
	Lab/Procedure/Medication usage rate	Start of the residency program in the Fall
	Lab/vitals measurements	Change in clinical guidelines
	Organization of care	Opening of new clinical units

Table 1: Description of Dataset Shift Categories for Clinical AI/ML Models

Number	Dataset Shift Category	Monitor	Scenario	Number of Simulations	Example
1	Practice Patterns	Per-Patient Usage of Common Labs	More tests per patient	20 tests * 1000 replications	New residents start working in the hospital and order labs/tests more frequently per patient
2	Practice Patterns	Per-Patient Usage of Common Labs	Less tests per patient	20 tests * 1000 replications	A shortage of lab supplies results in less lab tests per patient
3	Practice Patterns	Lab Results	More normal results from increased measurements	40 labs * 1000 replications	New residents start working in the hospital and order more labs/tests for healthy patients
4	Practice Patterns	Lab Results	More abnormal results from increased measurements	40 labs * 1000 replications	A surge of sick patients leads to an increase in abnormal (i.e. outside reference range) results.
5	Practice Patterns	Vital Measurements & Lab Results	More abnormal results from unexpected unit changes	5 labs * 1000 replications	An EHR change causes temperature results returned in a new unit (e.g., °F to °C)
6	Model inputs and outputs	Model Outputs	More high scores	1000 replications	A new virus increases the distribution of high scores
7	Patient Characteristics	Age	Increased population age	1000 replications	A hospital sees an increase in patients 65+ (e.g., a nearby hospital stops accepting medicare patients)

8	Patient Characteristics	Length of Hospital Stay	Increased length of stay	1000 replications	Patients are staying in the hospital for longer due to a change in clinical guidelines
9	Patient Characteristics	Time to Event	Increase time to event	1000 replications	Patient are deteriorating quicker (e.g., Covid-19 pandemic)
10	Model inputs and outputs	Prediction explanations	Change in average feature attributions	1000 replications	A respiratory illness increases the importance of respiratory rate to the model predictions

Table 2: Overview of Simulation Design

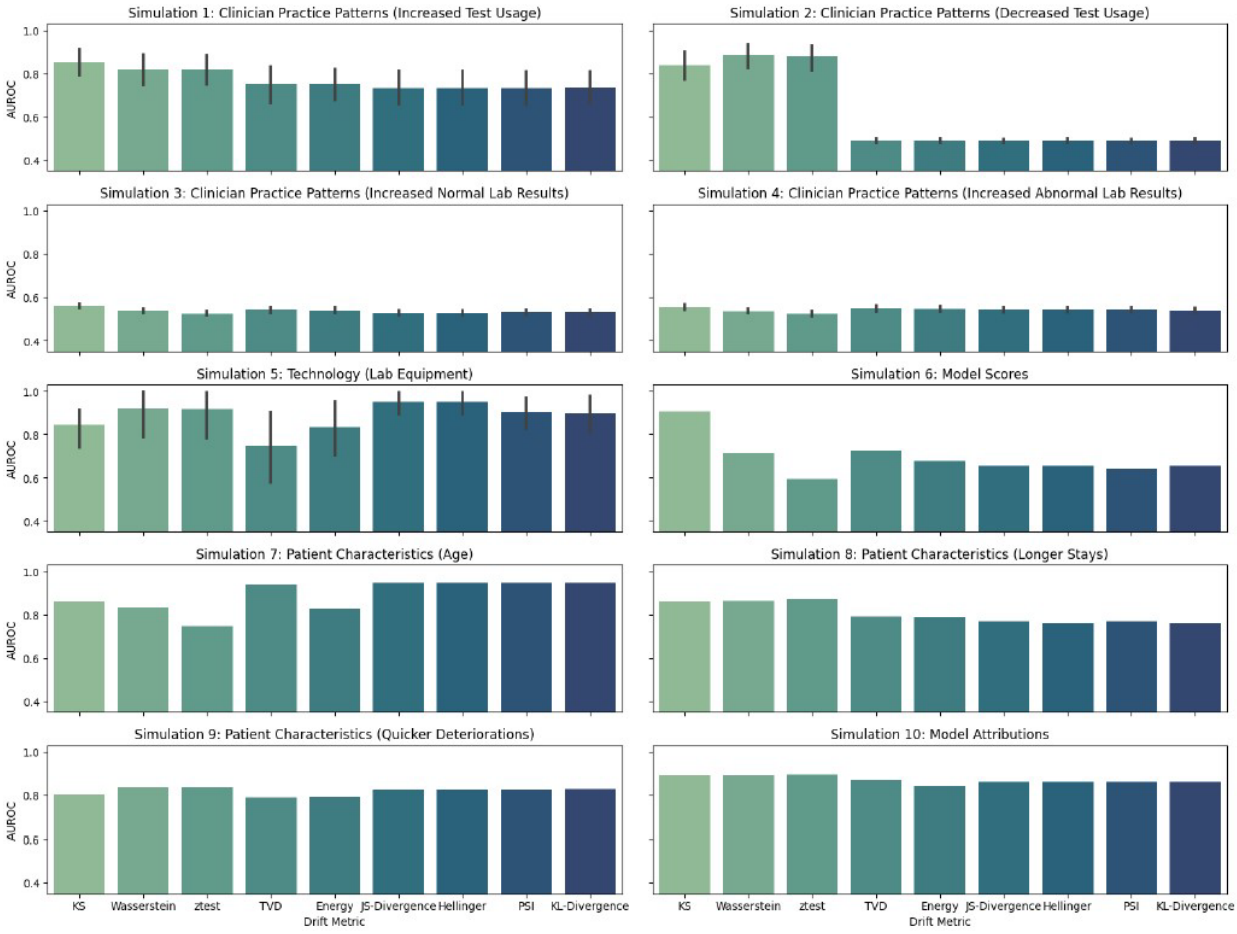

Figure 1: Summary of Discrimination Power of Different Drift Metrics across Simulations. Each simulation evaluates a different type of data drift that may degrade clinical AI/ML model performance. Simulations with multiple tests (e.g., Simulation 1) display the median result across tests with a 95% Confidence Intervals.

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7. Strategies for Deploying Artificial Intelligence to Complement Physician Diagnoses: An Application to Acute Respiratory Distress Syndrome Diagnosis

Negar Farzaneh, Elizabeth Lee, Kevin R. Ward, Sardar Ansari, Michael W. Sjoding

Originally published: N. Farzaneh, S. Ansari, E. Lee, K. R. Ward, and M. W. Sjoding, "Collaborative strategies for deploying artificial intelligence to complement physician diagnoses of acute respiratory distress syndrome," NPJ Digital Medicine, 6(1), 62, 2023.

Advances in Artificial Intelligence (AI) have led to models achieving human-level diagnostic performance across many health conditions using clinical images, including radiographic images [1-4]. However, a growing gap exists between studies describing AI's diagnostic capabilities using deep learning versus efforts to investigate when and how to integrate AI systems into a real-world clinical practice to support physicians and improve diagnosis. To address this gap, we examined the strengths and weaknesses of physicians and a previously published AI model [5] in interpreting chest X-rays. Additionally, we investigated potential strategies for AI model deployment and physician collaboration to determine their potential impact on diagnostic accuracy.

As a case study, we examined a deep learning model designed to identify acute respiratory distress syndrome (ARDS) on chest X-ray images [5]. The test set includes 414 frontal chest X-rays from 115 patients hospitalized between August 15 to October 2, 2017 at the University of Michigan. These patients met criteria for acute hypoxemic respiratory failure in one of 4 intensive care units (medical, surgical, cardiac, and trauma). Each chest X-ray was reviewed individually by at least six physicians for 1) the presence or absence of ARDS and 2) their confidence in the diagnosis.

Our findings shed light on the strengths, weaknesses, and blind spots of both physicians and AI systems which could better inform optimal system deployment. While the AI model (accuracy: 0.847 [0.806, 0.887]) had higher overall accuracy than physicians (accuracy: 0.808 [0.767, 0.85]), we found evidence that AI and physician expertise are complementary. When physicians lacked confidence in a chest X-ray's interpretation, the AI model had higher accuracy. Conversely, in cases of the AI model's uncertainty, physicians were more accurate (Fig. 1a). Furthermore, the AI model showed higher and more consistent accuracy than physicians on less difficult chest X-rays, while physicians were more accurate on difficult chest X-rays (Fig. 1b), defined as those where at least two physicians disagreed with the majority label.

