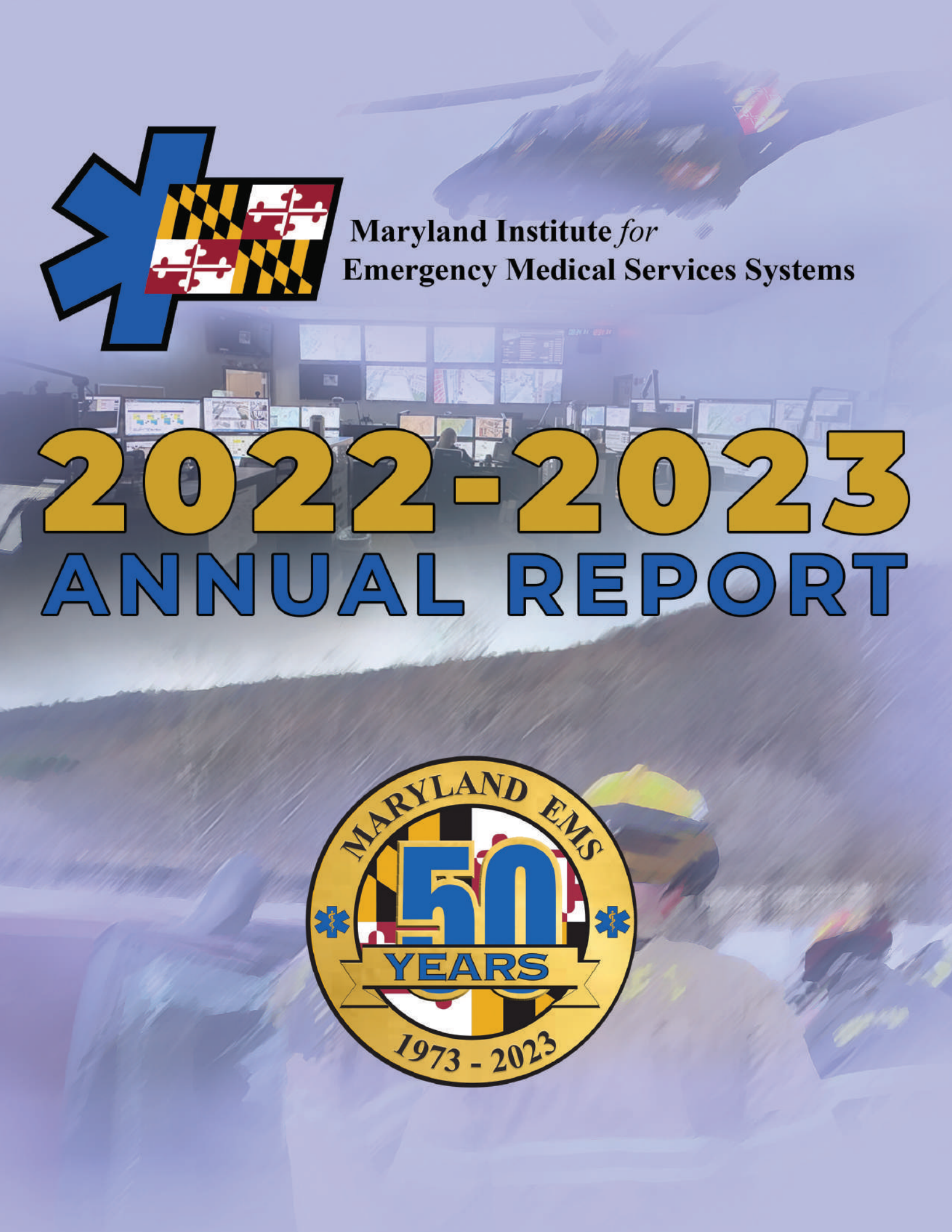


Maryland Institute *for*
Emergency Medical Services Systems

2022-2023 ANNUAL REPORT

MARYLAND EMS
50
YEARS
1973 - 2023

MIEMSS

The Maryland Institute for Emergency Medical Services Systems (MIEMSS) oversees and coordinates all components of the statewide EMS system (including planning, operations, evaluation, and research), provides leadership and medical direction, conducts and/or supports EMS educational programs, operates and maintains a statewide communications system, designates trauma and specialty centers, licenses and regulates commercial ambulance services, and participates in EMS-related public education and prevention programs. MIEMSS provides the executive support for the EMS Board in reviewing and approving the budgets for agencies receiving funds from the EMS Operations Fund, developing and promulgating regulations and protocols, proposing EMS system legislation, licensing/certifying and disciplining EMS clinicians, and conducting other EMS Board business. MIEMSS also provides the administrative and staff support for the Statewide EMS Advisory Council (SEMSAC) and five EMS regional councils.

653 W. Pratt Street • Baltimore, MD 21201-1536
www.miemss.org

2022-2023 ANNUAL REPORT

CONTENTS

MISSION, VISION, AND KEY GOALS

MISSION

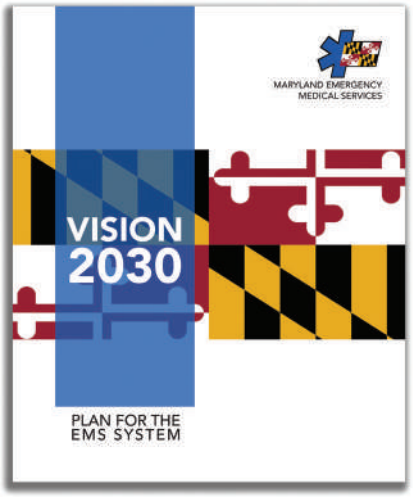
Consistent with Maryland law and guided by the EMS Plan, to provide the resources, leadership, and oversight necessary for Maryland's statewide emergency medical services (EMS) system to function optimally and to provide effective care to patients to reduce preventable deaths, disability, and discomfort.

VISION

To be a state EMS system acknowledged as a leader for providing the highest quality patientcare and that is sought out to help other EMS systems attain the same level of quality care.

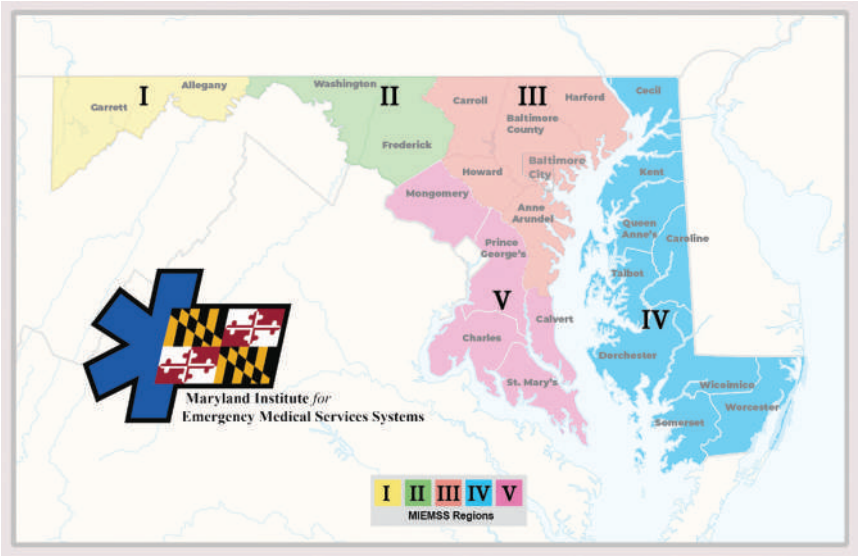
KEY GOALS

1. Ensure EMS clinicians are optimally prepared and qualified for the care they are called upon to provide.
2. Ensure all aspects of the EMS system benefit from qualified EMS medical direction.
3. Ensure Maryland EMS educational programs meet the needs of EMS clinicians and the patients they serve.
4. Ensure EMS clinical care reflects best practices, statewide.
5. Develop systems of care appropriate for the emergency conditions encountered by Marylanders.
6. Ensure that EMS is considered part of the continuum of health care.
7. Develop and maintain EMS communications systems that are integrated and interoperable.
8. Support implementation of Next Generation 9-1-1.
9. Ensure the Maryland EMS Operations Fund is a sustainable source of support for system infrastructure.
10. Ensure that evaluation is part of the EMS culture at all levels.



MARYLAND EMS REGIONS

Maryland's EMS system is composed of five regions. Each region has a Regional EMS Advisory Council responsible for and defined by regulation. Each council meeting covers a range of topics, including grants, training, EMS policies and protocols, legislation, and communications. Input from each Regional EMS Advisory Council is provided to the Statewide EMS Advisory Council for recommendation to the EMS Board. MIEMSS' regional coordinators support the councils, facilitate communication, and address regional EMS issues.



Clay B. Stamp, NRP
Chairman, EMS Board

FROM THE MARYLAND EMS BOARD CHAIR

On behalf of the Emergency Medical Services (EMS) Board, I want to thank the MIEMSS team, our EMS system partners, allied agencies, and each of our EMS clinicians who ensure our statewide EMS system performs at its best, "getting the right patient to the right care in the right amount of time."

This year marks the 50th anniversary of the Maryland EMS system. This is the greatest story ever told in Maryland. The development of the Maryland EMS system was the combination of strong leadership and the dedication of countless EMS and trauma clinicians striving to improve the health of the critically ill patient. The uniqueness of our Maryland EMS system continues to evolve with increased collaboration and partnerships with Maryland state agencies, hospitals, dedicated career and volunteer EMS responders, physicians, nurses, and technicians who provide the highest level of care to our Maryland communities. The positive impact of our system maintains broad citizen support echoed by state and local elected officials who assist with policy initiatives and support for needed resources.

History shows that our strength and resilience comes from our cooperative relationships with our EMS system partners and allied agencies. EMS system partners include the Maryland Institute for Emergency Medical Services Systems (MIEMSS), the Maryland Fire and Rescue Institute (MFRI), the Maryland State Police Aviation Command (MSPAC), the R Adams Cowley Shock Trauma Center (RACSTC), and the Maryland State Firemen's Association (MSFA), which work closely together to support emergency medical services across Maryland.

Again, I am honored and proud to work with our EMS Board members, the dedicated MIEMSS staff, our EMS system partners, stakeholders, and all of our volunteer and career clinicians, for their ongoing commitment to cooperative excellence. This excellence continues to build on the foundation of our collective successes that can be attributed to the Maryland "Vision 2030" EMS Plan, our roadmap for the future.

Theodore R. Delbridge, MD, MPH
Executive Director, MIEMSS

FROM THE EXECUTIVE DIRECTOR

This year, we celebrate the 50th anniversary of Maryland's statewide emergency medical services (EMS) system. What we might often take for granted as part of the fabric of society and our communities is, in reality, the result of incredible scientific inquiry, ingenuity, and perseverance. A governor's executive order 50 years ago served to acknowledge the promise of a well-organized statewide system to save lives and reduce morbidity. Five decades later, our work is not done, nor do we anticipate it ever will be.

Thus, while this report describes a spectrum of EMS system accomplishments over the past year, it is about the journey, or the quest to continuously improve the system born in 1973. During the past year, the EMS system responded to more than one million calls for help, and, while providing vital care, conveyed more than 530,000 people to emergency departments and trauma centers. What should be clear is the incredible collaboration it takes among countless partners to make the system work reliably and optimally for the benefit of one ill or injured person at a time.

The heart and soul of the EMS system are the nearly 20,000 EMS clinicians (emergency medical dispatchers, emergency medical responders, emergency medical technicians, cardiac rescue technicians, and paramedics) who dedicate themselves to helping others by deploying their expert knowledge, skills, and abilities during others' times of need. They include career personnel and volunteers who collectively serve Marylanders with professionalism and dedication. However, the system does not stop at emergency department doors. Instead, it includes tens of thousands of members of the emergency department, trauma center, cardiac center, stroke center, and perinatal teams. They are physicians, nurses, and many others who continue and coordinate the care initiated in the field. One of the most salient features of Maryland's EMS system is its inclusive, extensive, multi-disciplined expertise.

For much of the past three years we have dedicated significant energy toward the response to COVID-19 in our communities. If there was ever ambiguity about the importance of EMS as a component of the health care and public health systems, there is no more. In fact, Maryland EMS' response has been the focus of six scientific, peer-reviewed publications. There are more to come. Among them are descriptions of the work of the Critical Care Coordination Center (C4) and C4-Pediatrics (C4-P). They help match the critical care needs of emergency departments and hospitalized patients in the state with available resources in Maryland and beyond. In two-and-a-half years, the C4 and C4-P fielded more than 5,700 calls from emergency departments for assistance with their patients. During fall 2022, the C4-P shifted into high gear when the state was affected by a surge of pediatric respiratory illness that crowded emergency departments. Not only did the C4-P coordinators and physicians identify available resources (often outside Maryland), they issued valuable clinical guidelines to emergency physicians and pediatricians to help them manage the patients who needed their care. MIEMSS, with support from the Maryland Department of Health (MDH), opened the Pediatric Surge Operations Center. The center operated for months, keeping tabs on the course of the pediatric respiratory viral illnesses and their impact on available emergency care.

Through the year, MIEMSS continued to exercise the Maryland Emergency Medical Resource Alert Database (MEMRAD) every day to monitor the course of COVID-19 in our communities and the availability of hospital resources. We are grateful to our dozens of hospital partners who reliably respond to a MEMRAD ping each morning. The MEMRAD-derived data, provided daily by our hospitals, continues to be relied upon as the basis for ongoing surveillance.

We remain focused on workforce matters. During the past year, Maryland was one of five states to participate in efforts to standardize statewide assessment of EMS workforce issues. While the work is ongoing, we learned that EMS clinician trends in Maryland are similar to or more favorable than most of the other states. Similarly, the proportion of EMTs and paramedics who are clinically active (74% and 83%, respectively) are like or more favorable than the other reporting states. Much work remains to be done. We are also looking forward this next year to the work of the Commission to Advance and Strengthen Firefighting and Emergency Medical Services in Maryland.

Two other groups with EMS system significance are part-way through their work. Convened by the Maryland Hospital Association at the request of the Legislature, the Emergency Department

Throughput Workgroup is evaluating issues related to the time it takes to receive treatment in Maryland emergency departments, which is often longer than in other states. The implications for field EMS are clear, and EMS is represented in the workgroup. Tangentially, the Health Services Cost Review Commission has also turned its attention to measures of the emergency department throughout. It is noteworthy that the commission has found value in considering EMS-to-ED patient transfer intervals as a potential metric to assess quality in health care delivery.

MIEMSS and the Maryland Health Care Commission are coordinating the Commission on Trauma Funding. Hospitals assume a considerable financial burden when they accept the responsibilities inherent in being a trauma center. This commission is charged with assessing the extent of that burden and evaluating options to ensure the financial sustainability of Maryland's trauma centers. They are integral to the overall EMS system!

In the year upcoming, two additional priorities will be in focus. The first will be the sustainability of the Maryland Emergency Medical Services Operations Fund (MEMSOF). MEMSOF is principally funded by a surcharge on motor vehicle registrations. The fund supports the work of the MIEMSS, the Maryland Fire and Rescue Institute (MFRI), the Maryland State Police Aviation Command (MSPAC), and the R Adams Cowley Shock Trauma Center (RACSTC). It also provides grants to jurisdictions for fire and EMS infrastructure. However, the surcharge has not been adjusted in more than 10 years, and expenses have significantly risen over time. All EMS partners are committed to working with governmental leaders to develop a solution that ensures stability.

Finally, while this report highlights the performance and many of the accomplishments of the EMS system over the past year, we are compelled to focus on the future. Vision 2030 is our guide. It is the result of input from hundreds of EMS stakeholders, and since its adoption by the EMS Board in 2020 it has served as the roadmap. Our job is to stay on course.

The pages of this report should make it abundantly clear – enabling Maryland's EMS system to serve our state and its communities with the sophistication it does requires the selfless commitment and expertise of thousands of people who dedicate themselves to synergistic partnerships with unifying focus, to save lives, reduce suffering, and make Maryland better for the people who live and visit here. Thank you for reading.

MIEMSS OFFICES AND DEPARTMENTS

OFFICE OF THE STATE EMS MEDICAL DIRECTOR

The Office of the State EMS Medical Director (OMD) ensures that patients who interact with the Maryland EMS system receive consistent, high-quality out-of-hospital medical care. OMD provides leadership and coordination for state medical programs, protocols, and quality assurance. The office acts as a liaison with the regional programs and clinical facilities and promotes creative, responsive, and scientifically sound programs for the delivery of medical care to Maryland citizens.

The Maryland Protocols for Emergency Medical Services

In order to reflect best practices and evidence-based medicine, *The Maryland Medical Protocols for Emergency Medical Services* are updated annually by the Protocol Review Committee with multidisciplinary input from medical directors, emergency physicians, nurses, and EMS clinicians from across the state. State EMS Medical Director Timothy P. Chizmar, MD, FACEP, FAEMS, presented the changes for 2023 to the Statewide EMS Advisory Council and the Maryland EMS Board for approval.

This year, several significant additions and modifications were incorporated into the protocols. Here is a brief summary of the changes that took effect on July 1, 2023:

- ***Atrial Fibrillation Treatment:*** The guidelines for treatment of symptomatic atrial fibrillation and atrial flutter were clarified by requiring a heart rate of 130 bpm or greater to administer diltiazem.
- ***Buprenorphine Optional Supplemental Protocol for MIH Teams:*** This addition allows Mobile Integrated Health clinicians to administer buprenorphine to patients who have been recently resuscitated with naloxone. This protocol is intended to provide a bridge to long-term care for patients suffering from opioid use disorder.
- ***Diltiazem Infusion for Interfacility Transport:*** A qualified CRT or paramedic working for commercial services is now allowed to monitor an adult patient on a continuous intravenous diltiazem infusion. The infusion must have been initiated by the sending facility and the rate may not exceed 15 mg/hour.
- ***General Patient Care Communications:*** This revision defines the difference between a hospital notification and a medical consultation. It also changes the requirement for online medical consultation for Priority 1, unstable Priority 2, and Specialty Alert patients to a hospital notification, at minimum, for all Priority 1, Priority 2, and Specialty Alert patients. Medical consultation is still required in some specific treatment protocols or if the EMS clinician has questions regarding treatment or destination.
- ***Hospice/Palliative Care:*** Patients enrolled in hospice who are receiving locked continuous intravenous infusions may now be transported by BLS commercial services. In addition, hospice patients with chest tubes and those on ventilators with stable settings may be transported by ALS commercial services.
- ***Nitroglycerin (IV) Pilot:*** This pilot protocol allows intravenous nitroglycerin to be administered by IV bolus or infusion pump to patients with severe CHF requiring CPAP or BiPAP.
- ***Pain Management for Pacing and Cardioversion:*** Low-dose ketamine may now be given for pain management to patients who are receiving transcutaneous pacing or cardioversion.
- ***Pediatric Cardiac Arrest:*** The High-Performance CPR Algorithm was moved from the Procedures section to the Cardiac Arrest – Pediatric section. An age-based epinephrine dosing chart was added to the ALS algorithm with the goal of reducing first-dose delivery time.
- ***Refractory VF/VT:*** A revision to the Ventricular Fibrillation and Pulseless Ventricular Tachycardia Algorithm clarifies that a patient in refractory VF/VT can be defibrillated for as long as they remain in a shockable rhythm without a limit on the number of shocks allowed. Use of magnesium sulfate was moved from a footnote into the VF/VT algorithm.
- ***Respiratory Rate Changes:*** This revision changes the recommended ventilatory rate during CPR and rescue breathing for patients under 13-years-of-age to one breath every three seconds (from one breath every five seconds). For patients 13-years-of-age and older, the ventilatory rate was changed to one breath every six seconds (from one breath every five seconds).
- ***Tranexamic Acid (TXA) for Postpartum Hemorrhage:*** Postpartum hemorrhage with systolic blood pressure less than 90 mmHg or heart rate greater than 110 bpm and ongoing blood loss despite uterine massage is now an indication for the use of TXA.
- ***Trauma Decision Tree Changes:*** These revisions incorporate some of the changes to clinical criteria in the updated NHTSA National Guidelines for the Field Triage Injured Patients into the Maryland Trauma Decision Tree.
- ***Ultrasound (Pilot):*** Point-of-care ultrasound may now be used to evaluate carotid blood flow during cardiac arrest and CPR to inform the timing of transport and termination of resuscitation decisions. This change may also serve to limit interruptions in CPR for pulse checks.
- ***Wilderness EMS:*** Wilderness EMS teams may now administer epinephrine and tranexamic acid (TXA) without the requirement for a 100 mL bag.

Regional Medical Directors

The Office of the Medical Director (OMD) coordinates a network of Regional EMS Medical Directors, all of whom serve on the Protocol Review Committee, as well as on their respective regional councils. In addition, they serve as resources to jurisdictional medical directors and lead quality improvement initiatives within their regions of the state. In conjunction with EMS Preparedness and Operations and the Office of Care Integration, the Regional EMS Medical Directors provide oversight for the statewide EMS base station program, which provides for online (real-time) medical consultation for Maryland's EMS clinicians.

Base Stations

There are 47 Maryland hospital base stations designated by the EMS Board. All physicians and nurses who answer a base station call are required to successfully complete the MIEMSS Base Station Communications Course for Emergency Department Personnel and the 2023 Maryland EMS Updates for Hospital Base Station Personnel training video in order to communicate with EMS clinicians and provide appropriate online medical consultation. The base station course was offered at multiple hospitals entirely in a virtual format or in-person with appropriate social distancing measures in place in FY 2023, resulting in 432 base station certificates issued to emergency physicians and nurses. Additionally, three emergency medicine physicians became new MIEMSS-approved base station instructors over the past year.

EMS Medical Directors' Symposium

The 28th Annual EMS Medical Directors' Symposium was held in-person on April 12, 2023. The Symposium was attended by regional, jurisdictional, and commercial ambulance service medical directors, base station physicians and coordinators, highest jurisdictional officials, quality assurance officials, and MIEMSS personnel. This year's keynote speaker was Sheldon Cheskes, MD, CCFP (EM), FCFP, DRCPSC, who serves as the Medical Director, Sunnybrook Center for Prehospital Medicine, and Professor Department of Family and Community Medicine, Division of Emergency Medicine, University of Toronto. Dr. Cheskes' presentation was entitled, "Dose VF: Defibrillation Strategies for Refractory Ventricular Fibrillation." Other Symposium presentations included:

- "MIEMSS Executive Director Updates"; Theodore R. Delbridge, MD, MPH
- "Continuous Quality Improvement in the Maryland EMS System"; Timothy P. Chizmar, MD, FACEP, FAEMS
- "Pediatric T's: Rationale for Changes in Tubes and Trauma Tree"; Jennifer Anders, MD, FAAP
- "Pre-Hospital Whole Blood in Maryland"; Douglas J. Floccare, MD, MPH, FACEP
- "The Wall Time Challenge"; Kathy Jo Marvel, NRP; Scott Wheatley, NRP

Strengths, Weaknesses, Opportunities, and Threats Analyses (SWOT)

The Somerset County Commissioners requested the assistance of State EMS Medical Director Timothy P. Chizmar, MD, FACEP, FAEMS, and the MIEMSS Region IV office to facilitate a SWOT analysis. The Somerset County EMS Task Force included representation from Somerset's fire and EMS companies, Somerset County Emergency Services (9-1-1 Center), Somerset County Health Department, TidalHealth, mutual aid fire and EMS companies, and the Maryland Fire and Rescue Institute. A detailed geographic analysis of EMS calls was prepared with technical assistance from the Eastern Shore Regional GIS Cooperative. The SWOT report was presented to the Somerset County Commissioners on May 2, 2023.

CARES Program

MIEMSS works with the Cardiac Arrest Registry to Enhance Survival (CARES) in order to measure and ultimately improve emergency cardiac care in Maryland. CARES is an out-of-hospital cardiac arrest registry for the United States, facilitating uniform data collection and quality improvement in each state and nationally.

With the updated and consolidated Cardiac Arrest tab in eMEDS®, the statewide prehospital patient care reporting system, EMS clinicians can readily enter comprehensive prehospital cardiac arrest information. MIEMSS can then export the prehospital information directly to CARES when it is first entered, saving time for clinicians and EMS CARES coordinators. Using a single patient care record for CARES submission makes Maryland one of the first states to incorporate this process within their electronic patient care reporting documentation. Maryland hospitals then enter outcome data into the CARES report for those cardiac patients who receive ongoing care in the ED.

Since January 2017, all jurisdictional EMSOPs and Maryland health care facilities have submitted their cardiac arrest data to CARES. Statewide data for calendars year 2017 to 2022 is now included in CARES National Reports (see tables and graphs on pages 68-69). Notably, the number of out-of-hospital cardiac arrests increased from 6,796 in CY 2019 to 7,850 in CY 2020, representing a 15.5% increase. Nationally, the number of out-of-hospital cardiac arrests sharply increased during the COVID-19 pandemic as well. The number of out-of-hospital arrests has decreased slightly in the past two years. In CY 2022, there were 7,459 out-of-hospital cardiac arrests.

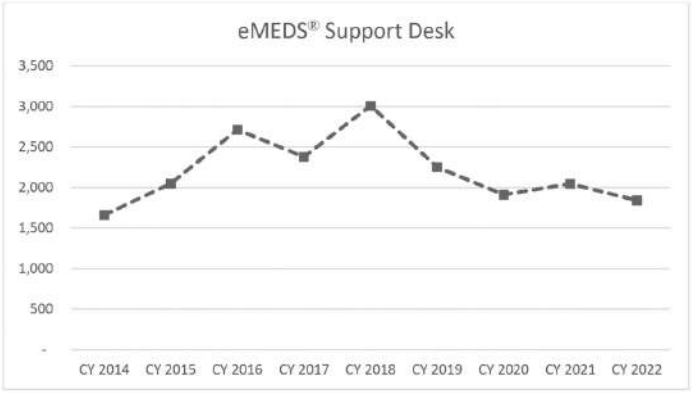
Two factors have demonstrated a significant impact on survival from sudden cardiac arrest: early cardiopulmonary resuscitation (CPR) and early defibrillation. CPR training is required for all Maryland high school students prior to graduation. Nearly every EMSOP offers layperson CPR and automated external defibrillator (AED) courses. Using the CARES data, it is clear that patient outcomes in Maryland are significantly improved by early bystander CPR and the use of public access AEDs.

Cardiac Arrest Steering Committee

The Cardiac Arrest Steering Committee (CASC), as authorized by the State EMS Board, provides guidance to MIEMSS' medical and executive leadership teams on matters related to sudden cardiac arrest in Maryland. The committee actively works on matters related to public safety by answering point engagement, prehospital cardiac arrest management performance improvement, and further development of a comprehensive statewide system for the treatment of sudden cardiac arrest. CASC collaborates with MIEMSS' Media Services and Public Information to develop public messaging campaigns intended to increase bystander use of CPR and AEDs. In FY 2023, CASC evaluated two new education and implementation strategies that use feedback of high-fidelity simulation data on CPR performance to inform, educate, and prepare EMS clinicians, and used telephone CPR data to prepare 9-1-1 Specialists. The results of these trials are positive and have been presented to the 9-1-1 Board and to the State EMS Advisory Council (SEMSAC). The Office of Care Integration (OCI) is currently working to develop the results from the pilot programs and identify a few communities for early adoption. It is anticipated that survival rates will improve in those communities that implement these new educational and quality improvement strategies.

electronic Maryland EMS Data System (eMEDS®)

The electronic Maryland EMS Data System (eMEDS®) uses commercial software provided and hosted by ImageTrend®, an industry leader for emergency patient care reporting. MIEMSS owns a statewide site license for the eMEDS® system, permitting the State's EMS services to use it at no cost and no additional burden on local funding. All of Maryland's jurisdictional EMS operational programs (JEMSOPs) and many licensed commercial ambulance services submit patient care reports directly into eMEDS®. Maryland has one of the few statewide comprehensive prehospital patient care reporting systems in the nation. eMEDS® provides timely information to hospital emergency department physicians and nurses through an application called Hospital Hub. All Maryland healthcare facilities have access to the eMEDS® Hospital Hub to obtain prehospital patient care reports.



The eMEDS® system supports a number of important system goals, including:

1. Providing uniform and consistent data collection and reporting on prehospital medical care delivered by Maryland's emergency medical clinicians;
2. Supporting the advancement of the practice of EMS medicine, including the modification of scope of practice, roles of EMS clinicians, and destination capacity;
3. Providing the foundation for applying performance measures to patient care and clinicians' compliance with protocols by local departments, EMSOPs, regional medical directors, and MIEMSS;
4. Enabling standardized data reporting to the National EMS Information System (NEMSIS);
5. Supporting Statewide and EMSOP data integration efforts:
   a. Statewide integrations include, but are not limited to:
      i. Syndromic surveillance system (ESSENCE)
      ii. The State's health information exchange (CRISP)
      iii. The State's overdose program (ODMAP)
      iv. Maryland Trauma Registry
      v. Cardiac Registry to Enhance Survival (CARES)
   b. EMSOP integrations include, but are not limited to:
      i. Integration of the EMSOP's Public Safety Answering Point, or 9-1-1 center's Computer-Aided Dispatch information
      ii. Exports to various third-party billing vendors to process reimbursement for services provided
      iii. Exports of EMSOP data to various third-party vendors to obtain a local copy of EMS data

eMEDS® Mobile Integrated Health Module

Since October 2020, MIEMSS has been working with the Statewide EMS Advisory Council's (SEMSAC) Mobile Integrated Health (MIH) Workgroup to implement ImageTrend®'s MIH module. This module within the eMEDS® system allows EMSOPs with an MIH program to document patient interactions in a centralized statewide system that is configured for mobile integrated health visits. EMSOPs started utilizing the MIH module in quarter 1 of 2021. MIEMSS continues to support this committee's requests to enhance the data collection, which allows for EMSOPs to focus their future MIH efforts. As of the end of FY 2023, over 5,300 reports have been entered using the MIH module.

eMEDS® Statewide Steering Committee

Jurisdictional, commercial and hospital stakeholders meet on a quarterly basis to discuss various topics related to eMEDS® for the betterment of the system. Such topics include the development of system-wide integrations, enhancements, and change requests to the system. Change requests can come from any stakeholder who uses or has any type of interface with the eMEDS® application. The committee reviews and discusses these change requests before they are made live in the system.

eMEDS® Support Desk (emeds-support@miemss.org)

The eMEDS® application contains a support desk/ticketing system. This ticketing system receives assistance requests from EMS clinicians, EMS Operational Program (EMSOP) administrators, and health care facility personnel throughout the state. Common issues addressed include password resets and login concerns, access level questions, report writer functionality, EMSOP integrations, and application inquiries. In CY 2022, eMEDS® received and processed over 1,800 tickets.

eMEDS® Update to NEMSIS v3.5

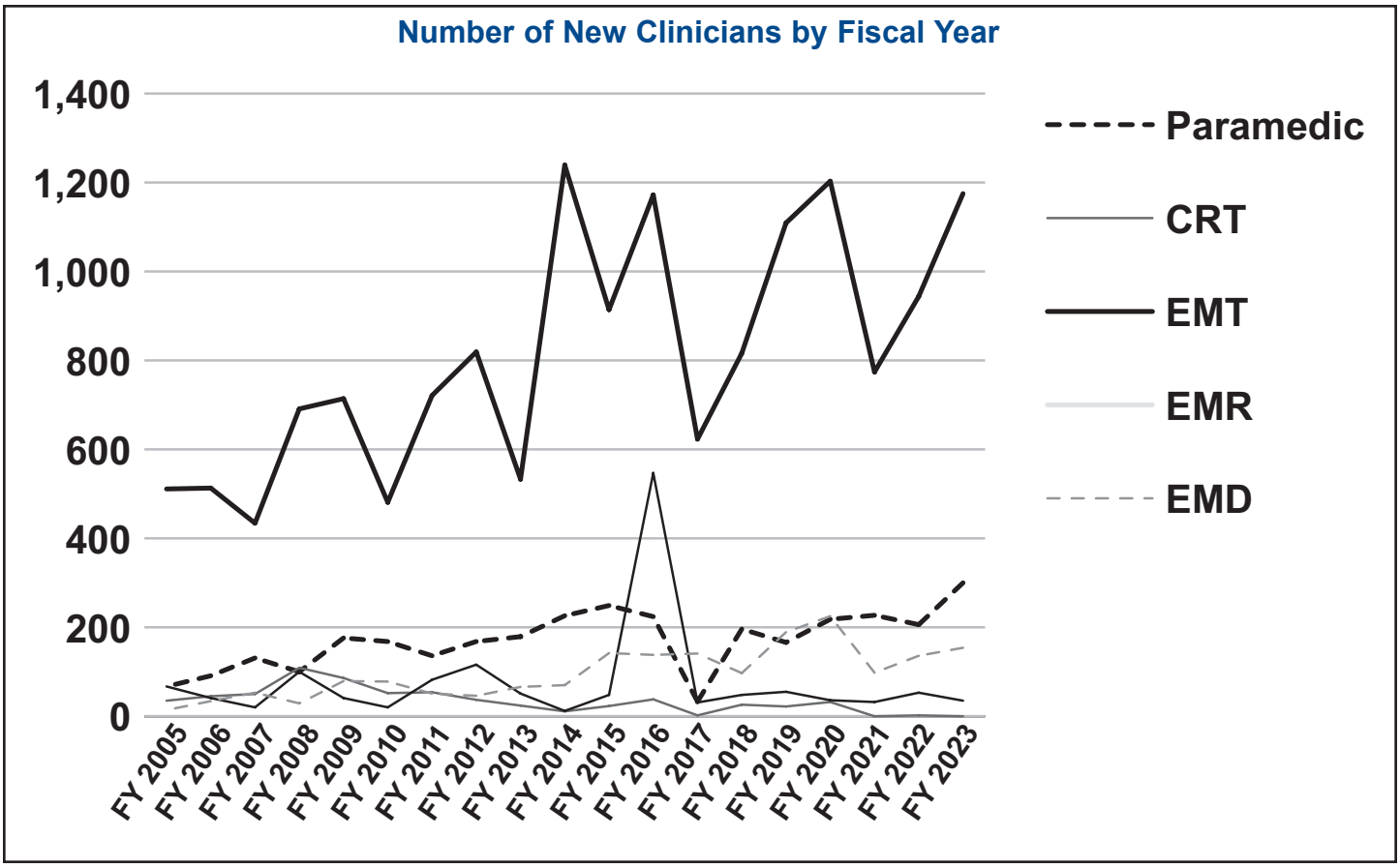
In fall 2023, MIEMSS is expected to complete an eMEDS® update to be compliant with the National EMS Information System (NEMSIS) version 3.5. NEMSIS is a nationwide database for prehospital EMS information and research, and is the de facto standard for prehospital patient care reporting. MIEMSS ensures that eMEDS® remains compliant with the updated NEMSIS versions as they are released.

Office of EMS Clinician Services

The office of EMS Clinician Services (OCS) coordinates Maryland EMS educational programs; provides and verifies educational opportunities for licensure and recertification of clinicians; develops and implements regulations to support clinician registration, renewal, and licensing; manages access to technology systems and learning management systems for EMS registration and education; supports constituents and partners statewide; manages and sells merchandise for Maryland EMS; and processes certifications and licensure. OCS coordinates a variety of services to protect the public and promote and facilitate the development of knowledgeable, skilled, and proficient prehospital professionals who deliver emergency care in the Maryland EMS system.

EMS Clinician Education

The Office of EMS Clinician Services (OCS) strives to improve clinician professional skills and abilities and ensure EMS clinicians have access to high-quality education and training opportunities and are optimally prepared to serve patients with the most up-to-date emergency medical services. OCS achieves this by assessing and implementing EMS curriculum being offered by the educational programs in Maryland; creating continuing educational courses on the Online Training Center to increase access to high-quality educational content; supporting students so they may achieve their goals; providing educational grant opportunities to assist educational programs in purchasing instructional materials for students' initial and continuing educational needs; and managing an EMT Stipend that provided over 500 EMT students with financial vouchers at each milestone of their EMT course journey. This stipend offered up to $2,000 after completing the state exam and national registry exam.



FY 2023 EMS Clinician Data

The Office of EMS Clinician Services (OCS) had a steady workload in FY 2023, processing 8,328 applications, issuing 1,664 initial prehospital clinician certifications and licenses, and renewing 5,335 certifications and licenses. The vast majority of new entrants into Maryland EMS are through an initial emergency medical technician (EMT) clinician course. Hundreds of EMTs enter the Maryland EMS system each year, although these numbers fluctuate. Upon gaining EMT certification, many subsequently transition to the advanced life support (ALS) level. While most remain in the Maryland EMS system, some explore opportunities in other healthcare professions. The number of Maryland clinicians is shown below. In FY 2023, the number of licensed/certified clinicians increased at each level except EMR, with the exception of FY 2021. OCS works with other MIEMSS departments to supply clinician data and trends (e.g., clinician numbers by affiliation and NREMT pass rates) to various statewide committees for analytical purposes.

