

# *Annual Report 2025*



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*Charles “McC” Mathias National Study Center  
for Trauma and EMS*

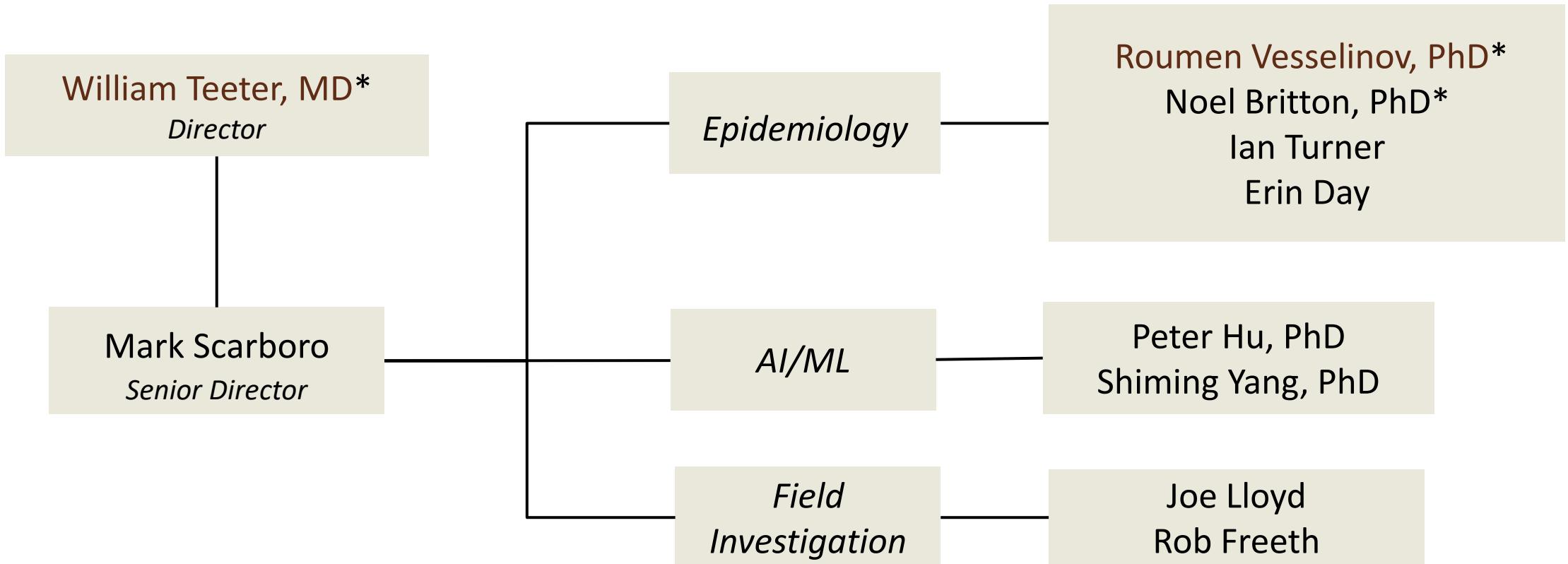
# Mission Statement

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*"The Study Center's primary mission is research, with particular emphasis on establishing national policies related to prevention, treatment, acute care and rehabilitation, trauma and emergency medical care delivery systems, disaster epidemiology and management, injury surveillance, and data collection. It shall serve as the primary research center for the State Emergency Medical Services System."*

MD Education Code § 13-513 (2024)

# NSC Organizational Chart



\*Faculty Appointment

# NSC Core Faculty

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## William Teeter, MD\*

Director, Charles McC Matthias National Study Center  
Associate Professor of Emergency Medicine  
University of Maryland School of Medicine

## Roumen Vesselinov, PhD

Assistant Professor of Epidemiology & Public Health  
University of Maryland School of Medicine

## Rosemary Kozar, MD, PhD

Professor of Surgery  
Director of Translational Research Shock Trauma  
University of Maryland School of Medicine