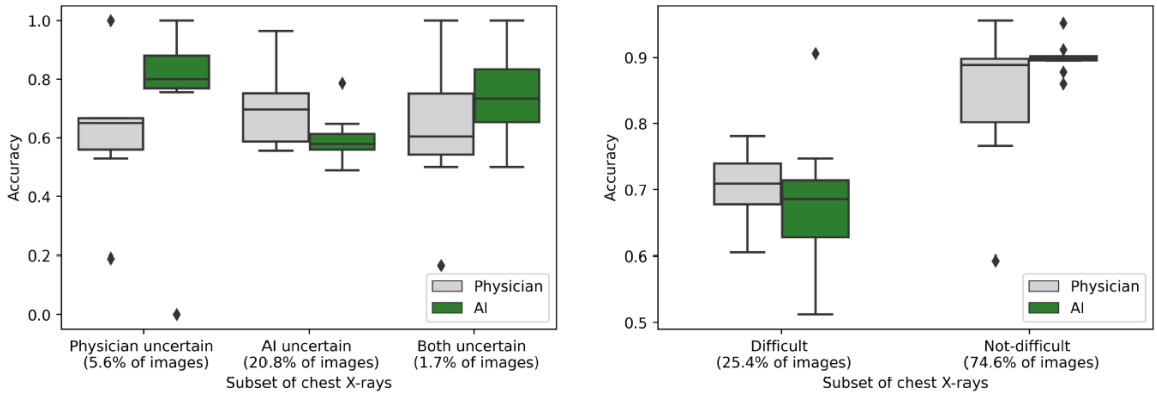

Figure 1. Performance comparison of physicians and AI stratified on image certainty and difficulty levels. (a) compares the performance of physicians and AI stratified on uncertainty in their evaluation, and (b) compares the performance of physicians and AI performance stratified on the difficulty of the image interpretation. Physician accuracies were calculated by comparing each of the nine physicians against reference labels that were generated from the remaining eight physicians. Similarly, the AI accuracies were composed of nine values by comparing the AI model output against the same nine sets of reference labels that physicians were tested against.

We then investigated several AI-physician collaboration strategies including (Fig. 2): 1) AI-aided physician: physicians interpreting chest X-rays first and deferring to the AI model if uncertain (accuracy: 0.824 [0.781, 0.862]), 2) physician-aided AI: AI model interpreting chest X-rays first and deferring to a physician if uncertain (accuracy: 0.869 [95% CI 0.835-0.903]), and 3) AI model and physician interpreting chest X-rays separately and then averaging their interpretations (accuracy: 0.86 [0.822, 0.894]) (Fig. 3). The physician-aided AI strategy not only exceeded other collaborative strategies as well as physician and AI-alone but also, in our case study, could off-load the human expert workload on the reading of up to 79.2% chest X-rays, allowing physicians to focus on the more challenging subset.

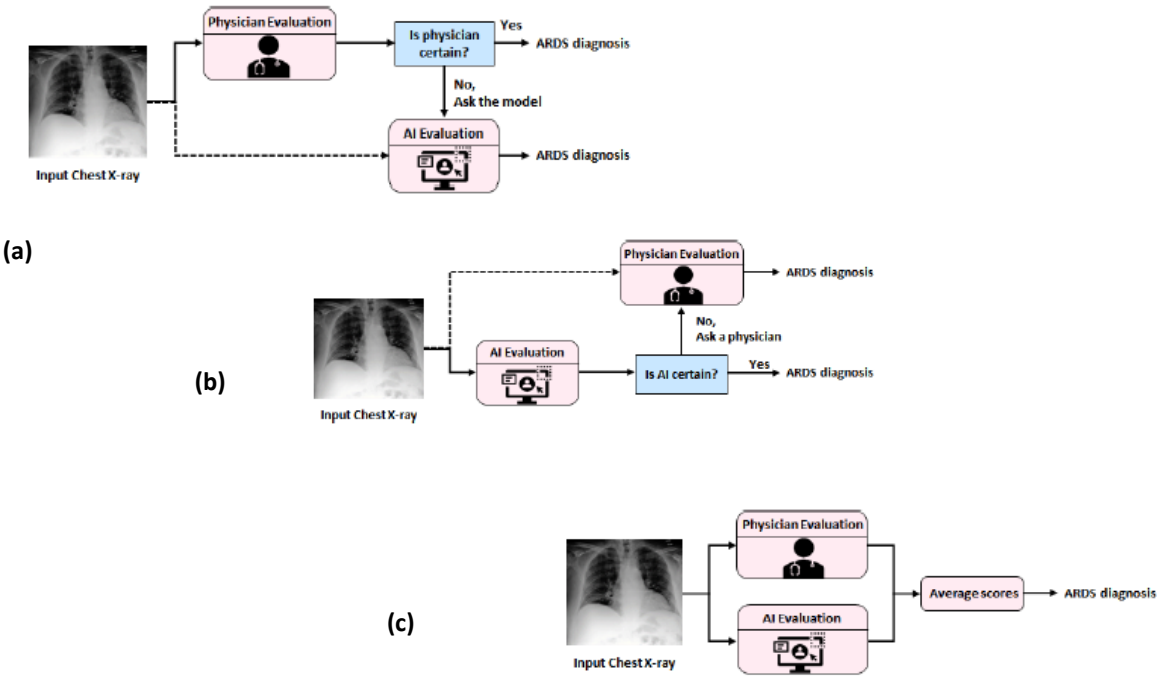

Figure 2. Schematic diagram of the proposed strategies for physician-AI collaboration. (a) shows the AI-aided physician framework, (b) shows the physician-aided AI framework, and (c) shows the average scoring framework.

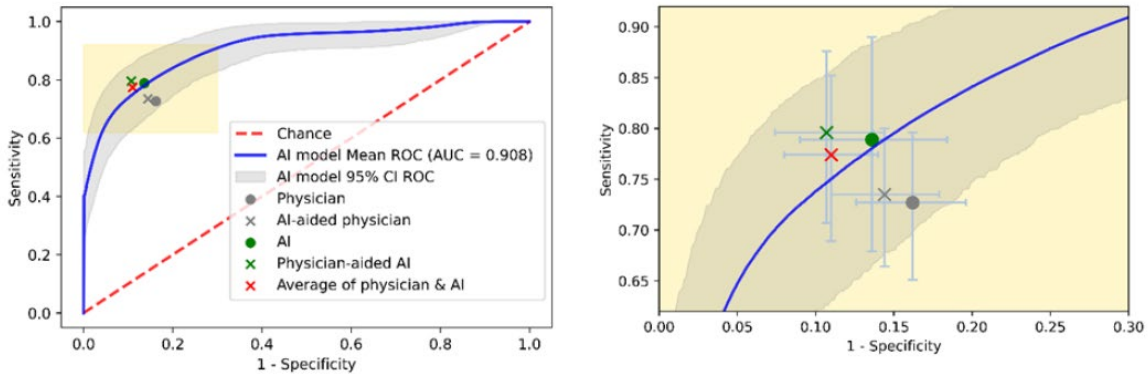

Figure 3. Average performance of physicians, AI, and four combinatory strategies. Receiver Operating Characteristic (ROC) curve of our AI model versus the performance of other strategies in ARDS detection. Markers denote each strategy's performance in terms of sensitivity and 1-specificity along with their 95% CIs.

In conclusion, this study highlights the potential benefits of integrating AI into clinical practice and employing collaborative approaches between physicians and AI models to improve ARDS diagnosis. The physician-aided AI strategy, which defers the diagnosis to physicians only if the AI model is uncertain, improved diagnostic accuracy compared to both physician- and AI-alone. Automating recognition of ARDS could offer more consistent care to many patients.

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8. Descriptive Abstract for OGBA Research titled "Bridging the Oral-Gut-Brain gap: Development of *in vitro* oral biofilm model & its implications on neurodegenerative disease.

Bonnett, Lauren, Erika Martínez-Nieves, J. Scott VanEpps, MD PhD

In the last two decades, there has been a growing body of literature that links the gastrointestinal and oral microbiome to neurodegenerative diseases including Alzheimer's and Parkinsons. Current analyses of dementia risk factors attribute 40% of cases to "modifiable lifestyle and environmental factors", an estimate that drives diagnostic criteria based on quantitative/visual presentation of symptoms. ***However, their mechanisms of impact remain under investigation – a gap that leaves providers with interventions that are palliative in nature.*** Representing the two largest microbial populations in the body, both systems can impart incredible influence on the brain and homeostatic function – a relationship described as the "oral-gut-brain axis" or OGBA for short. This research seeks to address the deficits in understanding via investigations of oral and gut dysbiosis – a dysfunction of the microbial ecosystem that leads to negative effects on host biology. Our lab focuses on bacteriology of biofilms and their contribution to human disease. We have developed a model of the oral component of the OGBA that can be exploited to develop potential early interventions. Understanding the pathological opportunities of these microbes on immune function – namely inflammatory response – and subsequent disease development may provide a robust foundation for early-stage diagnosis of dementia and a novel diagnostic criterion to manage severity of neurodegeneration.

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9. Narrative Review of Mechanism of Injury in Men and Women's Soccer and Lacrosse among Ivy League Schools: Preliminary Findings from the Ivy League Big Ten Epidemiology of Concussion Study

Finnegan, LM; Liu J; Bretzin, AC; Rettmann A; Wiebe, DJ

Background: Sports Related Concussions(SRC) comprise 5.2-8.3% of all injuries in men's and women's lacrosse and soccer. Thus, understanding mechanisms of injury(MOI) is warranted to direct primary prevention.