MIEMSS Online Training Center

The Online Training Center (OTC), MIEMSS' distance learning management system, received an extensive upgrade in 2022, and reached over 61,723 registered users through FY 2023. Of those registered users, 16,000 clinicians were active in the OTC during the same period. The OTC hosted 76 active courses and offered the examination for the Hospital Base Station Course exams. In conjunction with ImageTrend® and MIEMSS Information Technology and Systems Management, the Office of EMS Clinician Services (OCS) enhanced OTC functionality to capture clinician continuing education records into the Licensure system. This allows a course taken in the OTC to sync to a clinician's education report in the Licensure system, updating within 24 hours. With completed updates in the current fiscal cycle, OCS has scheduled additional planned upgrades to some new modules in Licensure. These upgrades will bring new features and functionality and advance education programs and services by improving the communication methods for sending correspondence for clinician education and training.

Collaboration and Constituents

To ensure all aspects of the EMS system benefit from optimally qualified EMS medical direction and incorporate technology-based solutions for effective medical direction to increase consistency and quality, the Office of EMS Clinician Services (OCS) partners with the Office of the State EMS Medical Director to provide technological innovation to incorporate protocol content into BLS psychomotor exams and ensure

reliability and validity through a skills exam module in the Moodle Learning Management System. This effort includes Quality Assurance and Quality Improvement site visits to educational programs in Maryland, including Maryland Fire and Rescue Institute (MFRI) regional offices, jurisdictional academies, and community colleges.

OCS develops, sustains, and collaborates with relevant constituents, professional and educational partners for emergency preparedness and the advancement of EMS by attending and supporting conferences and conventions. The variety of support given to these efforts ranges from merchandise sales for Maryland EMS clinicians to offering live support for EMS Clinician licensing and continuing education. In FY 2023, OCS attended the Winterfest EMS Conference, Miltenberger Emergency Services Seminar, EMS Care Conference, and the Maryland State Firemen's Association Annual Convention. OCS staff attends BLS and ALS subcommittees of SEMSAC, contributing organizational and management resources for committee meetings. As a stakeholder, OCS collaborates and problem-solves educational practices and procedures that affect EMS clinicians, making it a key conduit to MIEMSS leadership for support and resources. OCS gives regular reports at Commercial Ambulance Services Advisory Council, Jurisdictional Advisory Councils, Pediatric Emergency Medical Advisory Council, County Associations, and MIEMSS Regional meetings. OCS shares and disseminates essential information for the function of licensing and educational programs.

OCS participates as a member of the National Association of State EMS Officials Council (NASEMSO), the Personnel Licensing Council, and the Education Councils, and serves as liaison to the Councils to the East Region to support national decision processes regarding licensing, education, and best practices.

Office of Care Integration

The Office of Care Integration (OCI) follows COMAR regulations to designate hospital specialty centers. OCI provides on-site verification to programs to ensure they operate per their designation (e.g., Level 1, Level 2, Level 3) and have met the criteria necessary to maintain their designations. Designation and verification processes for trauma and specialty referral centers require continuing evaluation of designated centers for compliance with the regulations and standards set forth in COMAR 30.08 et seq., and ensure ongoing quality monitoring of Maryland's trauma/specialty care system.

Trauma System

The Maryland trauma system is regionalized and tiered, ensuring prompt and appropriate care of trauma patients throughout Maryland. A complete list of facilities within the Maryland trauma system, including out-of-state hospitals that receive Maryland trauma patients, appears on page 32. MIEMSS is responsible for oversight of the Maryland trauma system, consisting of nine Maryland-designated adult trauma centers and five categories of specialty referrals, including two pediatric trauma centers, adult and pediatric burn, neurotrauma, eye, and hand/upper extremity facilities.

Adult trauma centers are designated at one of four levels of care (Primary Adult Resource Center, Level I, Level II, and Level III), which provides for the appropriate resources necessary to care for injured patients across the state. Memorandums of understanding are in place with three out-of-state hospitals (MedStar Washington Hospital Center, Children's National Hospital, and ChristianaCare) to facilitate trauma services for injured patients requiring a higher level of care in outlying areas of the state.

Since 2015, all Maryland adult and pediatric trauma centers have been required to submit data to the National Trauma Data Bank (NTDB). This data is used to assist trauma centers with comparative data that allows each to benchmark their trauma center on a national scale. The Office of Care Integration (OCI) collaborates with each of the 14 trauma centers in Maryland and uses NTDB data to provide a statewide comparison that measures qualities between Maryland trauma centers and national trauma centers.

The Maryland Trauma Quality Improvement Committee (TQIC) is composed of trauma program managers and directors, trauma performance improvement staff, trauma registrars, and injury prevention and education staff. This group applies a trauma quality scorecard to review, monitor, and trend statewide compliance using metrics such as emergency department documentation of patients' Glasgow Coma Scale, emergency department documentation of patients' pain assessment, unplanned visits to the operating room, trauma bypass hours per month, and eight other criteria.

In FY 2023, in collaboration and support of ESO Solutions, Inc., trauma registries were successfully moved to the GEN6 Trauma Registry platform for Trauma, Eye Trauma, and Hand and Upper Extremity Trauma Registries. These registries link EMS documents to the patient's Trauma Registry documentation.

The Maryland Burn Collaborative meets to analyze and interpret "burn data submissions", "standard audit indicators", and "performance improvement". A Maryland burn center scorecard is used to monitor and trend statewide compliance using quality indicators such as Burn Total Body Surface (TBSA) greater than 10% of patients admitted within six hours from the scene, Burn TBSA greater than 10% of patients admitted within six hours from interhospital transfer, and Deaths less than 10% TBSA, as well as four additional criteria.

Designated Stroke Centers

Maryland's statewide regional system approach to stroke care continues to evolve with the publication of new research findings on stroke care. In FY 2023, the Stroke Quality Improvement Committee (Stroke QIC), consisting of Maryland

Stroke Core Measures (5-Year Comparison)

Core Measure	CY 2017	CY 2018	CY 2019	CY 2020	CY 2022
Percent of ischemic stroke patients who arrive at the hospital within 2 hours of time last known well and for whom IV t-PA is initiated within 3 hours of time last known well	93.2%	93.3%	92.7%	91.8%	91.2%
Percent of patients with ischemic stroke or TIA who receive anti-thrombotic therapy by the end of hospital day two	98.6%	98.2%	98.3%	97.7%	97.5%
Percent of patients with an ischemic stroke, or hemorrhagic stroke, who receive VTE prophylaxis the day of or the day after hospital admission	98.2%	98.0%	97.5%	97.3%	97.6%
Percent of patients with an ischemic stroke or TIA prescribed anti-thrombotic therapy at discharge	99.5%	99.6%	99.7%	99.4%	99.6%
Percent of patients with an ischemic stroke or TIA with atrial fibrillation/flutter discharged on anticoagulation therapy	98.2%	97.7%	98.9%	97.8%	98.5%
Percent of patients with ischemic or hemorrhagic stroke, or TIA with a history of smoking cigarettes, who are, or whose caregivers are, given smoking cessation advice or counseling during hospital stay	99.0%	99.0%	99.1%	98.6%	99.1%
Percent of ischemic stroke or TIA patients with a cholesterol LDL level=100, or LDL not measured, or on cholesterol-reducer prior to admission who are discharged on statin medication	98.5%	99.1%	99.0%	99.0%	99.3%
Percent of stroke patients who undergo screening for dysphagia (difficulty swallowing) with an evidence-based bedside testing protocol approved by the hospital before being given any food, fluids, or medication by mouth	89.1%	89.0%	91.0%	89.8%	90.0%
Percent of patients with stroke or TIA, or their caregivers, who were given education and/or educational materials during the hospital stay addressing all of the following: personal risk factors for stroke, warning signs for stroke, activation of emergency medical system, the need for follow-up after discharge, and medications prescribed	97.5%	96.9%	96.7%	96.8%	96.4%
Percent of patients with stroke who were assessed for rehabilitation services	99.3%	99.1%	99.5%	99.4%	99.6%

Source: Get With the Guidelines-Stroke Registry

IV t-PA = Intravenous Tissue Plasminogen Activator
VTE = Venous Thromboembolism
LDL = Low Density Lipoprotein (bad cholesterol)
TIA = Transient Ischemic Attack

hospitals' stroke program coordinators and stroke program medical directors, focused on ongoing initiatives for improving stroke care in Maryland.

Following the promulgated and enacted revision and updates to the COMAR regulations for Primary Stroke Center (PSC) and Comprehensive Stroke Center (CSC) in FY 2022, two additional stroke center designations were promulgated and enacted for the improvement of the regional system of care approach. The two types of center designations are the Acute Stroke Ready Hospital Center (ASRHC) and the Thrombectomy-Capable Primary Stroke Center (TCPSC). All stroke centers maintain their designations for up to five years. In FY 2023, two PSCs achieved an initial designation as a TCPSC, and six PSCs designations were renewed. Currently, Maryland has designated 32 Primary Stroke Centers, three Comprehensive Stroke Centers, and four Thrombectomy-Capable Primary Stroke Centers.

Each stroke center submits data monthly to the American Heart Association's (AHA) Get with the Guidelines® (GWTG) – Stroke registry. The Office of Care Integration (OCI) uses the registry data on a monthly basis to monitor compliance standards

established by the AHA and American Stroke Association (ASA) (see above). Using core performance measures for standards of care, OCI evaluates the data to benchmark Maryland's compliance rate and compares the results to national compliance measures. Compliance to the AHA and ASA standards has improved patient outcomes. The annual state aggregate data for CY 2022 revealed Maryland had a compliance rate of 92% or greater for each of the core performance measures, significantly higher than the AHA/ASA minimal compliance rate of 80%.

Maryland stroke centers use GWTG data to support changes to their stroke alert protocols, improve their response times, and to share best practices and processes. In FY 2023, stroke centers used GWTG data to improve door-to Intravenous tissue Plasminogen Activator (IV t-PA) times. It has been well-established that improved patient outcomes are documented when patients are treated sooner with the clot-busting fibrinolytic t-PA. The minimum compliance standard determined by the AHA/ASA Target Stroke Program stipulates that 75% of stroke patients eligible for t-PA should receive t-PA within 60 minutes of arrival at the hospital "door". For CY 2022, Maryland's median door-to-PA time was 45 minutes. Additionally, 83.7% of all acute ischemic stroke patients eligible to receive t-PA had a door-to-t-PA time that met the standard of 60 minutes or less.

Perinatal and Neonatal Programs

The Maryland perinatal and neonatal systems are modeled after American College of Obstetrics and Gynecologists (ACOG) and the American Academy of Pediatrics (AAP) standards of care. These standards range from Level I (basic perinatal and neonatal care) to Level IV (high-risk perinatal and neonatal care). MIEMSS is responsible for oversight of the Level III and IV Maryland perinatal and neonatal referral centers, which include 15 hospitals offering obstetric services. Of these 15 hospitals, 13 are Level III perinatal and neonatal centers, and two are Level IV centers.

Perinatal Referral Centers

- Anne Arundel Medical Center
- Frederick Health
- Greater Baltimore Medical Center
- Holy Cross Hospital
- Howard County General Hospital–JHM
- Johns Hopkins Bayview Medical Center
- The Johns Hopkins Hospital
- MedStar Franklin Square Medical Center
- Mercy Medical Center
- St. Agnes Hospital
- Shady Grove Adventist Hospital
- Sinai Hospital
- University of Maryland (UM) Medical Center
- University of Maryland (UM) Capital Region Medical Center
- UM St. Joseph Medical Center

Hospitals participating in the Maryland perinatal system submit patient care data to the Maryland Department of Health (MDH) and MIEMSS, as appropriate, for system and quality management. All Level III and IV perinatal referral centers submit an annual perinatal indicator report that provides statistics beyond mortality data and focuses on striving for clinical excellence, patient safety, and reliability. Perinatal centers strive to reach a goal of zero adverse outcomes when the cases are preventable. Perinatal and neonatal programs use both regional and national data to provide database elements and indicators including variables related to maternal and infant health. The MIEMSS Perinatal Advisory Committee uses this database to identify areas for improvement and best practices.

MIEMSS Perinatal Programs work to reduce the number of maternal morbidity and mortality rates in Maryland. Maryland is currently ranked 25th in the U.S. for adverse perinatal outcomes. In response to the data and our goal of reducing the number of preventable deaths in Maryland, Perinatal Programs has developed EMS specific education around culturally responsive care for Maryland's diverse maternal population. Fifty percent of preventable maternal deaths occur post-delivery and after leaving the hospital. EMS clinicians, who become primary care providers to this population, have the potential to have the greatest impact in combating the barriers to attaining effective and life-saving care.

Maryland STEMI System

Hospitals that comply with state standards for receiving patients experiencing the most common type of heart attack, ST-Elevation Myocardial Infarction (STEMI), are designated as Cardiac Intervention Centers (CIC). MIEMSS has designated 28 hospitals in Maryland and four out-of-state hospitals that serve Maryland patients as CICs. Primary percutaneous coronary intervention (pPCI), recognized by the American College of Cardiology and the American Heart Association (AHA) as the treatment of choice, is generally associated with fewer complications and better outcomes than other forms of treatment. Sooner treatment to relieve the blockage causing the STEMI increases the likelihood that the patient's heart muscle will recover. All CICs submit data quarterly to AHA's Get with the Guidelines® (GWTG) – Coronary Artery Disease (CAD) registry. MIEMSS measures care for STEMI patients in Maryland and compares that data to national data from participating hospitals. The goal for First Medical Contact (FMC) intervention using the cardiac catheterization lab ("device") is 90 minutes or less. Registry data indicated that, for the rolling four quarters of CY 2022, Maryland's FMC-to-device in less than 90 minutes was achieved in 72.9% of STEMI patients transported by EMS, with a median time of 85 minutes.

EMS Preparedness and Operations

EMS Preparedness and Operations (EMSPO) provides leadership and support to the statewide EMS system by cultivating

strong relationships with system stakeholders, ensuring that the system is effectively prepared and responding to the prehospital medical needs of the residents and visitors of Maryland. EMSPO includes EMRC/SYSCOM, Field Operations, Regional Coordination, the Critical Care Coordination Center (C4), and Critical Incident Stress Management.

EMRC/SYSCOM

The Maryland EMS Communications Center is a statewide coordination and operations center for Maryland's EMS system composed of two integrated components, Systems Communications (SYSCOM) and the Emergency Medical Resource Center (EMRC), which function 24 hours a day, 365 days a year.

SYSCOM receives requests and coordinates helicopter resources for medevac missions. The Maryland State Police Aviation Command (MSPAC) Operational Control Center is located within SYSCOM, and SYSCOM personnel coordinate missions with MSPAC Duty Officers involving medevac, search and rescue, law enforcement, homeland security, and disaster assessment.

EMRC provides communications linkages and facilitates medical consultations between prehospital EMS clinicians and emergency departments, trauma centers, and specialty centers. It maintains and shares situational awareness of the activities, capabilities, and capacities of hospitals and the prehospital system. Additionally, EMRC provides initial alerting and coordination of resources and the distribution of patients during major medical incidents.

In FY 2023, EMRC handled 187,686 telephone and radio calls. These calls included communications involving administrative/operational support issues, single patients, incidents with multiple patients, and calls involving online medical direction. SYSCOM handled 22,438 telephone calls and approximately 14,478 radio calls. The majority of those calls were related to requests for medevac helicopters. EMRC/SYSCOM staff also monitors EMS system activity, so as to alert key MIEMSS staff of significant or extraordinary major medical incidents that may require MIEMSS support.

Emergency Medical System Situational Awareness and Operations

EMS Preparedness and Operations (EMSPO) works directly with internal and external departments and agencies to respond to incidents and collect information that is used to inform EMS. This requires 24/7 staffing, collecting data, and integration of multiple systems to support Maryland EMS operations and emergency management.

- Emergency Medical Resource Center (EMRC) and Systems Operations (SYSCOM) are staffed 24/7.
- EMSPO is responsible for the management of the MIEMSS portion of the Administration for Strategic Preparedness and Response (ASPR/HHS), Hospital Preparedness Program (HPP) grant and funding.
- The Maryland Emergency Medical Resource Alerting Database (MEMRAD) is Maryland's statewide health and medical alerting and resource tracking system. Administered by EMSPO, this system connects daily with hospitals, EMS, Public Health and the Chesapeake Regional Information Sharing Platform (CRISP) interface, allowing EMS patient care reports to be viewable across the healthcare continuum, directly increasing patient's primary care providers access to EMS encounters.
- The Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) interface links EMS patient encounter data alongside other healthcare data securely shared to ESSENCE from across the state. This combination of EMS, Hospital, Primary Care, Pharmacy, and other data sources gives public health partners enhanced warning on potential epidemics.
- The Research Interest Group (RIG) is composed of members from MIEMSS, the National Study Center (NSC), and other partners including higher education institutions, EMS Operational Programs, regional partners from Washington, DC, and Northern Virginia, and others. In FY 2023, MIEMSS-RIG members published several articles and presented their work at national and international conferences related to EMS and public health. Additionally, members serve on MIEMSS committees in support of the agency's mission.
- EMSPO received, stored, allocated, and dispersed PPE for public safety and commercial EMS operational programs. PPE from the Strategic National Stockpile and from state purchases was received by MIEMSS via MDH and distributed multiple times. MIEMSS likewise assisted EMS/Fire personnel with COVID-19 testing by providing access to test kits when requested.
- National Disaster Medical System patient reception preparedness; High-consequence infectious disease (HCID) planning and preparedness; Critical incident stress management/peer support team development and coordination; CHEMPACK program maintenance, awareness, and operations; Healthcare facility evacuation preparedness and exercises;
- Participated in the State Incident Management Team (IMT) meetings and training sessions;
- Coordinated agency Continuity of Operation (COOP) planning;
- Management of the MIEMSS portion of the ASPR/HHS Hospital Preparedness Program (HPP) grant programs and funding;
- Participated in the Maryland Department of Emergency Management Association in-person statewide EM conference;

- Maintained ongoing situational awareness of the EMS and Healthcare systems through frequent communications with federal, state, local, and other stakeholders; EMRC reports things like mass casualty, nursing home fires, where support from Commercial Ambulance or other resources is needed.
- Daily gathering of hospital intelligence on bed availability and ED census data began during the COVID-19 to understand the number of available beds and data points.
- Participated in multiple planning efforts preparing for the 2023 Gubernatorial Inauguration. On Inauguration Day, MIEMSS personnel were deployed to incident command post as well as local and state emergency operations centers;
- Participated in multiple exercises throughout the state, including a full-scale Calvex exercise.

Regional Coordination

MIEMSS Regional Offices are geographically dispersed throughout the state and staffed by regional coordinators and administrative staff. Each office is responsible for monitoring the operation of their assigned region of the statewide EMS system. They serve as technical advisors to EMS jurisdictions, hospitals, and other system partners on EMS systems coordination and development. Each regional coordinator works with jurisdictional EMS programs to ensure efficient and effective emergency care is available at all times. Regional staff work with Local jurisdictions to support programs such as Maryland Integrated Health.

Critical Care Coordination Center (C4)

The Critical Care Coordination Center (C4) continues to provide adult critical and specialty care patients with placement assistance at hospitals and specialty centers throughout Maryland. This service has experienced a change in the trends as compared to the height of the pandemic in the past years. Since its inception in November 2020, C4 has managed a total of 5,583 calls for adult critical care and pediatric patients. Of these, 2,746 occurred over the past fiscal year, which represents a 30% overall increase from FY 2022. Thirty percent (30%) of the total call volume received in this reporting period was for pediatric patients, with most occurring during the surge of respiratory illness between September and December 2022. The C4 for Pediatrics (C4-P) managed 1,331 requests from Maryland hospitals and urgent care centers for pediatric patients.

C4-P adjusted to the increased demand of the surge by implementing new procedures, including expert medical consultation to assist clinicians at hospitals without pediatric intensive care units. C4-P increased coordination and clinician staffing to allow for more frequent follow-up of cases and prioritized based on need. Children whose conditions worsened gained higher priority. C4-P was able to load-level limited resources and retain critical beds for the sickest children. Medical Protocols for managing children on high-flow nasal cannula outside of tertiary hospitals and C4 CAPPs guided and supported clinicians managing these patients. C4-P was able to place 67% (898) of the patients during the surge, while the remainder were managed in the hospitals.

At the onset of the pediatric surge, C4 expanded its management team. And nearly doubled its coordinator staff. This promoted four lead coordinators for and assigned two senior staff to oversee operations and administrative management of the program. In June 2023, the projects' research, entitled "The Maryland (USA) Critical Care Coordination Center (C4): From Pandemic to Permanence", was published in Prehospital and Disaster Medicine, highlighting the successes of the program and its applicability to other systems, worldwide.

In FY 2023, the C4 adult service received 1,280 calls, showing a 28% decrease from FY 2022. Of the 1,280 calls, 64% of those patients were successfully transferred for care. The number of COVID-19 related adult transfers decreased from 32% in FY 2022 to 10% in FY 2023, understanding that recording and reporting of these cases reduced in priority with the disease transitioning to endemic. Though this transition reduced COVID-related adult transfers, the use of the C4 adult service for subspecialty calls has increased, resulting in neurological cases encompassing nearly 30% of adult call volume. C4's evolution experienced a paradigm shift resulting from the variety of specialty consultations. C4 identified more services to support hospitals across Maryland, and has placed greater emphasis on providing medical direction that improves patient care while finding placement.

MIEMSS Grant Disbursements (FY 2023) by Region

	Cardiac Devices Grant for Fiscal Year 2023	ALS Training Funds	Emergency Dispatch Programs	Totals By Region
Region I	$57,714.00	$28,000.00	$0.00	$85,714.00
Region II	$37,687.00	$28,000.00	$26,501.00	$92,188.00
Region III	$117,540.00	$98,000.00	$2,500.00	$218,040.00
Region IV	$112,640.00	$67,998.00	$13,490.00	$194,128.00
Region V	$99,217.00	$78,000.00	$7,156.00	$184,373.00
Total	**$424,798.00**	**$299,998.00**	**$49,647.00**	**$774,443.00**

Critical Incident Stress Management (CISM)

Critical Incident Stress Management (CISM) offers crisis support services to EMS clinicians, firefighters, law enforcement officers, dispatchers, and other emergency services personnel involved in stressful emergency incidents. It is designed to help accelerate recovery of those individuals exhibiting symptoms of severe stress reaction. CISM offers education, defusings, and debriefings conducted by psychosocial and EMS professionals well-trained in critical incident stress management. Volunteer regional coordinators act as points of contact for local 9-1-1 centers and EMRC/SYSCOM. MIEMSS works closely with local CISM/peer-support teams and the International Critical Incident Stress Foundation to improve capabilities throughout the state. Legislation signed into law in 2022 provided confidentiality protection for peer-support team activities, provisions, and required the Behavioral Health Administration (BHA) to study and provide a report on specified items for peer support teams. MIEMSS and members of local CISM and peer-support teams consulted and supported BHA's work on the required study. Additionally, MIEMSS sponsored a two-day International Association of Fire Fighters peer-support course at the annual EMS Care Conference in Ocean City.

CHEMPACK

EMS Preparedness and Operations (EMSPO), in conjunction with the Office of the State EMS Medical Director, coordinates the CHEMPACK program for first responders in the State of Maryland, in partnership with the US Department of Health and Human Services Assistant Secretary of Preparedness and Response and the Maryland Department of Health Office of Preparedness and Response. Originally an initiative of the CDC's Strategic National Stockpile (SNS), this program enables EMS clinicians to access time-critical antidotes for intentional nerve agent attacks and large-scale organophosphate poisonings. The nerve agent antidotes are strategically deployed at secure locations throughout Maryland to ensure rapid accessibility when requested through EMRC. The CHEMPACK inventory is closely monitored; MIEMSS Regional and Emergency Operations personnel, using the new Drop Ship Program, replaced near-expiring medications in FY 2023.

Automated External Defibrillator Registration

Public high schools, middle schools, and county or municipality-owned or operated swimming pools are required to have AEDs, as are some public/semi-public pools and health clubs, per local ordinances. However, the voluntary Maryland Public Access Automated External Defibrillator (AED) Program permits facilities that do not provide health care but meet certain requirements to have an AED onsite for use in the event of a sudden cardiac arrest (SCA) until EMS arrives.

Through the online Maryland AED registry (www.marylandaedregistry.com), MIEMSS received and approved 362 public access AED applications in FY 2023, placing 1,710 AEDs. As of June 30, 2023, 9,475 locations in the state have AEDs onsite. Registered users can receive automated notifications regarding battery and electrode expirations, program renewals, and AED recalls. The registry also integrates with AED Link, an application that displays all registered AEDs within a certain jurisdiction without having to manually enter site addresses.

Since its launch in 2000, the AED program has had 273 (23.2%) successful AED uses out of 1,179 reported incidents. Success is measured by the patient having a return of pulse at EMS arrival, during EMS arrival, or during EMS transport. Of the overall arrests, 643 were witnessed, and 201 of those witnessed arrests regained a pulse at the time of EMS arrival, for a 31.3% save rate for witnessed cardiac arrests.

Communications Engineering Services

Communications Engineering Services (CES) provides the equipment, support, and expertise necessary to operate the statewide EMS communications systems and to support public safety interoperability in direct alignment with the Vision 2030 key goals of developing, sustaining, and collaborating with relevant constituents for the advancement of EMS communications. CES ensures that every county and every town in Maryland has a well-functioning, up-to-date, and accessible EMS communications and response system through continual evaluation and maintenance. CES overcomes challenges by successfully maintaining strong partnerships and communication with public safety partners, including Maryland State Police, Maryland State Highway Administration, Department of Natural Resources Police and Forestry, Maryland Department of Transportation and the Transportation Authority, Maryland Department of Emergency Management, Homeland Security Border Protection, and our 9-1-1 centers and Counties.

Public Safety Interoperability Network (PSInet)

Communications Engineering Services (CES) deploys, administers, and maintains the Public Safety Interoperability network (PSInet), a statewide, private IP-based public safety network composed of fiber, microwave, and wireless links that support critical data and voice communications managed by MIEMSS. PSInet is the foundation upon which the EMS communications system upgrade to an IP-based EMS system, being implemented through the Communications Upgrade Project (CUP), is built, and it is vital to MIEMSS' future operations. Deployed across the state, the network provides connectivity into Maryland State Police barracks, MIEMSS regional operating centers, jurisdictional emergency operations centers (EOC), public safety answering points (PSAP), state and jurisdictional health departments, hospitals, and other allied agencies. Applications that currently operate on PSInet in addition to MFiRST include Digital Emergency Medical Services Telephone (DEMSTEL); Central Maryland Area Radio Communications (CMARC); other systems monitoring/controlling the state's public safety microwave network, and tower infrastructure.

In FY 2023, CES continued to migrate systems to new, more resilient technologies that enhance services provided to the EMS community. CES was involved in several major projects intended to evaluate and maintain a well-functioning, up-to-date, and accessible EMS communication and response system. Its major efforts this year included Public Safety Microwave Systems updates; continued work on the Communications Upgrade Project (CUP); completing coverage across Maryland with a 700 MHz radio system; addressing issues related to the Verizon copper retirement project; and a full schedule of maintenance on the communications systems. While CES is leveraging newer communications systems such as MFiRST, a large portion of departmental responsibilities and resources involves maintaining or improving current systems to provide the best service possible to EMS clinicians and the public.

CES's chief responsibilities include its leadership in the design, implementation, and maintenance of the Microwave System for EMS communications in Maryland. This critical system supports MIEMSS, Maryland State Police (MSP), Maryland Department of Natural Resources (DNR) Maryland State Highway Administration (SHA), Maryland counties' public safety radio systems, and other partners. It includes the statewide 700 MHz radio system project (MFiRST). Microwave systems are critical for reaching remote areas within that state that do not have access to newer technologies. Beyond CUP, in FY 2023, CES upgraded key microwave links to enhance the reliability and resiliency within the current communication systems plan. This included strategically placing Ethernet-capable radios in key locations to further support CUP. The upgrade of these microwave links across Maryland provides a more robust and reliable transportation of radio traffic (backhaul) that will sustain an effective EMS communications system for years to come. The following are notable microwave path replacements locations upgraded this year and in effect expand the native Ethernet network and enhance connectivity for CUP:

1. Bressler Building to Jessup tower
2. Jessup tower to College Park MSP tower
3. Bressler Building to State Office Building
4. State Office Building to Hopkins Blalock Building
5. Hopkins Blalock Building to Bayview Hospital
6. Bayview Hospital to Essex Community College
7. Essex Community College to Hickey tower
8. Frederick Law Enforcement Center tower to Montevue Lane tower
9. Frederick Law Enforcement Center tower to SHA District 7 tower
10. Montevue Lane tower to Gambrill Mountain tower
11. Gambrill Mountain tower to Lambs Knoll tower
12. Gambrill Mountain tower to Quirauk tower
13. Gambrill Mountain tower to Marlu Ridge tower
14. Sideling Hill tower to Fairview SHA tower
15. Naylor Mill tower to Bucktown tower
16. Bucktown tower to Dorchester 9-1-1 tower
17. Dorchester 911 tower to Easton MSP tower
18. Easton MSP tower to Parole MSP tower

Since 2019, CES has continued to make progress on CUP. As older systems have become more prone to failure and increase the risk of outages, the work on the microwave system has supported critical upgrades needed to advance CUP and reduce vulnerabilities to the communication system. As systems become outdated, vendor support is commonly reduced for those products, further increasing vulnerability. During this reporting period, the Region III Emergency Resource Center (EMRC) experienced a four-hour outage due to a failure of a critical power supply in the patching system, and Region I EMRC experienced a microprocessor board failure in August 2022. Events such as these reveal the importance of making significant headway toward the completion of CUP. Systems such as the Region III EMRC patching system have been operational for 25 years, and though proactively replacing these systems is desired, proactivity without significant downtime because of the integrated design of the power system is nearly impossible. While similar system failures are anticipated in future, continual systems monitoring along with specific and essential employee training and development will enable CES to quickly resolve incidents with minimal downtime.

Maryland First Responder Interoperable Radio System Team (MFiRST)

Maryland First Responder Interoperable Radio System Team (MFiRST) is a statewide system with encryption capabilities for public safety. MFiRST is designed to provide radio communication across the entire State. Upon completion, it will allow a public safety official located at Deep Creek Lake to talk with their counterparts in Ocean City. The system will also provide air-to-ground channels for public safety flight operations.

Communications Engineering Services (CES) serve on the Radio Control Board and its Operations Committee. The Radio Control Board is responsible for coordinating the operation and maintenance of the Statewide Public Safety Interoperability Radio System. In FY 2023, CES developed interfaces to enable all Maryland jurisdictions to leverage the MFiRST system for medical consultation and obtain medical direction via Emergency Medical Resource Center (EMRC). MFiRST's final phase was finished in April 2023, completing coverage across the state, and it is expected that Maryland State Police Aviation Command (MSPAC) communications will migrate completely to the MFiRST system. MFiRST efforts are now focused on a coverage improvement program to fill in areas that have been identified as dead spots. Meanwhile, CES continues to support the VHF low-band system to allow MSPAC to communicate across the state and successfully promote the creation and adoption of aviation talkgroups (AVTacs) on MFiRST, thus establishing a common gateway between Maryland counties and aviation resources. To date, Talbot, Caroline, Carroll, Cecil, Queen Anne's, Kent, Harford, Allegany, Garrett, Dorchester, Somerset, Washington, Wicomico, and Worcester Counties are actively advancing the EMS continuum of care by implementing the AVTac. Several other Maryland counties have committed or are considering the adoption of AVTac as the MFiRST system expands and completes deployment.

Communications Systems Maintenance and Improvements

To ensure Communications Systems Maintenance and Improvements, Communications Engineering Services (CES) continually upgrades microwave power and battery systems throughout the state to ensure reliable backup power for critical systems. CES established remote control and monitoring capabilities for the power systems and other system components to better respond to maintenance needs of the system. After the COVID-19 outbreak diminished, remnants of the pandemic continued to make remote access for Maryland Poison Control (MCP) essential. To support this telework solution, CES continued to work with MCP in FY 2023 to develop an intricate patching solution that will deliver high-quality service to meet its needs.

To accelerate progress of the CUP project, a switch was made to an IP-based communication system for Region V. CES began transitioning Region V hospitals to full-time use of the new Cisco 8851 Voice-over-Internet Protocol (VoIP) phones and network infrastructure to provide for a smoother future transition to the new all-network solution. It accomplished this by combining the current analog technologies with a hybrid network solution using voice gateways. Twenty-four of 26 hospitals in Region V have been converted to VoIP, leaving only two to complete in FY 2024. Hospital connectivity development in Regions I and III is continuing while core patching development for the system's reliability and functionality is tested. Phase II hospitals connectivity, MedStar Franklin Square, Northwest Hospital, Meritus Health, and Garrett Memorial Medical Center have been completed by the vendor.

CES worked with Laurel Hospital to coordinate the installation of the required network equipment to ensure the successful opening of its new campus in June 2023.

Verizon Copper Retirement Program

Approved by the Maryland Public Service Commission, the Verizon Copper Retirement Program precipitated the loss of Franklin Square's circuit in July 2023, which required transitioning the hospital to using the CUP project strategy. Communications Support Services (CES) developed a microwave link to Franklin Square ahead of the region's proposed schedule. CES will develop solutions for any additional hospital circuits pending notification from Verizon.

EMRC Back-up Sites / Continuity of Operations

A Continuity of Operations Plan (COOP) is essential. MIEMSS has been addressing the need for a new Emergency Medical Resource Center (EMRC) and System Communication (SYSCOM) Backup Center capable of fully supporting current EMRC and SYSCOM operations in the event that the primary communications center becomes unusable due to a building infrastructure failure, disaster, or other unplanned event. In April 2022, a partnership with the Harford County Department of Emergency Services offered space in its 9-1-1 center to MIEMSS operations. Communications Engineering Services (CES) successfully installed a network virtual environment that allows for off-site data storage and will support the advancements to EMS communications to realize the creation of a Backup Center that is geo-diverse from MIEMSS HQ. This advancement in technology is key for a stable COOP, making it essential to seek the appropriate procurement of funds to attain the necessary equipment to advance this effort.

In FY 2023, CES expanded its network monitoring and alarm monitoring systems to enable staff to be more efficient and to effect system repairs quickly and decisively. CES continued working to integrate the MFiRST system alarms into the MIEMSS master alarm system to provide daily insight into maintenance and performance issues that allow rapid identification and diagnosis of system problems. This integration leverages the state's investment in the master alarm system and enables a comprehensive, overall view of MIEMSS, DNR, SHA, and the MFiRST radio infrastructure. This year, the department installed enhanced alarm monitoring at many additional MIEMSS' tower sites.

Office of Aeromedical Director/ Aeromedical Operations

Aeromedical Operations provides the physician medical support necessary to the Maryland State Police Aviation Command

(MSPAC) to meet the emergency helicopter needs of Maryland's citizens. Aeromedical Operations staff is actively involved in ongoing training and verification of skill proficiency for Maryland State Police flight paramedics, and provides around-the-clock consultation support to Systems Communications (SYSCOM) for medevac requests and medical direction. Aeromedical staff are actively involved in the development of new patient care protocols and the oversight of ongoing care.

Transport Systems of Care

In FY 2023, The Maryland State Police Aviation Command (MSPAC) transported 1,978 patients. Of these patients, 1,963 (99%) were transported from the scene at the request of local emergency services and 15 (1%) were transported between hospitals to a higher level of care. This year, MSPAC responded to 711 motor vehicle crashes, 496 falls, 94 pedestrians, 69 cardiac cases, 64 burns, 54 gunshot wounds, 46 strokes, 40 stabbings, 20 assaults, 14 industrial injuries, and seven drownings.

Blood on Board Program

To better serve the critically injured, the Maryland State Police Aviation Command (MSPAC) "Blood on Board" program became operational on May 10, 2023, a collaborative and cooperative effort with MSPAC, MIEMSS, Maryland the University of Maryland Medical Center (UMMC), and UMMC Blood Bank. Flight medics were trained and prepared to administer whole blood products to critically injured patients and transport blood products from the blood bank to the helicopter. Through May and June, MSPAC incrementally expanded Blood on Board to all MSPAC helicopters serving the five MIEMSS regions; two units of Low Titer 0+ Whole Blood are now carried on board all seven MSPAC helicopters. The whole blood is intended for the treatment of patients who are in severe hemorrhagic shock, because whole blood contains all clotting factors needed to help slow bleeding and restore oxygenation to vital organs and will increase the likelihood of survival for patients experiencing extreme blood loss. During missions, flight crews are able to communicate with the Emergency Medical Resource Center (EMRC) to replenish blood supplies with systematic support throughout the state.

Helicopter Transports

In FY 2023, Maryland State Police Aviation Command (MSPAC) used the AgustaWestland 139 (AW-139) model of aircraft as an excellent platform for its multiple missions. Equipped with the most current safety technology as recommended by the National Transportation Safety Board, the AW-139 aircraft are powerful enough to carry two patients and two EMS clinicians despite the challenging heat and humidity of the summer months. The acquisition of an FAA-certified Flight Training Device has allowed significant hours of pilot training to be conducted under simulated conditions, not only saving aircraft flight hours but also allowing the simulation of in-flight emergencies not able to be performed in an actual flying aircraft.