## Shiming Yang, PhD\*

Associate Professor of Anesthesiology  
Co-Director, PRIME-AI Lab  
University of Maryland School of Medicine

## Thomas M. Scalea, MD

The Honorable Francis X. Kelly Distinguished Professor in Trauma  
Physician in Chief, Shock Trauma Center  
University of Maryland School of Medicine

## Peter F. Hu, PhD\*

Professor of Anesthesiology, Surgery, and Epidemiology & Public Health  
Chief Technologist, National Study Center for Trauma & EMS  
R Adams Cowley Shock Trauma Center  
University of Maryland School of Medicine

## Deborah M. Stein, MD, MPH

Professor of Surgery  
Director Adult Critical Care Services, University of Maryland Medical Center

\* PRIME-AI Investigators

# NSC Faculty

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## New in 2026

**Elizabeth Powell, MD**

Associate Professor of Emergency Medicine and Surgery  
Advanced Resuscitation in Combat Casualty Care (ARC3) Laboratory  
University of Maryland School of Medicine

**Douglas J. Floccare, MD, MPH**

Maryland State Air Medical Director, MIEMSS  
Assistant Professor of Emergency Medicine  
University of Maryland School of Medicine

**Matthew Jason Levy, DO, MSc**

Professor of Emergency Medicine  
The Johns Hopkins University School of Medicine



UNIVERSITY *of* MARYLAND  
SCHOOL OF MEDICINE

CHARLES McC. MATHIAS, JR., NATIONAL  
STUDY CENTER FOR TRAUMA AND  
EMERGENCY MEDICAL SYSTEMS

# Report Summary

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Collaborations / Publications

Project Spotlights

- IODES
- CIREN
- CAVALIER
- Regional Highway Safety

# NSC Collaboration

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## Collaboration with IHC, STAR, and other researchers

- Multiple projects evaluating state-of-the-art care in trauma

## MIEMSS Research Interest Group (RIG)

- Epinephrine and Cardiac Arrests in Maryland
- Transfer of Care Times and Factors
- Patient survivability post EMS contact

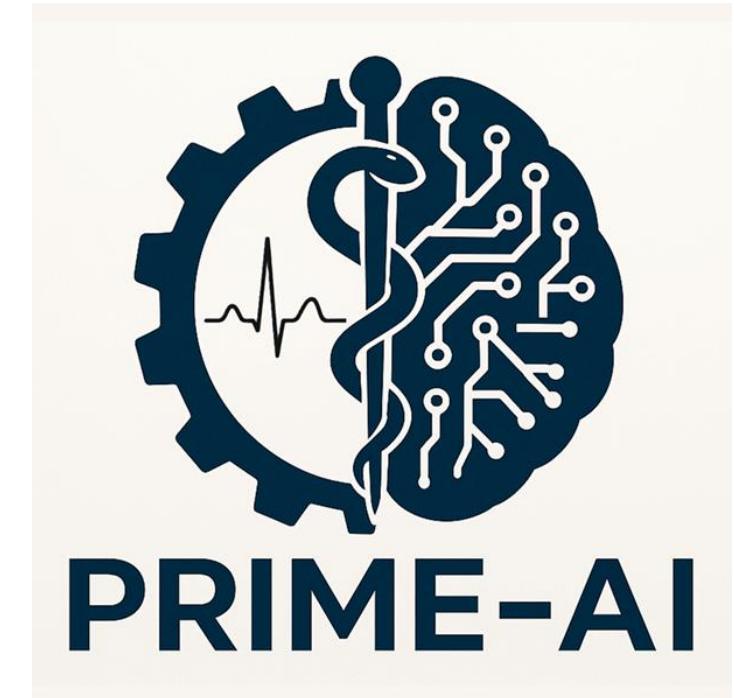
## Multiple papers submitted and published in 2025