Objectives: To describe and cluster MOI characteristics in select Ivy League sports.

Methods/Approach: The Ivy League-Big Ten Epidemiology of Concussion Study is a prospective cohort study initiated in 2013/14. Presently, we classified patterns of MOI: activity of the injury (e.g., practice, competition), position, cause of head contact, and coded descriptive narratives of how SRC was sustained. We used tree diagrams to display the associations of each MOI characteristic.

Results: In men's lacrosse(n=146), SRCs occurred in practice(50.7%), to midfielders(30.3%) and defense(30.3%). Most occurred from person-(56.2%) and ball-(19.2%) contact. SRC occurred in shooting-(24.7%) and collision-(17.1%) activities. In women's lacrosse(n=106), SRCs occurred in practice(55.7%), defense(32.4%), and midfielders(27.6%). Most occurred from ball-(39.6%) and stick-(28.6%) contact. SRC occurred in shooting-(32.2%), passing-(11.3%), and checked-(11.3%) activities. In men's soccer(n=113), SRC occurred in competition(52.2%), to midfielders(33.6%) and defense(33.6%). Most occurred from person-(55.8%) and ball-(28.3%). SRC occurred from headers(43.4%) and collisions(8.9%). In women's soccer(n=128), SRC occurred in competition(53.9%), to midfielders(34.4%) and defense(24.2%). Most occurred from ball-(46.9%) or person-(39.1%) contact. SRC occurred from headers(35.9%), or kicked balls(10.2%).

Conclusions: Narrative review provides valuable contexts into SRC causes, which are unique to each sport. Reviewing SRC across multiple years of surveillance can foster discussions with stakeholders(e.g., coaches, policy, athletes) aiming to reduce SRC.

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10. Sleep symptomology and concussion recovery: Findings from the Ivy League-Big Ten Epidemiology of Concussion Study

Bretzin, AC, D'Alonzo, BA, Rettmann, A, Wiebe, DJ

Background: Athletes may experience sleep difficulties after sport-related concussion (SRC). However, limited research investigates sleep symptoms in men and women following SRC and compares symptom resolution time for males and females with and without sleep symptomology.

Objectives: To compare time to symptom resolution between student-athletes with and without subjective sleep symptoms, adjusting for total symptom experience.

Methods: Using collegiate athlete SRC data from our prospective cohort study, we computed a total symptom score excluding the three sleep symptoms (i.e., fatigue, drowsiness, difficulty sleeping) among 22 recorded symptoms. For each of the three sleep symptoms, we assessed time from injury to symptom resolution among athletes with and without the symptom of interest and athletes above and below the median total symptom score by examining Kaplan Meier curves with Log-rank test ($p<0.05$). Each was performed separately for men and women.

Results: Of 1,740 SRC (women: n=722; men: n=1,018) during our study period 2013/14-2019/20, we observed differences in median symptom resolution time and each of the sleep symptoms (p's<.001). For women, we also observed differences in median symptom resolution time and each of the sleep symptoms adjusting for overall symptom presence (p's<.001).

Conclusion(s): Symptom resolution was shortest in men and women with symptom scores below the median paired with no fatigue, drowsiness, or difficulty sleeping. In contrast, symptom resolution time was longest in men and women with sleep symptoms paired with higher overall symptom scores. Therefore, sleep may be a modifiable target for treatment during SRC recovery.

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11. Adjuvant heat treatment for catheter salvage in central line associated bloodstream infection (HEATSAVE)

Shannon VanAken, J. Scott VanEpps

Catheter related infections (CRI) are one of the leading causes of bloodstream infections in the United States, resulting in significant morbidity, mortality, and healthcare cost. These medical device related infections are predominantly caused by bacteria forming sessile communities, known as biofilms. Biofilms are difficult to treat, as the dense extracellular polymeric substance shields the bacteria from exposure to antibiotics and host immune cells. Antibiotics alone are frequently ineffective which necessitates catheter removal and replacement, using up limited vascular access points. The work presented here applies engineering principles to expose biofilms to the external stimuli of heat and fluid shear to manipulate their rheological properties, thereby remediating biofilm growth in a rat central venous catheter infection model. Using the opportunistic pathogen, *Staphylococcus epidermidis,* rats were catheterized through the jugular vein. Rats were recovered then inoculated with 1E7 cfu for 3 days, then were treated with cycled heparinized saline. Five treatment groups were studied including a control/sham treatment, 5-minute, 10-minute, 20-minute and 40-minute treatment at 60C. Our model shows *in situ* mechanical treatment significantly reduces biomass on the entirety of the catheter by 20 minutes of cycling perfusate. There is a trend for decreased viable bacteria by 20 and 40 minutes, however this was not significant. These findings suggest a persistence of viable bacteria, which could be either due to bacteria surviving and recovering from treatment, bacteria attaching to the extraluminal surface and not being impacted by shear or heat manipulation, or a possibility of loss of heat along the length of the catheter. Histology of catheter adjacent tissue showed expected response to placement of a foreign body rather than due to repeated heat exposures through treatment. Treatment did not increase or decrease the amount of bacteria found in the blood after the first flush, however there is no viable bacteria observed in natural history animals with catheters that were not flushed, indicating the initial increase of bacteria was due to the heparin flush before treatment. Overall, a 20 minute treatment seems to be effective at removing biomass and reducing viable bacteria. Our current direction is to recover the animals and repeat these 20-minute treatments daily to study if these effectively treated biofilms will return post treatment.

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12. A cross-sectional survey to identify the state of point-of-care ultrasound in rural emergency departments in Michigan's Upper Peninsula

Jill Byrne, Ina Prevalska, Charles Kropf

Introduction: Point-of-care ultrasound (POCUS) is widely considered a safe and relatively low-cost technology used to shorten the time to diagnosis and therapy in the emergency department. There are several indications for POCUS ranging from evaluating patients with trauma, heart, lung, abdominal, and pelvic diseases.

There are fourteen rural and critical access hospitals in Michigan's Upper Peninsula. There have been no studies to determine the use of POCUS in low-resource, rural and critical access emergency departments in Michigan, despite its clear benefit to emergency care. This study fills the gap in understanding rural Michigan's POCUS use and identify barriers to its use.

Methods: A comprehensive needs assessment survey regarding POCUS education, use, and barriers to its use in rural Michigan emergency departments was developed. It obtained IRB exemption and was distributed via Qualtrics to physicians that work in the fourteen Upper Peninsula emergency departments. Survey data was analyzed.

Results: Fourteen physicians completed the survey. Results demonstrated that POCUS is being used in these rural emergency departments in limited capacity. The most common uses cited were trauma, procedural guidance, and pregnancy. Three out of the fourteen respondents have not received any formal training in POCUS, and twelve indicated that increased training in POCUS would be moderately to extremely useful in their practice of emergency medicine. Most physicians were not able to save scans to their EMRs and do not receive reimbursement for scans, and no physicians stated they have quality assurance of scans. When asked about barriers to increased POCUS use, many physicians cited the need for increased ultrasound training and administrative support for quality ultrasound machines, electronic health record connectivity, and quality assurance.

Conclusions: In rural Michigan emergency departments, there is a clear need for increased training and administrative support for quality ultrasound machines, EHR connectivity, and quality assurance. To benefit both the physicians and patients at rural EDs in Michigan, these results should be used to improve these aspects of POCUS use in UP hospitals.

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13. Development of an Ultrasound-based Flow-Pressure Index for the Assessment of Cerebrovascular Autoregulation

Alexis Davis*, Courtney Dennis*, Nicholas Greer, Zachary Sharpe, Kevin Ward, Hakam Tiba
*Contributed equally to this abstract

Introduction: Traumatic brain injury is a major cause of death and disability. Cerebrovascular autoregulation (CA) is a protective mechanism that allows an adequate level of blood to flow into the brain. CA might get impaired during TBI leading to worsen outcome. We aim to investigate a novel noninvasive method of assessing CA using an ultrasound-based Flow-Pressure (FPx) or Flow-Flow (FFx) indices and compare them to the Pressure Reactivity Index (PRx).

Methods: Swine were instrumented under anesthesia for hemodynamic, ultrasonic flowmetry and transcranial Doppler to monitor the time averaged mean velocity (TA_{mean}) of the middle cerebral artery. Several maneuvers were used to manipulate the hemodynamics, such as hyperventilation, vasopressor challenge, epidural hematoma, systemic hemorrhage, and resuscitation. PRx was computed as a moving Pearson correlation coefficient between MAP and ICP. FPx was computed as a moving correlation between MAP and TA_{mean}. FFx was computed as a moving correlation between the internal carotid or femoral artery flow and TA_{mean}, or as a moving correlation between the internal carotid or femoral artery flow. The area under the Precision-Recall Curve (AUPRC) were calculated for FPx and FFx at a PRx threshold of 0.3.

Results: Mean (SD) AUPRC for the different FFx indices are in the table below.