Since the COVID-19 pandemic, the helicopters have used sophisticated transport ventilators that flight medics incorporated into treatment. These technologies and training enhanced the quality of patient care of those suffering from trauma incurred during outdoor activities as they returned to pre-pandemic levels. The sophisticated transport ventilators enabled early initiation of lung-protective ventilation in conjunction with cutting-edge strategies to maintain blood pressure until patients could reach the operating room.

Rapid Sequence Intubation

Adult and pediatric Rapid Sequence Intubation (RSI) programs as defined in The Maryland Medical Protocols for Emergency Medical Services are designed to address the needs of patients whose airways are otherwise difficult to secure, including those with severe head injuries. Flight paramedics administer neuromuscular blocking medications that facilitate endotracheal intubation for patients who are not breathing adequately. Scenario-based simulation training modeled after real-life incidents enhances the knowledge and skills of flight paramedics, and provides the paramedics with credit for their recertification in Advanced Cardiac Life Support and Pediatric Advanced Life Support.

State Office of Commercial Ambulance Licensing and Regulation

The State Office of Commercial Ambulance Licensing and Regulation (SOCALR) provides leadership and direction to support the operations and growth of Maryland's commercial ambulance industry. It protects the health, safety, and welfare of persons using these services through the development and modification of statewide requirements for commercial ambulance services and vehicles and the uniform and equitable regulation of the commercial ambulance industry throughout Maryland.

At the conclusion of FY 2023, 34 commercial ambulance services and 481 commercial ambulance units held licenses issued by SOCALR.

SOCALR strives for efficient and responsive leadership and oversight of EMS and Medical Services vehicle licensing. The department plans and develops strategies to streamline internal business processes and implement methods to enhance records management for commercial vehicle licensing. SOCALR continues to maintain a year-round licensure renewal schedule, inspecting all commercial ambulances at least once during the year. SOCALR has updated and enhanced several of its operating systems and applications to improve productivity and reporting capabilities.

In addition to yearly unit renewal inspections, SOCALR conducts random unit inspections throughout the year. In FY 2023, SOCALR conducted random inspections on 103 days, visited 808 sites, and inspected 106 units. Inspections included 10 surveys of licensed commercial services bases. Surveys are conducted by a team of SOCALR personnel who provide follow-up reports outlining any corrective actions necessary to maintain COMAR Title 30.09 compliance.

SOCALR works closely with commercial services and third-party electronic Patient Care Records (ePCR) vendors to ensure data is imported accurately and efficiently from the vendor platforms. As MIEMSS transitions to the upgrade to NEMSIS 3.5, National EMS Information System, reports are randomly sampled for accuracy of information, and reviewed for completeness and to verify the receipt of data from services that import from third-party vendors. These measures are used to improve patient care through the standardization and aggregation of patient care data.

In May 2021, under the Governor's Emergency Declaration, SOCALR implemented a regulatory change that allowed Commercial BLS ambulances to be driven by non-EMS-licensed drivers. A waiver program was implemented to allow commercial services, who have gained approvals, to employ drivers on BLS units. Following the expiration of the emergency declaration, this program was approved by the EMS Board and adopted into COMAR. Currently, SOCALR has granted the waiver to 13 commercial services, which employ 172 approved non-EMS-licensed drivers.

Office of EMS for Children

The Office of EMS for Children (EMSC) provides leadership, direction, and expertise in the coordination of resources that focus on the unique needs of children and their families, in a manner that facilitates the efficient and effective delivery of

State Office of Commercial Ambulance Licensing and Regular (SOCALR) Statistics

SOCALR Licensed Services	
Ground	28
Air	5
Air/Ground	1
TOTAL	**34**

SOCALR Licensed Vehicles	
BLS	254
ALS	168
Air	19
TOTAL	**481**

SOCALR Total Calls	
BLS	216,013
ALS	29,121
SCT (P)	6,580
SCT (RN)	9,902
TOTAL	**261,616**

out-of-hospital, hospital, and restorative care statewide. These resources include injury and illness prevention, clinical protocols, standards of care and facility regulation, quality improvement and data analysis initiatives, interagency collaboration, and initial and continuing education for professionals across the continuum of care that promotes the health and well-being of children, youth, and families in Maryland.

EMSC is responsible for coordinating state-level advisory committees, leading federal grant projects, and collaborating with numerous state and local agencies in work focused on childhood health promotion and emergency care for children and their families across Maryland.

EMSC coordinates the state Pediatric Emergency Medical Advisory Committee (PEMAC) and its subcommittees, as well as the State Pediatric Quality Improvement Committee (QIC) and the Pediatric Data Analysis and Research (DART) Team. PEMAC meets bimonthly. EMSC staff participate in the National Association of State EMS Officials (NASEMSO) for the Safe Transport of Children in Ambulances and lead a number of committees and organizations supporting the safety and care of children.

Pediatric Readiness

In 2022, the Pediatric Readiness Emergency Department collaborative was initiated and held webinars for both nurse champions and physician champions. This collaborative includes Maryland ENA, Maryland AAP and Maryland ACEP members along with other interested professionals in advancing Pediatric Readiness in emergency departments across Maryland. Additional Pediatric Emergency Medical Advisory Committee (PEMAC) workgroups focus on injury prevention and pediatric disaster emergency medicine and preparedness.

The MIEMSS' Pediatric QIC and DART meet bimonthly and support the PEMAC Annual Research Forum each November. One function of the Pediatric QIC is to coordinate the Pediatric Base Station Course for Maryland's two designated Pediatric Base Stations, which provide statewide coverage for online and offline pediatric medical direction and community education. The course is currently being updated for an online platform and updated to include new protocols and the resources available through C4 for Pediatrics (C4P).

State Partnership Grant

The Office of EMS for Children (EMSC) received a new four-year EMS for Children State Partnership Grant from the Maternal and Child Health Bureau/Health Resources Services Administration of the US Department of Health and Human Services. For 19 consecutive years, grant funding has focused on the continued integration of pediatric readiness into both hospital EDs and EMS throughout the Maryland EMS system, using both the federal Maternal Child Health Core Performance Measures and the federal EMS for Children Performance Measures, and supported pediatric education for prehospital and hospital emergency healthcare professionals (see Pediatric and EMS Hospital Education, below). In alignment with Maryland EMS Vision 2030, these new grant goals focus on Pediatric Readiness in Emergency Departments, Pediatric Readiness in EMS Agencies, Pediatric disaster preparedness across the emergency care continuum, and the involvement of family advocates with outreach to widen the dissemination of the Right Care initiative (described later in this report).

Pediatric EMS Champions/Education

As part of the EMSC State Partnership Grant, the Office of EMS for Children (EMSC) supports and enhances the work of the EMS Operational Programs' Pediatric EMS Champions. Pediatric EMS Champions are EMS clinicians selected by their respective jurisdictions as EMS clinicians who are representative of their communities and passionate about the care and treatment of pediatric patients. As part of their role, Pediatric EMS Champions offer and/or promote pediatric continuing education opportunities, support pediatric safety and prevention programs, and encourage the use of current pediatric care guidelines. In FY 2023, Pediatric EMS Champions finalized the development of five pediatric medical scenarios and wrote an additional five pediatric trauma scenarios. The Pediatric EMS Champions use these scenarios in their jurisdictions to ensure EMS clinicians across the State have access to pediatric skill development and training. The content developed will move Maryland toward meeting the federal EMSC performance and training measures. In addition, the federal EMSC EMS Survey conducted in 2023 requested all EMS agencies to respond to the EMS performance measures with 100% participation by Maryland EMS Operational Programs.

Pediatric EMS and Hospital Education

The Office of EMS for Children (EMSC) offers pediatric-focused EMS and ED courses, nursing seminars, and training sessions through continuing education and other skill-development opportunities to nurses and EMS clinicians across Maryland. In FY 2023, educational topics included vehicular injuries associated with unrestrained children; cannabis exposure in pediatrics; management of pediatric cardiac arrest; pediatric respiratory emergencies; tracheostomy care; fireworks-related pediatric burn injuries; neonatal resuscitation; pediatric trauma assessment and management; pediatric cardiac assessment; and pediatric drowning.

In addition, EMSC offered the Pediatric Education for Prehospital Professionals, Fourth Edition (PEPP-4) hybrid course for ALS and BLS clinicians, both as a standalone course in Central Maryland and a pre-conference program at the Miltenberger Emergency Services Seminar, resulting in an increase in clinician confidence. EMSC likewise hosted a two-day Certification in Pediatric Emergency Nursing review course in Western Maryland for exam preparation, continuing education hours, or both.

Child Passenger Safety and Occupant Protection Healthcare Project

Funded by the Maryland Highway Safety Office, the Child Passenger Safety and Occupant Protection Healthcare Project (CPS) seeks to reduce the incidence of injuries and deaths in Maryland due to vehicle crashes or in-and-around-car events. Educational efforts include proper and consistent use of car safety seats, seat belt use for passengers and caregivers, and occupant protection. CPS promotes active CPS certification among EMS clinicians and hospital workers through incentives such as continuing education and free registrations. The project provides car seats and specialized restraints to healthcare clinicians to meet transport and community safety needs.

CPS, in conjunction with hospitals, nurseries, and NICUs, identified and supported access to a variety of car seats to support parents of newborns and children with special needs and benefited parents with financial need in FY 2023. CPS provided 16 "all-in-one" car seats, assisted at 22 community car seat check-up events, and advised hospital staff on the challenges of safely transporting vulnerable children. In addition, CPS assisted Maryland NICUs and newborn nurseries with updating their child passenger safety policies and materials.

In FY 2023, CPS conducted credit and non-credit regional and national educational programs for hospital and EMS clinicians to learn how to properly use specific car seats and equipment for emergency and non-emergency transport of children. CPS educated over 1,500 EMS clinicians on traffic safety, vehicular heatstroke, and more. Overall, CPS distributed approximately 14,000 educational materials to 3,673 people across 855 agencies. CPS provided Marylanders education about new child passenger safety laws which took effect on October 1, 2022.

Safe Kids Maryland and Maryland RISK WATCH®

Coordinated by the Office of EMS for Children (EMSC), MIEMSS is the lead agency for the Safe Kids Maryland state coalition. In FY 2023, Safe Kids Maryland hosted statewide educational meetings with seven local coalitions and 13 community partners. In partnership with the Maryland State Firemen's Association, Office of State Fire Marshal, and Maryland Fire and Rescue Institute, EMSC supported the Public Fire & Life Safety Educators Symposium in Community Risk Reduction in March. Safe Kids Maryland promoted educational media to raise awareness of the risk to children if left in cars.

Safe Kids Maryland maintains membership to the Maryland division of the American Trauma Society, Maryland State Emergency Nurses Association (ENA), Partnership for a Safer Maryland, and the Maryland Trauma Center Network (TraumaNet). EMSC facilitated distribution of resources and educational materials from both Maryland Highway Safety Office grants to reach rural, suburban, and urban communities in Maryland. These collaborations provide consistent information on injury prevention to MIEMSS' Regional Advisory Councils and the Pediatric Emergency Medical Advisory Committee (PEMAC).

Led by EMSC and the Family Advisory Network (FAN), Maryland RISK WATCH® remained in collaboration with the Office of State Fire Marshal, the MSFA Fire Prevention and Life Safety Committee, and other significant jurisdictional partners in FY 2023. Displays were made available for children, families, and local injury prevention advocates to learn current injury prevention strategies for home, school, and within their communities.

In FY 2023, the FAN Council, in partnership with Safe Kids Maryland, designed and distributed over 45 Safe Sleep interactive displays to Safe Kids coalitions and partners, three chapters of Maryland ENA, and all Pediatric EMS Champions. These displays provided the most current Maryland and national data on SUID deaths (SIDS, suffocation and unsafe sleep environments) and updated 2022 American Academy of Pediatrics policies.

Bike Safety Project

Funded by the Maryland Department of Transportation's Maryland Highway Safety Office (MHSO), the Bike Safety Project (BSP) coordinates the production of new educational materials; frequent social media communications; development of new partnerships; and distribution of bike helmets and educational supplies to EMS, Fire, Rescue, and Emergency Department professionals across Maryland. The project completed its sixth year of MHSO funding in FY 2023.

This year, BSP distributed over 1,100 bike helmets for children, youth, and parents through local Safe Kids partners, trauma coordinators, and Pediatric EMS Champions, bringing BSP's total helmet distribution over the last six years to 5,200. BSP developed and shared a variety of media, participated in both live and online programming, and in-person training in a variety of venues to disseminate important information about bike safety throughout Maryland communities. This included posters, video PSAs, social media posts, and quarterly articles in *Maryland EMS News*. The in-person training and seminars were conducted at the Maryland Emergency Nurses Association annual conference, the Mid Atlantic Life Safety Conference, the Public Fire & Life Safety Educator Seminar, and the Maryland State Firemen's Association Annual Convention.

Right Care When It Counts

The Office of EMS for Children's (EMSC) Right Care When It Counts Awards recognize children and youths in Maryland who have demonstrated "the right steps to take" in an emergency or preparedness for an emergency. In May and June, eight children and youths were recognized for their actions to assist another citizen during an emergency. This year, six children received certificates for providing the Right Care when It Count. Regions I, II, and IV each had two children recognized for actions such as performing CPR, calling 9-1-1 and providing care until paramedics arrived, and applying the use of an AED.

Data Analysis and Information Management

Quality Management

Data Analysis and Information Management (DAIM) provides continuous quality improvement initiatives, commitment to a customer-based way of doing business, and enhances the ability to effect improvement in related fields.

EMS Surveillance Measures

MIEMSS maintains several EMS system surveillance priorities based on routine data review, customer requests, and research outcomes. Hospital yellow alert demand is monitored at state, regional, jurisdictional, and hospital-specific levels through the online County Hospital Alert Tracking System (CHATS) for real-time system response capabilities as well as historical trends. This monitoring, coupled with hospital strategies that address high demand for emergency department services, helps improve the availability of this vital service system-wide. Yellow alert data also form one measurement in the Maryland Department of Health's (MDH) syndromic surveillance programs.

The Helicopter Utilization Database (HUD) accounts for all helicopter requests for transport independent of actual transport mode outcome, and permits requesting EMS managers and medical directors to conduct case reviews. HUD data analysis supports MIEMSS' efforts to utilize aerial transportation for only the most severe, time-critical incident scene patients statewide.

Since FY 2017, EMS interventions involving naloxone administration for opioid overdose cases have been consistently recorded and relayed to both MDH and the Opioid Operational Command Center. This non-confidential data, in conjunction with other valuable resources, serves as a pivotal tool in tracking opioid overdose trends and devising effective strategies to address this pressing crisis.

Data Confidentiality

MIEMSS maintains or has access to eight confidential databases used to ensure the delivery of quality EMS care. The Data Access Committee was formed to ensure that all data and requests for information are expedited efficiently and accurately while ensuring patient and clinician confidentiality at all times. Since January 2000, MIEMSS has tracked and responded to over 3,500 data requests.

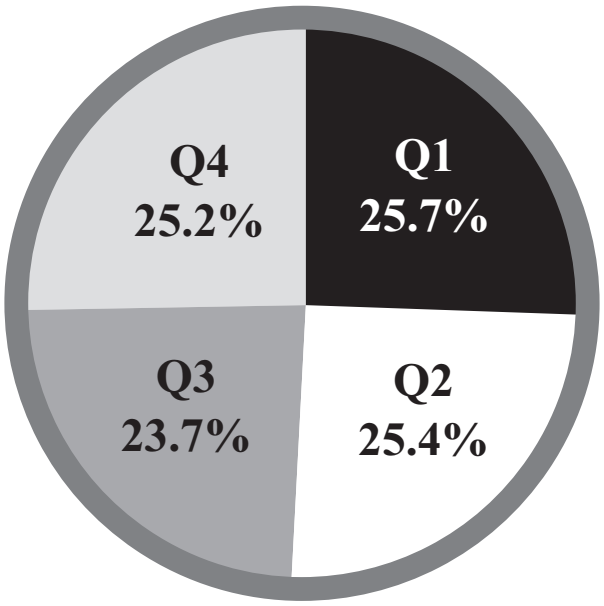
MD EMS Statistics from (eMEDS®)

The electronic Maryland EMS Data System (eMEDS®) serves as a primary resource to query data about EMS demand, response, and outcome. All jurisdictional EMSOPs in Maryland use eMEDS® to document their call information. The EMSOPs can enter data either via a local device with internet connectivity or via a dedicated website. The table below displays the quarterly record volume for FY 2023.

eMEDS® Quarterly Record Volume

(Fiscal Year 2023)

n=1,100,525



Maryland Emergency Medical Resource and Alerting Database (MEMRAD)-NG

The Maryland Emergency Medical Resource Alerting Database (MEMRAD) is Maryland's statewide health and medical alerting and resource tracking system. Administered by MIEMSS, this system connects hospitals, EMS, and Public Health and Emergency Management for real-time information sharing. MIEMSS is currently working to upgrade MEMRAD to MEMRAD-NG (Next Generation), which will include additional interoperability, mobile applications, and enhanced redundancy.

@Hospital Ambulances (@HA)

The At Hospital Ambulances (@HA) app is a web-based application that displays ambulance activity at each of the Maryland hospitals utilized by jurisdictional EMS clinicians. Data Analysis and Information Management (DAIM) developed this application to work on desktop computers and mobile devices, including iOS, Android, and Windows mobile devices. The @HA application displays information pertaining to ambulances located at the hospitals including the hospital name, number of ambulance units, alert status, and length of stay based on data received from the EMSOP's Computer Aided Dispatch (CAD) Systems. Participating jurisdictions supply data via CAD that populates the information displayed in the app and is made available to clinicians and/or dispatch centers via a link in the eMEDS® patient care reporting system dashboard. It can also be viewed with limited details at https://aha.miemss.org.

Jurisdictional EMS administrators may login and view additional information about the ambulance units, including unit number and jurisdiction.

Online Training Center: A Commitment to Digital Learning Excellence

Last year, MIEMSS significantly enhanced its Online Training Center (OTC), emphasizing improved usability and a modern design. This advancement aligns with our agency's mission to offer unparalleled continuing education opportunities to the State's EMS clinicians. Built on the robust foundation of Moodle – a renowned, open-source Learning Management System – the OTC seamlessly integrates with the MIEMSS Licensure System. We eagerly anticipate rolling out additional updates in the forthcoming months.

Chesapeake Regional Information System for our Patients (CRISP) and eMEDS® Integration Project

The integration of eMEDS® with Chesapeake Regional Information System for our Patients (CRISP), the health information exchange service for Maryland and Washington, DC, is an important ongoing project. Data Analysis and Information Management (DAIM) has enhanced this integration to allow CRISP to receive additional patient care data on a more frequent basis. Currently, EMS reports are securely transferred to CRISP in close to real time. This integration makes the EMS report available to all health care clinicians with CRISP access, including those in primary care. Aligning these two systems makes prehospital emergency care information available to participating physicians and hospitals throughout the state. A future phase of the project aims to make select patient medical data, such as medical history and medications, available to EMS clinicians to enhance the care they are able to provide at the patient's side.

Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) and eMEDS® Integration Project

MIEMSS' Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) interface links EMS patient encounter data with other statewide healthcare data shared to ESSENCE. This combination of EMS, Hospital, Primary Care, Pharmacy, and other data sources give public health partners enhanced situational awareness for potential disease outbreaks and epidemics.

Enhancing Data Analysis for Improved Patient Care

Understanding the critical role that precise, up-to-date, and easily accessible prehospital patient care data plays, MIEMSS continually broadens its data analysis capacities. In FY 2023, MIEMSS achieved this by leveraging local instances of the eMEDS® and Licensure System databases. Our focus steadfastly remains on detailed statistical reporting, pivotal metrics that drive system-wide quality enhancement and assurance, and the pragmatic use of both EMS and hospital data.

Opioid Overdose Data Reporting

In adherence to state regulations, MIEMSS regularly contributes data derived from EMS patient care reports to the Washington/Baltimore High-Intensity Drug Trafficking Areas (HIDTA) Overdose Map (ODMAP) database. MIEMSS collaborates with the Maryland Department of Health, the Opioid Operational Command Center (OOCC), and other partnering agencies to monitor and address opioid overdoses in Maryland and facilitate a comprehensive statewide oversight and proactive response to the opioid overdose challenge. This united front remains unwavering in its commitment to addressing and mitigating the opioid overdose crisis within Maryland.

EMS Portal

Data Analysis and Information Management (DAIM) diligently collaborates with Office of EMS Clinician Services to uphold the EMS Portal, which empowers local jurisdictions to craft and execute bespoke educational reports. Such an initiative amplifies jurisdictional cognizance of educational requisites tailored for their affiliated clinicians.

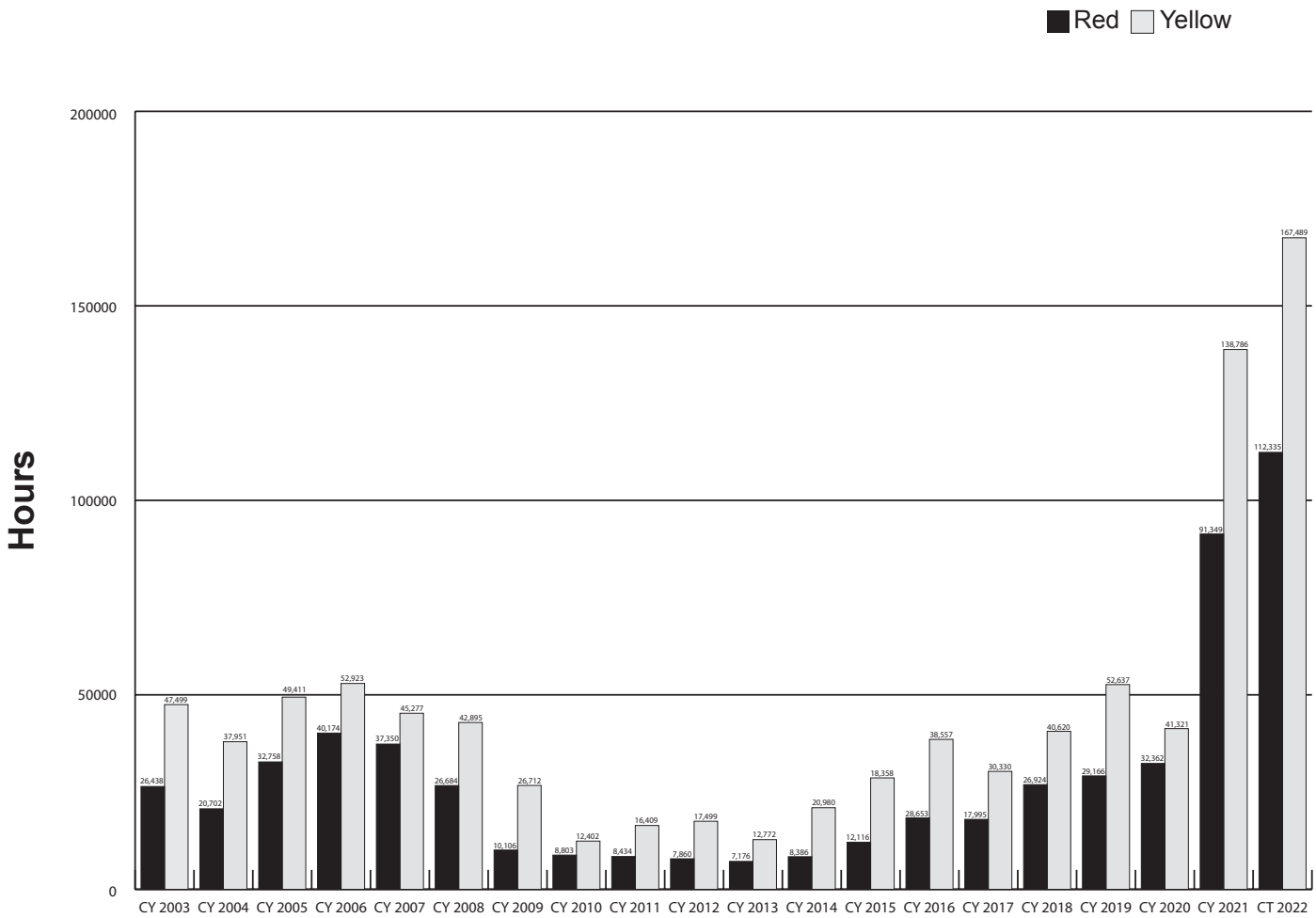
Information Technology and Systems Management

Information Technology and Systems Management (IT) works to improve Maryland EMS by providing leadership, support, and guidance to MIEMSS and the EMS community in their use of information technology and systems management.

IT works with all of the MIEMSS Offices and Departments to provide hardware, software, technology integration, evaluation, and support, including networking and security. The following are a few of the important systems that require collaboration with IT:

- **electronic Maryland EMS Data System (eMEDS®):** IT supports the management of the eMEDs® system. All 24 of Maryland's jurisdictional EMS operational programs (EMSOP) and most licensed commercial ambulance services submit patient care reports directly into eMEDS®.
- **National Study Center Collaboration:** MIEMSS collaborates with the National Study Center for Trauma and Emergency Medical Systems (NSC) to further the use of EMS data. These efforts include working on the Crash Outcome Data for Enhancing Survival (CODES) project and the EMS Research Interest Group (RIG).
- **Online Training Center:** MIEMSS regularly updates its Online Training Center (OTC) to enhance usability and design in its continual efforts to provide continuing education opportunities Maryland's EMS clinicians. Based on Moodle (a free, an open-source Learning Management System), the OTC is integrated with the MIEMSS Licensure System.

State Diversion Alert Totals (Calendar Years 2003 to 2022)



Remote Access and Teleworking

While MIEMSS has resumed in-office work in the wake of the COVID-19 pandemic, IT continues to support remote and telework options for administration and staff. IT has implemented additional infrastructure improvements to enhance and increase security and the capability of Virtual Private Networking (VPN). In FY 2023, these efforts included evaluating and implementing a multi-factor authentication solution to increase security and system integrity.

Flight Vector

MIEMSS hosts, supports, and maintains Flight Vector, the computer-aided dispatch system utilized by the Maryland State Police Aviation Command (MSPAC) and MIEMSS. This application streamlines the process of requesting, selecting, assigning, and tracking aircraft to respond to medevac requests in and around Maryland. The system accelerates the request and dispatch process, and improves MSPAC flight safety by providing real-time, automated tracking of MSPAC aircraft. Flight Vector also automates the tracking of Emergency Medical Resource Center (EMRC) consultations. It features a disaster recovery instance located at a data center that is geographically separate from the MIEMSS data center. In FY 2023, Information Technology and Systems Management (IT) worked with MSPAC and Flight Vector staff to implement a system-wide upgrade of Flight Vector to the latest server and client versions in EMRC and System Communications (EMRC/SYSCOM), all statewide MSPAC sites, and other affiliated sites. IT works continually with MSPAC and Flight Vector staff to further customize Flight Vector software to meet the specific needs of staff at all sites.

Trauma and Specialty Care Registries

MIEMSS hosts the Maryland Adult and Pediatric Trauma Registries, Hand Registry, Eye Registry, and Burn Registry. Information Technology and Systems Management (IT), in conjunction with Electronic Health Records for Emergency Services (ESO), maintains critical support for these registries. In FY 2023, IT worked to provide continual upgrades for the Linux-based software underlying the Gen 6 platform. IT and ESO have worked together to add functionality and increased stability and security to the platform in addition to quickly addressing critical support issues from the user base. IT and Registry Administrators are working jointly to investigate the potential future direction of these registries.

EMRC/SYSCOM Support

The Emergency Medical Resource Center and System Communications (EMRC/SYSCOM), located in Baltimore City, is operational 24/7 and is staffed by MIEMSS and Maryland State Police Aviation Command (MSPAC) personnel. The facility is home to the Region III and Region V EMRC communications centers, as well as the state's medevac dispatch center, SYSCOM. Information Technology and Systems Management (IT) provides 24/7 technical support to EMRC/SYSCOM in coordination with Communications Engineering Services. In FY 2023, IT collaborated with EMRC/SYSCOM to further refine procedures for updating EMRC/SYSCOM IT equipment with the latest security patches and operational software in both the main and backup centers on a monthly (or as needed) basis without down time or interference in critical EMRC or helicopter mission tasks.

EMS Audio Recording (EMSAR) System

Information Technology and Systems Management (IT) continues to work with Communications Engineering Services to provide a way for hospitals to retrieve EMS/hospital consultation recordings through the internet using a secure portal. This is a necessary step in the completion of the EMS Communications Upgrade Project as well as copper circuit retirement by Verizon. The system provides connectivity to MIEMSS' NICE Audio Recorder system for hospitals to review consultations for quality assurance needs. This year, a plan was approved for the critical refresh of components for this system to provide greater performance and security. This plan is scheduled to be implemented in the coming year.

Help Desk and User Support

Information Technology and Systems Management (IT) is committed to providing support to end users, including agency staff and EMS clinicians statewide. IT hosts a help desk ticketing system (KACE), which supports a number of MIEMSS departments, including Computer Support, eMEDS®, Licensure, MEMRAD, C4, Infectious Diseases, and Media Services and Public Information. This system supports ticketing through incoming phone calls, emails, and from the KACE web application. Dedicated, skilled staff monitor these queues, and tickets are investigated, assigned, resolved, completed, and closed. These tickets are archived and stored for assessment and improvement.

The eMEDS® and Licensure queues are two of the primary public-facing ticketing systems. Each ticketing system receives assistance requests from EMS clinicians and EMS Operational Program (EMSOP) administrators throughout the state for issues like password resets and login concerns, access questions, report writer functionality, and other eMEDS®/Licensure-related issues. Additionally, the Computer Support queue receives requests for general IT-related issues (including password and login issues, VPN, email, website and application outages, and general hardware/software/network support). The Licensure support queue received 3,238 tickets that were created and resolved in CY 2022, while the eMEDS® support queue processed 1,840 tickets during that same period. The Computer Support queue received and resolved 1,219 requests in CY 2022.

Security Improvements

Information Security monitors MIEMSS' IT operations for potential exploits, vulnerabilities, and threats and makes proactive enhancements to MIEMSS' IT infrastructure and related systems. Security awareness training is a focal point, ensuring that staff are aware of common security threats and take necessary action. MIEMSS proactively monitors emerging threats and gathers threat intelligence from government and industry sources.

MIEMSS applies critical security patches to the IT infrastructure and related systems in a timely fashion to protect against emerging cyber security threats and vulnerabilities. Information Security and IT personnel work collaboratively to expand and develop system security plans, as well as codify managerial, operational, and technical security controls. In FY 2023, those efforts included software updates to internal firewalls, network, email, and endpoint protection suites; a full assessment and periodic monitoring of all front-facing websites for security strengthening; enhanced access controls on the network front-end; upgrades to physical security systems; and the installation/configuration of new network scanning tools.

In FY 2023, MIEMSS deployed and refined security software tools, including industry-standard Vulnerability Scanning Software and Log Management/Security Information and Event Management Software. These new tools allow MIEMSS to rapidly identify and remediate security issues, track and identify anomalous network behavior, and ensure MIEMSS information systems remain safe, stable, and operational to provide critical services and information to clinicians. MIEMSS saw immediate benefit in the detection and blocking of over 250,000 malicious access attempts in a six-month period.

The physical security of IT resources is a high priority. In FY 2023, a joint MIEMSS IT, Communications, and Information

Security initiative enabled the purchase of new hardware to upgrade the MIEMSS physical access control system to supplement the previous year's upgrade of the security camera infrastructure at MIEMSS headquarters. This upgrade will further improve the reliability and performance of this system and enhance MIEMSS' ability to monitor the physical security of its headquarters building.

Computer Network Improvements

Information Technology and Systems Management (IT) works to continually improve computer resources, network reliability, and disaster preparedness by upgrading core server, storage, and VMware® systems.

IT's expanded resources include additional storage and server hardware. These resources allow MIEMSS to expand the capacity of the computing infrastructure allowing continued growth of the virtual server environment and to decommission end-of-life technology. In FY 2023, IT integrated new production storage and VM infrastructure equipment into the core network, which is being prepared for both a complete refresh of production assets as well as the flexibility to utilize existing equipment in other initiatives such as the expansion of disaster recovery capabilities. MIEMSS has purchased new servers to host updated network components and provide enhanced continuity of operations capabilities.

IT is currently working to upgrade MIEMSS' internal email system to the latest version of Microsoft Exchange in accordance with best practice guidelines. In FY 2023, IT deployed new networking equipment to further bring our regional office sites on the Eastern Shore, Western Maryland, and the National Capital Region into greater alignment with our core network and improve network performance and reliability at the Regional Offices.

Media Services and Public Information

Media Services and Public Information (Media Services) is responsible for the design, development, and deployment of the MIEMSS website; educational and instructional media for EMS educators and clinicians; publications; video production; audio/visual conference support; graphic and illustrative design; visual communications for the Maryland community including but not limited to public service announcements, newsletters, social media, and web content; and providing successful educational and informational events for the EMS community and partners in the state of Maryland. Media Services ensures that necessary and relevant information developed internally and by its partners is distributed statewide, and that public requests are met as needed and required by Maryland's Public Information Act.

Maryland Medical Protocol Updates Support

In FY 2023, Media Services and Public Information (Media Services) supported the production and dissemination of educational materials and content for the updating, documentation, and dissemination of *The Maryland Medical Protocols for Emergency Medical Services*. The Media Services team created the print and electronic versions of the Maryland EMS Protocols, which included a hard-copy book in three sizes and a PDF for electronic distribution. Media Services worked with the Office of EMS Clinician Services (OCS) and EMS professionals from across the state to create accessible educational materials and videos for EMS clinicians and Base Stations to aid EMS professionals with completion requirements. Materials are available through the MIEMSS website, Online Training Center, Maryland EMS YouTube channel. Media Services collaborated with the Office of the State EMS Medical Director to produce videos for each protocol update for FY 2023, worked with OCS to ensure SCORM standards, and made them available in the Online Training Center.

Media Development

Media Services and Public Information (Media Services) provides video and photographic production and editing, graphic design, digital publishing, illustration, editorial, A/V, and framing for internal and external partners throughout the year. Full PSA productions, social media, flyers and posters, and full audio, visual and lighting support for media events, conferences, and classroom sessions are just a few services provided. Other projects include:

- An informational video about MIEMSS for AARP Maryland;
- Video "Importance of bike helmets" (30 and 60 second spots);
- Public service announcement (PSA) video "Car Seats";
- "SIM WEEK" video production for UMM poster session;
- PSA "Stroke Smart Maryland, The Warning Signs of a Stroke" for the Maryland Stroke Center Consortium (MSCC);
- Social media videos to celebrating and documenting Maryland EMS;
- *Maryland EMS News*;
- Executive Director's Report;
- Social media posts for Bivalent Vaccination Booster and the Flu Shots to include the Flooster, seat belts, and traffic safety, including the "Move Over or Get Pulled Over", in support of Maryland Department of Health, Maryland State Police, and MIH;
- Mental Health First Aid Maryland graphic production and marketing materials to support public education national certification; and
- Maryland Active Assailant Interdisciplinary Work Group (AAIWG) website support and analytics.

Events and Conferencing Support

Media Services and Public Information (Media Services) provides a range of leadership, consulting, and support to the design and setup of events and conferencing. In addition to

media development, Media Services provides streaming and post-production sharing of interviews, remote engagement, smart classroom setup, audio/video, lighting and photography, and other important tasks in support of our internal and external partners. Media Services' portrait and photo booth-style setups and social media interviews promoted camaraderie and pride in Maryland EMS. In FY 2023, its partners included Maryland Fire and Rescue Institute (MFRI), University of Maryland Medical System, R Adams Cowley Shock Trauma Center, Maryland Committee on Trauma, and the Maryland State Firemen's Association, among others. Media Services provides support for audio, video, graphics, illustration and audio, and visual and photographic support. Media Services fully supported the following conferences and events:

- Maryland State Firemen's Association (MSFA) Legislative Reception (Annapolis, MD)
- Winterfest EMS Conference (Talbot County, MD)
- Miltenberger Emergency Services Seminar (Garrett and Allegany Counties, MD)
- The 28th Annual EMS Medical Directors Symposium (Baltimore, MD)
- EMS Care Conference (Ocean City, MD)
- MSFA Memorial Foundation Induction Service (Annapolis, MD)
- Annual Point/Counterpoint Acute Care Surgery Conference (Baltimore, MD)
- MSFA Convention and Memorial Program (Ocean City, MD)

During National EMS Week in May 2023, Media Services worked with Leadership, Regional Coordination and Maryland Jurisdictions to plan, implement, and notify the public of celebratory activities; organize award presentations; create and prepare certificates, plaques, and pins for distribution to awardees; and set up audio/visual equipment to document the events, including the Maryland Star of Life Awards, Right Care When It Counts Awards, and EMS Star Awards.