- Early trauma-induced coagulopathy, drugs and toxicology, trauma clinical outcomes, built environment and injuries, among others

# Collaboration Spotlight

## Precision Research in Medicine and Engineering at University of Maryland, Baltimore

- Big data capture of real-time clinical data and continuous physiologic waveforms
- AI Machine Learning applied to big clinical data with a trauma focus
- Predictive Analytics and Clinical Decision Support tools
- Multi-view videography and analytics in trauma resuscitation



<https://www.medschool.umaryland.edu/anesthesiology/research/labs/prime-ai-lab/>

# Collaboration Spotlight

25+ years of data collection in real-world trauma environment

Physiologic Waveforms: ~100,000,000 datapoints/patient/day

Big Clinical Data ~140,000,000 data points per year

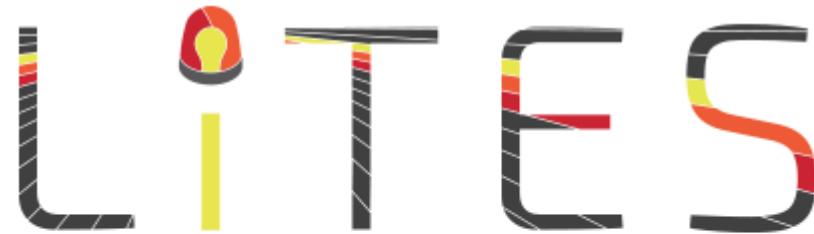
3,700,000 gigabytes of data

Unified Dataset of 7000+ Trauma Patients  
5000+ prehospital helicopter MEDEVAC Patients



Maryland Institute for  
Emergency Medical Services Systems

# National Collaboration Spotlight



Linking Investigations in Trauma  
and Emergency Services



Department of Defense-funded consortium of nearly 50 trauma centers in the United States and Canada to continue a clinical research trial program that is advancing trauma care.

Trials proposed by Department of Defense with support given to centers for multi-institutional enrollment in both field and in-hospital spaces

# National Collaboration Spotlight

<https://www.litesnetwork.org/cavalier/>



Linking Investigations in Trauma  
and Emergency Services



## Calcium and Vasopressin following Injury Early Resuscitation trial (CAVALIER)

**Randomized controlled trial** examining whether giving calcium, vasopressin, or both earlier following injury would help severely injured patients that require blood transfusion.

**NSC partnering with STC and MSPAC for coverage of the entire state**

**Exception from Informed Consent (EFIC) Campaign  
Completed by NSC – Awaiting IRB approval**

**Enrollment expected Q2 CY2026**

# Grants and Projects

- **USAF Enroute Care Triage Clinical Decision Support** - \$3,000K
  - Extended to \$5,000K total – FLIGHTNET/FORECAST
- **DCHSO Seat Belt Study FY25** - \$250K, FY26-\$200K
- **MHSO Seat Belt Study FY25** - \$190K, FY26 - \$180K
- **CIREN Research** - Transportation Data Linkage and Cost of Injury Analysis - \$87K
- **Safe Streets and Roads for All (SS4A) Grant Program** - \$642k
- **MHSO** 2 pilot studies: Aggressive and Reckless Driving, Traffic Stops and Race in MD
- **Crash Injury Research & Engineering Network (CIREN)** - \$597k
- **CAVALIER Trial** - \$500k