	FPx (TA_{mean} and MAP	FFx (TA_{mean} and ICA-flow)	FFx (TA_{mean} and FA-flow)	FFx (ICA-Flow and FA-flow)	p
AUPRC. Mean (SD)	0.82 (0.084)	0.83 (0.097)	0.85 (0.075)	0.90 (0.032)	<0.0001

Conclusion: Initial results show that FPx and FFx agree with PRx with excellent precision to predict autoregulation impairment.

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14. Implementation of a quality improvement toolkit and incentive program is associated with decreased chest x-ray utilization for asthma, bronchiolitis, and croup in a statewide emergency department network

John A. Greco, MD, PhD, Michele M. Nypaver, MD, Keith E. Kocher, MD, MPH, Michelle L. Macy, MD, MS, Kristian Seiler, Courtney W. Mangus, MD

Background: Approximately 10 million children present to emergency departments (EDs) annually for asthma, bronchiolitis, and croup (ABC). Decreasing routine chest X-ray (CXR) utilization in this population is part of the Pediatric ED Choosing Wisely campaign and consistent with national guidelines. The Michigan Emergency Department Improvement Collaborative (MEDIC) is an emergency physician-led network of over 40 EDs including general and pediatric hospitals. MEDIC maintains a clinical registry to track patient outcomes, identify best practices, and improve performance. MEDIC launched a quality improvement (QI) initiative in March 2019 to decrease routine CXR utilization in ABC patients. A subset of sites elected to use this CXR utilization metric as part of a pay-for-performance incentive model.

Objective: Analyze the impact of MEDIC's QI initiative and incentive system on CXR utilization in patients diagnosed with asthma, bronchiolitis, or croup in a statewide network of EDs.

Design/Methods: We utilized International Classification of Diseases (ICD-10) codes to identify children less than 18 years old in the MEDIC registry with asthma, bronchiolitis, or croup from May 2017 to April 2023. The monthly rate of CXR utilization in these patients was calculated across all sites, and rates among incentive vs non-incentive sites were compared. Statistical process control charts tracked monthly CXR utilization and identified special cause variation. Admission rates and 72-hour ED return visits for a respiratory chief complaint were calculated as balancing measures.

Results: There were 113,948 total ABC visits during the study period: 55,516 visits for asthma, 36,689 for bronchiolitis, and 26,330 for croup. CXR was obtained in 29.6% of patients with asthma, 31.1% of patients with bronchiolitis and 11.0% of patients with croup. Network-wide CXR utilization decreased from 32.9% (SD=3.19%) to 21.45% (SD=1.55%). At incentive sites, CXR utilization decreased from 29.4% (SD=3.61%) to 19.3% (SD=1.46%), vs from 35.2% (SD=3.08%) to 27.9% (SD=6.57%) at non-incentive sites. For all ABC conditions, there was no significant change in admission rates and 72-hour ED revisit rates for respiratory chief complaints.

Conclusion: Implementation of this QI initiative was associated with a network-wide decrease in CXR utilization in patients with asthma, bronchiolitis, and croup without evidence of harm. Sites that were incentivized on CXR utilization had greater improvement than non-incentive sites during the study period, suggesting pay-for-performance incentive programs may support QI efforts.

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15. Accuracy of Continuous Glucose Monitor in Diabetic Ketoacidosis

Nathan L. Haas, Lynn Ang, Nazanene Esfandiari, James Cranford, Ahsan Khan, Ashley Cohen, Jordan Sell, Mostafa Abdel-Hamid, Kevin E. Romanchik, Frederick Korley

Background and Objectives: Management of diabetic ketoacidosis (DKA) requires frequent point-of-care blood glucose measurements (POC BG), often requiring intensive care unit admission with substantial cost and patient discomfort. Use of a continuous glucose monitor (CGM) could optimize DKA management by replacing hourly POC BG, improving patient experience and reducing resource utilization. However, the accuracy of CGM in DKA is not well established. Our objective was to determine the accuracy of CGM in adult ED patients with DKA.

Methods: This was a prospective observational study at a single academic medical center ED. Adults >18 years with DKA (glucose ≥250 mg/dL, pH ≤7.30, bicarbonate ≤18 mEq/L, anion gap ≥12, presence of serum or urine ketones) within 12 hours of ED presentation were included. Glucose measurements from a Dexcom G6 CGM (collected every 5 minutes) were compared to simultaneous POC BG (collected hourly via fingerstick) until resolution of DKA; CGM "high" and POC BG ">600 mg/dl" readings were excluded. The primary outcome was the proportion of paired CGM and POC BG values in Clarke Error Grid Zones A (within 20% of reference) and B (outside 20% of reference but not leading to inappropriate treatment). Additional outcomes included level of agreement via Bland Altman plot, mean absolute relative difference (MARD), and time of first detection of glucose < 150 mg/dL. Analyses were conducted with R statistical software (v4.2.2., 2022).

Results: Twenty adult ED patients in DKA were enrolled. Mean age was 37.6 years, 60% were female, 70% had type I diabetes, and mean presenting lab values were pH 7.16, glucose 677 mg/dL, anion gap 21. 334 paired measurements from CGM and POC BG were analyzed. Clarke Error grid analysis revealed 97.0% of readings within zones A and B. Bland-Altman analysis showed the average difference between POC – CGM was -26.0 mg/dl (95% limits of agreement [-122.6, 70.7]). MARD was 28.6% (95% CI 26.5%, 30.6%). The first incidence of glucose < 150 mg/dL (n=14) was detected 28.9 minutes earlier by CGM than POC. A sub analysis of only POC BG readings < 150 mg/dL revealed 98.6% of paired readings in Clarke Error Grid zones A and B.

Conclusion: A CGM provided clinically accurate measurements of blood glucose and identified missed opportunities for earlier intervention in adults with DKA. Future interventional trials can assess the impact of CGMs on patient outcomes, patient experience, and resource utilization.

*abstract only; no poster presented

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16. THE ROLE OF THE GUT MICROBIOME IN TRAUMATIC BRAIN INJURY

Lisbeth Hernandez, Zachary Sharpe, Nicolas Greer, Kevin Ward, and Hakam Tiba

BACKGROUND: The relationship between the gut microbiome and critical illness has been broadly studied. Researchers have established its role in various pathophysiological aspects of critical illness. The effects of the gut microbiome in regard to traumatic brain injury (TBI), however, have remained largely unexplored. To address this issue, we conducted an experiment using a swine model of TBI where we manipulated the gut microbiome to test the hypothesis that metabolomic differences can alter TBI severity.

METHODS: Fifteen Yorkshire swine were sedated for blood sample and culture swab collection. Animals were randomized and given a three-day antibiotic course for either anaerobic depletion or selective digestive decontamination. Another group (sham) did not receive antibiotics. On experiment day, swine were anesthetized, mechanically ventilated, and instrumented for blood and intracranial pressure (ICP) monitoring. Burr hole surgery was performed to allow for a controlled cortical impact simulating a TBI. After impact, ICP, cerebral perfusion pressure (CPP), and hemodynamics were monitored for 12 hours with serial blood sampling and culture swabbing.

RESULTS: The results showed that antibiotic manipulation of the gut microbiome caused no significant changes in TBI severity or TBI-induced ICP and CPP. An increase of S100B, a neuronal injury marker, was observed but neuron-specific enolase remained unchanged.

CONCLUSION: These initial findings suggest that the gut microbiome might not play a role in regulating the acute pathophysiology of TBI. Future studies could benefit from administering antibiotic regimens for longer than 3 days and monitoring for longer than 12 hours to observe long-term changes.

17. An Unexpected Cause of Generalized Weakness

Jake Hirschl, Miyante Newton, and David Haidar

A 71 year old woman with metastatic breast cancer presented to the ED with generalized weakness and fatigue. Presenting vitals were BP 130/66, RR 30, HR 122, T 39.4, and O2 sat 98% on room air. Symptoms and vitals initially improved with 30 cc/kg fluid bolus and acetaminophen, however her pressures down trended until she was hypotensive to 80s/50s. Infectious workup was sent, and an additional 500cc fluid bolus and broad spectrum antibiotics were given. Labs were significant for AST 364, ALT 242, sodium 129, and lactate 3.6 despite fluid resuscitation. She was started on vasopressors given concern for septic shock. Point of care ultrasound (POCUS) was then performed.

POCUS revealed markedly dilated RA and RV with evidence of D-sign, indicative of elevated RV pressure. This was significantly worsened from the mild dilatation on her previous echocardiogram. Severe tricuspid regurgitation and plethoric IVC were also observed. CTA chest and CT abdomen/pelvis showed further evidence of fluid overload with bilateral pleural effusions and was negative for pulmonary embolism. These findings, in combination with the above labs, suggest right heart failure with congestive hepatopathy and mixed cardiogenic and septic shock. Patient was transferred to EC3 where she required diuresis, norepinephrine, cardiology consultation, and eventual admission to cardiology. The use of POCUS was critical in identifying this patient's shock etiology and was valuable in guiding management toward diuresis rather than fluid resuscitation.