Public Information

Media Services and Public Information (Media Services) stewards the EMS and MIEMSS history archive. As part of the yearlong celebration of the 50th anniversary of the Maryland EMS system, Media Services created a virtual Interactive History Timeline (IHT), which allows the EMS community to archive and share relevant events, images, documents, and videos from the past and present.

In FY 2023, Media Services assisted the Office of EMS for Children through ongoing webinar support for training series, technical audio visual support, illustrated posters, web updates, newsletters, advertisements/flyers for the Child Passenger Safety grant; and opening its production studios to serve a variety of groups in need of video recording and photography in preparation for events and presentations.

In January 2023, MIEMSS hosted Dr. Rahul Gupta, Director of the White House Office of National Drug Control Policy, who discussed the ongoing opioid overdose epidemic with EMS, public health leaders, and law enforcement officials of the Washington/Baltimore High-Intensity Drug-Trafficking Areas (HIDTA) program. Media Services, in collaboration with MIEMSS' Leadership and EMS Preparedness and Operations, prepared the educational space and worked with the HIDTA team to disseminate event-related communications. Media Services recorded the event, shared that recording with HIDTA, and provided follow-up information about the event in *Maryland EMS News* and the Executive Director's Report.

Office of Integrity

The Office of Integrity works to ensure the health, safety, and welfare of the public as it relates to the delivery of EMS by Maryland-licensed and certified EMS clinicians. It helps to ensure the quality of patient care by investigating complaints and allegations of prohibited conduct.

The Office of Integrity works closely with the EMS Board, Attorney General's Office, Incident Review Committee (IRC), Peer-Review Panel (PRP), and EMS operational program (EMSOP) quality assurance officers statewide. The PRP is a 13-member panel of physicians representing the Maryland Board of Physicians, Maryland Medical Chirurgical Society, and EMSOP medical directors. All levels of EMS clinicians are also represented on this panel. The PRP reviews complaints, as

well as the results of the investigations presented by the Office of Integrity, and recommends corrective and disciplinary actions to the EMS Board. The State EMS Medical Director and MIEMSS Executive Director serve as ex-officio members of the PRP.

FY 2023 Office of Integrity Activity

- Provisional applicant background investigations completed (23)
- Stipend applicant background investigations completed (19)
- Initial and renewal background investigations completed (14,177)
- Reciprocity background investigations completed (138)
- Total background investigations completed (14,949)
- IRC investigations conducted (77)
- IRC Complaints Issued (64)
- IRC complaints forwarded to PRP (61)
- Complaints forwarded to EMS Board (54)
- EMS Board Actions
- Reprimands (12)
- Probation (33)
- Suspensions (6)
- Revocations (1)
- Remedial training (5)
- Surrenders (1)
- Applications denied (0)
- Random testing (9)
- Case Resolution Conferences (11)
- OAH hearings conducted (2)
- OAH hearings defaulted (0)
- Settlement agreements (9)

Administration

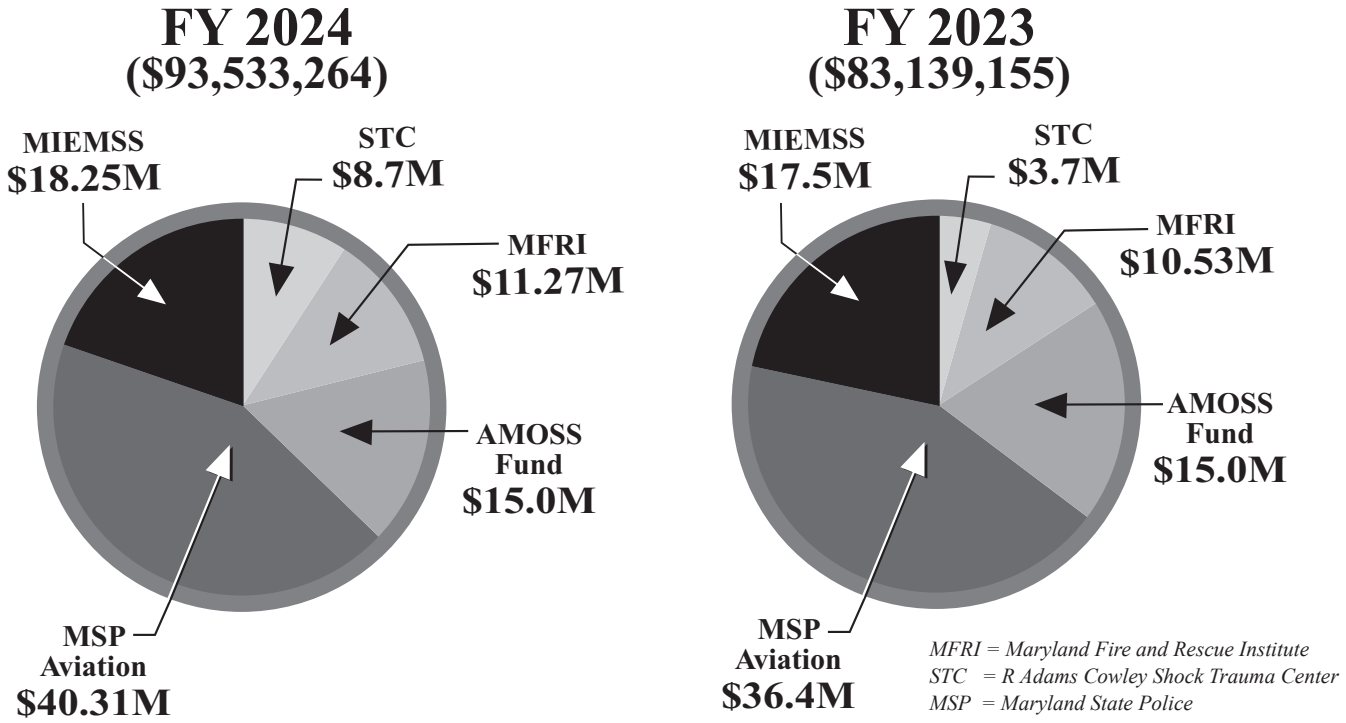
Administration is responsible for the accounting, procurement, grant administration, and human resources functions of MIEMSS.

The Accounting Unit provides oversight and guidance for human resources and the management of various fiscal and budgetary matters. The staff develops the budget, tracks and monitors expenditures, processes accounts payable and receivable, maintains employee leave and payroll records, and deposits cash receipts.

The Procurement Unit obtains all necessary supplies, materials, and services required by MIEMSS to fulfill its mission in accordance with all applicable state procurement laws and regulations. The Procurement Unit is responsible for contract and grant administration.

Administration's other responsibilities include inventory control, fleet management, travel services, and building operations and maintenance. In addition, Administration supports legislative and regulatory initiatives and provides financial data relevant to the legislative actions that support the Maryland Emergency Medical Services Operations Fund.

EMS Operations Fund



Attorney General's Office

The Attorney General's Office (OAG) provides legal advice to the EMS Board, the Statewide EMS Advisory Council, and MIEMSS in connection with all aspects of EMS, the ongoing administrative functions of the agency, and the regulation of commercial ambulance services. OAG supports MIEMSS in promulgating and implementing the agency's regulations, procurement, personnel matters, and contracts, including technology initiatives, as well by assisting in the administration of state and federal grant programs.

OAG serves as the administrative prosecutor for cases involving allegations of prohibited acts by EMS clinicians before the EMS Provider Review Panel, the EMS Board, the Office of Administrative Hearings, and the courts. In FY 2023, it handled 64 cases of alleged prohibited acts by EMS clinicians and applicants.

OAG provided legal advice to the State Office of Commercial Ambulance Licensing and Regulation (SOCALR) in all compliance matters in FY 2023, and provided support to the Commercial Ambulance Services Advisory Committee. Assistant attorneys general helped the Office of Care Integration to monitor compliance requirements of specialty referral centers. In FY 2023, they worked to amend regulations, including updating the standards for Adult and Pediatric Trauma Centers and specialty care transport for SOCALR. OAG advised the Office of EMS Clinician Services on the application of requirements for licensure and certification, as well as the development of regulatory amendments to update those requirements; provided advice and support for the designation of trauma and specialty referral centers and base stations; prepared responses to Public Information Act requests and subpoenas; responded to requests for Data Access and prepared responses for research projects; and provided advice on the Maryland Public Access Defibrillation program and the AED Registry.

Maryland Orders for Life-Sustaining Treatment (MOLST) provides patients with the legal means for communicating medical care wishes to EMS and other health care professionals. In FY 2023, OAG helped to distribute plastic bracelets and answered phone calls and email inquiries to obtain, use, and better understand the MOLST program. The public can download the MOLST form from the MIEMSS website, and MIEMSS provides hard copies for those individuals without internet access. OAG provides information to health care clinicians by answering questions and aiding in MOLST implementation.

Office of Government Affairs

The Office of Government Affairs (Government Affairs) is dedicated to advancing EMS by cultivating collaborative partnerships between relevant constituents and State government. As MIEMSS' liaison with the Executive and Legislative branches, Government Affairs helps to develop effective statutory and regulatory approaches and solutions to a variety of prehospital emergency and health care issues. It works on proposed legislation that affects all components of the statewide EMS system,

the emergency care system, and Maryland's healthcare system as a whole. By partnering with EMS clinicians, physicians, nurses, hospitals, and other health care providers, Government Affairs ensures that EMS system issues are accounted for in legislation under consideration by the Maryland General Assembly.

The 2023 Legislative Session saw the creation of the Commission to Advance and Strengthen Firefighting and Emergency Medical Services within Maryland. The Commission is charged with studying and making recommendations for enhancing recruitment and retention efforts to support both career and volunteer firefighting and EMS in Maryland. It will report its findings to the Legislature by December 1, 2023. The Session also established the Commission to Study Trauma Center Funding in Maryland to study the adequacy of funding for designated trauma centers for their operating, capital, and workforce costs. The Commission will report its findings and recommendations to the Legislature by December 1, 2023.

Beginning January 1, 2025, grocery stores and restaurants, with certain exceptions, will be required to place automated external defibrillators (AEDs) on premises and maintain the functionality of the devices. Restaurants and grocery stores subject to the AED requirement must register their AEDs with MIEMSS, and will be able to claim a State income tax credit in years 2023-2027 for the first $500 of the AED purchase price. MIEMSS will report on the placement and applications of AEDs in restaurants and grocery stores to the Legislature.

This year, statutory language pertaining to peer-support programs for Fire, Rescue, and EMS programs was clarified to reflect work currently underway to review and report on best practices and professional standards for these programs. Finally, a public awareness campaign will be conducted to encourage use of mental health advance directives in Maryland. A study will examine mechanisms by which first responders and behavioral crisis providers can access mental health advance directives via the State-designated health information exchange.

Number of EMDs, EMRs, EMTs, CRTs, and Paramedics
[Includes Current, Extended, and Military Status; Excludes Lapsed (Inactive and Expired)]

Level	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022*	FY 2023
EMD	1,377	1,066	1,110	1,210	1,052	869
EMR	1,136	662	603	652	464	498
TOTAL	**2,513**	**1,728**	**1,713**	**1,852**	**1,516**	**1,367**
EMT	15,485	14,853	14,875	15,501	14,763	14,456
CRT	587	575	546	509	441	404
Paramedic	3,278	3,491	3,573	3,787	3,724	3,774
TOTAL	**19,350**	**18,919**	**18,994**	**19,797**	**18,928**	**18,634**

**July 1, 2021-September 1, 2022; all other years reported are shown by fiscal year.*

MARYLAND TRAUMA AND SPECIALTY REFERRAL CENTERS

MARYLAND DESIGNATED ADULT TRAUMA CENTERS
(For explanation of differences in levels, see Trauma Center Categorization chart on page 35)

Primary Adult Resource Center
- R Adams Cowley Shock Trauma Center/ University of Maryland Medical Center, Baltimore City (MIEMSS Region III)

Level I Adult Trauma Center
- The Johns Hopkins Hospital, Baltimore City (MIEMSS Region III)

Level II Adult Trauma Centers
- Johns Hopkins Bayview Medical Center, Baltimore City (MIEMSS Region III)
- Sinai Hospital, Baltimore City (MIEMSS Region III)
- Suburban Hospital–Johns Hopkins Medicine (JHM), Bethesda (MIEMSS Region V)
- University of Maryland Capital Region Medical Center, Largo (MIEMSS Region V)

Level III Adult Trauma Centers
- Meritus Medical Center, Hagerstown (MIEMSS Region II)
- TidalHealth Peninsula Regional, Salisbury (MIEMSS Region IV)
- UPMC Western Maryland, Cumberland (MIEMSS Region I)

OUT-OF-STATE HOSPITALS (with MOUs)

- Adult Trauma Center/ChristianaCare Health System, Newark, DE
- Adult Trauma Center/MedStar Washington Hospital Center, Washington, DC
- Adult Burn Center/MedStar Washington Hospital Center, Washington, DC
- Pediatric Trauma Center/Children's National Hospital, Washington, DC
- Pediatric Burn Center/Children's National Hospital, Washington, DC

MARYLAND DESIGNATED SPECIALTY REFERRAL CENTERS

Burn Centers
- Adult Burn Center/Johns Hopkins Bayview Medical Center, Baltimore City
- Pediatric Burn Center/Johns Hopkins Children's Center, Baltimore City

Cardiac Interventional Centers
- Region I
  UPMC Western Maryland
- Region II
  Frederick Health
  Meritus Medical Center
- Region III
  Anne Arundel Medical Center
  Carroll Hospital Center
  Howard County General Hospital, JHM
  Johns Hopkins Bayview Medical Center
  The Johns Hopkins Hospital
  MedStar Franklin Square Medical Center
  MedStar Union Memorial Hospital
  Sinai Hospital
  St. Agnes Hospital
  University of Maryland (UM) Medical Center
  UM Baltimore Washington Medical Center
  UM St. Joseph Medical Center
  UM Upper Chesapeake Medical Center
- Region IV
  TidalHealth Peninsula Regional
  University of Maryland Shore Health at Easton
- Region V
  Adventist HealthCare White Oak Medical Center
  Holy Cross Hospital
  MedStar Southern Maryland Hospital Center
  Shady Grove Adventist Hospital
  Suburban Hospital–JHM
  University of Maryland Capital Region Medical Center
- Out-of-State Cardiac Interventional Centers
  Bayhealth Kent General, Dover, DE
  Christiana Hospital, Newark, DE
  MedStar Washington Hospital Center, Washington, DC
  Nanticoke Memorial Hospital, Seaford, DE

Eye Trauma Center
- The Wilmer Eye Institute/The Johns Hopkins Hospital, Baltimore City

Hand/Upper Extremity Trauma Center
- The Curtis National Hand Center/MedStar Union Memorial Hospital, Baltimore City

Neurotrauma Center
- R Adams Cowley Shock Trauma Center/ University of Maryland Medical Center, Baltimore City

Pediatric Trauma Center
- The Johns Hopkins Children's Center, Baltimore City

Perinatal Referral Centers
- Anne Arundel Medical Center
- Frederick Health
- Greater Baltimore Medical Center
- Holy Cross Hospital
- Howard County General Hospital–JHM
- Johns Hopkins Bayview Medical Center
- The Johns Hopkins Hospital
- MedStar Franklin Square Medical Center
- Mercy Medical Center
- St. Agnes Hospital
- Shady Grove Adventist Hospital
- Sinai Hospital
- University of Maryland (UM Medical Center
- UM St. Joseph Medical Center

Comprehensive Stroke Centers
- The Johns Hopkins Hospital
- University of Maryland Medical Center
- Johns Hopkins Bayview Medical Center

Primary Stroke Centers
- Adventist HealthCare White Oak Medical Center
- Anne Arundel Medical Center
- Atlantic General Hospital
- Calvert Health Medical Center
- Carroll Hospital Center
- Christiana Care, Union Hospital
- Doctors Community Hospital
- Frederick Health
- Greater Baltimore Medical Center
- Holy Cross Germantown Hospital
- Holy Cross Hospital
- Howard County General Hospital–JHM
- Mercy Hospital Center
- Meritus Medical Center
- MedStar Good Samaritan Hospital
- MedStar Harbor Hospital
- MedStar Montgomery Medical Center
- MedStar Southern Maryland Hospital Center
- MedStar St. Mary's Hospital
- MedStar Union Memorial Hospital
- Northwest Hospital
- St. Agnes Hospital
- TidalHealth Peninsula Regional Medical Center
- University of Maryland (UM) Medical Center Midtown Campus
- UM Baltimore Washington Medical Center
- UM Capital Region Medical Center
- UM Charles Regional Medical Center
- UM Harford Memorial Hospital
- UM Shore Medical Center at Easton
- UM St. Joseph Medical Center
- UM Upper Chesapeake Medical Center
- UPMC Western Maryland

Thrombectomy-Capable Primary Stroke Centers
- Sinai Hospital
- Shady Grove Adventist Hospital
- MedStar Franklin Square Medical Center
- Suburban Hospital–JHM

POISON CONSULTATION CENTER

- Maryland Poison Center/University of Maryland School of Pharmacy, Baltimore City

DESIGNATED TRAUMA CENTER CATEGORIZATION

Differences in Standards Based on Physician Availability and Dedicated Resources	PARC	Level I	Level II	Level III
For the “most critical patients”, an in-house fellowship-trained attending trauma surgeon, trauma fellow, or trauma equivalent/PGY5+ general surgery resident should be at the bedside upon arrival, documented at least 80% of the time.	X			
Dedicated facilities (Resuscitation Unit, Operating Room, and Intensive Care Unit) 24 hours a day	X			
Facilities (Resuscitation Area, Operating Room, and Intensive Care Unit) 24 hours a day		X	X	X
Trauma Surgeon available in-house at all times shall be at the bedside within 15 minutes of call request, documented at least 80% of the time		X	X	
On-call Trauma Surgeon shall be at the bedside within 30 minutes of call request, documented at least 80% of the time of call request				X
Anesthesiologist in-house dedicated 24 hours a day to trauma care, should be at the bedside upon arrival, documented at least 80% of the time	X			
Anesthesiologist in-house at all times but shared with other services and shall be at the bedside within 15 minutes of call request		X	X	X
Orthopedic Surgeon in-house at all times and dedicated to trauma care	X	X		
Orthopedic Surgeon on-call shall be at the bedside within 30 minutes of call request, documented at least 80% of the time of call request			X	X
Neurosurgeon in-house at all times and dedicated to trauma care	X			
Neurosurgeon in the hospital at all times but shared with other services		X		
Neurosurgeon on-call shall be at the bedside within 30 minutes of call request, documented at least 80% of the time of call request			X	X
A designated fellowship-trained/board-certified in surgery or critical care surgical director of the Intensive Care Unit	X	X	Desired	
An organized trauma research program with a designated physician director and documented research plan	X	X		
Education – Fellowship Training in Trauma	X			
Surgical Residency Program	X	X		
Injury Prevention and Public Education Program	X	X	X	X

MARYLAND EMS SYSTEM TRAUMA AND SPECIALTY CENTER REPORTS

Primary Adult Resource Center

R Adams Cowley Shock Trauma Center

22 S. Greene Street, Baltimore, Maryland
MIEMSS Region III

Located within the University of Maryland Medical Center, the R Adams Cowley Shock Trauma Center (RACSTC) serves as the state's Primary Adult Resource Center. As a multidisciplinary clinical, educational, and research institution, RACSTC is dedicated to world-class standards in the prevention and management of critical injury and illness.

From June 1, 2022, through May 31, 2023, RACSTC treated 5,958 primary trauma patients, according to the Maryland State Trauma Registry. Over this 12-month period, 84% of patients admitted to RACSTC arrived by ground transportation and 16% arrived by air. Demographic data obtained indicates that the majority of admissions were male (66%) and aged 56 or older (38%), followed by those aged 15-35 years (35%), and those aged 36-55 (26%). In FY 2023, RACSTC was redesignated as Maryland's Primary Adult Resource Center and Neurotrauma Center.

Center for Hyperbaric Medicine

The Center for Hyperbaric Medicine (CHM) is the statewide referral center for individuals who experience decompression sickness, carbon monoxide poisoning, smoke inhalation, delayed effects of radiation treatment, non-healing wounds, and/or gas gangrene. It is internationally recognized for its leadership and expertise in the clinical application of hyperbaric therapy.

In FY 2023, CHM provided 3,965 dive hours of therapeutic hyperbaric oxygen treatment (HBO). Of these, 34% were inpatients, 65% were outpatients, and 0.7% were emergent. This year, CHM transitioned to the use of a new hyperbaric ventilator following arduous testing, safety approvals, collaboration with outside hospitals with the on-boarding process and data collection, the construction of a nitrogen flushing system, and staff training. The new ventilator now allows for transport of patients from their inpatient unit to the HBO unit, as well as treatment on the same ventilator.

The GO-TEAM

A joint effort between RACSTC and Fire, Rescue, EMS, and Aeromedical Services throughout the region, the GO-TEAM is a specialized component of Maryland's statewide EMS system. As RACSTC's rapid-deployment arm, it enables the extrication, resuscitation, and stabilization of patients prior to and during transport to advanced hospital facilities. In collaboration with MIEMSS and Maryland State Police Aviation Command, the GO-TEAM delivers anesthetic, surgical, and resuscitative services to the prehospital arena and renders life-saving interventions at the scene of injury. Each GO-TEAM activation brings an attending physician and nurse anesthetist to the patient's side, whether on a highway, in the Chesapeake Bay, or at the bottom of a ravine.

In FY 2023, there were 12 requests for the GO-TEAM, with three deployments, including Anne Arundel County (MVC), Baltimore County (MVC), and Baltimore County (Entrapment). Patients from these incidents were transported to the R Adams Cowley Shock Trauma Center.

The GO-TEAM offered educational opportunities to prehospital clinicians in FY 2023. Among these were two days of education provided to Maryland State Police Paramedics, covering such topics as TBI and SCI prehospital care, resuscitative endovascular balloon occlusion of the aorta (REBOA), blunt trauma, crush injuries, and prehospital management of peri-arrest/circulatory arrest.

Center for the Sustainment of Trauma and Readiness Skills and Other Learning Experiences

Since 2001, US Air Force Medical Service personnel have traveled to Baltimore for training at the US Air Force Center for the Sustainment of Trauma and Readiness Skills (C-STARS), embedded within RACSTC. These civilian-military partnerships are crucial in keeping military medics continuously ready for wartime casualty care. In addition to providing educational observation experiences to the Air Force, RACSTC now also provides these experiences to Walter Reed nurses and technicians.

Injury Prevention Programs and Initiatives

RACSTC's Center for Injury Prevention and Policy (CIPP) focuses on identifying injury trends and developing prevention education programs. In FY 2023, CIPP presented 98 events reaching over 2,000 students and more than 3,800 community members with important prevention messages. These included CIPP's Violence Intervention Program, Bridge Program, Trauma Prevention Program, Trauma Survivors Network, ThinkFirst National Injury Prevention Foundation, and Adult Court-Ordered Drinking Driver Monitor Program. Additionally, CIPP, in collaboration with the Maryland Committee on Trauma, participated in the Stop the Bleed® initiative, which bolsters RACSTC's emergency preparedness as well as community awareness and education on bleeding control. In FY 2023, RACSTC conducted Stop the Bleed® training for, among others, Maryland State Police instructors and Paramedics, as well as Baltimore County school nurses and medical assistants.

Quality Management and Improvement

RACSTC maintains a complete and comprehensive quality management program. It monitors all aspects of care from pre-

hospital trauma-line consulting to peer review of patient deaths and complications. The program benchmarks the best practices of other institutions and integrates quality activities of other specialty services that provide care to critically ill and severely injured patients. The multidisciplinary Quality Improvement Committee outlines program quality, monitors performance, and develops new initiatives.

EMS Outreach and Educational Activities

By focusing on patient care trends, RACSTC expanded and advanced its educational programs in FY 2023, delivering lectures and participating in case reviews with local jurisdictions. It reached over 200 EMS clinicians and nurses through two educational programs administered remotely via live broadcast. Additionally, members of RACSTC's EMS liaison team provide education to their assigned EMS jurisdictions. A virtual tour video offers EMS students, clinicians, and other first responders an opportunity to better understand the process of transporting patients to RACSTC. EMS clinicians are permitted to observe procedures in the Trauma Resuscitation Unit or the Critical Care Unit; 90 EMS clinicians observed in FY 2023.

The Trauma Observation Program provides healthcare professionals with a current understanding of their particular area of interest through clinical interactions, meetings and lectures, rounds, and observation of operational procedures. Program participants include EMS students, pre-med students, military medics, nurses, high school trainers, nurse practitioners, and physicians. In FY 2023, RACSTC welcomed 64 participants.

RACSTC conducted additional educational outreach to EMS in a host of conference settings, including Winterfest EMS, EMS Care, and the Mid-Atlantic Transport Conference, among many others.

Center for Critical Care Training and Education (CCCTE)

The Center for Critical Care Training and Education (CCCTE) offers a robust educational schedule, and has built environments to mimic every phase of patient care within the Primary Adult Resource Center. CCCTE hosts many certification courses, including Advanced Trauma Life Support (ATLS), Advanced Trauma Care for Nurses (ATCN), Prehospital Life Support (PHLS) and Maintenance of Certification in Anesthesiology. Advanced trauma skills training includes Basic Endovascular Skills for Trauma, Extracorporeal Membrane Oxygenation (ECMO) and ultrasound training. In FY 2023, CCCTE provided more than 450 classes to more than 7,000 healthcare workers from around the world, including EMS clinicians, medical students, attending physicians, and nurses. In addition, CCCTE provides EMS training for Maryland State Police, Maryland Express Care, Harford EMS, US Army National Guard, FBI Field Agents, and volunteer organizations, and hosts community outreach educational programs including Stop the Bleed®, Minds of the Future, and the Edmonson High School Scrub Tech Program. Learn more at https://www.umms.org/ummc/pros/critical-care-trauma-education.

Research

Research projects are designed to enhance the trauma system's ability to resuscitate, stabilize, and treat the needs of trauma patients. RACSTC conducts research under the umbrella of the Shock, Trauma, and Anesthesiology Research – Organized Research Center (STAR-ORC), a multidisciplinary research and educational center focusing on brain injury, critical care and organ support, blood and resuscitation, surgical outcomes, patient safety, and injury prevention. STAR-ORC is the first research center in the nation dedicated exclusively to the study of trauma, its complications, and prevention. As of the close of FY 2023, RACSTC has more than 15 clinical studies either underway or upcoming. Topics include, but are not limited to, traumatic brain injury, hemorrhagic shock, venous thromboembolism therapies, spinal cord injury, vascular injury and the biomechanics of motor vehicle crash-related injury. Its research partners include the National Institutes of Health, the US Air Force, the National Institute of Neurological Disorders and Stroke, and the Eastern Association for the Surgery of Trauma. In FY 2023, RACSTC presented on a recent landmark study that found aspirin to be as effective as low-molecular dose heparin in preventing blood clots following fracture at the annual meeting of the Orthopaedic Trauma Association. The clinical trial of more than 12,000 patients spanning 21 trauma centers in the US and Canada – the largest-ever trial involving orthopedic trauma patients – was co-led by the Department of Orthopaedics at the University of Maryland School of Medicine and the Major Extremity Trauma Research Consortium and based at the Johns Hopkins Bloomberg School of Public Health.

Legislation

RACSTC's Legislative Committee plays a significant role in advocating for crucial improvements in trauma care and patient support across Maryland. During the 2023 Maryland legislative session, it actively monitored over 24 trauma-related bills. The Legislative Committee provided expert testimony in support of three key bills: emphasizing the need for adequate program funding to assist victims of violence, the importance of upholding helmet safety laws, and the necessity for a comprehensive statewide approach to trauma funding.

Rehabilitation Services

RACSTC emphasizes early patient mobilization at the beginning of the Advanced Trauma Life Support rehabilitative process. A highly-trained interdisciplinary team of physicians, nurses, therapists and ancillary care providers participate in extensive daily interactions and disposition rounds to problem solve and set the clinical plan for their complex, multi-system patients. This interdisciplinary approach facilitates utilization of therapy services through the full continuum of care, from the Trauma Resuscitation Unit (TRU) to follow-up clinics after discharge. The RACSTC rehab team also serves as a specialty

resource for local, regional, and national providers and professional associations. The University of Maryland Rehabilitation & Orthopedic Institute and the UMMC Midtown Campus primarily provide post-acute inpatient and outpatient services for RACSTC patients.

Level I Adult Trauma Center

The Johns Hopkins Hospital

1800 Orleans Street, Baltimore, Maryland
MIEMSS Region III

The Johns Hopkins Hospital (JHH) is a designated Level I Adult Trauma Center serving Baltimore City and its surrounding counties, as well as patients throughout the state and region. JHH improves the health of the community and the world by setting the standard of excellence in medical education, research, and clinical care. Diverse and inclusive, Johns Hopkins Medicine educates medical students, scientists, healthcare professionals and the public. It conducts biomedical research and provides patient-centered medicine to prevent, diagnose, and treat human illness. The trauma acute care surgery departments of JHH and Johns Hopkins Bayview Medical Center are unified under a single division of Acute Care Surgery.

From June 1, 2022, through June 30, 2023, JHH treated 2,852 trauma patients, according to the Maryland State Trauma Registry. Adult trauma services are provided by the Division of Acute Care Surgery within the Department of Surgery. This year, *US News & World Report* again counted JHH among the nation's top five hospitals in its Best Hospitals 2023 rankings.

Quality Management and Improvement

A leader in quality and safety, JHH has received an A grade by Leapfrog related to patient safety, as well as the American College of Surgeons NSQIP's Meritorious Status. JHH developed several quality improvement projects in FY 2023. Among these was the implementation of a new paging structure that reduced Trauma Surgeon Time to Arrival from 12 minutes to one minute, as well as a Trauma Registry Data Automation Tool to help improve health system registry data abstraction. Over the last five years, JHH has maintained a Trauma Bypass Rate of 0.09%. Additionally, JHH implemented a Whole Blood Program for Adult Trauma Patients in FY 2023.

Injury Prevention Programs

The Johns Hopkins Adult Trauma Division works to reduce harm and prevent injuries through education, training, and outreach, focusing its efforts toward community improvement in three main areas: violence, home safety (e.g., falls, lacerations), and motor-vehicle safety. Dashboards within Johns Hopkins Adult Trauma help JHH focus its efforts. The Office of Care Coordination maintains a Break the Cycle Violence Intervention Program geared toward harm reduction in the community. Johns Hopkins Medicine collaborated with the Johns Hopkins Bloomberg School of Public Health Center for Gun Violence Solutions to co-host a Break the Cycle of Violence Summit in June 2023. The summit brought together clinicians, representatives of hospital-based and community-based violence intervention programs, and other key stakeholders in state and local government to share experiences and identify ways to collaborate to improve patient care and prevent gun violence in Baltimore.

EMS Education

JHH actively provides quality improvement and follow-up to its EMS colleagues. In addition to hosting the biannual Topics in EMS conference, JHH is a site facility for five EMS education programs. Its EMS board room is used to deliver education service to EMS clinicians who deliver patients to JHH for care. JHH works closely with EMS officials from multiple agencies at the local, state, and federal government levels on numerous projects related to EMS system development, quality assurance, clinical protocols, EMS clinician education, and research.

Trauma Education is a priority for the trauma center. Trauma attending physicians at JHH teach Advanced Trauma Operative Management, Advanced Trauma Life Support, Advanced Surgical Skills for Exposure in Trauma, and Rural Trauma Team Development courses. Many trauma physicians were featured speakers at numerous national and international conferences this past year. They lend their expertise as session moderators, visiting professors, and keynote speakers throughout the country, and have conducted presentations for members of the US Congress and military.

Fellowship and Residencies

The JHH Adult Trauma program graduates two to three Fellows per year. In FY 2023, it welcomed three new Acute Care Surgery/Trauma Fellows.

Research

As an academic medical center, all attending trauma center faculty at JHH maintain research interest and expertise through its trauma research program. JHH has been awarded extramural research funding in excess of $4 million in grants and contracts have been awarded for various projects, with trauma surgery faculty serving as primary investigators. Extramural funding sources include the Patient-Centered Outcomes Research Institute (PCORI), the Agency for Healthcare Research and Quality (AHRQ), the Department of Defense/Army Medical Research Acquisition Activity, and the Henry M. Jackson Foundation for the Advancement of Military Medicine (HJF). The JHH faculty carry diverse research interests, including health services research related to trauma outcomes, trauma systems in the developing world, trauma resulting from interpersonal violence, the effects of frailty on injury outcome, prehospital trauma care, and gun violence prevention. Trauma research resulted in a significant number of peer-reviewed publications

this past academic year. The Surgery Faculty-Student Mentoring Program pairs master's students with faculty to perform clinical and outcomes research. So far, the program has trained more than 100 students and yielded over 200 peer-reviewed manuscripts.

Rehabilitation Services

The JHH Department of Physical Medicine and Rehabilitation (PMR) provides a wide range of rehabilitation services to trauma patients, from the bedside to inpatient rehab and home services. Opened in 2017, the Comprehensive Integrated Inpatient Rehabilitation Program is a state-of-the-art, 18-bed inpatient rehabilitation unit offering unique features that include a mock apartment where patients can practice the tasks of living independently and a "streetscape" area for patients to rehearse activities of daily living, such as grocery shopping and using an ATM. The PMR sponsors a yearly national rehabilitation conference. This year's conference focus will be on the early mobilization of patients in the ICU setting.

Level II Adult Trauma Center

Johns Hopkins Bayview Medical Center

4940 Eastern Avenue, Baltimore, Maryland
MIEMSS Region III

Johns Hopkins Bayview Medical Center (JHBMC) is a designated Level II Adult Trauma Center serving eastern Baltimore City, eastern Baltimore County, Harford County, and Cecil County. As a member of Johns Hopkins Medicine, JHBMC provides emergency access to surgical care for acutely injured patients with time-sensitive injuries. The program provides patient-centered comprehensive care to all trauma patients, incorporating a multidisciplinary, collaborative approach, and evolves by implementing protocols that address patient, community, and institutional needs.

From June 1, 2022, through May 31, 2023, the JHBMC Emergency Department evaluated more than 4,000 patients triaged by EMS for specialty trauma care, and entered 2,425 trauma patients to the Maryland State Trauma Registry. Adult trauma care services at JHBMC are provided by the Johns Hopkins School of Medicine Department of Surgery's Division of Acute Care Surgery.

JHBMC is one of the state's busiest trauma centers by volume. The trauma and emergency surgery services of both JHBMC and the Johns Hopkins Hospital are unified under a single Division of Acute Care Surgery, and provide trauma attending physician support to both trauma centers. The Bayview Trauma Advanced Practice Providers (APP) Service expanded to four APPs who provide care exclusively for trauma patients facilitating more admissions to the Trauma Service with the goal of better patient outcomes through dedicated, specialized care.

JHBMC recognized National Trauma Awareness Month in May 2023 by welcoming back two survivors and their families to celebrate their recovery with a special event. Additionally, trauma team survivors participated in the Race to Rebuild 5K.

Quality Management and Improvement

Through its quality management process, JCBMC continually improves patient care and outcomes at both the individual and system level. Its multidisciplinary Trauma Joint Practice Committee, consisting of physician liaisons from Emergency Medicine, Trauma Surgery, Orthopaedic Surgery, and Neurosurgery, reviews patient care to enhance multidisciplinary collaboration and identify improvement opportunities.

Injury Prevention Programs and Initiatives

In May 2023, JHBMC held its third annual Stop the Bleed® marathon training on National Stop the Bleed® Day, and offered Stop the Bleed® training sessions to local community groups. In FY 2023, JHBMC trained 393 hospital personnel and members of the community in Stop the Bleed®. In addition, JHBMC informed visitors and staff on topics such as Stop the Bleed® and fall prevention through quarterly resource fairs. It will hold a collaborative falls prevention effort with Physical Therapy and Emergency Medicine during Falls Prevention Month in September 2023.

EMS and Nursing Continuing Education

In FY 2023, JHBMC hosted its semiannual Topics in EMS Conference for EMS clinicians in the spring and fall. This full-day hybrid course includes trauma and burn injury content. Additionally, five EMS educational programs are contracted with JHBMC for clinical learning opportunities. It provides further continuing education for its EMS colleagues via an educational board in the ED. JHBMC is likewise committed to improving patient outcomes through enhancing the knowledge of its front-line nurses. This year, JHBMC supported nursing staff attendance to the Emergency Nurses Association Trauma Nursing Core Curriculum, as well as their pursuit of national certification in trauma nursing. JHBMC's trauma program actively supported the Maryland ACS Committee on Trauma's Advanced Trauma Care for Nurses Courses as Course Directors and Instructors.

Research

The integrated Division of Acute Care Surgery provides JHBMC with opportunities to join new and ongoing research initiatives focused on trauma care.

Rehabilitation

Approximately one-third of admitted trauma patients require a period of rehabilitative care after hospitalization, especially older patients with pre-existing comorbidities. JHBMC has access to an inpatient acute rehabilitation center on its campus to provide patients with this level of care. JHBMC's Social

Work and Case Management Services assess each individual patient's post-discharge needs prior to their release from the hospital.