# Illness/Injury Outcomes Data Evaluation System (IODES)

## Integration of multiple datasets

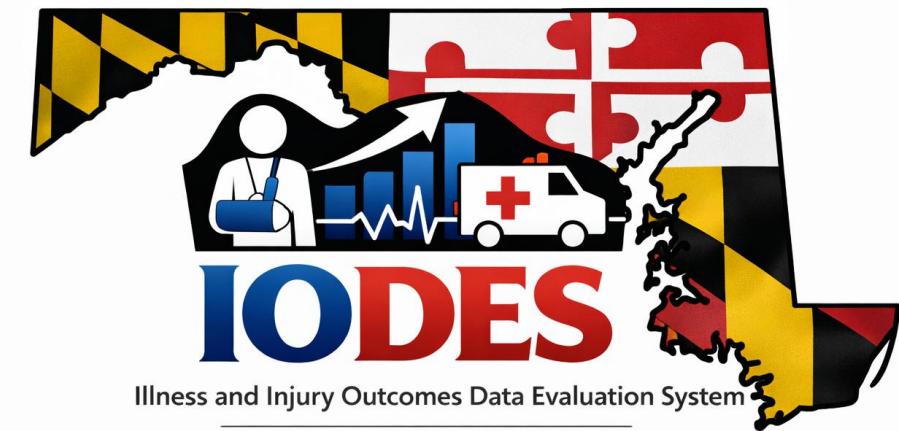
- EMEDS forms the keystone between event and hospital data
- HSCRC data (2016-2026) included in late 2025

## IODES stores data in secure database at UMB

- Integrated and Useable data

## Data continuum

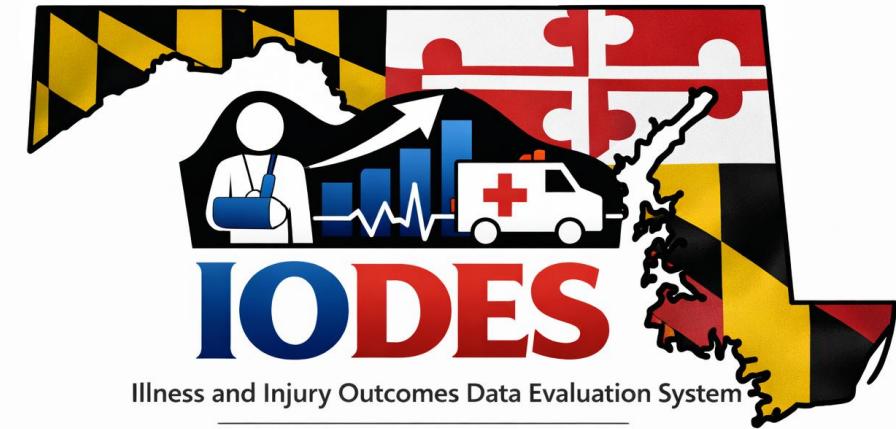
- Patient history, through event, hospital stay, and beyond hospital discharge



# Illness/Injury Outcomes Data Evaluation System (IODES)

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Collaboration with MIEMSS in 2026 to improve access to prehospital data in support of NSC's mission to the State EMS System