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18. Evaluating a Simulant Overdose Definition Based on EMS Record Text Using Linked EMS-Hospital Data from two Ann Arbor, MI Hospitals

Marne, Yashashree

Statement of Purpose: To link emergency department (ED) and emergency medical services (EMS) data to evaluate a stimulant overdose definition using EMS record text proposed by the Michigan Department of Health and Human Services (MDHHS).

Methods/Approach: We received records for EMS transports sent to Michigan Medicine (MM) and St. Joseph's Mercy Hospital (SJ) between 1/1/2019-6/30/2022. For "true"-status cases, we received records from SJ and MM with stimulant-related ICD-10 codes arriving via EMS. EMS data were linked to hospital data using patient gender, age, and arrival date. To evaluate MDHHS's definition, we calculated sensitivity and positive predictive value (PPV) using ICD-10 based narrow (stimulant overdose: SO) and broad (SO or stimulant abuse/dependence: SO/SA) true-status definitions. We analyzed false negatives and positives and tested data mining methods to identify improvements to MDHHS's definition.

Results: Between 1/1/19-6/30/22, 122,009 EMS records were transported to either MM or SJ. 823 (0.7%) flagged positive for the MDHHS definition. During the study window, 77 (80) SO and 689 (738) SO/SA arrived at MM (SJ) via EMS. The overall sensitivity of MDHHS's definition was 25.0% for the detection of SO and 14.0% for the detection of SO/SA. The definition's overall PPV when detecting SO and SO/SA was 4.0% and 23.7%, respectively. Minor changes to the MDHHS text-based definition identified through case review and literature review improved sensitivity (SO-33.9%; SO/SA-20.2%) with minor reductions to PPV (SO-3.4%; SO/SA-20.8%). Of four data mining methods tested, the random forest model had the highest discriminatory power (AUC=0.739). The ICD-10 discharge code's weakness as a "true"-status definition may have limited further improvements.

Significance: In recent years, there have been nationwide increases in stimulant-involved drug-related mortality. With an effective stimulant-overdose definition, EMS data could provide timely information of emerging stimulant-overdose trends. Our study evaluates one such definition, notes potential improvements, and identifies apparent limitations.

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19. Emergency Medicine Residency Ultrasound "Bootcamp": Advancing the Proficiency and Confidence of First-Year Residents

Molvik H, Feeney M, Ager E, Haidar D

Point-of-care ultrasound (POCUS) is pivotal in the role of time-sensitive diagnosis and interventions in the Emergency Department (ED). Developing proficiency in this skill is crucial for emergency medicine (EM) clinicians. Considerable variability remains in medical school POCUS training, and incoming EM residents start with wide variability in POCUS comfort and skill. EM residencies have addressed this by introducing POCUS courses early on in training. The objective of this study is to evaluate the impact of an introductory intern year POCUS "bootcamp" on the self-perceived confidence in POCUS skills and to assess course value among participants.

A 2-day POCUS course that involved didactic and hands-on scanning sessions was held as part of an intern orientation for a large EM residency in the Midwest U.S. A survey based on previously validated institutional course surveys was distributed before and after the course. Participants' self-reported pre-residency POCUS training was summarized using descriptive statistics. For nine core scans (echo, FAST, ocular, aorta, renal, biliary, DVU, soft tissue, and US-guided needle placement), 2-sided t-tests were used to compare confidence in understanding the indications for each US scan, how to perform each scan, and how to interpret US images prior to and after the course (self-reported using 5-point Likert scale). Qualitative data on perceived value of the course was obtained through open-ended questions.

There were 16 survey respondents, with a 100% response rate. Participants reported completing an average of 34.4 scans prior to residency, with a median of 20 scans (range 2-100; SD 36.8). There was a significant increase in confidence in understanding the indications for and interpreting images for all scan types. There was a significant increase in confidence performing all scans except for the biliary scan. All respondents agreed that the POCUS course was valuable to their learning.

This study supports that a 2-day hands-on POCUS training course for EM interns significantly enhances confidence and proficiency in recognizing indications for POCUS, image acquisition, and image interpretation. Our study also indicates that EM interns start residency with variable exposure to POCUS in medical school. Our findings support focused educational interventions in improving the POCUS proficiency of EM clinicians.

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20. Creating Leaders from Within: Development of a Longitudinal Leadership Curriculum for Emergency Medicine Residents

Rudin S, Davis M, Micheller D, Hopson L

Purpose: Most emergency medicine (EM) residencies develop non-technical skills, including leadership skills, through on-shift experiential learning. This results in variable skill acquisition without a consistent rigorous foundation. Residents who are women, underrepresented in medicine, or described as "quiet" may face cultural biases and other barriers to leading in the clinical environment. A comprehensive approach to a leadership development curriculum in EM is not well defined. We sought to create a longitudinal leadership curriculum within our EM residency, by defining key content areas, optimal instructional methods, and outcomes for both resident assessment and program evaluation, with the goal of thoughtfully preparing EM residents to lead when they enter the workplace as attendings.

Methods: We applied Kern's six-step model of curriculum design to develop a longitudinal framework for incorporating leadership training into all years of EM residency training. We analyzed our annual program evaluation data and conducted a needs assessment. We reviewed the literature on leadership development in medicine, drawing from leadership development curricula in non-medical fields, including military and civilian leadership. We identified key instructional principles for leadership training, including small-group instruction, project-based learning, and individual coaching.

Results: We created a four-year longitudinal curriculum structured around the FourCe-PITO model, a leadership training framework used in the US military. This conceptual model incorporates the four domains of character, competence, context, and communication, and maps well onto the needs of EM trainees. These four domains form longitudinal threads across all years of the curriculum. Each year is structured to emphasize key leadership principles necessary at that level of training. Interns focus on fundamental leadership skills; second-year residents on leadership of the resuscitation team; third-year residents on managing conflict; and fourth-year residents on global team development. Content is delivered through small-group discussion of assigned readings, podcasts, and talks drawn from the medical, military, and civilian business environments. Simulations with topic-focused debriefings further emphasize skill development. We developed focused learning objectives for each didactic or session. Sequential self-assessments track residents' perceptions of their own development as a leader. Specific areas for assessment will also be incorporated into clinical shift evaluations, mapped onto milestones for professionalism and interpersonal communication skills. Senior residents and attendings will be provided with material to coach trainees both on and off shift as well.

Conclusions: In summary, we present a longitudinal leadership curriculum based on the FourCe-PITO model which relies on best instructional practices and contains explicit assessment mechanisms for learners and program evaluation outcomes. We are implementing this curriculum in the 2024-25 academic year. Next steps include a comprehensive program evaluation and review of outcomes data to modify the curriculum for the future.

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21. Dose-Dependent Effect of Intranasal Insulin in Humans using Functional MRI

Florian Schmitzberger, MD, MS; Jennifer Fowler, RN; Douglas Noll, PhD; Luis Hernández-García, PhD; Cindy H. Hsu, MD, PhD; Robert W. Neumar, MD, PhD; Robert Silbergleit, MD

Numerous neuroprotective agents have been demonstrated to be effective in animal models, however no human trials have shown significant benefit to this point. Some, including insulin, have shown significant promise, and can be administered intranasally. This could potentially lead to very rapid administration after brain injury. Our phase 1 trial to explore the safety of intranasal insulin of doses up to 1000 U has demonstrated a suitable safety profile, with only 2 administrations out of 140 leading to systemic hypoglycemia, which was rapidly corrected. Our ongoing trial determines the brain functional MRI response to intranasal insulin or placebo. Prior work has shown an effect at doses of up to 160 units, we are investigating doses of 500 and 1000 units in six participants. Our study has concluded with no episodes of hypoglycemia, evaluation of fMRI data is ongoing.

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22. Rates and Correlates of Firearm Storage Behaviors among Parents of Teens: Results from a Nationally Representative Survey

Laura A. Seewald MD; Heather Hartman MD; Matthew Myers MPH; Marc A. Zimmerman PhD; Maureen A. Walton PhD; Rebecca M. Cunningham MD; Patrick M. Carter MD

Purpose: Firearms are the leading cause of death for U.S. teens, with firearm access the most significant risk factor for injury. Parental storage practices in households with teens have not been well characterized. In this nationally representative sample, we estimate the prevalence of storage practices among parents and characterize factors associated with regularly storing firearms unlocked and loaded to inform future prevention efforts.

Methods/Approach: Data are from a web-based survey (6/24/2020–7/22/2020) of parents (n=2,924) of teens (age:14-18). Weights were applied to generate nationally-representative estimates. We describe storage practices among firearm-owning parents and identify factors associated with storing firearms unlocked and loaded.