Level II Adult Trauma Center

University of Maryland Capital Region Medical Center

901 Harry S. Truman Dr. N., Largo, Maryland
MIEMSS Region V

The University of Maryland Capital Region Medical Center (Cap Region) is a designated Level II Adult Trauma Center serving Prince George's County and other adjacent areas, including Washington, DC. With four major highways nearby, the hospital is an ideal location for local EMS transport and public accessibility. Cap Region is committed to restoring the quality of life for all of its patients and their families, beginning with prehospital communication and extending throughout their hospital stay, and long after discharge. From June 1, 2022, to July 31, 2023, the University of Maryland Capital Region Medical Center treated 6,367 trauma patients, according to the Maryland State Trauma Registry.

Opened in June 2023, Cap Region's state-of-the-art facility features five treatment bays within a large trauma resuscitation unit, an operating room dedicated to trauma surgery, one operating room dedicated to acute care surgery, and one hybrid operating room dedicated to vascular, orthopedic, and trauma care. Its Acute Care Surgery and Trauma faculty consists of five board-certified surgical critical care full-time Associate Professors as well as one part-time surgeon, as well as two community-practice surgeons with decades of trauma experience.

In FY 2023, Cap Region hosted rotating acute care surgery fellows from the R Adams Cowley Shock Trauma Center in Baltimore and supported the education of Howard University surgery residents at every level of their training, as well as rotating residents from Walter Reed Medical Center and Anne Arundel Medical Center. In July 2022, Cap Region was designated a Kaiser facility, expanding its coverage for the population of Prince George's County. Additionally, Cap Region launched its first Sickle Cell Clinic in March 2023.

Quality Management and Improvement

Acute Care Surgery's quality management program consists of a multidisciplinary care team whose collaborative efforts align positive patient outcomes with clinical expertise and best practices and ensure access to necessary resources. Multiple monthly comprehensive case and peer reviews, loop closures, and process improvement initiatives reflect Cap Region's commitment to improving the care and outcomes of injured patients.

Injury Prevention Programs and Initiatives

Through its injury prevention programs and initiatives, Cap Region educated over 1,600 persons in FY 2023. Inpatients received injury-specific prevention and awareness resources daily. Cap Region offered injury prevention information and tips, such as the myriad of Trauma Awareness and Prevention activities held during National Trauma Awareness Month, in May, fall prevention demonstrations, and Stop the Bleed® training. Cap Region also educated its visitors and the broader community on National Gun Violence Awareness and Prevention Day, sharing information and resources via question-and-answer tables and its social media channels. In conjunction with its Community Health and Domestic Violence and Sexual Assault Center, Cap Region participated in community events, and visited multiple community centers for aging, providing general injury prevention awareness. It distributed bicycle helmets and car seats and actively participated in the DC Trauma Injury Prevention Coordinators Collaborative. The Capital Region Violence Intervention Program hosted weekly virtual men's group meetings, enabling continued contact with survivors and ensuring the provision of post-discharge mental health and resource support necessary for a full recovery. Additionally, the John "Jack" Godfrey Traumatic Brain Injury Support Group for survivors and caregivers maintained its monthly virtual platform addressing the emotional, physical, resource, and support needs of survivors and caregivers.

EMS and Nursing Continuing Education

The Acute Care Surgery team provides enhanced EMS and nursing education opportunities, including web-based orientation modults, skills simulation stations, lectures specific to the care of the injured patient, and mock codes that create real-life scenarios.

Research

Cap Region's Trauma Registry and Acute Care Surgery team support internal, local, and multi-institutional research efforts to identify trends, improve outcomes, and evaluate injury prevention efforts. In FY 2023, they actively collaborated with the R Adams Cowley Shock Trauma Center and the University of Maryland School of Public Health, focusing on research on violence intervention and recidivism.

Rehabilitation

The Physical Medicine and Rehabilitation teams collaborate to ensure that the physical, occupational, and speech-language therapy needs of the injured patient are met. In FY 2023, the Physical Medicine Department was awarded two brand-new vital sign machines to assist in the care of the trauma patient.

Level II Adult Trauma Center

Sinai Hospital

2401 West Belvedere Avenue, Baltimore, Maryland
MIEMSS Region III

Sinai Hospital of Baltimore (Sinai) is a designated Level II Adult Trauma Center serving the Greater Baltimore metropolitan area. As part of the LifeBridge Health System, Sinai works to maintain and improve the health of the individuals and communities it serves through compassionate, high-quality care through comprehensive treatment and preventative wellness services. Sinai is dedicated to educating medical students and residents and engaging in research to improve lives throughout Maryland and worldwide. From June 1, 2022, through May 31, 2023, Sinai treated 2,368 trauma patients, according to the Maryland State Trauma Registry. Adult trauma services at Sinai are provided by the Acute Care Division of Surgery.

In October 2022, Sinai broke ground on a $50 million expansion and renovation project to its Emergency Department. This expansion will double the footprint of the existing ED, allowing for larger patient rooms, an additional trauma bay with direct access to diagnostic testing, and more space for subspecialties. A brand-new ambulance bay and offloading area, set to open in September 2023, will further improve Sinai's offloading times and enhance both patient care and the EMS clinician experience. Sinai anticipates completion of the entire renovation project in summer 2025.

In 2022, LifeBridge Health and the Center for Hope announced they were assuming oversight of six Safe Streets locations throughout Baltimore, including two sites in Sinai's surrounding neighborhoods (Belvedere and Park Heights). This expansion has enhanced Sinai's comprehensive violence intervention efforts both within the hospital and greater community, which saw a 30% reduction in gunshot and stabbing victims in FY 2023.

LifeBridge Health and the George Washington School of Medicine and Health sciences welcomed third- and fourth-year medical students to Sinai's new Regional Medical Campus in April 2023. This partnership provides these students the opportunity to train in a community-focused health system with strong emphasis on primary and continuity care in a population health environment. Sinai's Division on Trauma partnered with the Maryland Committee on Trauma at its annual Point Counterpoint Conference in May 2023. This year's conference included four industry leaders who spoke on topics such as delirium management, nurse resilience, and improving trauma teams, among others.

Injury Prevention Programs and Initiatives

For the third consecutive year, Sinai partnered with the Injury Free Coalition for Kids in its mission of preventing injury in children by joining other Baltimore City and national hospitals and businesses in turning the hospital green for Injury Prevention Day. Sinai expanded its Stop the Bleed® program to include several area schools, local businesses and organizations, training over 400 participants in FY 2023. Through these partnerships, Sinai now provides ongoing Stop the Bleed® training to students, community members, and healthcare professionals throughout Baltimore City and the surrounding counties.

In May 2023, Sinai participated in the Red Desk Project as part of Child Abuse and Trauma Awareness Month for the third year in a row. This year, a display of red desks – each one representing a child's life lost to homicide in Baltimore City – was set up outside of the Center for Hope, located next to Pimlico Race Course. A press conference issued a call to action to provide child homicide and violence throughout Baltimore. The red desks remained on display throughout May until National Gun Violence Awareness Day on June 4.

Quality Management and Improvement

In FY 2023, Sinai Trauma Services partnered with Sinai's systemwide LBH Quality and Patient Safety Department and various multidisciplinary hospital committees to routinely review and implement best practices to improve the outcomes and experience for Sinai's trauma population. Additionally, the Trauma Program created and implemented a Lead Trauma Registrar position to assist in performance improvement initiatives, recognize potential patterns of complications, including EMS trauma quality metrics, and work with Sinai's Trauma Quality Specialist, Trauma Program Manager, and Trauma Medical Director to improve patient outcomes.

EMS and Nursing Continuing Education

In FY 2023, Sinai worked to reduce EMS offloading times by creating an internal ambulance offload algorithm that assists ED nurses with ambulance triage. This algorithm includes a dedicated ambulance triage nurse and physical relocation of EMS triage and offloading. These efforts improved the median offload time to 22 minutes. In addition, the ED trained and certified nurses and physicians in Base Station Operations and Medical Direction. The Division of Trauma provided information for nursing trauma continuing education through the many virtual and hybrid conferences that were offered both statewide and nationally. Sinai's ED trained several new Trauma Nurse Core Course (TNCC) and Emergency Nurse Pediatric Course (ENPC) instructors, allowing us to bring more classes into the hospital. Several more ED nurses also received advanced certifications such as Trauma Certified Registered Nurse (TCRN).

Sinai's upgraded simulation training capabilities include a new Academic Simulation Center with 10 new simulation spaces, featuring rooms dedicated for critical care, trauma, primary care and operating room simulations; technologically advanced simulation mannequins that can speak, bleed, and interact like real patients; three lecture classrooms; a technology lounge area; and private exam rooms allowing Sinai's new George

Washington medical students to practice medical exams on volunteer "patients". In collaboration with its simulation lab, ED, and Surgery Residency program, Sinai holds quarterly multidisciplinary trauma simulations. Through the guidance of Sinai's Trauma Surgery Attendings, these simulations strengthen relationships and provide opportunities for educational growth and development between the teams. In the future, Sinai hopes to include its EMS partners in these simulations.

Fellowships and Residencies

Sinai's full staff of fellowship-trained acute care surgeons – 22 surgical residents ranging from interns through fifth-year who have extensive training in trauma care – and experienced, dedicated advanced practice provider staff offers in-house 24/7 coverage. Sinai is the third largest teaching hospital in the state, training residents in multiple specialties. All surgical residents and advanced practice providers at Sinai maintain current ATLS, ACLS, and BLS certifications. The surgical residents have the opportunity to pursue additional trauma training in Advanced Trauma Operative Management, Focused Abdominal Sonography in Trauma, and Advanced Surgical Skills for Exposure in Trauma. Sinai's residents complete four-week rotations at the R Adams Cowley Shock Trauma Center during their post-graduate III year focusing on treating soft-tissue injuries, Johns Hopkins main campus focusing on transplant surgery, and at Johns Hopkins Bayview Medical Center during their post-graduate II year, focusing on burn surgery and wound care.

Research

The LBH Department of Research provides opportunities for all levels of providers and staff to participate in research initiatives, including those that advance trauma care. In FY 2023, Sinai's Division of Trauma partnered with the Geriatric Surgery program and the Department of Advanced Orthopedics on research projects to further enhance Sinai's care for its injured patients.

Rehabilitation

Sinai rehabilitation services are integrated throughout the patient's hospital stay. When a patient is ready for discharge, Sinai can accommodate qualifying patients in a 43-bed inpatient rehabilitation center. It offers a full spectrum of acute rehabilitation services, including pain management, aquatic therapy, physical therapy, occupational therapy, and speech-language therapies. The rehabilitation center supports patients with specialists in physiatry, social work, rehab psychology, offers programs for individuals with balance and dizziness, driving evaluations, return-to-work programs, and a brand-new division of rehabilitation engineering.

Level II Adult Trauma Center

Suburban Hospital – Johns Hopkins Medicine

8600 Old Georgetown Road, Bethesda, Maryland
MIEMSS Region V

Suburban Hospital – Johns Hopkins Medicine (Suburban) is a designated Level II Adult Trauma Center serving Montgomery County, but also easily accessible from Frederick and Prince George's Counties. Suburban and its entire staff are dedicated to providing safe, compassionate, and evidenced-based quality care to all injured patients during their hospitalization. From June 1, 2022, through May 31, 2023, multidisciplinary care teams associated with the Trauma and Emergency Surgery Section of Suburban's Department of Surgery treated more than 2,300 trauma patients, according to the Maryland State Trauma Registry.

In FY 2023, Suburban's adult trauma center took deliberate steps to increase readiness for pediatric trauma patients presenting emergently to the trauma resuscitation units. These efforts included the development of a pediatric massive transfusion protocol to complement the existing adult protocol, the purchase of specialized pediatric surgical and trauma supplies, and additional pediatric trauma staff education.

Trauma nursing education hours, including case reviews, mock trauma simulations, and focused workshops, have increased significantly since the lifting of COVID-19 restrictions. The trauma center held its inaugural Trauma Survivors Day on May 17, 2023, celebrating one trauma survivor who graciously offered to share his story with the EMS clinicians and hospital staff members who helped to save his life. In April 2023, Suburban joined the other three trauma centers of the Johns Hopkins Health System in a distracted driving prevention campaign that spanned all four campuses as part of a new collaborative approach to data collection and injury prevention.

EMS Continuing Education and Programs

Suburban fosters an ongoing collaboration with its EMS colleagues through training and professional development opportunities. On May 18, 2023, Suburban's trauma program director and a trauma surgeon attended EMS Grand Rounds at the Montgomery County Training Academy (MCTA) to participate in the case review of a complex trauma patient. Through an agreement with MCTA and Montgomery County Community College Suburban's Emergency Department serves as a training site for prehospital clinicians. In fall 2022, Suburban hosted more than 150 EMS clinicians, nurses, advanced practice providers, and physicians for the Critical Issues in Trauma seminar. The annual trauma conference opened with a presentation by a Montgomery County EMT/Firefighter, highlighting the vibrant partnership between Suburban and EMS clinicians. Suburban will again host the conference in fall 2023.

To further strengthen its response during an emergency,

Suburban partners with Fire/EMS to co-chair the local Montgomery County Emergency Preparedness Collaborative (MOCEP), a collegial and long-standing partnership aimed at sharing best practices for exercise planning and overall readiness for real-world events. This led to continued improvement in communication and planning in FY 2023.

The Suburban Emergency Department recently upgraded its communication system, reflecting its commitment to maintaining a state-of-the-art base station to ensure reliable communications with EMS units. In February 2023, Suburban transitioned to the Maryland Emergency Medical Services Audio Recorder System under an agreement with MIEMSS' Emergency Medical Response Center.

Injury Prevention Programs and Initiatives

Suburban has actively participated in the national Stop the Bleed® campaign since 2016. As part of the Maryland Trauma Network's statewide initiative to spotlight National Stop the Bleed® Day on May 25, 2023, Suburban hosted a four-hour Stop the Bleed® Marathon, training more than 70 people and distributing as many Stop the Bleed® kits and tourniquets. Additionally, in FY 2023, Suburban's trauma program staff actively took part in blood drives organized by the Red Cross in response to the nationwide critical blood shortage.

Quality Management and Improvement

At Suburban, every trauma patient's chart is regularly reviewed by a trauma clinical data abstractor, a trauma nurse with expertise in performance improvement, the trauma program director, and the trauma medical director in a concerted effort to identify opportunities for improvement at all levels. Additionally, all deaths, transfers, complications, and unexpected treatment outcomes are presented at the monthly Morbidity and Mortality Conference for additional feedback and education.

Rehabilitation

Suburban retains a memorandum of understanding with Adventist HealthCare Rehabilitation Center for rehabilitation services. Physical, occupational, and speech therapy are provided onsite to trauma patients during their hospital stay. All trauma patients are assigned a case manager and/or a social worker who works closely with the trauma team to make the appropriate referrals to rehabilitation facilities.

Level III Adult Trauma Center

Meritus Medical Center

11116 Medical Campus Road, Hagerstown, Maryland
MIEMSS Region II

Meritus Medical Center (MMC) is a designated Level III Adult Trauma Center serving Washington and Frederick Counties in Maryland, southern Pennsylvania, and the eastern panhandle of West Virginia. Values that focus on the patient and family first – respect, integrity, service, excellence, and teamwork – reflect MMC's commitment to improving the health of the community. From June 1, 2022, through May 31, 2023, MMC treated 2,985 trauma patients, according to the Maryland State Trauma Registry. Adult trauma services are provided by the staff of the emergency department.

In FY 2023, MMC's biannual trauma conferences delivered continuing education to more than 300 providers, including EMS clinicians, hospital staff, and other local healthcare providers from outside the organization. Additionally, MMC implemented an Acute Care Emergency Surgery/Trauma program that provides 24/7 in-house coverage.

Quality Management and Improvement

MMC trauma center staff worked throughout FY 2023 to improve trauma documentation, heavily focusing their efforts on complete documentation of vital sign assessments upon arrival at and departure from the ED. MMC implemented changes to its electronic health record that deliver automated reminders to staff to provide the required documentation. A redesigned workflow in MMC's trauma rooms allows for better movement and care of trauma patients by eliminating duplicate equipment and ensuring that all bays are consistent in supply and location of specialty equipment. In FY 2023, trauma center staff worked with the ED physicians and pharmacy to help ensure that antibiotics are administered within one hour of arrival for open fractures. MMC is currently working to increase the efficiency of trauma patient throughput in the ER and has implemented daily multidisciplinary rounds for inpatient trauma admissions in order to decrease length of stay and improve patient satisfaction.

Injury Prevention Programs and Initiatives

In FY 2023, MMC promoted distracted driving awareness and falls prevention through participation in statewide injury prevention days. Additionally, MMC trauma staff taught several Stop the Bleed® classes in the community. MMC collaborated with Safe Kids Washington County in providing bicycle, fire, poison, sun, and pedestrian safety education to 1,000 children in the community. MMC likewise partnered with local summer camps to discuss general safety with children. In addition to car seat checks and loaner programs, MMC trauma staff offered one-on-one car seat installation assistance to families in the community; teaching parents and grandparents how to properly install child passenger safety seats. During this time, MMC offered both virtual and in-person car seat checks.

EMS and Nursing Continuing Education

In FY 2023, MMC organized free trauma conferences for staff and EMS partners, and provided trauma nurse core curriculum (TNCC) and emergency nursing pediatric care (ENPC) courses at the hospital. The Trauma Department also provided Case

Reviews for EMS throughout the region. Each spring, the trauma department team recognizes a Trauma Nurse of the Year for his/her outstanding care of patients. The honoree is granted an educational stipend to spend at a trauma conference.

Research

MMC's professional nursing research council studies evidence-based best practices in nursing. In FY 2023, these efforts included a recent study on nurses' perception of "quiet time" in the critical care unit.

Rehabilitation

Meritus Physical Therapy is the region's largest, most comprehensive rehabilitation center, providing care in an inpatient hospital unit as well as an outpatient facility located in the adjacent Robinwood Professional Center. The center provides a full range of rehabilitation programs, including comprehensive adult inpatient rehabilitation, outpatient pediatric and adult services, traumatic brain injury rehabilitation, and an inpatient joint replacement program. The inpatient rehabilitation unit is certified to meet rehabilitation standards set forth by the Commission on Accreditation of Rehabilitation Facilities.

Level III Adult Trauma Center

TidalHealth Peninsula Regional

100 East Carroll Street, Salisbury, Maryland
MIEMSS Region IV

TidalHealth Peninsula Regional is a designated Level III Adult Trauma Center serving the Delmarva Peninsula, the Eastern Shore of Maryland, Sussex County in southern Delaware, and Accomack County on the Eastern Shore of Virginia. TidalHealth encompasses the former Peninsula Regional Health Systems, Nanticoke Memorial Hospital, McCready Memorial, the Peninsula Regional Medical Group, Nanticoke Physician Network, Delmarva Heart, and Peninsula Cardiology. TidalHealth's values of quality, service, and community inform its mission of improving the health of the communities it serves. From June 1, 2023, to May 31, 2023, TidalHealth Peninsula Regional treated 2,211 trauma patients, according to the Maryland State Trauma Registry. The Emergency/Trauma Center provides adult and pediatric trauma services at TidalHealth Peninsula.

In May 2023, TidalHeatlh Peninsula Regional received a five-year redesignation from MIEMSS. Following a three-year lapse and much research and procurement of needed equipment, the Emergency Department went live with Autotransfusion (Continuous Re-infusion).

Quality Management and Improvement

TidalHealth Peninsula maintains several ongoing quality improvement initiatives. To improve trauma documentation, Trauma and ED leadership work with the EPIC healthcare software team to improve the Trauma Narrator, making the EPIC proprietary application more user-friendly for clinicians. In FY 2023, TidalHealth Peninsula added FAST exam to the RN Trauma Documentation, and developed the Blood-Tracking Tool to improve documentation of uncrossmatched blood in massive transfusions in EPIC. TidalHealth Peninsula implemented Mock Trauma Walk-Through Codes to better define the massive transfusion process, guidelines, and roles for ED staff. Working with clinical staff, a multidisciplinary team worked to improve quality metrics such as vital signs, antibiotics for open fractures, time to head CT, and door-to-reversal times for anticoagulated patients with abnormal imaging. Team members receive documentation feedback as needed.

FY 2023 saw the resumption of mandatory trauma simulation sessions, which offer staff an opportunity to provide documentation in the EMR in real time, as well as incorporate the trauma nurse process into practice. This year, the Trauma Committee reviewed, revised, and approved proposed changes to trauma program policies throughout the health system to further develop a consistent, evidence-based approach to providing care to trauma patients. To ensure continuity of care across the continuum, the Trauma Committee aligned TidalHealth Peninsula's practice guidelines with The Maryland Medical Protocols for Emergency Medical Services. In FY 2023, the EMS Medical Director attended local and regional EMS meetings, providing direction, feedback, and education to local EMS agencies. Additionally, EMS clinicians play an active role in TidalHealth Peninsula's AMI and Stroke Committees.

Injury Prevention Programs and Initiatives

In August 2022, TidalHealth Peninsula provided bike safety education at National Night Out, and distributed 88 properly-fitted helmets. TidalHealth Peninsula again delivered bike safety messaging at the annual Children's Christmas Carnival in December, distributing 25 properly-fitted helmets. Since June 2022, TidalHealth Peninsula has held 15 Stop the Bleed® training sessions for both hospital staff and the community. Local Fire/EMS personnel attend and/or serve as instructors for these Stop the Bleed® classes.

EMS and Nursing Continuing Education

TidalHealth assists in planning, coordinating, and sponsoring regular educational opportunities for prehospital and hospital healthcare clinicians. Resuming an in-person format in September 2022, the annual Topics in Trauma conference drew EMS clinicians and nurses from Maryland, Delaware, Pennsylvania, and Virginia by addressing subjects such as the daily practice of prehospital care and advanced inpatient trauma care. In FY 2023, the Trauma Nursing Core Course (TNCC) became mandatory for RN staff; 27 nurses completed the course and received TNCC certification. This year, TidalHealth Peninsula provided continuing education (including Advanced Life Support, ALS Skills, and Paramedic recertifications/

refreshers) to EMS clinicians in Worcester, Wicomico, and Somerset Counties. TidalHealth Peninsula supports the Wor-Wic Community College EMS program by serving as a clinical training site for students. Through this agreement, EMS students have clinical rotation through the various units for a better understanding of how evidence-based practice guidelines apply across the healthcare continuum.

Rehabilitation

TidalHealth Peninsula maintains an in-house rehabilitation program that offers physical, occupational, and speech therapy. TidalHealth offers inpatient skilled nursing care at Alice B. Tawes Nursing & Rehab in Crisfield, MD, for those patients recovering from injury. The hospital retains a memorandum of understanding with HealthSouth Chesapeake Rehabilitation Hospital in Salisbury and other appropriate centers to provide care to those who require additional resources and time to recover from traumatic injuries.

Level III Adult Trauma Center

UPMC Western Maryland

12500 Willowbrook Road, Cumberland, Maryland
MIEMSS Region I

UPMC Western Maryland is designated as a Level III Adult Trauma Center serving Allegany and Garrett Counties in Maryland, and neighboring counties in Pennsylvania and West Virginia. Adult trauma services are provided primarily by the Emergency Department. UPMC serves the community by providing outstanding patient care while shaping tomorrow's health system through clinical and technological innovation, research, and education. From June 1, 2022 to May 31, 2023, UPMC Western Maryland treated 755 trauma patients, according to the Maryland State Trauma Registry.

Quality Management and Improvement

Since becoming a part of the UPMC Hospital Network in February 2020, UPMC Western Maryland has leveraged its innovation and clinical expertise to advance quality initiatives to enhance healthcare services provided to patients in the tristate service region. UPMC Western Maryland is enrolled in the American College of Surgeons Trauma Quality Improvement Program to streamline and benchmark quality. Quality data is utilized to develop policies for the standardization of patient care and improvement of outcomes built upon evidence-based best practice models. UPMC Western Maryland's multidisciplinary approach is designed to serve the unique needs of each patient. Staff work diligently to facilitate communication between hospital and pre-hospital personnel. To support this initiative, in addition to the base station, UPMC Western Maryland maintains representation on the Miltenberger Emergency Services Seminar planning committee, the MIEMSS Region I EMS Advisory Council, the Maryland Trauma Center Network, Maryland EMS Protocol Revision Team for Trauma, Allegany County Emergency Services Board, Allegany County Emergency Services Quality Assurance Review Board, Allegany County Medical Review Board, Maryland Region I & II Healthcare Council, and the MIEMSS Region I Prehospital Care and Quality Improvement Committee.

Injury Prevention Programs and Initiatives

In FY 2023, UPMC Western Maryland collaborated with the Allegany County Department of Emergency Services and the Garrett County Department of Public Safety to provide instructional support for Stop the Bleed® program courses taught to Fire/Rescue and EMS clinicians, law enforcement officers, and citizens throughout MIEMSS Region I and bordering counties in Pennsylvania and West Virginia. UPMC Western Maryland supports child and family safety and prevention initiatives such as the Maryland Kids in Safety Seats. It likewise coordinated with MIEMSS' EMS for Children and Safe Kids Maryland as part of the Bike Safety Project, which provides bicycle helmets to the public while delivering education on correct helmet use in an effort to reduce the number of significant head injury deaths in Maryland due to bike crashes.

EMS and Nursing Continuing Education

UPMC Western Maryland is the continuing education hub for MIEMSS Region I, offering continuing education credits in a variety of subjects, including trauma, to physicians, nurses, technicians and unit assistants, EMS clinicians, and countless others within the multidisciplinary patient care team. It provides trauma credits through courses in Advanced Cardiac Life Support, Pediatric Advanced Life Support, Neonatal Advanced Life Support, Basic Trauma Nursing, and the Trauma Nursing Core Course while also actively participating in the planning, production, and implementation of the annual Miltenberger Emergency Services Seminar. UPMC Western Maryland serves as a clinical site for Garrett College's Paramedic Studies program as well as the Paramedic program administered by Blue Ridge Community and Technical College in West Virginia. Since the construction of a simulation lab equipped with three state-of-the-art simulation patient manikins in spring 2022, UPMC Western Maryland has provided continuing education opportunities to hundreds of staff and non-employee learners.

Rehabilitation

UPMC Western Maryland's 13-bed Comprehensive Inpatient Rehabilitation Unit (CIRU) provides rehabilitation services to its trauma patients. Recognizing that each patient's needs are unique, CIRU works to improve patients' ability for self-care, mobility, and communication while working to reduce limitations and promote wellness and self-worth. CIRU develops a plan for care beyond the inpatient rehabilitation stay and helps patients return to their homes and communities.

Out-of-State Adult Trauma Centers

ChristianaCare Level I Adult Trauma Center – Newark Campus

4755 Ogletown-Stanton Rd., Newark, Delaware

ChristianaCare Level I Trauma Center is the only Level I Adult Trauma Center in the state of Delaware, as well as the only Level I Adult Trauma Center along the I-95 corridor between Philadelphia, Pennsylvania, and Baltimore, Maryland. It serves as the regional referral center for a catchment area that includes the entire state of Delaware, Southern Chester County (Pennsylvania), Salem County (New Jersey), and Cecil County in northeastern Maryland.

As an American College of Surgeons-verified Level I Adult Trauma Center, Christiana Hospital has the capability for the care and treatment of traumatically injured patients at all levels of acuity, including those who are critically injured. From July 1, 2022, through June 30, 2023, it treated 4,864 patients, with 3,752 (77%) being admitted for trauma care. Of those admitted, 12.5% were Maryland residents.

MedStar Washington Hospital Center

110 Irving Street, NW, Washington, DC

MedStar Washington Hospital Center delivers exceptional patient-first health care by providing the highest quality and latest medical advances through excellence in patient care, education, and research. The MedSTAR (Medical Shock/Trauma Acute Resuscitation) Trauma Unit at MedStar Washington Hospital Center is the regional referral center for critical multiple trauma, treating individual victims of traumatic injury and multiple victims of mass trauma occurrences. Located in the heart of the nation's capital, the Center has responded to thousands of medical crises, including treating patients of the September 11, 2001, terrorist attack on the Pentagon, victims of the Navy Yard shootings in 2013, and the active assailant attack on the Congressional Baseball Game for Charity in 2017. Verified by the American College of Surgeons as a Level I Facility, MedSTAR serves as a referral center for a 150-mile radius of the hospital, receiving critical trauma patients from the District of Columbia, Maryland, Virginia, Delaware, and Pennsylvania. It provides both air and ground transport via MedSTAR Transport, bringing in patients from referring hospitals and from the site of injury. In FY 2023, MedSTAR treated 2,371 trauma patients.

Adult Burn Center

Johns Hopkins Bayview Medical Center

4940 Eastern Avenue, Baltimore, Maryland
MIEMSS Region III

The Burn Center at Johns Hopkins Bayview Medical Center (JHBMC) serves the residents of Maryland and specific regions of adjacent states. The Burn Center provides a comprehensive, nationally recognized program of care for patients with burn injuries. In FY 2023, JHBMC treated 657 patients (270 inpatients and 387 patients), either in the emergency room or under observation.

JHBMC advanced the science of burn care in FY 2023 with a record-setting 49 peer-reviewed publications on a wide variety of burn topics, including resuscitation, skin substitutes, and wound healing. Research projects including exploration of the impact of social determinants of health to burn outcomes, pre-existing viral infections' impact on morbidity, the involvement of women and underrepresented groups in burn research projects, and strategies to reduce the prevalence of pressure injuries.

JHBMC supported vital programs rooted in evidence-based practice in FY 2023. Current initiatives directed at better serving the Burn Center's patients include quality improvement programs to decrease hospital-acquired infections, decrease pain, improve functional outcomes of burn patients, and improve fluid resuscitation in large burns. JHBMC likewise played a vital role in providing burn care education to prehospital and hospital-based clinicians, including students.

The American Burn Association re-verified the Johns Hopkins Burn Center in FY 2023. This distinction affirms that the Burn Center has met the highest standards of care for the burn-injured patient.

Quality Management and Improvement

JHBMC has developed and maintained a system for tracking and responding to a variety of quality improvement metrics, including time from scene to initial presentation and throughput time from ED to admission. In addition, the Burn Center works closely with the base station to identify communication and transport problems in near-real time. Additional metrics tracked include hospital-acquired infections, throughput time from the ED, wound infections, and pressure injuries, among others. These metrics are reported and discussed in a multi-disciplinary format monthly. The Burn Joint Practice Committee examines trends in care and quality.

Injury Prevention Programs and Initiatives

JHBMC designs, leads, and implements community outreach and education in a variety of ways. Educational offerings in FY 2023 included presentations in the Johns Hopkins Occupational Therapy Hand and Acute Fellowship Program and schools of nursing. It hosted and provided additional educational opportu-

nities with the annual Topics in EMS Conference, and offered Advanced Burn Life Support courses to its internal and external staff as well as prehospital clinicians. Community outreach activities included statewide health and safety fairs and programs in burn prevention. Outreach activities with burn survivors continued to flourish this year through participation in the Phoenix Society for Burn Survivors, the World Burn Congress, and Survivors Offering Assistance in Recovery (SOAR).

EMS and Nursing Continuing Education

JHBMC provides clinical education at local nursing schools. The Burn Center cycles EMS students through clinical rotations and coordinates biannual prehospital and clinical educational opportunities, including Advanced Burn Life Support. In addition, JHBMC offers an EMS/Firefighter Burn Course for prehospital clinicians throughout the region, and participates in annual Emergency Medical Technician ALS updates in many Maryland counties. JHBMC delivers frequent lectures at EMS Regional Conferences as well as the EMS Care Conference, as well as to outside hospital conferences and lectures throughout the region upon request. Onsite clinical training for medical, nursing, rehabilitation, psychology, and dietician students has resumed. Additionally, the Burn Center provides educational presentations at many colleges and universities throughout the region for various health disciplines, including prehospital clinicians.

Research

The Burn Center collaborates with multiple disciplines, including physical and occupational therapy, critical care, nursing, infectious disease, palliative care, and psychology, to investigate complex, multi-disciplinary research questions. It participates in sponsored clinical trials, federally funded multicenter trials, and investigator-initiated research. The Michael D. Hendrix Burn Research Laboratory actively studies the non-healing wound environment in animal models, and looks at ways to improve burn wound healing. In FY 2023, JHBMC's research included the utilization of social media during COVID-19; pressure mapping to prevent pressure injuries; risk factors for cooking injuries; opioid dependence in burn survivors; antibiotic prophylaxis; and the management of weight changes during acute hospitalization. The Burn Center publishes and presents its findings at various local, regional, and national conferences.

Fellowships/Residencies

For over 20 years, the Johns Hopkins Burn Center has provided annual fellowship training for physicians in both general and plastic surgery tracks. In addition, it provides residency training in partnership with local hospitals and universities, including Johns Hopkins University, Christiana Care Health System, Union Memorial Hospital, St. Agnes Hospital, Hershey Medical Center, and Sinai Hospital.

Rehabilitation

The Johns Hopkins Burn Rehabilitation Department is dedicated to rehabilitating burn survivors. Every patient admitted to the Burn Center is seen by PT/OT within the first 24 hours. In FY 2023, the Burn Center evaluated 248 inpatients. Burn inpatients are treated on a daily basis in the Burn Center's onsite burn rehabilitation gym or in their rooms, depending upon the patient's condition. This year, the Burn Center served as a site for a multi-center research study investigating early ambulation in burn patients. In addition, the Rehabilitation Department works with case management and social workers to discharge patients to appropriate levels of care. The Burn Center maintains a close working relationship with the Johns Hopkins Specialty Hospital for inpatient rehabilitation.

Adult Burn Center

MedStar Washington Hospital Center

110 Irving Street, NW, Washington, DC

The Burn Center at MedStar Washington Hospital Center is the only adult burn treatment center in the Washington Metropolitan area, serving the District, Southern Maryland, Northern Virginia and Eastern West Virginia. It treats 500 – 600 acute burn-injured patients admitted for treatment each year, with another 800 treated as outpatients. The Burn Center provides outpatient burn care for more than 2,500 patients annually. Additionally, it provides care for an array of thermal, electrical, and chemical injuries, as well as soft-tissue lesions.

The Burn Center features a 10-bed ICU with its own operating room and tanking room, as well as a 23-bed Burn Step-Down Unit and a Burn Rehabilitation Gym staffed by specialized Burn Physical and Occupational Rehabilitation Therapists. Reconstructive surgery and rehabilitation are available for patients in the post-acute and convalescent phases of their care, regardless of where they received treatment for their acute burns.

The Burn Center meets stringent criteria for verification by the American Burn Association for providing excellence in burn care. Its multidisciplinary team approach to burn care provides comprehensive services for patients from injury through rehabilitation. The Burn Center is a national leader in laser scar revision, with a practice dedicated to patients with burn and traumatic injuries. For patients suffering from pain, itching, tightness, and discoloration associated with burn or traumatic scars, the Burn Center offers multiple interventions, including compression and massage, laser scar revision, and surgical reconstruction.

In FY 2023, the Burn Center at MedStar Washington Hospital Center increased the number of Advanced Burn Life Support Courses it offers to EMS clinicians throughout the region. It actively participated in the National Capital Region Burn Mass Casualty Incident Task Force to ensure that burn patients receive optimal care in the event of a mass casualty event. The Burn Center extended its outreach and educational efforts with first responders and the greater community, and provided feedback

and loop closer to EMS and outside entities for patients transferred to the Burn Center.

Pediatric Trauma and Burn Centers

Johns Hopkins Children's Center

1800 Orleans Street, Baltimore, Maryland
MIEMSS Region III

JHCC Pediatric Trauma Center

The Johns Hopkins Children's Center (JHCC) is the designated Level I Pediatric Trauma Center serving Maryland and the surrounding region. The 205-bed, state-of-the-art hospital features an expansive pediatric emergency department equipped with dedicated pediatric trauma resuscitation bays, a 28-bed Pediatric Intensive Care Unit (PICU), and a pediatric operative suite with designated emergency operating rooms for pediatric trauma patients. From June 1, 2022, through May 31, 2023, JHCC treated over 1,000 trauma-injured children, according to the Maryland State Trauma Registry.

This year, The Johns Hopkins Hospital received its fourth Magnet Designation, a healthcare organization's highest and most prestigious designation for nursing innovation, excellence, and quality-driven patient care from the American Nurses Credentialing Center. JHCC remains *US News & World Report*'s No. 1-ranked children's hospital in Maryland, and among the Top 10 in the nation, with 10 pediatric specialties nationally ranked.

Johns Hopkins Pediatric Transport helped arrange the transfer of more than 700 trauma or burn patients from regional hospitals to JHCC in FY 2023. The JHCC Trauma team launched a quarterly collaborative meeting with multidisciplinary stakeholders from across the organization. These collaborative sessions aim to discuss ongoing initiatives from disciplines across JHCC, identify new research opportunities, and reinforce the shared mission of the trauma program.