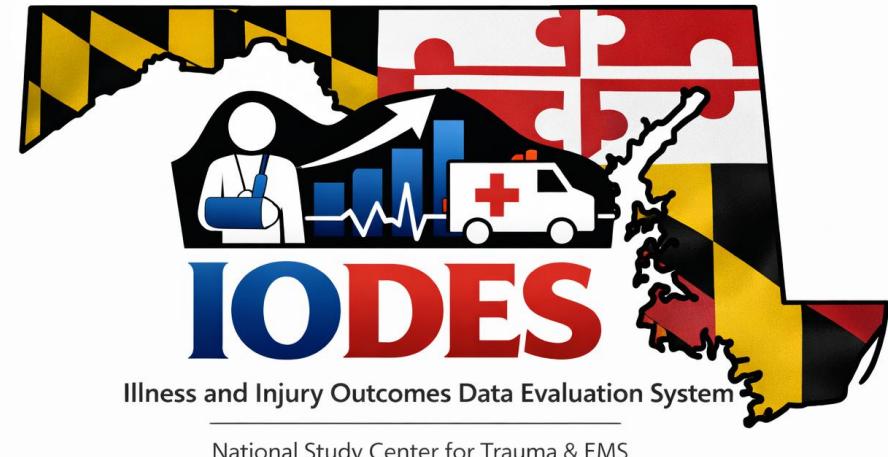


# Illness/Injury Outcomes Data Evaluation System (IODES)

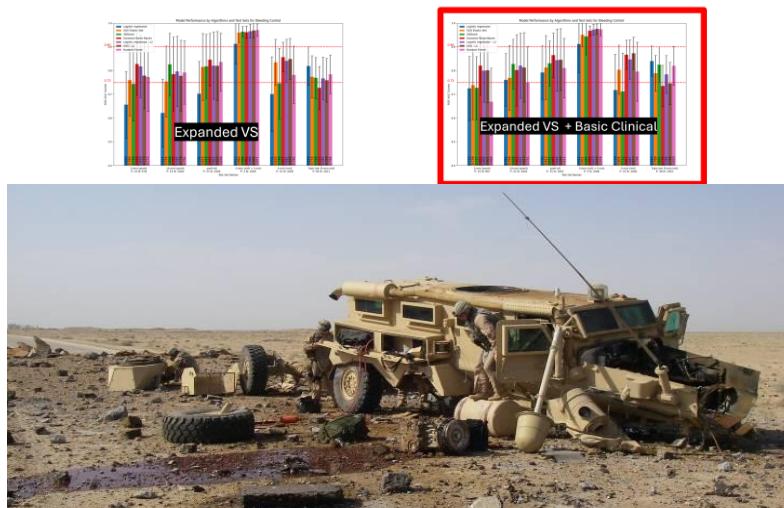
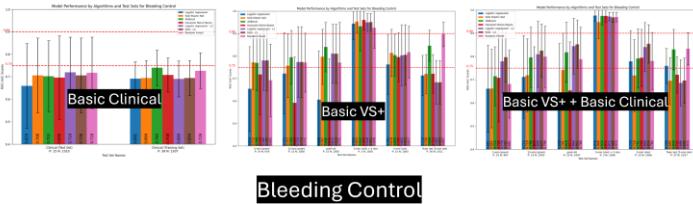
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## Planned inaugural projects in collaboration with MIEMSS and MSPAC

- WTA Multi-institutional Study: Early trauma-induced coagulopathy (eTIC)
- Whole blood program (Statewide)
- Outcome and Mortality following Motor Vehicle Collisions in Maryland



# TRIAGE CLINICAL DECISION SUPPORT (CDS) FOR PROLONGED FIELD CARE



The military faces the likelihood of **large-scale combat operations (LSCO)** with extended prolonged prehospital care and the need for **life-saving interventions (LSIs)** during transport and upon arrival to Role 2 surgical capabilities.

**Valid and reliable early warning systems** will improve facility-based surgical team readiness, particularly in the **setting of multiple casualties** or non-compressible torso hemorrhage that is otherwise difficult to identify.

# NHTSA Crash Injury Research and Engineering Network (CIREN)



NHTSA funded

- 5 year contract awarded - \$2.6M

Pedestrian cases

- Pursuing only fatal cases with DCIR

Motorcycle crash reconstructions

- 2025-2026

Continued focus on serious injury resulting from late model passenger vehicle crashes

# Maryland and District of Columbia Highway Safety Office Seatbelt Projects

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NSC will be manage the field data collection on seatbelt usage rates throughout the District of Columbia and Maryland.

Data collection will include information on the drivers and front seat passengers of: **passenger cars, vans, sport utility vehicles (SUVs), pick-up trucks, etc.**

**Goal:** Determine the percentage of seatbelt use within the District for mandatory reporting to NHTSA

MD Funding FY25: \$190K, FY26: \$180K

DC Funding FY25: \$250K, FY26: \$200K



# Thank you!



Maryland Institute for  
Emergency Medical Services Systems



U.S. Department of Transportation





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# Questions?

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[HTTPS://WWW.MEDSCHOOL.UMARYLAND.EDU/NSC\\_TRAUMA/](https://www.medschool.umaryland.edu/nsc_trauma/)