Results: Among parents (M_{age}=46.4; 63.0% male; 78.7% non-Hispanic White) of teens, 44.0% own firearms (22.6% handguns; 14.3% long-guns; 63.1% both handguns/long-guns) with 31.1% of parents regularly storing $\geq$=1 firearm unlocked/loaded. Parents were more likely to store firearm(s) unlocked/loaded (vs. other methods) if they had military service (OR=2.02), owned long-guns and handguns (OR=2.10), conducted safety audits verifying location/storage (OR=2.48), and their teen received safety training (OR=2.83). They were also more likely to store firearm(s) unlocked/loaded despite perceiving their teen as having easy household firearm access (OR=0.43) or to be engaged in other risk behaviors (*e.g.,* alcohol/drugs; OR=1.27). Ownership motivation (*i.e.,* protection), exposure to community violence, and presence of young children did not alter storage decisions in this sample.

Significance/Contribution: Approximately 44% of U.S. teens reside in households with firearms; a third of which are unlocked and loaded. While such parents may add safety practices (*e.g.,* audits; safety training), it is unclear if these measures are protective, which is especially concerning for teens engaged in other risk behaviors. Future research should examine the efficacy of firearm safety training and storage interventions to decrease injury-related outcomes.

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23. Emergency Department Ultrasound Guided Regional Anesthesia - Experience with 155 Nerve Blocks

Jordan Sell, MD; David Haidar, MD; Jacob Hirschl, MD; Sarah Jamali, MD; Ryan V Tucker, MD; Nicole Klekowski, MD; Jessica Koehler, MD; Christopher M Fung, MD

Background: Non-opioid analgesia, including ultrasound guided nerve blocks (UGNB), has gained interest in recent years for a variety of common presentations [including…if space]. However, limited data exists on efficacy and safety outcomes for nerve blocks performed by emergency providers. Our objective was to determine the incidence of serious adverse events for UGNBs performed in our Emergency Department (ED).

Methods: This is a retrospective cohort study conducted using the UGNB quality assurance (QA) database at a single academic medical center ED from 1/1/22 to 11/30/23. Both adult and pediatric patients were included if they received any UGNB in the ED. Procedure details, pain scores and opioid requirements pre- and post- nerve block were extracted from the electronic health record for the QA database. Emergency physicians performing QA conducted manual chart review for complications at the index visit as well as in follow up documentation for cases with at least 30 days of follow up time. Difference in pain scores and oral morphine equivalents was assessed using a paired t test.

Results: We identified 155 ultrasound nerve blocks performed from 1/1/22 to 11/30/23. Ten different types of UGNBs were performed, with the most common being femoral nerve/fascia iliaca blocks (106, 68%) and erector spinae plane blocks (13, 8.4%), and the majority performed with ropivacaine (107, 69%). We did not identify any episodes of major adverse events including local anesthetic systemic toxicity or significant neuropraxia. There were 8 cases with clinician documented failure of nerve blocks. 105 long acting UGNBs were performed in patients who were admitted. Compared to pre UGNB, the mean maximum and minimum pain scores were significantly reduced, with mean differences of 2.0 (95% CI 1.4-2.6) and 2.5 (95%CI 1.8-3.2). OME usage was not significantly different (mean difference 3.2 mg, 95%CI -4.4-10.9).

Conclusion: Our ED performed 155 UGNBs during the study period, the most common being femoral nerve/fascia iliaca blocks and the majority using ropivacaine. No major adverse events were identified during the initial visit or in follow up documentation, and patient pain scores were significantly reduced after NBs. This study adds to existing data on the safety and efficacy of ultrasound guided nerve blocks performed by ED physicians as an adjunctive analgesic strategy.

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24. Automated Analysis of Arterial Waveforms and Diastolic Blood Pressure During Cardiopulmonary Resuscitation in a Swine Cardiac Arrest Model

Zachary Sharpe, Nicholas Greer, Cindy H. Hsu, and Hakam Tiba

Background and Objectives: Invasive arterial blood pressure can provide valuable information during cardiopulmonary resuscitation to extrapolate and optimize coronary perfusion pressure using diastolic blood pressure. However, the way chest compressions drive blood flow can result in pressure monitors incorrectly extracting the diastolic pressure. Using data obtained during cardiopulmonary resuscitation and post-resuscitation monitoring of a swine model of cardiac arrest, we evaluate several neural network-based methods to assist in automated extraction of diastolic blood pressure.

Methods: Systolic and diastolic peaks of the pressure waveforms are labeled for 42 animals during and after CPR using MATLAB. Several neural network architectures for peak detection varying in size and memory requirement are built using Python's TensorFlow library. Hyperparameters are found using 5-fold cross-validation using a 80-20 train-validation split. Models are compared using precision, sensitivity, and F1-score. The best models are tested on a final subset of data.

Results: Models had similar performance on detection of systolic peaks with mean (SD) F1 scores of 0.96 (0.01) for both compression and spontaneous beats. The diastolic detection task was slightly more difficult, with spontaneous diastolic F1 score at 0.90 (0.02). The diastolic compression task was most difficult, with an F1 score of 0.84 (0.03). The number of parameters showed a moderate positive relationship with F1 score.

Conclusions: Smaller network architectures can approach the performance of more complex ones while requiring less memory. Additional waveform data will be integrated into model training covering a wider variety of waveforms including real and artificially added noise.

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25. Rates and factors associated with risky firearm carriage and discharge among young adults presenting to four urban emergency departments

Philip Stallworth, Patrick M. Carter, Lauren Whiteside, M. Kit Delgado, Keara Sullivan, Rebecca M. Cunningham, Jason E. Goldstick

Background/Objectives: The Screening to Predict Young Adults at Risk for Firearm Violence (SPARK) project is a prospective longitudinal study aiming to predict future firearm violence risk. Here, we use baseline data from SPARK to study rates and factors associated with risky firearm behaviors.

Methods: Research assistants in four emergency departments (EDs) in three cities (Flint, Seattle, Philadelphia) recruited youth aged 18-24 for SPARK. Consenting youth completed a baseline assessment including measurements of firearm-related behaviors, violence exposure, peer behaviors, and neighborhood-level factors. We calculated rates of past-six-month firearm carrying, rates of high-risk carriage/discharge behaviors, and analyzed associations between covariates and firearm carrying using logistic regression.

Results: 1,506 participants enrolled in SPARK across four sites (35.9% male, 61.3% female, 2.7% non-conforming; 40.9% Black, 33.0% White, 9.6% Multi-racial, 14.6% Other race). 157 (10.5%) reported firearm carrying outside the home. Among those, 37.8% report carrying in ≥1 high-risk scenario (e.g., while drinking/using drugs) and 20.4% report discharge in ≥1 high-risk scenario (e.g., to scare/threaten someone). Relative to others, those reporting carriage had higher rates of non-partner (67.7%-vs-39.5%) and partner violence (42.3%-vs-23.5%), higher rates of violence-related childhood experiences (54.2%-vs-29.9%), and higher scores on scales measuring community violence, peer delinquency, and retaliatory attitudes (all $p<0.001$). Logistic regression models, adjusted for site and demographics, were consistent with unadjusted results.

Conclusion: Roughly 10% of youth presenting to urban EDs carry firearms. 40% of these youth report carriage/discharge in high-risk scenarios. Firearm safety interventions should prioritize youth with violence exposure, exposure to delinquent peers, and retaliatory attitudes.

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26. Using Near Real-time Data to Enhance Coordinated Community Responses to Opioid Overdose in Genesee County, MI

Keara Sullivan, Jessica Roche, Rebecca Cunningham, Jason Goldstick

Objective: Timely opioid overdose surveillance is critical for data-driven community-based responses to combat the opioid epidemic. We conducted a qualitative study in Genesee County to understand how to optimize data dissemination to facilitate such responses.

Methods: We convened a stakeholder group comprised of public health practitioners, public safety workers, and community outreach service providers in Genesee County. We gathered stakeholders for an initial focus group and individual 1-on-1 interviews to identify: 1) How real-time overdose reports can be used to inform prevention and response; 2) Barriers to prevention and response; and 3) Effective methods to coordinate a community-level response strategy. Stakeholders received data reports (descriptive statistics and spatio-temporal data visualizations) generated by the Michigan System for Opioid Overdose Surveillance (SOS) on a regular basis for eight weeks, and their feedback was solicited over time through biweekly surveys. A final focus group emphasized the mobilization of data-driven coordinated community responses through near real-time reports, and the creation of a coordinated community response toolkit.

Results: Our qualitative study results suggest that SOS data addresses numerous barriers to overdose and is being used to impact local planning, implementation, and responses to opioid overdoses. A toolkit based on stakeholder feedback describing community-based response strategies in Genesee County has been created.

Conclusions: These data provide vital information on what is most useful to stakeholders in Michigan, laying the foundation for targeted interventions in high-risk communities across the state. These data can be used to implement innovative interventions to respond to opioid overdose.

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27. Behavior Cuing in Student Assessments Improves Feedback Concordance

Rachael Tesorero, MD, MS, Beth Holman, DrPH, Isabel Hsu, AB, Joseph House, MD, Dan Dinh, BS, Laura R. Hopson, MD, MEd

Background: Providing feedback is challenging yet essential to learner development. Timely and actionable feedback is essential on emergency medicine (EM) rotations, where students do not consistently rotate with the same supervisors. Throughout clinical rotations, students report dissatisfaction with feedback. Cognitive forcing strategies and checklists show potential to change behaviors.