Quality Management and Improvement

JHCC's pediatric trauma performance improvement (PI) program ended FY 2023 with its highest volume of patients to date. The multidisciplinary PI Committee meets monthly to review trauma statistics and other relevant data to increase transparency and identify areas for improvement in a timely, collaborative fashion.

The JHCC Pediatric Base Station's active quality improvement (QI) plan ensures regular evaluation of the online medical direction it provides to EMS clinicians, who provide formal and informal feedback to jurisdictional QI officers. Integration with EMS stakeholders and the pediatric trauma team occurs in the monthly multidisciplinary process improvement and morbidity and mortality conferences as partners in the healthcare continuum.

Injury Prevention Programs and Initiatives

The JHCC Injury Prevention Program's (IPP) child passenger safety technicians (CPSTs) provided car seat fittings, assisted with on-site installations for their patients, and participated in local community seat checks and the JHCC Summer Seat Check. Additionally, IPP collaborated with various groups, including the JH Safe Sleep Group; Safe Kids Baltimore & Maryland; the Injury Free Coalition for Kids; Childhood Injury Prevention Network (JHCC and the Johns Hopkins School of Public Health); JHCC multidisciplinary burn and trauma groups; Non-Accidental Trauma (NAT) Workgroup; TraumaNet; and the JHM Trauma Collaborative.

IPP offered Stop the Bleed® training to patients, staff, and community members, and attended and participated in local and national conferences, webinars, and trauma-related seminars. In fall 2022, IPP partnered with Adult Trauma, JHM nursing, and the Wilmer Eye Institute to host a Falls Prevention event; shared the MIEMSS Safe Sleep Display with NICU and Peds ED parents for Safe Sleep Month; and, in conjunction with the Safe Kids Baltimore and Maryland Kids in Safety Seats programs, took part in National Injury Prevention Day by assisting with car seat checks around the state. IPP provided onsite trauma awareness education for students at Meade Heights Elementary and Redeemer Classical Christian School in February, and hosted a poison prevention table on the JHH Main Loop and Bike Helmet Distribution among Peds ED patients in the spring. The JHH Trauma Survivors Day Event, held in conjunction with the JHH Adult and Wilmer Eye Institute Trauma programs, honored a pediatric trauma survivor; whose transporting EMS clinicians were in attendance.

Interdisciplinary Pediatric Trauma Bootcamp/Course for Fellows

The Interdisciplinary Pediatric Trauma Bootcamp emphasizes evidence-based trauma management and procedural training skills, and enhances pediatric trauma team dynamics during pediatric trauma activations. This year, JHCC expanded the program, which focuses on ATLS implementation in the trauma bay and the importance of multidisciplinary collaboration, to include pediatrics and general surgery residency trainees.

EMS and Nursing Continuing Education

JHCC offered prehospital clinicians and students monthly training, including lectures, case reviews, and simulations. Maryland State Police Paramedics trained alongside pediatric anesthesiologists in the operating room to maintain comprehensive pediatric airway management competency. Trauma staff provided ongoing education and case reviews to referring facilities.

The Johns Hopkins Simulations Center, a fully accredited, state-of-the-art training facility incorporating standardized patients and teaching associates, human patient simulation, virtual reality, task trainers, and computerized simulation, helped clinicians with trauma education and preparedness. The Pediatric Base

Station provided online medical direction to EMS clinicians with an active QI plan for evaluation and feedback. Every six months, JHCC provides pediatric content for refresher classes for Baltimore City Paramedics, consisting of seven hours of continuing education. Physicians from all subspecialty areas provided continuing education for Maryland prehospital clinicians at the annual EMS conferences, including the EMS Care Conference in Ocean City.

JHCC has an active contract with the University of Maryland Baltimore County, Baltimore City Community College, and the Community College of Baltimore County's Paramedic program within the pediatric emergency department. The students participate in assessments and vital signs and attend traumas in an observational role. Additionally, through the pediatric ED, JHCC hosts military-based C-STARS (Center for the Sustainment of Trauma and Readiness Skills) personnel preparing for active deployment.

Fellowships and Residencies

Johns Hopkins Pediatric Surgery has an Accreditation Council for Graduate Medical Education-approved two-year fellowship program. After a competitive process, one fellow per year enters the program, allowing a junior and senior fellow to train concurrently. Under the direction of the general pediatric surgery attending, the fellows are responsible for managing all trauma and burn patients at JHCC. Additionally, a collaboration with the University of Maryland Medical Center allows for a three-month rotation at UMMS.

Research

Members of the JHCC Pediatric Trauma Program are involved in several cutting-edge research projects spanning from clinical outcomes and injury prevention to basic science research. These include but are not limited to: a National Institutes of Health-funded, multi-institutional, five-year study that tackles the critical issue of drug and alcohol abuse in the pediatric trauma population; a multidisciplinary study of the neuroinflammatory pathways involved in pediatric traumatic brain injury, extending standard trauma research from the bedside into the laboratory; examination of the adherence to a trauma checklist during our highest trauma activations; evaluation of the association of elevated white blood cell count and other clinically significant inflammatory markers in pediatric trauma patients; and a study of the risk factors for trauma recidivists, including firearm injuries and non-accidental trauma. In FY 2023, the Maryland Trauma Network provided a grant for a retrospective assessment on how the COVID-19 pandemic, with social distancing and stay-at-home orders, increased the risk for childhood injuries sustained in the home due to increased stress, changes in supervision, and possible increased use of alcohol and/or other substances.

Rehabilitation

JHCC's state-of-the-art pediatric rehabilitation program offers inpatient rehabilitation and comprehensive outpatient services. The hospital collaborates with Mount Washington Pediatric Hospital (MWPH) for burn patients needing continual inpatient rehabilitation. Accreditation for MWPH is by The Joint Commission (TJC) and The Commission on Accreditation of Rehabilitation Facilities (CARF) for the hospital's Comprehensive Integrated Inpatient Rehabilitation Program with a Pediatric Specialty Program. The pediatric rehabilitation programs also collaborate with providers across the state for patients who cannot commute to JHCC for continued care after discharge.

JHCC Pediatric Burn Center

The Johns Hopkins Children's Center (JHCC) is verified by the American Burn Association (ABA) and designated by MIEMSS as a Level I Pediatric Burn Center. This year, ABA re-verified JHCC until FY 2025. JHCC treated over 350 burn-injured children, including 140 admissions, according to the Maryland State Trauma Registry. Johns Hopkins Pediatric helped to arrange transport of over 700 pediatric trauma and burn patients from hospitals across Maryland to JHCC.

JHCC follows patients in a multi-disciplinary outpatient burn clinic focusing on both the physical and emotional recovery after a burn injury. Laser burn treatment is available for those patients who develop symptomatic scarring. JHCC integrated innovative burn and wound care methods such as regenerative medicine, evidence-based updates to fluid resuscitation protocols, and wound dressings.

Quality Management and Improvement

The Pediatric Burn Performance Improvement (PI) Committee is a multidisciplinary team focused on the overall programmatic PI. It reviews performance metrics and data trends, as well as existing policies, and assesses and implements new regulatory requirements and recommendations. The committee develops, tracks, and implements action plans stemming from morbidity and mortality review, and develops and tracks the implementation of additional action plans raised by data trends and committee members. It publishes burn statistics in monthly reports and compares current metrics with those of the prior year to evaluate for trends. All emergency department visits for burn injuries are reviewed for quality management, and all burn patient charts are audited and tracked until discharge.

Established in 2016, the Pediatric Injury Quality Improvement Consortium (PIQIC) is a network with four additional pediatric burn centers. Each program contributes data allowing for benchmarking and development of best practice guidelines.

Jurisdictional quality improvement (QI) officers review EMS feedback regarding the online medical direction provided by the Pediatric Base Station to EMS clinicians. Integration with EMS stakeholders and the pediatric burn team occurs in the monthly multi-disciplinary process improvement and morbidity and mortality conferences as partners in the healthcare continuum.

Pediatric Psychology

Pediatric psychology is integral to the pediatric burn team, providing inpatient and outpatient clinical services to patients and their families. The team screens patients and their families using standardized instruments to assess the child's quality of life and overall child and parent distress. Interventions, such as coping mechanisms during stressful experiences, support optimal adherence to medical recommendations and patient and family recovery. A dedicated burn psychologist at JHCC leads efforts to collaborate with other pediatric burn centers through Pediatric Injury Quality Improvement Consortium (PIQIC) for establishing psychosocial PI metrics and best practices. Through JHCC's involvement in PIQIC, the implementation of the JHCC-developed standard psychology screening protocol is now in use across multiple sites.

Injury Prevention Programs and Initiatives

JHCC's Injury Prevention Program (IPP) provides services to patients, families, community, and staff. This year, IPP provided burn awareness education to students at Meade Heights Elementary and Redeemer Classical Christian School. In addition, it posted a burn prevention table in the pediatric ED to promote burn prevention in pediatric patients and debuted a new video PSA, "Scald Burn Prevention for Kids", which shares tips for keeping children safe in the kitchen and bathroom.

EMS and Nursing Continuing Education

The JHCC burn team provides burn education to referring hospitals, typically focused on evaluating and managing injuries. This year, it provided closed-loop feedback to referring hospitals through case review offerings and CME burn education. JHCC offered monthly training to prehospital clinicians and students, including lectures, case reviews, and simulation. Maryland State Police paramedics train alongside pediatric anesthesiologists in the operating room to maintain comprehensive pediatric airway management competency.

Fellowships and Residencies

Johns Hopkins Pediatric Surgery has an Accreditation Council for Graduate Medical Education (ACGME) approved two-year fellowship program. After a competitive process, one fellow per year enters the program, allowing a junior and senior fellow to train concurrently. Under the direction of the general pediatric surgery attending, the fellows are responsible for managing all trauma and burn patients at JHCC. A collaboration with the University of Maryland Medical Center allows for a three-month rotation at UMMS.

The pediatric psychology fellowship program includes training with burn patients. A psychology fellow and/or attending physician meets all burn patients while inpatient. Additionally, a burn fellow and/or attending physician staff our outpatient clinic.

Designed to enhance the performance of the pediatric trauma team, the Interdisciplinary Pediatric Trauma Bootcamp emphasizes evidence-based trauma management and procedural training skills. The course supports the enhancement of pediatric trauma team dynamics during pediatric trauma activations. The curriculum development for this course places specific emphasis on ATLS implementation in the trauma bay. The intentional multidisciplinary instruction emphasizes the necessary collaboration between teams during trauma events. In FY 2023, the course was expanded to include pediatrics and general surgery residency trainees.

Research

The JHCC pediatric burn staff presents research at national meetings and submits manuscripts for peer-reviewed journals. Current research initiatives include evaluating child quality of life and parent PTSD and depression symptoms following pediatric burn injury; parent perceptions of the pediatric burn healing process and the need for support; drug and alcohol screening in teens; epidemiology of hot beverage scalds in children; attrition between emergency department care and outpatient clinic visits; and follow-up compliance of burn patients during the COVID–19 pandemic.

Rehabilitation Services

JHCC's tate-of-the-art pediatric rehabilitation program offers inpatient rehabilitation and comprehensive outpatient services. The hospital collaborates with Mount Washington Pediatric Hospital (MWPH) for burn patients needing continual inpatient rehabilitation. Accreditation for MWPH is by The Joint Commission (TJC) and The Commission on Accreditation of Rehabilitation Facilities (CARF) for the hospital's Comprehensive Integrated Inpatient Rehabilitation Program with a Pediatric Specialty Program. Additionally, the pediatric rehabilitation program collaborates with providers across the state for patients who are unable to commute to JHCC for continued post-discharge care.

Children's National Hospital

111 Michigan Avenue, NW, Washington, DC

CNH Pediatric Trauma Center

Children's National Hospital (CNH) is designated as a Pediatric Trauma and Burn Center by MIEMSS. CNH serves Washington DC, surrounding Maryland Counties, and parts of Southern Maryland. CNH's pediatric trauma services are provided by the Division of Emergency Trauma and Burn Surgery. In FY 23, CNH treated 1,202 trauma-injured children, of which 862 were residents of Maryland, and 280 of them were treated in the Trauma Code Room. CNH has improved the availability of blood products for immediate use in the Emergency Department and Intensive Care Units.

Quality Management and Improvement

Through a donation that provided a dedicated Social Worker,

Child Life Therapist and a Burn Nursing Coordinator, CNH was able to increase psychosocial resources that focused on the mental health of injured patients and their families. This allowed for the design of detailed care programs that prevent long-term symptoms, address Post Traumatic Stress Syndrome (PTSD), and created a storybook template to aid in the education and comprehension of children working through the trauma process and maintaining a focus on mental health.

CNH Pediatric Trauma Center's quality improvement program includes periodic submissions to the Pediatric Trauma Quality Improvement Program (TQIP) to support the American College of Surgeons Committee on Trauma's initiatives. The TQIP provides adjusted benchmarking for pediatric trauma centers to track outcomes and improve patient care. The data is used to nationally benchmark and evaluate patient care.

CNH improved the efficiency of emergency blood delivery, which included all aspects of blood product delivery to be evaluated from order entry to delivery. Improvement included the transition to new rapid infusers that provide a more intuitive mode of blood delivery, updated massive blood transfusion protocol order sets, and simplified order entry and communication with the Blood Bank.

Through outreach and follow-up efforts, CNH works to improve the function of the CODE room by using immediate blood transfusions and checklists. Automatic timers were implemented for tracking at the time patients are placed on a stretcher. The timers allowed the entry of additional information to increase efficiency of vital signs entries. This practice has led to the development of mechanisms that indicate the probability of blood transfusion and potential need for neurosurgical intervention.

Injury Prevention Programs and Initiatives

Firearm-related injuries are now the top cause of death in patients aged 24-years-old and under in the United States. In FY 2023, CNH cared for a record number of children with gunshot injuries, taking the incidence from 2.7% of trauma activations in 2017 to 13% of trauma activations, and approximately 44% of trauma volume is attributed to fall injuries. In response, the hospital created a Violence Intervention Team focused on interrupting violence in the community by building relationships with violent offenders and providing them with services and resources that address the underlying causes of violence. CNH promoted a video-based fall prevention program which was distributed to the public in a social media campaign with a reviewer response of over 100,000 unique views. CNH educated the public on the effects and prevention of abusive head trauma, and in alignment with the Protecting Young Children program educated on the risk of inflicted abusive head trauma during infancy. This video was offered to families admitted to CNH, birthing centers, prenatal clinics, and parenting groups. CNH's Trauma Center provided training to more than 400 daycare providers to meet requirements set by the District of Columbia.

CNH was awarded the Specialized Services for Abused Parents and Children grant. This grant continued to support the development of the Family Support and Enrichment Program (FSEP) and included therapy and parenting workshops for children and parents affected by family violence. The grant provides partial funding for the Regional Academy on Family Violence, formally the Child Abuse Awareness Symposium that promotes awareness, motivation and interest in abuse survivors and child advocacy.

EMS and Nursing Continuing Education

The Trauma Service partnered with the Emergency Department to co-host monthly case studies in a hybrid format for Prince George's County EMS. Cases were customized for EMS clinicians were created from identified cases through CNH's Performance Improvement and Patient Safety Program. The specialized sessions created were awarded EMS credit for educational units (CEUs) for all clinicians. Expanding on credit for education units (CEUs) CNH's Trauma Center provided live and recorded trauma education for nurses, physicians, and Paramedics. The education included Closed Head Injuries, Forensics and Sexual Assault, and Cervical Spine Immobilization. With over 24,000 views, the instructional videos provide a positive impact to EMS practices.

Research

The Trauma Research Team, in collaboration with Drexel and Rutgers University, have two major grants, Build an Intention-aware Recommender System for Improving Trauma Resuscitation Outcomes and a National Science Foundation (NSF) grant to Recognize Activities to Reduce Delays in Fast-Response Teamwork. There have been three research papers accepted and published by Trauma Surgery Service clinicians. CNH research provides results that improve pediatric trauma care.

CNH Pediatric Burn Center

The Children's National Hospital (CNH) Pediatric Burn Center serves Washington, DC; multiple counties within Maryland, including Montgomery and Prince George's; Southern Maryland, and certain regions of adjacent states. From June 1, 2022, through May 1, 2023, CNH treated 1,747 burn-injured children, 517 of whom reside in Maryland, according to the Maryland State Trauma Registry. Of the 1,747 burn-injured children, 83 were admitted, and 417 were emergency department (ED) visits. There were an additional 1,613 burn clinic visits. Pediatric burn services at CNH are provided by the Division of Trauma and Burn Surgery.

In FY 2023, CNH expanded its mental health care for burn-injured patients. The Burn Team focuses on the mental health of the child and family after a burn-injury event. It triages care, matching patients to the level of mental health care they need to prevent long-term symptoms. To date, the Burn Team has implemented PTSD screening for patients and families starting

with patients admitted to the hospital and continuing through the burn treatment plan. It created a story book template for patients and children to help work through the healing process, implemented the Beads of Courage© program, and implemented a school reintegration program.

Quality Management and Improvement

The Pediatric Burn Center's quality improvement program includes daily review of care for inpatient acute burns and weekly multidisciplinary review and care planning for active patients (inpatient and outpatient) with complex wound treatment, risk for scarring/contractures, psychological needs, or other complexities in care. This year, CNH worked to enhance burn care by improving discharge education that the family receives when a burn patient is discharged. This multidisciplinary project culminated with a family-friendly burn discharge instruction print out unique to the patient's wound and mechanism of injury. The print out includes a link to the burn care videos for the family to view. CNH is one of five charter members of the Pediatric Injury Quality Improvement Consortium, which with the backing of one year of data has implemented five pediatric burn benchmarks. This data will assist in the development of best practice protocols in burn care and contribute to multicenter research in burn management.

Injury Prevention Programs and Initiatives

Burn prevention remains a top priority for CNH. In FY 2021, CNH produced a social media campaign consisting of a burn prevention video series produced with funding from DC firefighters. This campaign enabled CNH to target areas within the catchment with a high number of burn patients. These efforts continued into FY 2023, funded by an intramural grant of $20,000. Since 2021, the video series has reached more 500,000 individuals, 225,000 of whom viewed the videos through to completion.

EMS and Nursing Continuing Education

This year, CNH offered over 50 hours in virtual and in-person continuing education. Virtual burn education is offered through the Trauma and Burn YouTube channel. The site, which contains both recorded didactic education as well as a burn podcast (Burncast) is accessible to internal staff as well as external audiences. To date, CNH has produced 16 Burncasts covering various burn care-related topics of interest to those caring for burn patients, including the mental health needs of a family post-burn injury, school re-entry, and OR interventions of the burn wound. In addition, virtual education has enabled CNH to expand its outreach and educational opportunities. Children's Burn Service, in partnership with the Children's Emergency Department, has developed monthly education for multiple EMS departments in Maryland, featuring content tailored to the specific needs of the EMS agency and patient situations encountered.

Research

The Burn Center maintains an active research program with multi-year studies in place. Through funds received from the National Institutes of Health and the Agency for Healthcare Research and Quality, the Burn Center continues to research automatic workflow capture and analysis using real-time, data-driven feedback to improve trauma resuscitation outcomes and trauma patient safety. Funded by the Lambert Foundation Award, the burn service is able to study methods to screen for young child hyperactivity and impulsivity with unintentional burn injuries with the intent to develop interventions for parents to prevent burn injury. Multiple presentations at the American Burn Association national meeting highlighted this work. Additionally, the burn team has published peer review articles on parent resiliency and parent traumatic stress after a burn injury.

Rehabilitation

The Department of Physical Medicine and Rehabilitation at CNH consists of three divisions: Pediatric Rehabilitation Medicine, Physical Therapy, and Occupational Therapy. Physicians, advanced practice nurses (APN), registered nurses, physical therapists, occupational therapists, and rehabilitation aides deliver interdisciplinary care to patients at the National Center for Children's Rehabilitation (acute inpatient medical care) and Children's National Hospital, as well as regional outpatient centers (outpatient medical care). Physicians and APNs also provide consultation services in integrated equipment at a bracing clinic and a subacute rehabilitation facility. Children with burns are evaluated and treated by a dedicated OT/PT team during the inpatient stay, extending to the outpatient phase of care. The OT/PT team is available at both the main campus and the Friendship Heights campus to encompass compression measurement and evaluation. Laser therapy is available through the burn service for burn patients in the subacute phase of care to minimize pigment changes and increase skin flexibility.

Specialty Adult & Pediatric Eye Trauma Center

Wilmer Eye Institute at The Johns Hopkins Hospital

1800 Orleans Street, Baltimore, Maryland
MIEMSS Region III

Based at The Johns Hopkins Hospital (JHH) in East Baltimore, the Wilmer Eye Institute's Eye Trauma Center (ETC) is the sole designated facility in Maryland specializing in the diagnosis, treatment, and long-term management of ocular trauma. Founded in 1925, the Wilmer ETC is among the largest and top-ranked academic departments of ophthalmology in the United States.

The Wilmer ETC gathers the finest scientific evidence to promote improved ophthalmic care and the reduction of visual disability in a collaborative environment that combines compassionate patient care, innovative research, and the training of future leaders in ophthalmology and visual sciences. Its faculty, staff, and trainees collaborate with JHH adult and pediatric emergency departments and care teams across the enterprise to meet the comprehensive care needs of patient populations both within and outside of Maryland. Dedicated eye treatment rooms, operating rooms, diagnostic and procedural equipment and supplies, Pharmacy, Radiology, and Pathology support services; and on-call coverage in every subspecialty ensure that patients are treated at the highest standard of care, 24 hours per day.

The Wilmer team is composed of 170+ full-time faculty members and more than 600 staff members working across nine locations in Maryland. The Wilmer clinical practice supported 274,000 patient visits and just under 15,000 eye surgeries.

Patient populations include: neonates, pediatrics, adolescents, adults, and geriatrics. Core clinical areas of expertise include comprehensive eye care (medical, optometric, and optical services), cornea, glaucoma, laser vision correction, vision rehabilitation, neuro-ophthalmology, ocular immunology, ocular oncology, oculoplastics, pediatric ophthalmology and adult strabismus, retina; and traumatic eye injury. Consistent with prior years, patients from all across the State of Maryland and beyond (including Pennsylvania, Virginia, West Virginia, the District of Columbia, Delaware, New Jersey, New York, and North Carolina) presented to the Wilmer ETC in FY 2023. Baltimore City and Baltimore County together accounted for about 60% of within-Maryland origin, with Anne Arundel, Montgomery, Harford, Carroll, Frederick, Howard, Prince Georges, and Washington Counties rounding out top-ten ETC referral regions.

The Wilmer ETC's patient base remained demographically diverse in FY 2023, with higher relative burden of eye trauma observed for racial and ethnic minority groups (1.5 times higher incidence in patients identifying as African American, as compared to White or Caucasian, jointly comprising 80% of the trauma cohort). Mean and median ETC patient age was 37-years-old, ranging from newborns to nonagenarians. Male patients sustained a disproportionate share of eye injuries, with an incidence rate 2.2 times that of female patients, with higher prevalence among youth and young adults (especially underrepresented minorities). Consistent with prior years, injury intentionality in FY 2023 was split among accidents and assaults (predominantly blunt traumas) and spanned all etiology-of-injury categories.

The Wilmer ETC maintained its close collaborations with other care teams, most frequently Johns Hopkins Emergency Medicine (JHH Adult & Pediatric Emergency Departments, EDs), Anesthesiology & Critical Care Medicine (ACCM), and Nursing, in FY 2023, toward the goals of improved population access to ocular trauma services, streamlined pathways for more coordinated and timely care management, more value-driven models of healthcare delivery, and highest-quality experience and outcomes for our patients.

Wilmer's Patient Access Center for the Eye (PACE) clinic has continued its same-day and same-week appointment program dedicated for Ophthalmology patients presenting to the ED with non-acute eye issues. This resource – daily/weekly slots maintained for several years now, and benefitting hundreds of prior patients – offers ED registrars the ability to direct-schedule patients to a more appropriate venue of care for timely follow-up, which is helping to reduce patient wait times, improve access for right within the ED setting through advance triage of emergency vs. non-emergency visits, and promote more responsible use of healthcare resources.

Quality Management and Improvement

Wilmer ETC core staff participated in ongoing surveillance of quality and performance metrics, escalation of and loop closure on prior trauma cases warranting special review, analysis of demographic and injury trends, assessment of operations and infrastructure needs, and generation of new ideas for trauma education, research, and outreach. They also participate with and report up through the Quality Improvement Committee of the Wilmer Eye Institute, which convenes on a quarterly basis, and is directly aligned with the overall quality and safety structure and institutional initiatives at JHH.

The ETC team met quarterly with JHH ED leaders (quarterly, at a minimum) for detailed review of any issues related to clinical coordination and co-management of patients. The candid discussions that occur in this forum have directly contributed to improvements in handoff communication, workflows, access, quality of care, and value of care. The ETC has moved to a model of monthly data extraction and surveillance of Johns Hopkins Epic EHR-derived key performance indicators for Adult and Pediatric Emergency Department patients presenting with eye issues, including subsets of patients flagged positively for ocular trauma at time of specialty consult response (another EHR optimization that was previously implemented).

Injury Prevention Programs and Initiatives

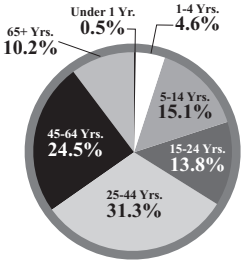
The Wilmer ETC works with medical students, ophthalmology residents, public health experts, and other collaborators to analyze data and consider interventions for groups observed to have higher incidence of ocular trauma. In FY 2023, ETC leaders partnered with Wilmer's internal Marketing and Communications team to produce social media messaging in line with the American Academy of Ophthalmology eye health monthly observances, including workplace eye wellness, sports eye safety, and eye injury risks to children from toys that are frequently gifted during holiday months. Before each Fourth of July holiday, the Wilmer ETC partners with the Children's Safety Center of the Johns Hopkins Center for Injury Research and Policy to publish an article on firework safety on the Johns Hopkins website.

Wilmer Eye Institute at The Johns Hopkins Hospital Demographics

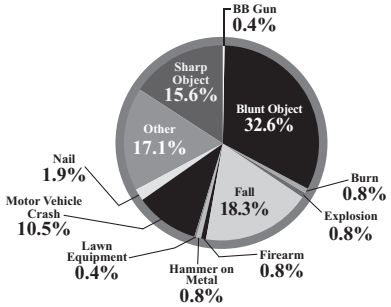
(June 2022 to May 2023), n=392

Source: Maryland Eye Trauma Registry

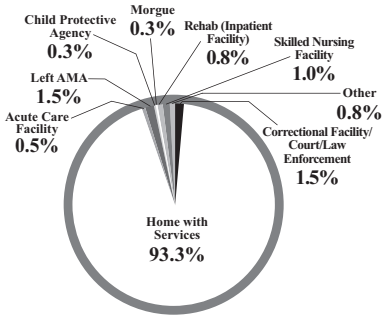
Age



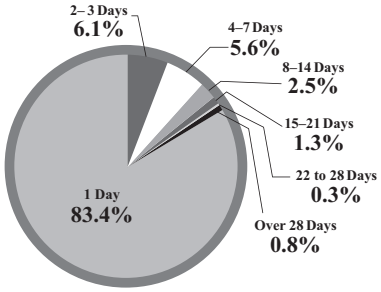
Injury Type



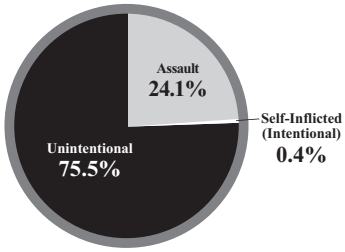
Final Disposition



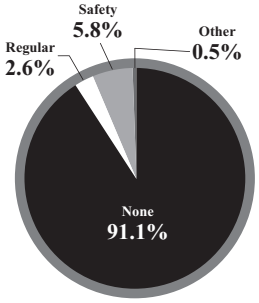
Length of Stay



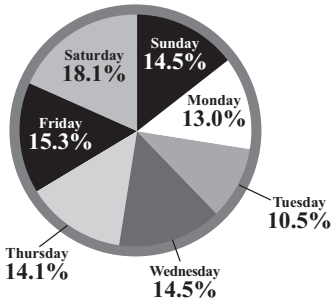
Intentionality



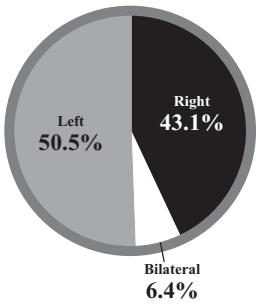
Eye Protection



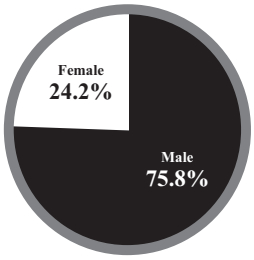
Day of Week



Eye Injured



Gender



Continuing Education

Each year, the Wilmer ETC provides education on eye trauma identification and management to multidisciplinary care teams throughout the Johns Hopkins Hospital & Health System enterprise; any entities that might serve as points of entry and first response for ocular trauma patients. Nurse educators deliver eye trauma programs across JHH units to assure meeting of biannual education requirements, through learning modules that include article reviews, lectures and conferences, online continuing education, and new staff orientations. In June 2023, Wilmer held its 39th Annual Nursing and Ophthalmic Technician Conference, with the theme "Eye Care Through the Eyes of the Patient". This hybrid online/in-person all-day program incorporated several hours of ocular trauma topics, including presentations on oculoplastic injuries, dual talks on triage and clinical co-management of eye emergencies, a fall risk prevention seminar, and more.

Fellowships and Residencies

The Wilmer ETC supports a four-year ophthalmology residency program with recent integration of a medicine internship year, and accepts five residents per program year. Wilmer residents, alongside assistant chiefs of service, faculty attendings, and staff

are highly active participants in the assessment and management of ETC patients in the EDs, on inpatient floors, in the clinic, and in the operating room.

Rehabilitative Services

The Wilmer ETC offers its patients direct, in-house access to a full complement of clinical services and resources necessary for visual recovery or functional accommodation, in the case of irreversible injury. Wilmer's Low Vision & Vision Rehabilitation Division matches patients with assistive technologies that can enable their independence and participation in activities of daily living, and even offers some functional, in-home support services through occupational therapist experts on its staff. Wilmer's Oculoplastics Division offers functional and cosmetic surgical services to limit the after-effects of traumatic eye injuries. ETC patients also have access to an ocularist, an expert who is highly skilled in the creation and fitting of ocular prosthetics.

Research

The Wilmer ETC faculty is composed primarily of clinician-scientists – prolific researchers, authors, and educators in addition to expert clinicians. In FY 2023, trauma-related publications covered the full spectrum of topics, including research and development of innovative therapeutic protocols to improve post-trauma outcomes; enhancements in the taxonomies and meta-analysis tools for ocular trauma trending at the population level; public policy opportunities for reduction of healthcare disparities; and longitudinal clinical outcomes reviews for patients sustaining eye injuries.

Hand/Upper Extremity Trauma Center

Curtis National Hand Center, MedStar Union Memorial Hospital

201 East University Parkway, Baltimore, Maryland 21218
MIEMSS Region III

As Maryland's referral center for the specialized care of injuries to the hand, wrist, forearm, and elbow, the Curtis National Hand Center (CNHC) at MedStar Union Memorial Hospital (MUMH), located in Baltimore City, is committed to handling acute injuries and providing reconstructive surgery for Maryland's trauma victims. Its focus on complex hand, wrist, and elbow injuries has been part of the well-developed Maryland trauma care system since Dr. Raymond M. Curtis, the Center's founder, collaborated with Dr. R Adams Cowley and others during the inception of the Shock Trauma Center and the Maryland EMS system.

CNHC's emergency department cared for 2,155 patients with acute hand injuries, and nearly 27% of the patients were transported by public safety, ambulance or medevac helicopter. The unique nature of CNHC's services also draws acutely injured patients from a broad geographic region, including Pennsylvania, Delaware, Virginia, West Virginia, and Washington, DC. Whether in Baltimore City or as far as these neighboring states, the onsite heliport facilitates reduced travel times and continues to improve the speed of intervention for the most critically injured.

CNHC's expertise in management of challenging bone and soft tissue trauma is supplemented by advanced skills in microsurgery. It primarily focuses on the handling of fractures, complex soft-tissue coverage problems, and amputations requiring replantation.

The acute trauma unit, staffed by specialists in orthopedic and plastic surgery with subspecialty training in hand and upper extremity surgery, is available for the care of the trauma patient 24/7/365. Calls for transfer from the field are received immediately and accepted by the emergency physicians. Transfer requests from other emergency rooms for the treatment of hand trauma patients are received via the dedicated hand transfer line. In FY 2023, this transfer center received 1,036 calls/year for transfer or consultation. Call logs of these transfer requests demonstrate an acceptance rate of greater than 94% of these patients to CNHC. The remaining cases (less than 6%) are determined to not require transfer emergently and are provided outpatient follow-up at CNHC or are referred for other specialty care due to associated injuries (e.g., burns, ophthalmologic injury, spine injury).

Professional Education

CNHC expanded its academic offerings in FY 2023, reflecting greater collaboration with affiliated institutions and increased participation by colleagues and alumni around the region and country. The robust didactic program at CNHC includes lectures, dissections, and daily interactive conferences. Specialty labs held 15-20 times/year encompass half-day lab demonstrations and surgical simulation practice sessions. The monthly journal club symposia reviews the most up-to-date literature on a schedule of pertinent clinical topics, and includes all fellows, faculty, and other hand surgeons from around the area to ensure a robust and meaningful discussion and broader learning.

In FY 2023, CNHC enhanced its Regional Hand Surgery Symposium, and its visiting lecture series has expanded to include impactful speakers who challenge faculty and staff with new ideas related to innovations in arthroscopy, congenital surgery, osteocartilaginous arthroplasty, microsurgery, allotransplantation, brachial plexus surgery, and forearm and elbow pathology. Speakers are invited from across the country and around the world.

Although many teaching and educational sessions reverted to an in-person format in FY 2023, CNHC has maintained the remote learning option for many events to allow broader participation and inclusion of any providers unable to attend (whether related to pandemic/quarantine or not). MedStar provides enterprise-level secure video conferencing accounts that continue to sup-

port CNHC's educational conferences and visiting speaker events.

Quality Management and Improvement

CNHC maintains a formal performance improvement process for timely problem identification, data-driven analysis, and resolution of issues within the quality framework of MedStar Union Memorial Hospital. In FY 2023, it reviewed challenging and readmitted cases for evaluation and outcomes at its monthly morbidity and mortality conference. CNHC maintains efficient electronic data capture and data entry into the Maryland Trauma Registry, providing thorough, high-quality reporting. With expanded data and analytic capabilities, the Hand Center has launched quality improvement initiatives aimed at improving triage and transfer, evaluating processes of care delivery and how to optimize them across all services, and providing unique approaches to reduce patient burden after trauma.

Injury Prevention Programs and Initiatives

In FY 2023, the Hand Center initiated community and hospital visitor outreach via social media and hospital digital wall screens that provided injury prevention and safety information about falls, lawnmowers, fireworks, and snow blowers. Each year, CNHC likewise participates in a statewide injury prevention initiative. In line with many other large upper extremity trauma centers, CNHC has initiated a focused clinic for patients that have suffered an upper extremity amputation. This clinic allows for coordination of care across hand surgery, orthotics/prosthetics, therapy, and social work/social services during a single clinic visit, providing efficient and high-value care for amputees.

In FY 2023, MedStar Union Memorial Hospital's (MUMH) new hand surgery-led bone health program facilitated streamlined evaluation and management of patients that presented fragility fractures or bone health challenges that might impact recovery from other traumatic injuries. This partnership between hand/orthopedics, endocrinology, geriatrics, physical therapy/occupational therapy, the MedStar primary care network, and MUMH has already made a substantial impact on timeliness, capture, and management of bone health, especially in more senior trauma patients.

Prehospital/EMS/Nursing Continuing Education

The MUMH Continuing Medical Education Committee Hospital oversees the continuing medical education (CME) program at the Curtis National Hand Center. Routine CME events are provided for the attending hand surgeons, fellows and residents, hand therapists, mid-level practitioners, nursing, and ED staff. Hand trauma labs are scheduled on a regular basis, giving staff the opportunity to learn, practice, and update their skills. Specialty labs for ED management of hand trauma are available for emergency department staff and first call providers. Advanced surgical labs are conducted for surgical staff, hand fellows, and residents. Hand surgeons provide lectures for OR staff on specialty topics as part of the OR weekly educational series, while visiting speaker events are open to all staff across the system.

Fellowships and Residencies

As one of the nation's premier training centers for hand surgery, CNHC's fellowship training program is highly sought after by the best plastic surgery and orthopedic surgery trainees in the world and prepares all graduates for management of complex upper extremity problems. CNHC offers two fellowship programs – one civilian, the other military – for advanced training in hand surgery. Additionally, CNHC provides dedicated hand surgery training rotations for residents in the Johns Hopkins Plastic Surgery, Georgetown Plastic Surgery, and Medstar Orthopedic Surgery training programs, among others.