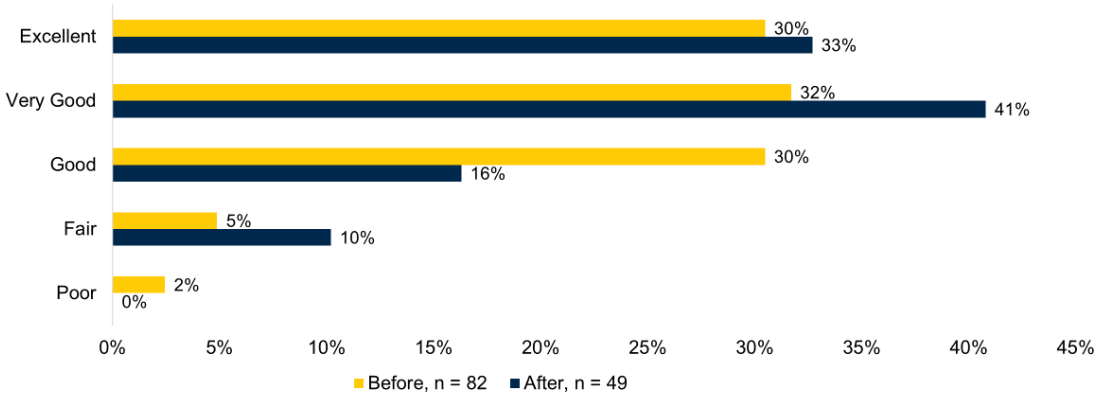
Objectives: We incorporated a "stop and think" checkpoint in supervisor assessments of students rotating on EM requiring supervisors to answer yes or no to the statement: "This feedback was discussed with the student prior to this evaluation". We hypothesized this would improve the student's assessment of feedback quality and verbal-written feedback concordance.

Methods: 3 feedback perception questions were added to the end of clerkship student evaluation including overall quality, verbal-written conconcordance, and a free text descriptive option. We prospectively collected 8 months of data (n = 82) prior to adding the feedback verification question to the supervisor assessment. We compared the pre-intervention data to 5 months of post-intervention data (n = 49).

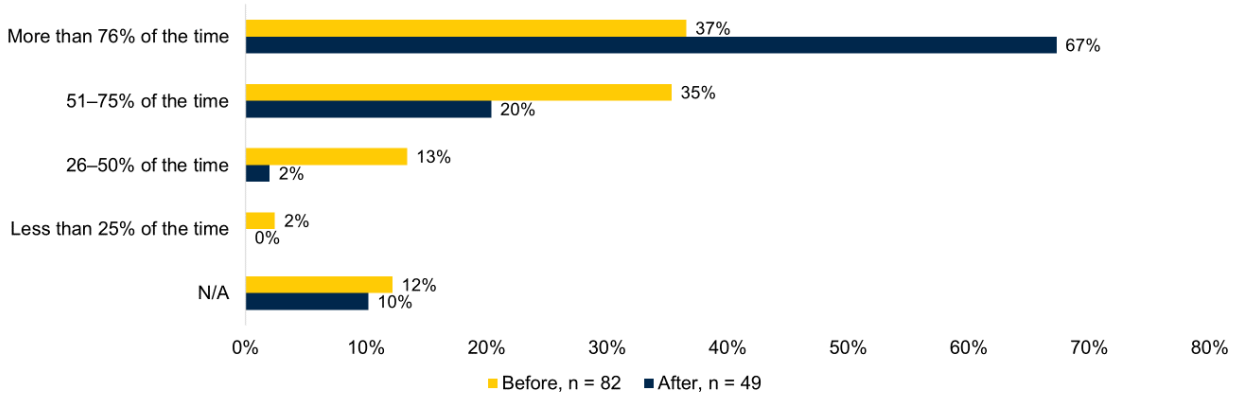
Results: The percentage of students rating the quality of clerkship feedback as excellent or very good increased from 62% to 74% which was not significantly different ($p = 0.76$). There was significant improvement in students reporting concordance of the verbal and written feedback the majority of the time from 72% to 87% ($p < 0.001$).

Conclusions: A verification question added to student assessment forms can positively impact student perceptions of verbal-written feedback concordance; although not overall perceptions of feedback quality. This easy-to-implement strategy may provide one mechanism for educators to encourage supervising residents and faculty to improve their feedback concordance.

Overall quality of feedback on your performance in this clerkship
(Percentage of respondents)



How often did the written feedback on your evaluation match the in-person feedback?
(Percentage of respondents)



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SAEM24

Sheraton Phoenix Downtown
Phoenix, AZ
May 14 – May 17, 2024

Tuesday, May 14, 2024

8:00am-12:00pm **Be the Best Teacher: Clinical Teaching Educational Bootcamp** (CME 3.5)
Location: Estrella: Second Level
Presenters: Mary R. C. Haas, MD, MHPE

8:00am-12:00pm **Clerkship Director Bootcamp: Best Practices and Expert Insights** (CDEM Sponsored, CME 3.5)
Location: Maryvale B: Second Level
Presenters: Joseph B. House, MD
William Peterson, MD, MHPE

8:00am-5:00pm **SAEM Grant Writing Workshop** (Research Committee Sponsored, CME 7.0)
Location: Paradise Valley: Second Level
Presenter: Colin Greineder, MD, PhD

8:00am-5:00pm **SAEM Leadership Forum** (AACEM Sponsored, CME 7.0)
Location: Laveen A: Second Level
Presenter: Brian Zink, MD
Ben Bassin, MD
Steve Maxwell, MSM

8:00am-5:00pm **SAEM24 Consensus Conference: Creating a Diverse and Sustainable Emergency Medicine Investigator Pathway** (CME 7.0)
Location: Phoenix Ballroom A&B: Third Level
Presenter: Robert W. Neumar, MD, PhD

5:00pm-6:00pm **SAEM Kickoff Party**
Location: Valley of the Sun Ballrooms: Second Level

Wednesday, May 15, 2024

8:00am-8:50am **Best Practices for Utilizing Medical Students as Embedded Simulation Participants in Point-of-Care Ultrasound Training** (AEUS and CDEM Sponsored, CME 0.75)
Location: Paradise Valley: Second Level
Presenters: Will Kropf, MD, MHPE
David Haidar, MD

Samantha Chao, MD, HEC-C
Michelle Feeney, MD

8:00am-8:50am **Socks for Cold Feet: Insights From Emergency Medicine-Bound Medical Students Who Ultimately Chose Another Path** (CDEM and RAMS Sponsored, CME 0.75)
Location: Laveen A: Second Level
Presenter: Joseph B. House, MD

9:00am-11:00am **SAEM24 Awards Ceremony, Dr. Peter Rosen Memorial Keynote Address, and Plenary Abstracts 1-4** (CME 0.0)
Location: Phoenix Ballroom C, D, & E: Third Level
Presenter: Robert W. Neumar, MD, PhD

11:00am-12:00pm **Clinical Operations, Wellness, Airway:**

11:00am-11:12am **14 – Accuracy of Continuous Glucose Monitor in Diabetic Ketoacidosis** (CME 1.0)
Location: Camelback A: second Level
Presenting Author: Nathan L. Haas, MD

12:00pm-1:15pm **Innovations Session 1:**

12:56pm-1:03pm **848 – Combating Climate Change Through Medical Education: Preparing the Next Generation of Planetary Health Leaders** (CME 1.25)
Location: Ahwatukee A: Second Level
Presenting Author: Alyssa Valentyne, MD

1:00pm-5:30pm **Education Summit – Stuck in the Middle: Professional Development for Mid-Career Faculty** (CME 3.5)
Location: Paradise Valley: Second Level
Presenter: Brian Zink, MD

1:25pm-2:50pm **Innovations Session 2:**

2:00pm-2:07pm **855 – Addressing Sexual Health Equity Through Expedited Partner Therapy Prescribing Operational Solutions** (CME 1.25)
Location: Ahwatukee A: Second Level
Presenting Author: Rachel Emily Solnick, MD, MSc

2:07pm-2:14pm **856 – Development of an In Situ Postpartum Hemorrhage Simulation Training Program** (CME 1.25)
Location: Ahwatukee A: Second Level
Presenting Author: Rachel Emily Solnick, MD, MSc

1:30pm-2:20pm **You've Got this! Best Practices in the Care of Critically Ill Boarding Patients** (Critical Care Interest Group Sponsored, CME 0.75)
Location: Ahwatukee B: Second Level
Presenter: Nathan L. Haas, MD

2:00pm-3:30pm **Ultrasound 1:**

2:30pm-3:20pm **Thinking About a Fellowship? What Residents Need to Know: A Fellowship Roundtable Discussion** (CME 0.75)
Location: Laveen B: Second Level
Presenter: Nik Theyyunni, MD

2:30pm-3:20pm **Words Matter: Destigmatizing the Language of Medicine** (ADIEM and Social EM and Population Health Interest Group Sponsored, CME 0.75)
Location: Phoenix Ballroom C: Third Level
Presenter: Marcia A. Perry, MD

3:00pm-3:50pm **Tasers, Tear Gas, Long-Range Acoustic Devices, and PepperBalls: Treatment of Injuries from Less Lethal Weapons** (Tactical and Law Enforcement Interest Group Sponsored, CME 0.75)
Location: Desert Sky: Third Level
Presenters: Florian F. Schmitzberger, MD, MS
Samuel Malakhovsky, MD, EMT-P

4:30pm-5:20pm **Developing a Working Group to Standardize the Ethical Conduct of Global Emergency Medicine Research** (GEME and Research Committee Sponsored, CME 0.75)
Location: Phoenix Ballroom C: Third Level
Presenter: Nina Entcheva, Undergraduate Student

4:30pm-5:35pm **Health Policy and Health Services Research 1:**

5:26pm-5:33pm **348 – Health Disparities of Recurrent Sexually Transmitted Infections: Retrospective Study of a Multihospital System** (CME 1.0)
Location: Ahwatukee B: Second Level
Presenting Author: Rachel Emily Solnick, MD, MSc

5:30pm-7:30pm **SAEM24 Opening Reception**
Location: Valley of the Sun Ballrooms: Second Level

Thursday, May 16, 2024

8:00am-9:00am **Health Equity & Disparities 2:**

8:28am-8:35am **189 – Time to Provider in the Emergency Department for Patients with a Non-English Language Preference** (CME 1.0)
Location: Camelback B: Second Level
Presenting Author: Asmaa Rimawi, MD, MPhil, MPH

8:00am-3:00pm **SAEM Medical Student Symposium** (CME 0.0)
Location: Desert Sky: Third Level
Presenting Author: Joseph B. House, MD

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12:30pm-2:00pm **Diagnostic Technologies/Radiology, Simulation:**

1:12pm-1:19pm **247 – A Novel Ultrasound-Guided Wrist Arthrocentesis Task Trainer for Procedural Teaching and Assessment Drone** (CME 1.5)
Location: Estrella: Second Level
Presenting Author: Won-Jun Kuk, MD

1:26pm-1:33pm **249 – A Randomized Trial Comparing Cognitive Aids in simulated Pediatric Resuscitation** (CME 1.5)
Location: Estrella: Second Level
Presenting Author: Prashant V. Mahajan, MD, MPH, MBA

1:00pm-1:50pm **Clinical Operations, Clinical Decision Guidelines, Disaster Medicine:**

1:00pm-1:50pm **National Institutes of Health Career Development "K" Awards: Why to Apply, How to Succeed** (Research Committee Sponsored, CME 0.75)
Location: Ahwatukee B: Second Level
Presenter: Courtney W. Mangus, MD

2:00pm-2:50am **Health Equity & Disparities 2:**

2:00pm-2:50pm **TogetHER: Enhancing the Professional Development of Women Physicians Through Collaborative Initiatives** (AWAEM and ADIEM Sponsored, CME 0.75)
Location: Laveen B: Second Level
Presenter: Nicole Klekowski, MD

3:00pm-3:50pm **Pediatrics 1:**

3:00pm-3:50pm **Shifts, Scholarship, and Stuffed Animals: How Physician Moms Find Joy** (ADIEM and AWAEM Sponsored, CME 0.75)
Location: Laveen B: Second Level
Presenter: Mary R. C. Haas, MD, MHPE

3:30pm-4:30pm **Disease/Injury Prevention, Trauma:**

3:30pm-3:37pm **353 – Aware of Consequences: Mixed Methods Study of Virtual Reality Game Enhancing Teen Distracted Driving Education** (CME 1.0)
Location: Camelback B: Second Level
Presenting Author: Timothy Visclosky, MD
Prashant V. Mahajan, MD, MPHE, MBA
Andrew Hashikawa, MD
Vincent Cervantes, MD

3:30pm-4:30pm **Neurology/Psychiatry 1:**

3:44pm-3:51pm **363 – Door-In, Door-Out Times at Referring Hospitals and Outcomes from Hemorrhagic Stroke** (CME 1.0)
Location: Alhambra: Second Level
Presenting Author: Regina Royan, MD, MPH

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4:00pm-4:50pm **How Prehospital Severe Stroke Screening Impacts Patients and Systems of Care: A Debate** (Neurologic EM and Emergency medical Services Interest Groups Sponsored, CME 0.75)
Location: Ahwatukee A: Second Level
Presenters: Lauren E. Mamer, MD, PhD
Cemal B. Sozener, MD, Meng, FACEP, FAHA

4:00pm-4:50pm **Emergency Medical Services, Simulation, Ultrasound:**

4:35pm-4:42pm **769 – Emergency Department Ultrasound-Guided Regional Anesthesia Experience With 155 Nerve Blocks** (CME 0.75)
Location: Maryvale B: Second Level
Presenting Author: Jordan Sell, MD

4:00pm-4:50pm **Revolutionizing Education in Emergency Medicine: Unleashing the Power of Artificial Intelligence** (CME 0.75)
Location: Laveen A: Second Level
Presenter: Maxwell Spadafore, MD
Mary R. C. Haas, MD, MHPE

4:30pm-5:35pm **Ultrasound, Research Methods:**

5:00pm-5:20pm **Using Point-of-Care Echocardiography to Land an Occlusion Myocardial Infarction Diagnosis** (AEUS and CPR/Ischemia/Reperfusion Interest Group Sponsored, CME 0.25)
Location: Encanto B: Second Level
Presenter: William J. Meurer, MD, MS

5:00pm-5:35pm **Obstetrics/Gynecology, Wellness, Informatics/Social Media, Patient Safety and Quality:**

5:00pm-5:07pm **770 – Emergency Department Visits for Early Pregnancy Complications: A Statewide Registry-Based Study** (CME 0.5)
Location: Maryvale A: Second Level
Presenting Author: Emily E. Ager, MD, MPH

6:00pm-10:00pm **AACEM Annual Reception and Dinner**
Location: Mancuso's Restaurant

Friday, May 17, 2024

8:00am-8:50am **A Bad Case of the Zoomies: Deciding on Virtual vs In-Person Didactics after COVID-19** (Education committee Sponsored, CME 0.75)
Location: Encanto B: Second Level
Presenter: Will Kropf, MD, MHPE

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8:00am-9:50am **Innovations Session 4:**

8:56am-9:03am **873 – Creating Leaders From Within: Development of a Longitudinal Leadership Curriculum for Emergency Medicine Residents** (CME 1.75)
Location: Ahwatukee A: Second Level
Presenting Author: Shoshana L. Rudin, MD

8:00am-1:00pm **SAEM SonoGames** (CME 0.0)
Location: Valley of the Sun Ballrooms: Second Level

9:00am-9:50am **Disease / Injury Prevention**

9:21am-9:28am **801 – Perceptions of a Novel Emergency Medicine Services-Based Naloxone Distribution Program Among People Who Use Drugs** (CME 0.75)
Location: Maryvale B: Second Level
Presenters: Eve Losman, M
Ella Purington, MD
Emily Ager, MD

9:28am-9:35am **802 – Experiences with a Novel Leave-Behind Naloxone Program Among Emergency Medical Services Personnel** (CME 0.75)
Location: Maryvale B: Second Level
Presenters: Eve Losman, MD
Emily Ager, MD
Jessica Baker

9:00am-9:50am **Health Policy and Health Services Research 1:**

9:30am-9:50am **Resuscitation for the Soul: How to Talk to Patients With Serious Illness** (CME 0.25)
Location: Laveen A: Second Level
Presenter: Carrie Harvey, MD

9:30am-11:00am **Pallative EM, Education:**

10:47am-10:54am **460 – A Novel Teaching Intervention Improves Emergency Medicine Trainee comfort With Delivering Serious News** (CME 1.5)
Location: Estrella: Second Level
Presenting Author: Carrie Harvey, MD

12:00pm-1:00pm **Health Policy and Health Services Research, Obstetrics/Gynecology:**

12:21pm-12:28pm **556 – Characterizing Frailty Amongst Veterans Admitted for Medical Conditions With and Without Postdischarge Emergency Department Visits** (CME 1.0)
Location: Camelback B: Second Level
Presenting Author: Sharmistha Dev, MD

12:00pm-1:00pm **IGNITE! Session 4:**

12:00pm-1:00pm **30 – Cursed Words: Three Vague Phrases We Love but Should Hate** (CME 1.0)
Location: Ahwatukee B: Second Level

Presenting Author: Heather Molvik, MD

12:00pm-1:00pm **31 – Ew, Don't Touch Me!** (CME 1.0)
Location: Ahwatukee B: Second Level
Presenting Author: Carrie A. Bailes, MD