Research

CNHC's investigative efforts have grown exponentially in the past few years. Funded by internal and external sources, research projects look at a wide range of issues, including microsurgery, peripheral nerve surgery and augmenting nerve recovery, bone and soft-tissue problems, evaluation and triage for traumatic injuries, and reconstruction after trauma. In FY 2023, CNHC expanded its focus on health services research, launching an expansive data collection initiative, participating in multiple clinical trials, and coordinating numerous research efforts evaluating policy and care quality issues around hand and upper extremity trauma.

Rehabilitation

The rehabilitation team at CNHC and across the MedStar rehabilitation network works closely with CNHC hand surgeons to establish a treatment plan for each patient. CNHC's complete suite of rehabilitation services includes management of acute or chronic pain; protective splinting for immobilization and controlled motion, postoperatively or post-injury; exercise programs to restore motion, strength, and fine and gross motor coordination; home exercise programs; sensory re-education programs after nerve injury; thermal and electrical modalities to minimize pain and swelling, and more. With a wide network of subspecialized Certified Hand Therapists (CHTs) located in satellites throughout the state of Maryland, the therapy team facilitates supervised and independent therapy sessions for CNHC patients based on their specific surgical, rehabilitative, geographic, occupational, and socioeconomic requirements and restraints. In addition, CNHC offers in-person as well as teletherapy visits for its patients, enabling them to progress in their recovery while maintaining proper precautions.

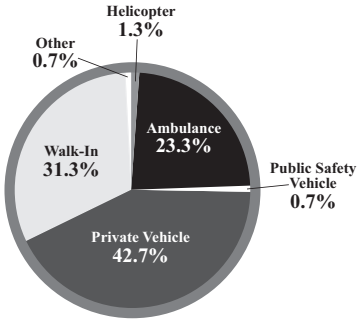
Pain Psychology Services

Considering the impact of the opioid epidemic, especially on musculoskeletal surgery and musculoskeletal trauma, CNHC has initiated multiple programs aimed at improving pain management while reducing reliance on opioids. Part of this initiative

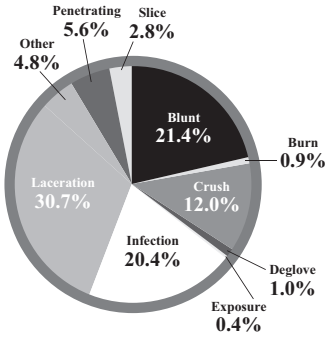
The Curtis National Hand Center at MedStar Union Memorial Hospital

(July 2022 to June 2023)
Source: The Curtis National Hand Center
n = 2,155

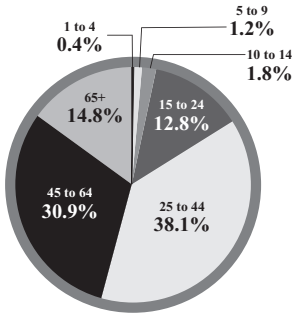
Transport Mode



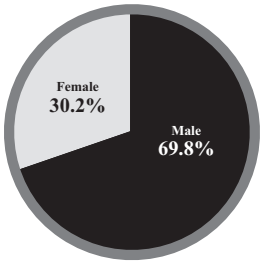
Injury Type



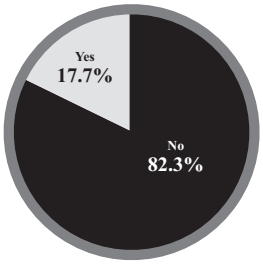
Age



Gender



Work-Related



includes working with MedStar National Rehabilitation Hospital to provide pain psychology and cognitive behavioral therapy services to many of our hand trauma patients.

Neurotrauma Center

R Adams Cowley Shock Trauma Center

22 S. Greene Street, Baltimore, Maryland
MIEMSS Region III

Located at the R Adams Cowley Shock Trauma Center (RACSTC), in the University of Maryland Medical Center, the Neurotrauma Center (NTC) provides comprehensive management for patients with injuries of the brain, spinal cord, and spinal column.

From June 1, 2022, through May 31, 2023, NTC provided care to 2,228 patients with traumatic brain injuries, 561 patients with spinal column or spinal cord injuries, and 404 patients who suffered from both traumatic brain and spinal column or spinal cord injuries, according to the Maryland State Trauma Registry. The NTC's dedicated, highly trained, and experienced multidisciplinary clinical staff includes physicians, nurses, therapy services, case management, pain management, nutritional services, integrative medicine, social work and pastoral care staff, a designated patient advocate, and a substance abuse program.

NTC patients with severe brain injury receive a multisystem assessment with intracranial pressure parameters closely monitored so factors that may cause secondary brain injury are rapidly recognized and treated, optimizing patient outcomes. Neurosurgeons are readily available to intervene, if necessary, and perform craniotomies for hematoma evacuation, gunshot wound debridement, elevation of depressed skull fractures, decompressive craniectomies, and cranioplasties. Patients with spinal cord injuries, often with cervical spine injuries, are treated using sophisticated respiratory care protocols leading to successful weaning from mechanical ventilation for most patients.

The 12-bed Neurotrauma Critical Care Unit (NTCC) provides

interdisciplinary care to critically ill patients who have sustained primarily central nervous system injury and may have other associated injuries or organ dysfunction. The NTCC operates with all required resources for critical care with the addition of specialized fiber optic, intraparenchymal and/or intraventricular intracranial pressure monitoring, cerebral oxygen monitoring and continuous electroencephalogram monitoring.

The 24-bed Neurotrauma Intermediate Care Unit (NTIMC) provides interdisciplinary care to ill patients who have sustained primarily central nervous system injury and may have other associated injuries or resolving organ dysfunction. These patients still require frequent monitoring or intensive nursing care.

In FY 2023, the NTC successfully completed re-designation as the neurotrauma center for Maryland. In this capacity, it offered outreach education to healthcare providers across the state.

The NTC's website (https://www.stcneurotrauma.org) serves as a neurotrauma resources site for all healthcare providers. The site is viewable by the general public with resources for neurotrauma patients.

Quality Improvement/Evidence-Based Practice

In FY 2023, NTC quality initiatives focused on reducing hospital-acquired infections, with emphasis on ensuring daily chlorhexidine treatments, adhering to handwashing, staff re-education and regular monitoring of adherence to hospital acquired infection prevention interventions, ensuring removal of vascular catheters placed in the field or during resuscitation, and optimizing use of intermittent bladder catheterizations versus placement of indwelling catheters. The urinary catheter and central line usage standardized utilization ratio has remained consistently below 1.0 for both NTCC and NTIMC.

Prevention of hospital-acquired pressure injuries (HAPI) remained an area of focus for the NTC's quality initiatives this year. NTC presented multiple education sessions, both didactic and hands-on, to staff, and implemented a multimodal pressure injury bundle, with 100% compliance. As a result, the NTCC has maintained a rate of zero HAPIs since January 2023.

Following a successful pilot program, the NTC initiated an electronic bed request portal, which allows nurses to select and order the most appropriate mattress based on patient risk factors, in FY 2023. This process has been linked to a reduction in HAPIs, a decrease in patient falls with injury, improved patient outcomes, and improved patient satisfaction.

This year, the NTC created and implemented a novel guideline to manage agitation in patients with acute traumatic brain injury (TBI) on NTCC and NTIMC to reduce agitation prevalence, subsequently reducing falls, inadvertent line removal, incidences of aggression towards members of the healthcare team, and restraint use. This guideline utilizes non-pharmacologic interventions to prevent and treat agitation, review of common causes of agitation to rule out and treat, pharmacological management based on age and Agitation Behavior Scale score, and tips for use of pharmacotherapy.

A FY 2023 performance Improvement initiative relating to critical care nurses' ability to manage code blue and rapid response events provided didactic education in addition to skills training for critical care nurses with a reported 36% of participants reporting an increase in confidence. Implementation of a standardized location for isolation signage resulted in a 24% increase in PPE compliance by all staff. Since the implementation of a performance improvement initiative aimed at preventing a loading medication dose from being ordered without the following maintenance dosing order, there have been no missed maintenance dose orders.

Injury Prevention Programs and Initiatives

The Center for Injury Prevention and Policy (CIPP) aims to reduce preventable injuries and violence, and their consequences throughout Maryland. Several injury-prevention programs operate within CIPP.

Emergency Medical Services and Nursing Continuing Education

The NTC incorporates didactic education and simulations on care of patients with traumatic brain injury and spinal cord injury as part of the Trauma Theory course. In FY 2023, four lectures and numerous articles on neurotrauma related topics were made available to all staff at RACSTC, fulfilling the mandatory Neurotrauma education credits of nursing staff.

Research

The NTC's multidisciplinary team of clinical experts employs evidence-based treatment strategies designed to ensure immediate diagnostic and therapeutic access for patients with traumatic brain, spinal column, and spinal cord injuries. The NTC faculty's trauma-related publications in FY 2023 covered a variety of topics. Articles in peer-reviewed journals and neurotrauma-related grant research projects included advances in traumatic brain and spinal cord injury, such as defining the role of intraoperative ultrasound to guide spinal cord decompression after injury; expanding the current and future use of augmented reality in neurosurgery; and exploring predictive models for TBI based on big data. New and ongoing clinical trials include optimizing brain oxygen supply and outcomes following TBI using a brain oxygen monitor; determining the effect of small nucleotide polymorphisms (SNPs) on spinal cord injury outcome; delivering optimal oxygen therapy to TBI patients through hyperbaric oxygen; cooling patients with spinal cord injury to improve outcomes; using virtual reality to both assess and treat TBI in older trauma patients; and determining if maintaining spinal cord perfusion pressure (not just MAP) leads to better outcomes for spinal cord injury patients

Rehabilitation

Part of the recovery process must start at the very instant patients arrive at the NTC, with the ultimate aim of stabilization of

critical injuries followed by early rehabilitation. The NTC's emphasis on early patient mobilization as the beginning of the rehabilitative process helps to decrease morbidity associated with neurologic injury. Post-acute inpatient and outpatient services are primarily provided by the University of Maryland Rehabilitation & Orthopedic Institute.

Rehabilitation Services

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Designated trauma centers within the Maryland EMS system are required to provide for the rehabilitation needs of their patients, whether provided in-house or by way of affiliation with other facilities. This service is a critical element of the continuum of care for patients who have survived traumatic injury.

Initiation of rehabilitation services begins as soon as possible following admission. Rehabilitation services are both in-patient and outpatient. Patients who experienced multiple trauma injuries resulting in temporary or long-term disability benefit from a full range of rehabilitative services dedicated to enabling them to resume active, independent lives. The most frequent injuries requiring rehabilitation are spinal cord injury, traumatic brain injury, fractures, amputations, and gunshot wounds. The goal is to enable the patient to resume their highest level of functioning by regaining strength, range of motion, and cognitive healing. Individualized rehabilitative interdisciplinary treatment plans, developed with the patient, assist in meeting their needs and goals. The initial rehabilitation team evaluates and monitors the patient, focusing on the prevention of morbidity associated with the patient's immobility, positioning, and nutrition. Rehabilitation services within the hospital setting are also useful for future rehabilitation planning, prognosis, and care. Following the acute care phase, trauma centers help the patient and/or family determine the most appropriate place to meet the patient's rehabilitation needs. Factors that affect the patient, such as functional outcomes, social needs, financial constraints, geographic location, and eligibility requirements, assist in consideration for rehabilitation placement.

There are three main types of rehabilitation: physical, occupational, and speech therapy. The purpose of each rehabilitative therapy focuses on the patient's unique circumstances in order to enable the patient to resume the greatest level of functioning.

- **Physical Therapy.** The goals of physical therapy are to relieve pain, improve movement, strength, balance, and flexibility following injury, and for teaching patients how to use devices to help the patient manage his or her mobility. A physical therapist visits the patient at the bedside or in a physical therapy setting while in the acute care hospital. Decreasing pain and limiting permanent disability ensures patients the best possible chance of returning to daily activities. Physical therapists assist patients following injuries to bones, muscles, nerves, the spinal cord, and the brain. Patients may continue to see a

Top Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Aged 15 and Over) (June 2022 to May 2023)

Source: Maryland State Trauma Registry

Rehabilitation Center	Number
Adventist Health Care Rehabilitation	126
Autumn Lake Healthcare	18
Encompass Health	214
FutureCare	15
Genesis HealthCare	16
Inova Hospitals	18
Inpatient Rehabilitation Center at MedStar Good Samaritan Hospital	15
Inpatient Rehabilitation Unit at the JHH	38
Johns Hopkins Bayview Specialty Hospital Programs	22
MedStar National Rehabilitation Hospital	47
ProMedica Senior Care	15
Sinai Rehabilitation Center	44
University of Maryland Rehabilitation & Orthopaedic Institute	313

Note: Total patients age 15 and over that went to rehabilitation centers = 1,549.

Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Aged 14 and Under) (June 2022 to May 2023)

Source: Maryland State Trauma Registry

Rehabilitation Center	Number
The HSC Pediatric Center, DC	4
Kennedy Krieger Institute	10
MedStar National Rehabilitation Hospital	1
Mount Washington Pediatric Hospital	8

Note: Total patients age 14 and under that went to rehabilitation centers = 23.

physical therapist at home or at an outpatient center after leaving the hospital.

- **Occupational Therapy** Occupational therapists focus on restoring a patient's ability to perform self-care, recreational activities, and everyday tasks such as getting dressed, eating, driving, and taking a shower. Occupational therapy may take place in the acute care hospital, outpatient center, and at home.
- **Speech Therapy.** The goal of speech therapy is to combine speech mechanics with the use of language for enhancing patient outcomes for communication functioning. Speech therapy can help a wide variety of issues involving language, communication, voice, swallowing, and articulation. Frequently, speech therapies are employed following a traumatic brain injury. Speech therapists help patients to swallow, eat, and better comprehend language following an injury. Speech therapy takes place in the hospital, at home, or at an outpatient center, depending on a patient's condition and needs.

The Maryland-National Capital Region Emergency Response System

Instituted in 2014, the Maryland-National Capital Region Emergency Response System (MDERS) serves as the single point of collaboration between fire, rescue, emergency medical services, law enforcement, emergency management, and healthcare within Montgomery and Prince George's Counties. In service to its stakeholders, MDERS leads the building, implementation, and sustainment of critical response capabilities that protect over 1.9 million residents within the Maryland-National Capital Region. In coordination with a Steering Committee, consisting of leaders from stakeholder agencies, MDERS identifies priority response capabilities within the region that require additional development and expansion. These capabilities and associated objectives are outlined in the MDERS Strategic Plan, which guides all planning, organization, equipment, training, and exercise investments for a given fiscal year.

From June 1, 2022, through May 31, 2023, MDERS assisted its stakeholders in enhancing response capabilities through the provision of plan and policy development, training and exercise development and delivery, and equipment acquisition to support the missions of its partner agencies.

INVESTMENT OVERVIEW

Command Competency Lab Enhancement

The Command Competency Program Lab Enhancement aims to modernize the Prince George's County Fire Department (PGFD) command competency lab. This cutting-edge, in-house training environment provides an immersive training experience, enabling PGFD to develop, refine, and assess overall response competencies. By combining a robust training environment with simulations that closely mirror real-world operations, incident command and responders can acquire the knowledge, skills, and abilities necessary to succeed when faced with challenging situations. In FY 2023, PGFD augmented its facility with an upgraded information technology (IT) infrastructure and equipment to create a state-of-the-art, 3D training environment for response staff. This includes a rendering workstation (which is used to finalize digital images and 3D models), a projector, 3D glasses, and upgraded audiovisual and IT visualization software. These enhancements contribute to a lifelike training setting, empowering personnel to enhance their capabilities and readiness.

Emergency Management Response and Recovery Professional Services

In FY 2023, MDERS supported the diverse missions and functions of the Montgomery County Office of Homeland Security and Emergency Management (OEMHS) and the Prince George's County Office of Emergency Management (OEM) through the provision of professional services. In Montgomery County, MDERS funds a full-time employee that supports OEMHS's emergency management, volunteer, and donations management, as well as the provision of funding for as-needed contract support through the University of Maryland Center for Health and Homeland Security. In Prince George's County, MDERS funds four full-time employees – one dedicated to planning, one dedicated to training and exercises, and two dedicated to volunteer and donations management.

EMS Augmented Reality Training

The Montgomery County Fire and Rescue Service (MCFRS) recognized the need for integrating scenario-based simulation training into its initial and continuing education programs for EMS. Quality training is the key to any successful emergency medical services (EMS) credentialing program, and continual training is essential for all department personnel, from firefighters to chiefs. Their commitment to ongoing training guarantees their competency and fosters skill improvement in critical areas such as patient assessment, treatment, and scene management. These certain skills are seldom practiced in the field, necessitating a strong focus on these skills through training. This year, MDERS supported MCFRS with this initiative by providing funding to purchase portable simulation software and equipment that allows personnel to train in a highly realistic, interactive, and scalable environment that can be designed to closely simulate an actual patient encounter and replicate complex, large-scale incidents, such as those involving mass casualties.

Incident Command Simulation, Game Development

MDERS is partnering with the Uniformed Services University (USU) Val G. Hemming Simulation Center (Simcenter) to develop virtual reality simulation software and hardware tools. These tools will allow Montgomery and Prince George's County to establish and utilize the incident command system in a controlled training setting and learn to coordinate response

operations for all-hazards events. The mobile immersive simulation environments (MISE) will be deployed in Montgomery County and Prince George's County fire, rescue, and EMS stations. The Simcenter and MDERS are researching and developing a training capability involving the use of immersive training scenarios to be deployed at remote command sites. The training capability will include 3D environmental modeling, software development, training scenario and content development, training delivery, and after-action review.

Innovation Fund

In FY 2023, MDERS procured a multitude of technology and equipment for several stakeholders. Montgomery County Fire and Rescue Services (MCFRS) identified the need for a Paratech Rescue Guardian Kit, an advanced monitoring and alarm system for technical rescue that enables technical rescue specialists to monitor a change in stability or status to their scene on any Android or iPhone device. This kit can be used in structural collapse, vehicle stabilization, trench rescue, or for stand-alone monitoring. In addition, MCFRS identified the need for First Arriving Digital Dashboards to increase the situational awareness of fire and rescue personnel. With hundreds of features and integrations, this technology allows for fire and rescue personnel to be aware of the weather, the location of ongoing calls, background information on addresses, and allows for the integration of social media. The First Arriving system offers a new and innovative way for fire and rescue personnel to stay updated and aware. Montgomery County Police Department (MCPD) requested the procurement of several GPS Collars for their K9 partners. These GPS Collars have the ability to track the K9's location for up to 100 yards and hold an 80-hour battery life. Both MCPD and Prince George's County Police Department recognized the need for butterfly monitors, which enable responding police personnel to quickly assess the needs of an injured person prior to EMS personnel arriving on scene. MDERS likewise assisted PGPD in purchasing audio-visual equipment to assist in their capability building of command competency.

Mass Casualty Incident Response Support

MDERS supports mass casualty incident response. In FY 2023, it procured additional tactical emergency casualty care (TECC) supplies and equipment for both Montgomery County Fire and Rescue Services (MCFRS) and the Prince George's County Fire Department (PGFD) to refresh their current inventory and to expand this capability. TECC is a civilian-oriented adaptation of the military's Tactical Casualty Combat Care (TCCC), which establishes a framework to balance the risks and benefits of medical response and provides guidance on medical intervention for preventable deaths during warm/hot zone operations. The supplies procured support medical operations in warm and hot zones during an incident.

Medical Resource Officers

In FY 2023, MDERS funded two, full-time medical resource officers (MROs), one each in Montgomery and Prince George's County, to bolster public health emergency preparedness and response capabilities. These MROs lead the coordination of the local Medical Reserve Corps (MRC) volunteers in both counties, including the recruitment, credentialing, planning, training, exercising, and deployment of volunteers. Through the coordination and oversight by the MROs, the county MRCs aim to strengthen individual, community, and workplace preparedness in the Maryland-National Capital Region. In both Montgomery and Prince George's County, the MROs and the MRC that they oversee instrumentally supported ongoing COVID-19 response efforts, including operating call centers, conducting surveillance efforts, and supporting testing and vaccination sites.

Public Access Trauma Care

MDERS continued the expansion of Public Access Trauma Care (PATC) capability across Montgomery and Prince George's Counties. Designed to empower bystanders with the knowledge, skills, abilities, and supplies to deliver immediate medical care prior to the arrival of first responders, the PATC program deploys the equipment and training necessary to common injuries associated with life-threatening trauma. In FY 2023, the PATC program provided five-pack kits at Montgomery College's Rockville, Germantown, and Takoma Park/Silver Spring campuses, as well as its central maintenance facility; all Prince George's County Public (PGCPS) high schools; Prince George's County government buildings; The Universities at Shady Grove; and University of Maryland Global Campus facilities in Montgomery and Prince George's Counties. As a result, the total number of PATC five-pack kits supplied to MDERS stakeholders increased significantly, illustrating an increase of three hundred (300) over the previous year.

Small Unmanned Aerial Systems

MDERS supported the ongoing deployment of the Small Unmanned Aerial Systems (sUAS) capability in Montgomery and Prince George's County public safety agencies through the acquisition and delivery of several sUAS flight platforms, peripheral and support accessories, and training for pilots. MDERS procured DroneSense software to gain additional situational awareness before, during, and after a disaster, three new platforms, and battery/charging equipment to increase the operational capacity of existing sUAS systems in Montgomery County. In Prince George's County, MDERS purchased training to enhance operators' ability to fly sUAS in different environments, settings, and times of day, as well as accessories for a previously procured sUAS vehicle. Through the provision of these investments, MDERS helped Montgomery and Prince George's County first responders maintain real-time situational awareness of complex, evolving incidents across the public safety enterprise.

Tactical Equipment for Law Enforcement

MDERS remains a critical partner in supporting MCPD's and

PGPD's Special Weapons and Tactics (SWAT) team members. Over the past year, MDERS helped MCPD procure personal protective equipment to outfit officers. Simultaneously, MDERS provided PGPD's SWAT team members with TEMS extraction kits, thermal breaching equipment, a special operations van, and personal protective equipment for the officers. Through these investments, MDERS supported MCPD and PGPD's ability to expeditiously, effectively, and efficiently respond to and mitigate a variety of high-threat scenarios.

Training and Exercise Program

MDERS's Training and Exercise program offers numerous opportunities for stakeholders to develop and enhance capabilities through in-person, virtual, and hybrid curricula. These offerings range from highly specialized tactical training to policy-level and leadership theory.

Additional Activities Support to Regional Workgroups

MDERS staff supported or led workgroups and initiatives that informed the vision, deployment, expansion, and investment of critical response capabilities in FY 2023. Through these workgroups, MDERS identified necessary planning, organizing, equipping, training, exercising, and evaluation components necessary to enhance and sustain the Maryland-National Capital Region's public safety enterprise. These workgroups include, but are not limited to, the Structural Collapse Workgroup, sUAS Workgroup, Public Order Workgroup, and the Command Competency Workgroup.

Representation in Regional Activities

In FY 2023, MDERS represented its stakeholders by holding positions on regional committees hosted through the Metropolitan Washington Council of Governments (COG). As a conduit between the local jurisdictions and the larger National Capital Region (NCR), MDERS minimized the burden on stakeholder agencies while ensuring their interests are represented and supported through regional funding. MDERS staff members participated in meetings and activities, including involvement in Regional Emergency Support Function (RESF) Committees; Regional Programmatic Working Groups; Regional Planning Guidance Working Group; the NCR Emergency Response System; and the NCR Homeland Security Executive Committee (HSEC), Policy Group, and Advisory Council.

Emergency Health Services Department, University of Maryland – Baltimore County

The Department of Emergency Health Services (EHS) is a center of excellence for EMS and emergency public health education and research at the University of Maryland Baltimore County (UMBC). EHS educates practitioners, clinicians, scholars, and leaders in community and emergency health and disaster management. EHS works to improve the well-being of individuals

and communities and increase health equity by leading innovative research, education, policy development, practice, and service in community and emergency health and disaster management.

Since its formation in the 1980s as MIEMSS' research and education arm, EHS has graduated an impressive number of students, many of whom have become federal, state, and local EMS leaders, physicians, medical directors, researchers, and administrators. EHS provides undergraduate, master's, and doctoral level education to future and existing prehospital and emergency public health clinicians, emergency management, and disaster health leaders. Undergraduate programs include a Paramedic concentration and an EHS Management concentration. These undergraduate programs deliver instruction in evidence-based EMS practices and skill-based learning, while providing opportunities for students to gain experience in their communities and understand the EMS role in the healthcare continuum.

The EHS Graduate Program includes a track in EHS Administration, Planning and Policy, emphasizing High-Performance EMS and expanding student capacity to develop, support, and evaluate facilities and EMS transport systems in order to optimize prehospital healthcare delivery. The track in Epidemiology and Preventive Medicine focuses on the integration of public health, emergency management, and emergency preparedness. In addition, EHS offers a disaster-focused Certificate in Emergency Management.

EHS is affiliated with the UMBC School of Public Policy Doctoral Program, where students can pursue a doctorate in Public Policy with a concentration in Emergency Health/Management, strengthening the EHS workforce in the policy and administrative arena. In FY 2023, the Department's PACE operation continued to provide continuing and professional education opportunities to local, regional, and national EMS responders. PACE's signature program, Critical Care Emergency Medical Transport Program (CCEMTP), continues to grow, having reached 18,541 students through 950 courses offered at 56 University/Community college and educational sites nationwide.

The Paramedic refresher and CCEMTP programs collaborate with the University of Maryland Medical System EMS Residents and Fellows. As of FY 2023, the Pediatric and Neonatal Critical Care Transport Program (PNCCT), the pediatric equivalent of CCEMTP, has reached 1,252 students through 100 courses and 12 sites. PACE has continued its relationship with ICISF to support the CISM certification exam and CISM course offerings. In addition, EHS maintains the AHA Training Center offering ACLS, PALS and CPR, and serves as the State of Maryland ITLS Chapter for all ITLS courses across the state. Learn more at https://ehs.umbc.edu.

Maryland Poison Center, University of Maryland School of Pharmacy

The Maryland Poison Center (MPC) works to decrease the cost and complexity of poisoning and overdose care while maintaining and/or improving patient outcomes. A division of the University of Maryland School of Pharmacy, MPC is designated by MIEMSS as a specialty referral center and by the Maryland Department of Health (MDH) as a regional poison center for Maryland. MPC provides 24/7 emergency poison information to the public and health professionals across the state. MPC is accessed by calling the nationwide poison help telephone number, 1-800-222-1222, or via the Emergency Medical Resource Center (EMRC).

MPC is certified by the American Association of Poison Control Centers (AAPCC) as a regional poison center. It has provided poisoning treatment advice, education, and prevention services to Marylanders since 1972. MPC's poison specialists are pharmacists and nurses who are certified as specialists in poison information (CSPI) by AAPCC. The 18 specialists at the MPC have over 210 years of combined poison center experience, ensuring that callers have access to experienced, qualified, and well-trained staff.

In CY 2022, MPC managed more than 37,000 cases. While 30,000 of these cases involved human exposure, the remaining 7,000 were requests for information or involved animal exposures. Children under the age of 6 accounted for 38.2% of poison exposures. The top five causes of poisoning were analgesics, household cleaners, antidepressants, cosmetics and personal care products, and cardiovascular drugs. More than 65% of the cases reported to MPC were managed at a site not providing health care, such as the home, school, or workplace. Maryland EMS clinicians consulted with MPC on 1,337 cases in CY 2022. In 14% of those cases, transportation by EMS to a healthcare facility was deemed unnecessary and avoided based on MPC advice. Safely managing patients at the site of the exposure avoids unnecessary health care costs and allows more efficient and effective use of limited healthcare resources.

MPC works closely with the National Capital Poison Center and other state and national agencies to monitor for possible chemical and biological weapons exposures and public health events throughout Maryland and the Washington, DC, region. MPC's data-collection system allows data to be submitted in real time to a nationwide poison center surveillance system. In addition to the astute clinicians covering the service 24 hours a day, automated symptom and substance outlier detection strategies are used to help identify evolving patterns or emerging clusters of exposures.

MPC partners with the Maryland Department of Health's Behavioral Health Administration and the Maryland Office of the Chief Medical Examiner to address the rise in opioid overdoses and deaths. MPC provides a vital service to the state's Overdose Response Program by directly managing overdose cases as well as helping the state document naloxone administration by the lay public and law enforcement officers. In CY 2022, MPC was involved in over 300 reports of bystander naloxone administration. MPC shares its data with state and local health departments on a weekly basis to help them respond to the opioid epidemic.

MPC staff conduct research to advance the prevention, diagnosis, and treatment of poisonings. A complete list of MPC research efforts can be found in the forthcoming Maryland Poison Center 2022 Annual Report.

Reason for Poisoning (CY 2022)

Circumstance	*Number of Patients*	*Percentage*
Unintentional	22,223	75.1
Intentional	5,889	19.9
Adverse Reaction	948	3.2
Other and Unknown	524	1.8
TOTAL	**29,586**	**100.0**

Medical Outcome of Poisoning (CY 2022)

Medical Outcome	*Number of Patients*	*Percentage*
No Effect/Minor Effect	29,940	84.3
Moderate Effect	2,047	6.9
Major Effect	686	2.3
Death	57	0.2
Other and Unknown	1,854	6.3
TOTAL	**29,586**	**100.0**

Location of Poisoning Exposure by MIEMSS Region (CY 2022)

Region	*Number of Exposures*	*Percentage*
Region I	703	2.4
Region II	2,240	7.6
Region III	18,358	62.1
Region IV	2,706	9.1
Region V*	3,218	10.9
Unknown County/ Other state	2,359	8.0
TOTAL	**31,377**	**100.0**

**Routing for the nationwide telephone number automatically connects most callers from Montgomery and Prince George's Counties to the National Capital Poison Center in Washington, D.C. This report reflects calls to the Maryland Poison Center only. Additional human exposures in Maryland may have been reported to the National Capital Poison Center.*

MPC's public education efforts are intended to help prevent poisonings from occurring and to increase awareness of the Center's services. In CY 2022, MPC attended 32 programs throughout Maryland, reaching approximately 2,700 people. Organizations that partnered with MPC to provide education included fire and police departments, hospitals, health departments, pharmacies, hospital perinatal education programs, Head Start, Healthy Start, and local health improvement coalitions. Nineteen county school systems and daycare centers used educational materials from MPC in their classrooms. MPS distributed more than 151,000 pieces of educational materials (brochures, magnets, telephone stickers, Mr. Yuk stickers, teachers' kits, and more) at programs, schools, health fairs, and by direct mailings.

National Poison Prevention Week (March 20-26, 2022) activities included mailings to emergency departments throughout the state. To provide Poison Prevention Week toolkits to elementary schools, MPC partnered with elementary school nurses in 13 counties to offer Poison Prevention Week. Schools could choose from a list of activities to increase awareness of poison safety to the students and their families. In all, 84 schools participated, reaching over 39,000 students and their families.

MPC publishes *Poison Prevention Press*, a bimonthly e-newsletter for the public that highlights poison safety topics, and shares content on topics related to poison prevention and safety with the public via its Facebook and Twitter channels, as well as its blog, *e-Antidote*. In recognition of its 50th anniversary in 2022, MPC debuted its Instagram account. Additionally, MPC shares important clinical and medical toxicology information, updates, and news with health professionals via its monthly e-newsletter, *ToxTidbits*, and its dedicated accompanying Twitter channel.

MPC's educational programming and materials are designed to help health professionals better assess and manage poisoning and overdose cases. In CY 2022, MPC presented 25 programs at hospitals, EMS/fire departments, colleges, professional conferences (state, regional, and national), and through online webinars. More than 760 physicians, nurses, EMS clinicians, pharmacists, physician assistants, and other health professionals attended these programs and webinars. MPC likewise provides on-site training for physicians, pharmacists, and EMS clinicians.

National Study Center for Trauma and EMS

The Charles "McC." Mathias, Jr., National Study Center for Trauma and EMS (NSC) was established at the University of Maryland by the US Congress in 1986. In 2009, the University of Maryland School of Medicine (UMSOM) designated NSC as part of the Shock, Trauma and Anesthesiology Research Organized Research Center (STAR-ORC) to further basic, translational, and clinical studies in injury research.

Research Activities

NSC, in conjunction with R Adams Cowley Shock Trauma Center (RACSTC), is a leading participant in the Crash Injury Research and Engineering Network (CIREN), funded by the National Highway Traffic Safety Administration (NHTSA). During the 2022 to 2023 contract year, approximately 54 patients were consented. A comprehensive investigation was conducted for each qualifying case. Monthly case reviews were held, and NSC virtually hosted NHTSA administrators and members of the Maryland Highway Safety Office (MHSO) on several occasions. CIREN cases are frequently used as part of biomechanics presentations at RACSTC, and the CIREN team shared its research at the Maryland Crash Reconstruction Committee (MCRC) in October 2022 and Winterfest EMS Conference in February 2023. This year, it launched plans to start reconstructing pedestrian crash cases to determine injury biomechanics as well as the role of vehicle geometry on injury causation. Additionally, the CIREN team's pedestrian crash work is geared toward evaluating the effectiveness of Advanced Driver Assistance Systems (ADAS) in the mitigation of pedestrian crashes.

In FY 2023, NSC worked with the data sets to form the Crash Outcome Data Evaluation System (CODES), with the goal of producing a census of motor vehicle-related data in the state. The compiled CODES data sets are a valuable resource to Maryland's highway safety and injury prevention community. Under a grant from MHSO, NSC serves as a key data analysis resource and partner for MHSO, MVA, and other state and local traffic safety partners. Data provided through the Maryland CODES program are used for portions of the Maryland Strategic Highway Safety Plan (SHSP), Federal Highway Safety Plan, MHSO Annual Report, and to support several problem identification and program evaluation activities across the state. Each year, NSC produces Problem Identification Reports and Program Area Briefs for local jurisdictions to aid in the development of Local Strategic Highway Safety Plans.

In FY 2023, NSC staff conducted analyses and provided reports, diagrams, graphs, or slides on occupant protection, pedestrian and bicyclist fatalities and serious injuries, impaired driving by younger drivers, child pedestrian fatalities, race/ethnicity variables in crash data, child passenger safety, young drivers with young passengers involved in crashes, multiple DUI arrests and subsequent adjudication, multiple PBJs for DUI within 10 years, school bus stop arm cameras, motorcycle helmet law talking points for legislative session, cell phone citations – single/multiple offenses, and behaviors that lead to crash involvement. Some of these products are available at https://zerodeathsmd.gov/resources/crashdata/.

In spring 2023, NSC was awarded a grant from the MHSO to review the current processes for collecting and analyzing race-based traffic stop/citation information. Tasks include generating descriptive frequencies on the currently available data and describing any gaps in the systems related to NHTSA Section 1906 requirements. NSC will submit its final report in summer 2023.

NSC facilitates the Traffic Records Coordinating Committee and provides data expertise on SHSP Implementation and Emphasis Area Teams. NSC researchers presented a performance measure analysis of traffic citation and adjudication data obtained from the Maryland District Courts in May 2022; these analyses continued to help with more accurately determining arrests and correct licensing numbers of reoffending drivers with impairment in FY 2023.

Over the past year, NSC modified CODES to cover all injuries in the Injury Outcome Data Evaluation System (IODES). IODES is intended to produce a census and yield a complete picture for all injuries, including penetrating trauma such as gunshots and stabbings, and blunt trauma such as falls, and other injury producing incidents in the state of Maryland. IODES and CODES are both expected to benefit from recent data partners, including MIEMSS (which provides eMEDS® data), Maryland Department of Transportation (MDOT) State Highway Administration (SHA), which provides data on roadway infrastructure, and Maryland State Police (which provides crash data). The IODES expansion is anticipated to be far more comprehensive than what is available today and will supercharge the ability to pursue injury and life-saving practices in Maryland.

For the 11th consecutive year, NSC supervised and reported findings of the Maryland Front Seat Belt Use Project in June 2022, and again in November at the in-person SHSP Executive Council meeting and virtually at the Occupant Protection and Distracted Driving Emphasis Area Team Meeting of the MHSO. The usage rate on all roadways for both passenger cars/SUVs and pick-up trucks was 92.7% in 2022.

NSC completed its analysis on the observed relationships between driver and passenger restraint use in the front and rear seats and a manuscript was published in the peer-reviewed journal Traffic Injury Prevention in June 2022. The analysis concluded that passenger seat belt use in both the front and rear seats is associated with driver restraint use (https://www.tandfonline.com/doi/full/10.1080/15389588.2022.2077931).

Dunlap and Associates, Inc. provided funding for NSC to trace the DUI/DUID process from traffic stop through adjudication and sanction. Specifically of interest was investigation of how the process differed following the change in the DUID statute in 2011 and how the process differed following the Maryland change in data systems related to DUID.

In FY 2023, NSC concluded a joint study with the University of Utah, the University of Kentucky, and Nationwide Children's Hospital (Ohio) on a Centers for Disease Control and Prevention (CDC) grant to use CODES data to examine the types and severity of injuries sustained by older occupants in motor vehicle crashes. A final joint manuscript, co-authored by NSC statisticians and examining the age-related variability in crash-associated injury type and severity, was published in the Annals of Epidemiology.

Based on linked Maryland crash and hospital data, an analysis was made of the cost of non-fatal motor vehicle crash injury in older adults (65 or older) for a future publication. Findings from this study were presented at the Association of Transportation Safety Information Professionals (ATSIP) Traffic Records Forum (TRF) August 2022.

NSC assessed the safety impacts to e-scooters and presented the findings at the Transportation Research Board (TRB) annual meeting in January 2023. Subsequently, NSC researchers expanded the study scope to include all vulnerable road users. Results were presented at the Maryland Highway Safety Summit in April 2023. NSC developed a conference abstract from the findings, which will be submitted for the ATSIP TRF meeting in July 2023.

NSC worked on integrating admission and treatment records of patients presenting to the R Adams Cowley Shock Trauma Center status post motor vehicle crash from 2016 through to 2021 with police reported crash data and Functional Roadway Classification (FRC) data from MDOT. The resulting dataset contained detailed patient toxicology data, police crash data, and the class of the roadway on which the crash occurred, in addition to basic patient demographics. The NSC researchers then modeled the data using Ordinal Logistic Regression to regress injury severity as a function of basic patient demographics, FRC, crash report attributes, and toxicology results. The findings will be included in a paper for submission to TRB in August 2023.

The NSC developed the first pass of an equity indicator for use by MHSO in ensuring traffic safety measures and resources are equitably applied. The tool, called Overburdened and Risk Indicator Outcomes at Locations for Equity in Safety (ORIOLES), is currently under development. When ready ORIOLES will be available as a Geographic Information System (GIS) dashboard that highlights disadvantaged and marginalized zip codes. Disadvantages are calculated in two domains, socioeconomic and transportation safety. The results are highly interpretable and give MHSO clear indication on where and how to apply resources to best address the underlying causes of inequity.

The NSC is responsible for the extraction of data from the R Adams Cowley Shock Trauma Registry (STCTR) for research protocols with appropriate permissions. Over the past year, NSC has written over 40 SQL queries to the STCTR. Query topic areas have been very diverse as demonstrated by the following limited list: whole blood transfusion vs packed cells, role of pre-operative CT for abdominal GSW, thoracic injury damage control, offender-victim relationship in gun violence, laryngeal trauma, geriatric trauma outcomes, violence with black women and TBI and blood pressure variability.

NSC offers comprehensive statistical support to various research groups at UMB, ranging from Acute Care Surgery to Lung Transplantation Survival Research. Findings from these groups were published in the American Surgeon and the Journal of the American College of Surgeons and co-authored by NSC researchers. Additionally, NSC extends its expertise to research projects

funded by esteemed organizations like the National Institutes of Health (NIH), US Department of Defense, and US Army Medical Research, ensuring a robust and data-driven approach to cutting-edge research.

The NSC launched several self-funded projects looking into a diverse array of cutting-edge traffic safety research areas. These areas focus on new modes, driver education, and infrastructure. The projects align with the Safe System Approach (SSA) adopted by the Federal Highway Administration (FHWA) and US Department of Transportation (USDOT) and related agencies including NHTSA. The findings from the studies were presented at multiple conferences, including ATSIP (Association of Transportation Safety Information Professionals) Traffic Records Forum in Denver (August 7–10, 2022) and the Intelligent Transportation Systems World Congress in Los Angeles (September 18–22, 2022). The findings indicate that a majority of e-scooter riders in Baltimore are intoxicated, high-risk driving behaviors exhibited by teenagers are seldom rectified by adulthood, and crashes on local streets and arterials over the past six years produce graver injuries than high-speed, high-flow facilities like the Interstates.

Technical Support

In addition to in-house preparation of peer-reviewed research papers, NSC staff offer grant proposal, abstract, and manuscript preparation support, including technical writing, research design, and data analysis for university, hospital, and trauma center researchers. Partner agencies and the public can submit a specific data request to NSC epidemiologists and data analysts using the data request form on NSC's website (https://issomweb02.som.umaryland.edu/NSCTrauma/NSCData.aspx). NSC staff members were instrumental in the publication of manuscripts on various trauma and injury related topics, such as biomarkers of endothelial cell dysfunction emergency general surgery costs.

MIEMSS-Research Interest Group (RIG)

Research Interest Group (RIG) is composed of members from MIEMSS, the National Study Center (NSC), and other partners including, but not limited to, higher education institutions, EMS Operational Programs, regional partners from Washington DC and Northern Virginia. Over the last year, MIEMSS-RIG members have published several articles and presented their work in national and international conferences related to EMS and public health. Members also serve on MIEMSS committees in support of the agency's mission.

In addition to staff from NSC, the Maryland Emergency Medical Services Systems Research Interest Group (MIEMSS-RIG) is composed of members from MIEMSS, University of Maryland, and Johns Hopkins University. The group meets monthly to help further EMS research within Maryland and across the nation. Over the past five years, MIEMSS-RIG members have published over 36 articles related to trauma and EMS. The group is currently working on a possible manuscript related to the epinephrine cardiac arrest study.

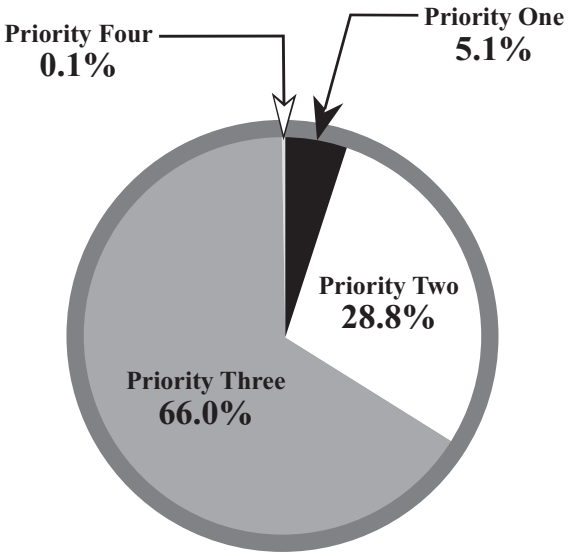
NSC members continue to serve on several MIEMSS committees and help advance the agency's mission.

MARYLAND EMS STATISTICS

Types of EMS Calls

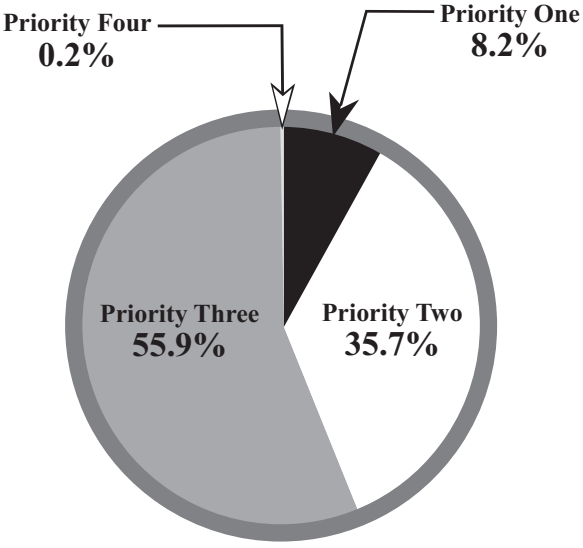
Patient Priority For Injury Transports

Fiscal Year 2023



Patient Priority For Medical Transports

Fiscal Year 2023



Source: electronic Maryland EMS Data System (eMEDS®)

Priority 1 *- Patient critically ill or injured (immediate / unstable)*
Priority 2 *- Patient less serious (urgent / potentially life-threatening)*
Priority 3 *- Patient non-urgent*
Priority 4 *- Patient does not require medical attention*

Cardiac Arrest Registry to Enhance Survival (CARES)
CY 2022 Registry Data

Demographic Information	Maryland	National
Mean Age (years)	63.5	62.2
% Males	59.2%	62.7%
% Females	40.8%	37.3%

Arrest Witnessed?	Maryland	National
Witnessed by Bystander	33.1%	37.1%
Witnessed by First Responder/EMS	11.9%	11.6%
Unwitnessed	55.0%	51.3%

Who Initiated CPR?	Maryland	National
Bystander	40.7%	40.8%
First Responder	29.0%	31.9%
Emergency Medical Services (EMS)	30.3%	27.3%

Who First Defibrillated the Patient?	Maryland	National
Not Applicable	73.3%	70.9%
Bystander	1.5%	1.5%
First Responder	4.2%	6.2%
Emergency Medical Services (EMS)	21.0%	21.4%

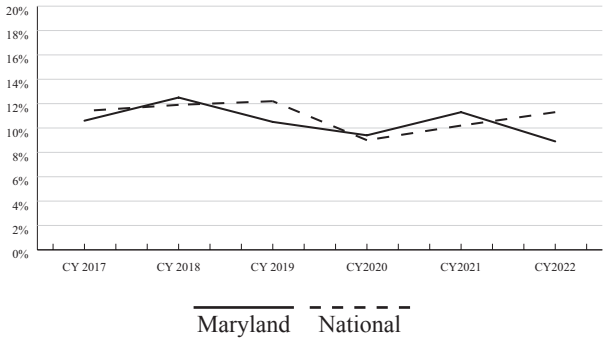
***Bystander Intervention Rates are calculated as follows:**

Bystander CPR: Arrests that occurred before the arrival of First Responders/EMS and that did not occur in a nursing home, health care facility, physician's office or clinic, in which CPR was initiated by lay persons, out of all arrests that occurred before the arrival of First Responders/EMS and that did not occur in a home/residence, nursing home, health care facility, physician's office, or clinic.

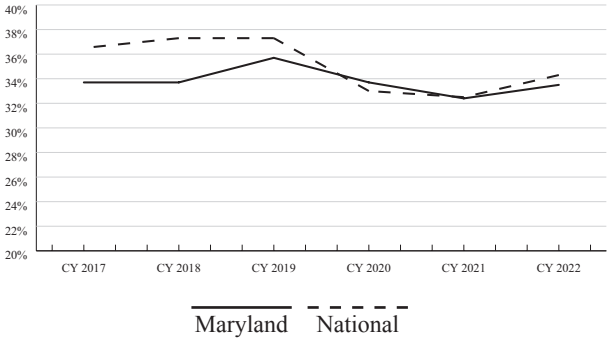
Public AED Use: Arrests that occurred before the arrival of First Responders/EMS and that did not occur in a home/residence, nursing home, health care facility, physician's office or clinic, in which AEDs were initially applied by lay persons out of all arrests that occurred before the arrival of First Responders/EMS and that did not occur in a home/residence, nursing home, health care facility, physician's office, or clinic.

Cardiac Arrest Registry to Enhance Survival (CARES)
CY 2017 through CY 2022 (Source: CARES Registry)

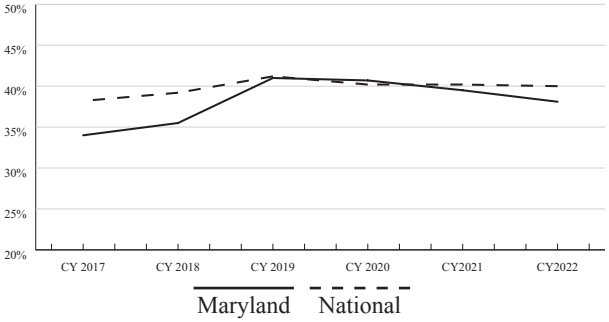
Maryland and National Public AED Use Rates



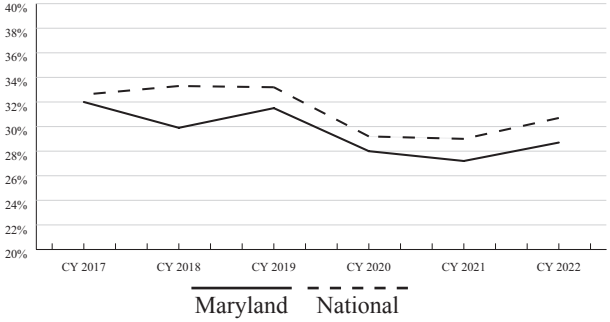
Survival Rates for Patients with Out of Hospital Cardiac Arrests With First Arrest Rhythms That Were Shockable and Witnessed by Bystanders and Bystanders Either Performed CPR and/or Applied AEDs



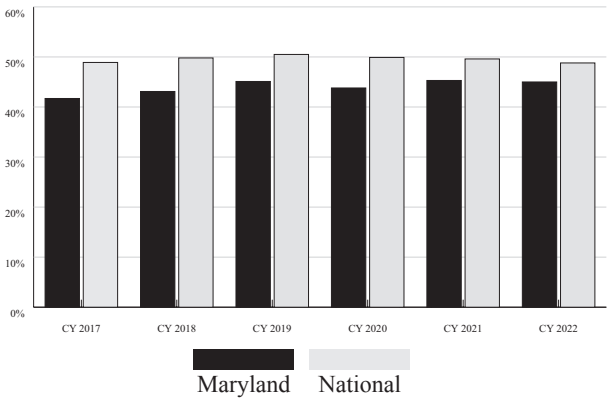
Maryland and National Bystander CPR Rates



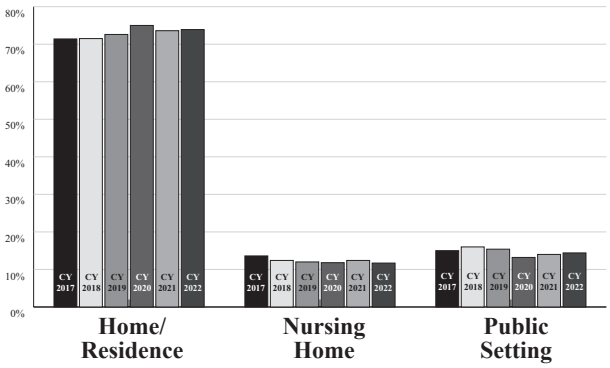
Survival Rates for Patients with Out of Hospital Cardiac Arrests That Were Witnessed by Bystanders and Had First Arrest Rhythms That Were Shockable



Percentage of Cardiac Arrests That Were Witnessed by Bystanders and/or First Responder/EMS by Calendar Year



Location of Cardiac Arrest



*See page 68 for intervention rate formulas.

Public Safety EMS Units

Patient Transportation Vehicles

Region	Ambulances								Ambulance Buses	
	BLS				ALS				Type I	Type II
	In-Service	Peak Hours	Ready Reserve	Unstocked, Unequipped Reserve	In-Service	Peak Hours	Ready Reserve	Unstocked, Unequipped Reserve	20 + Patients	10 - 19 Patients
Region I	2	0	0	0	18	3	12	0	0	0
Region II	39	0	5	8	11	2	0	0	0	1
Region III	17	3	19	16	123	15	23	48	0	2
Region IV	9	4	20	2	61	26	70	9	0	1
Region V	118	17	47	22	51	11	29	1	1	2
STATEWIDE TOTAL	**185**	**24**	**91**	**48**	**264**	**57**	**140**	**58**	**1**	**6**

NOTE: Excludes federal EMS Operational Programs.
Source: Vehicle data reported by the EMS Operational Programs

Patient Transportation Vehicle Definitions:

Basic Life Support (BLS) Transport Vehicle: A vehicle equipped to carry and treat a patient per EMT Protocols
Advanced Life Support (ALS) Transport Vehicle: A vehicle equipped to carry and treat a patient per Cardiac Rescue Technician (CRT, CRT99) or Paramedic protocols
Total Equipped: Includes units that are equipped as either BLS or ALS and that are available for staffing in the event of system surge
Staffed 24/7: EMS clinicians assigned and ready to respond to a 9-1-1 call
Ambu Bus: A passenger bus configured or modified to transport as many as 20 patients on stretchers

Public Safety/Non-Transportation Vehicles

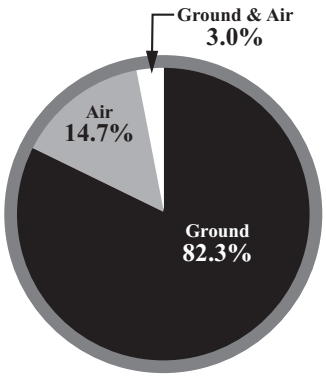
Region	Non-Transport Support				Disaster Supplies		
	BLS Capable First Responder		ALS Capable First Responder		MCSU Type I	MCSU Type II	MCSU Type III
	Non-Suppression	Suppression	Non-Suppression	Suppression	100+ Patients	50 Patients	25 Patients
Region I	8	13	6	1	0	2	1
Region II	17	36	6	13	0	2	3
Region III	26	238	24	28	5	5	0
Region IV	65	104	34	2	0	2	3
Region V	39	114	32	46	0	8	1
STATEWIDE TOTAL	**155**	**505**	**102**	**90**	**5**	**19**	**8**

NOTE: Excludes federal EMS Operational Programs.
Source: Vehicle data reported by the EMS Operational Programs
***MCSU = Mass Casualty Support Unit*

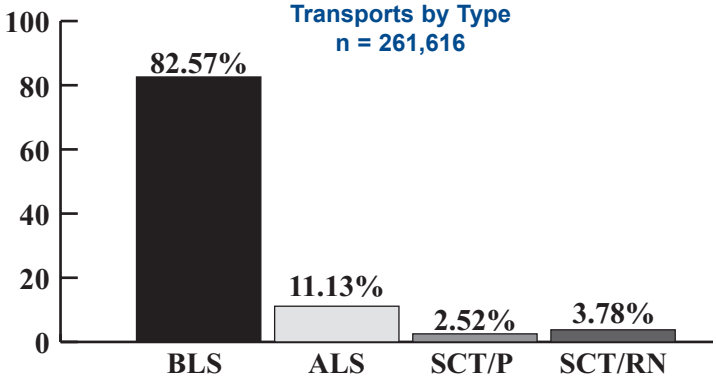
Maryland-Licensed Commercial Ambulance FY 2023 Statistics

Source: MIEMSS Commercial Ambulance Licensing System

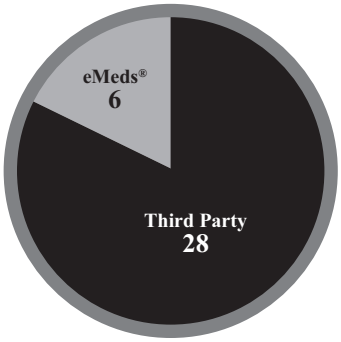
Total Number of Services
n = 34



Transports by Type
n = 261,616



ePCR Reporting Software Platform
n = 34



Patient Care Reporting Records Submitted to MIEMSS by Maryland Jurisdictions

The electronic Maryland EMS Data System (eMEDS®) enables Maryland's EMS clinicians to document and produce an electronic patient care record (ePCR). Additionally, it serves as a primary resource to query data about EMS demand, response, and outcome. All jurisdictional EMSOPs in Maryland use eMEDS® to document their call information. The EMSOPs can enter data either via a local device with internet connectivity or via a dedicated website. The table below displays the quarterly record volume for FY 2023.

eMEDS® Records Submitted to MIEMSS per Fiscal Year 2023 Quarter[1]

Reporting Between: 7/1/2022 - 06/30/2023

EMSOP	1st Qtr. FY 2023	2nd Qtr. FY 2023	3rd Qtr. FY 2023	4th Qtr. FY 2023	Total
Airports: BWI & Martins	1,026	988	852	1,082	**3,948**
Allegany County	4,428	4,604	4,226	4,513	**17,771**
Annapolis, City of	2,692	2,649	2,432	2,537	**10,310**
Anne Arundel County	18,248	18,501	17,255	18,141	**72,145**
Baltimore City	56,841	52,634	50,633	55,476	**215,584**
Baltimore County	34,842	35,631	33,060	33,809	**137,342**
Calvert County	4,403	4,258	3,935	4,358	**16,954**
Caroline County	1,672	1,846	1,717	1,823	**7,058**
Carroll County	5,767	6,077	5,783	5,889	**23,516**
Cecil County	5,668	5,255	4,638	3,987	**19,548**
Charles County	7,864	7,768	6,962	7,537	**30,131**
Dorchester County	1,918	1,823	1,755	1,936	**7,432**
Frederick County	14,072	14,314	13,000	13,956	**55,342**
Garrett County	1,415	1,337	1,080	1,222	**5,054**
Harford County	9,898	9,837	9,346	9,386	**38,467**
Howard County	6,905	7,102	6,720	8,742	**29,469**
Kent County	1,391	1,259	1,121	1,161	**4,932**
Montgomery County	22,510	23,661	23,042	24,009	**93,222**
MSP Aviation Command	592	474	394	591	**2,051**
Ocean City, Town of	2,495	998	818	1,965	**6,276**
Prince George's County	48,229	50,438	45,525	47,033	**192,225**
Queen Anne's County	2,301	2,219	2,016	2,164	**8,700**
Salisbury, City of	2,971	3,002	2,868	2,923	**11,764**
Somerset County	905	929	855	963	**3,652**
Talbot County	2,100	1,838	1,728	1,896	**7,562**
Washington County	9,070	8,723	8,454	9,006	**35,253**
Wicomico County	1,814	1,915	1,793	2,009	**7,531**
Worcester County	2,081	1,900	1,963	2,135	**8,079**
Other EMSOPs	7,775	7,344	6,882	7,206	**29,207**
Grand Total	282,893	279,324	260,853	277,455	**1,100,525**

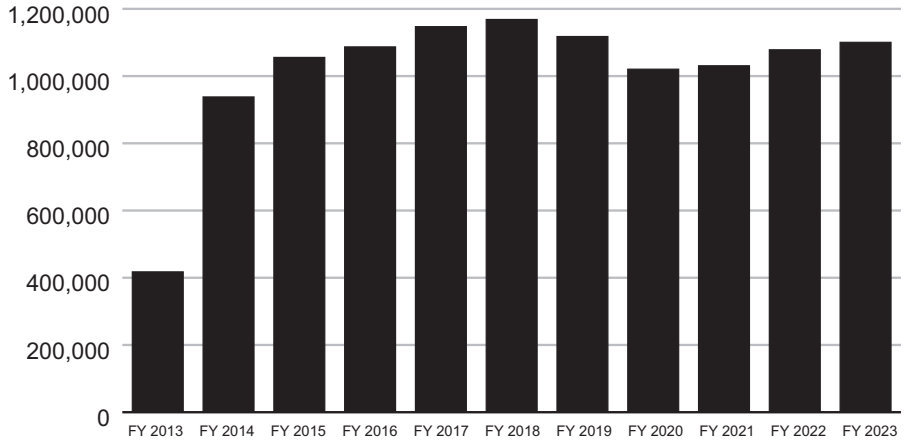
[1]The number of records submitted to MIEMSS does not necessarily represent the number of individual patients treated. Duplicate records can be submitted for the same patient if more than one EMS company responds to treat that patient. Number of records also include both EMS reports and Mobile Integrated Health (MIH) reports.

eMEDS® Records Submitted to MIEMSS per Quarter

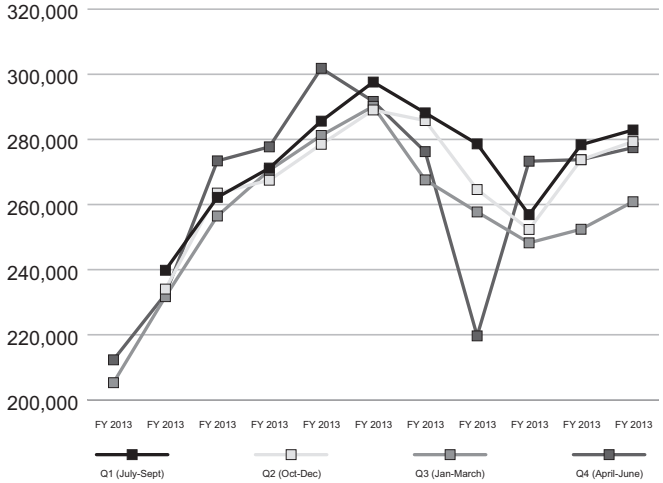
Reporting Between: FY 2013 - FY 2023

EMSOP	1st Qtr. (July-Sept)	2nd Qtr. (Oct-Dec)	3rd Qtr. (Jan-March)	4th Qtr. (April-June)	Total
SFY 2013			205,278	212,297	**417,575**
SFY 2014	239,810	234,029	231,699	232,470	**938,008**
SFY 2015	262,197	263,515	256,475	273,403	**1,055,590**
SFY 2016	271,193	267,467	270,538	277,714	**1,086,912**
SFY 2017	285,611	278,493	281,211	301,832	**1,147,147**
SFY 2018	297,614	289,044	290,157	291,666	**1,168,481**
SFY 2019	288,151	285,788	267,566	276,245	**1,117,750**
SFY 2020	278,630	264,598	257,723	219,655	**1,020,606**
SFY 2021	256,887	252,341	248,229	273,306	**1,030,763**
SFY 2022	278,362	273,760	252,406	273,778	**1,078,306**
SFY 2023	282,893	279,324	260,853	277,455	**1,100,525**

eMEDS® Records Submitted to MIEMSS per Fiscal Year 2013-2023



eMEDS® Records Submitted to MIEMSS per Fiscal Year by Quarter 2013-2023



MARYLAND TRAUMA AND BURN STATISTICS

Age Distribution of Patients Treated at Pediatric or Adult Trauma Centers

(3-Year Comparison)

Source: Maryland State Trauma Registry

Age Range	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Under 1 year	239	249	237
1 to 4 years	488	478	519
5 to 9 years	549	605	627
10 to 14 years	555	753	751
15 to 24 years	3,226	3,297	3,453
25 to 44 years	6,939	6,614	6,641
45 to 64 years	5,335	4,917	5,014
65+ years	7,581	7,609	8,741
Unknown	13	7	5
TOTAL	24,925	24,529	25,988

For children who were burn patients at Children's National Hospital or Johns Hopkins Pediatric Trauma Center, see Maryland Pediatric Burn Statistics.

MARYLAND ADULT TRAUMA STATISTICS

Legend Code

Johns Hopkins Bayview Medical Center	BVMC	Suburban Hospital – Johns Hopkins Medicine	SUB
The Johns Hopkins Hospital	JHH	TidalHealth Peninsula Regional	THPR
Meritus Medical Center	MMC	University of Maryland Capital Region Health	UMCRH
R Adams Cowley Shock Trauma Center	STC	UPMC Western Maryland	UPMCWM
Sinai Hospital	SH		

Total Cases Reported by Trauma Centers

(3-Year Comparison)

Source: Maryland State Trauma Registry

Trauma Center	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
The Johns Hopkins Bayview Medical Center	3,816	2,663	2,413
The Johns Hopkins Medical System	1,717	2,206	2,620
Meritus Medical Center	2,426	2,763	2,984
R Adams Cowley Shock Trauma Center	5,958	5,160	5,674
Sinai Hospital of Baltimore	2,273	2,565	2,376
Suburban Hospital – Johns Hopkins Medicine	1,958	2,028	2,154
TidalHealth Peninsula Regional	1,662	1,822	2,211
University of Maryland Capital Region Medical Center	3,021	2,879	2,925
UPMC Western Maryland	506	638	755
TOTAL	23,337	22,724	24,112

Occurrence of Injury by County: Scene Origin Cases Only

(June 2022 to May 2023)
Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	542
Anne Arundel County	895
Baltimore County	3,057
Calvert County	158
Caroline County	75
Carroll County	260
Cecil County	40
Charles County	196
Dorchester County	161
Frederick County	485
Garrett County	33
Harford County	491
Howard County	444
Kent County	36
Montgomery County	1,858
Prince George's County	1,860
Queen Anne's County	85
St. Mary's County	196
Somerset County	157
Talbot County	60
Washington County	1,745
Wicomico County	781
Worcester County	476
Baltimore City	4,244
Virginia	99
West Virginia	126
Pennsylvania	332
Washington, DC	36
Delaware	116
Other	4
Not Indicated	1,181
TOTAL	20,229

Note: Scene origin cases represent 83.9% of the total trauma cases treated statewide.

Residence of Patients by County: Scene Origin Cases Only

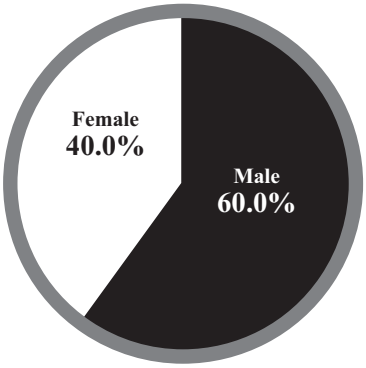
(June 2022 to May 2023)
Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	494
Anne Arundel County	932
Baltimore County	3,224
Calvert County	176
Caroline County	77
Carroll County	328
Cecil County	57
Charles County	233
Dorchester County	139
Frederick County	500
Garrett County	27
Harford County	510
Howard County	387
Kent County	37
Montgomery County	1,773
Prince George's County	1,670
Queen Anne's County	70
St. Mary's County	184
Somerset County	167
Talbot County	62
Washington County	1,872
Wicomico County	729
Worcester County	323
Baltimore City	3,819
Virginia	353
West Virginia	259
Pennsylvania	605
Washington, DC	345
Delaware	226
Other	437
Not Indicated	214
TOTAL	20,229

Note: Scene origin cases represent 83.9% of the total trauma cases treated statewide.

Gender Profile: Primary Admissions Only

(June 2022 to May 2023)
Source: Maryland State Trauma Registry



Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Patients with Protective Devices at Time of Trauma Incident: Primary Admissions Only

(3-Year Comparison)
Source: Maryland State Trauma Registry

Protective Device	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
None	24.1%	22.6%	23.7%
Seatbelt	9.8%	10.1%	12.0%
Airbag and Seatbelt	37.2%	39.0%	37.5%
Airbag Only	13.3%	12.7%	11.7%
Infant/Child Seat	0.1%	0.1%	0.0%
Protective Helmet	15.1%	15.3%	14.8%
Padding/Protective Clothing	0.1%	0.1%	0.1%
Other Protective Device	0.2%	0.1%	0.0%
Unknown	0.1%	0.0%	0.2%
TOTAL	100.0%	100.0%	100.0%

Note: Patients were involved in motor vehicle, motorcycle, bicycle, and sports-related incidents only. "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Mode of Patient Transport to Trauma Centers: Scene Origin Cases Only

(June 2022 to May 2023)
Source: Maryland State Trauma Registry

Modality Type	BVMC	JHH	MMC	THPR	CRMC	SH	STC	SUB	WM	TOTAL
Ground Ambulance	93.8%	78.4%	80.9%	93.3%	86.8%	94.1%	78.5%	92.1%	77.8%	85.8%
Helicopter	0.2%	1.6%	0.6%	1.8%	10.5%	0.6%	19.7%	0.3%	0.4%	5.7%
Other	6.0%	20.0%	18.5%	4.9%	2.7%	5.3%	1.8%	7.6%	21.8%	8.5%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Only patients brought directly from the scene to a trauma center are included in this table.

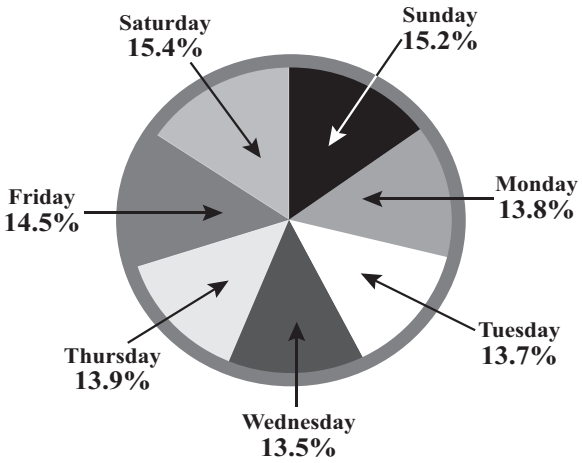
Origin of Patient Transport to Trauma Centers

(June 2022 to May 2023)
Source: Maryland State Trauma Registry

Origin Type	BVMC	JHH	MMC	THPR	CRMC	SH	STC	SUB	WM	TOTAL
Scene of Injury	98.0%	81.7%	95.8%	80.6%	86.6%	84.2%	67.7%	92.9%	98.3%	84.0%
Hospital Transfer	0.0%	7.8%	0.4%	1.4%	4.7%	9.7%	32.1%	3.8%	0.9%	10.5%
Other	2.0%	10.5%	3.8%	18.0%	8.7%	6.1%	0.2%	3.3%	0.8%	5.5%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

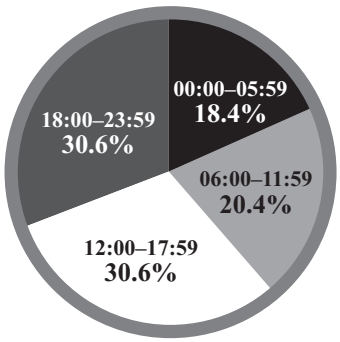
Emergency Department Arrivals by Day of Week: Primary Admissions Only

(June 2022 to May 2023)
Source: Maryland State Trauma Registry



Emergency Department Arrivals by Time of Day: Primary Admissions Only

(June 2022 to May 2023)
Source: Maryland State Trauma Registry



Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Number of Deaths by Age
(3-Year Comparison)
Source: Maryland State Trauma Registry

Age	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Under 1 year	1	1	0
1 to 4 years	1	0	0
5 to 14 years	1	5	3
15 to 24 years	130	122	104
25 to 44 years	278	257	209
45 to 64 years	170	161	173
65+ years	299	314	301
Unknown	8	2	1
TOTAL	888	862	791
Deaths Overall as a Percentage of the Total Injuries Treated	3.8%	3.8%	3.3%

Note: Only pediatric patients who were treated at Adult Trauma Centers are included in this table. For patients treated at Pediatric Trauma Centers, see Maryland Pediatric Trauma Statistics.

Number of Injuries by Age
(3-Year Comparison)
Source: Maryland State Trauma Registry

Age	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Under 1 year	60	64	70
1 to 4 years	104	113	124
5 to 14 years	216	272	271
15 to 24 years	3,092	3,131	3,248
25 to 44 years	6,936	6,613	6,640
45 to 64 years	5,335	4,915	5,013
65+ years	7,581	7,609	8,741
Unknown	13	7	5
TOTAL	23,337	22,724	24,112

Note: Only pediatric patients who were treated at Adult Trauma Centers are included in this table. For patients treated at Pediatric Trauma Centers, see Maryland Pediatric Trauma Statistics.

Number of Injuries and Deaths by Age
(June 2022 to May 2023)
Source: Maryland State Trauma Registry

	Number of Injured Patients		Number of Deaths	
Age	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	70	57	0	0
1 to 4 years	124	105	0	0
5 to 14 years	271	221	3	2
15 to 24 years	3,248	2,836	104	93
25 to 44 years	6,640	5,845	209	184
45 to 64 years	5,013	4,374	173	153
65+ years	8,741	7,927	301	274
Unknown	5	2	1	0
TOTAL	24,112	21,367	791	706

Note: Only pediatric patients who were treated at Adult Trauma Centers are included in this table. For patients treated at Pediatric Trauma Centers, see Maryland Pediatric Trauma Statistics.

Etiology of Injuries: Primary Admissions Only
(3-Year Comparison)
Source: Maryland State Trauma Registry

Etiology	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Cut or Pierce	5.2%	4.7%	4.5%
Drowning/Submersion	0.1%	0.1%	0.0%
Fall	45.6%	46.2%	47.5%
Fire or Flame	0.3%	0.3%	0.3%
Hot Object or Substance	0.2%	0.1%	0.2%
Firearm	8.0%	7.7%	7.0%
Machinery/Mechanical	0.7%	0.7%	0.6%
Motor Vehicle Crash	22.9%	23.4%	22.4%
Motorcycle Crash	3.7%	3.6%	3.4%
Pedal Cycle Crash	1.9%	1.7%	1.5%
Pedestrian Incident	4.4%	4.6%	4.9%
Other Transport	0.1%	0.1%	0.1%
Natural or Environmental	0.5%	0.5%	0.6%
Poisoning	0.3%	0.2%	0.3%
Struck by or Against	4.9%	4.5%	5.1%
Other	1.2%	1.6%	1.6%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Blood Alcohol Content of Patients* Primary Admissions Only
(3-Year Comparison)
Source: Maryland State Trauma Registry

Blood Alcohol Content	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Negative	42.6%	44.8%	44.2%
Positive	18.6%	16.6%	16.0%
Undetermined	38.8%	38.6%	39.8%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

**Due to changes in the software and how the data was reported, the percentages have changed from what was reported in previous years.*

Etiology of Injuries by Age: Primary Admissions Only

(June 2022 to May 2023)
Source: Maryland State Trauma Registry

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Stab Wound	Struck by/ Against	Pedal Cyclist	Other	Total
Under 1 year	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.5%	0.1%
1 to 4 years	0.1%	0.0%	0.2%	0.4%	0.0%	0.1%	0.3%	0.4%	1.5%	0.3%
5 to 14 years	0.6%	0.2%	0.4%	0.5%	0.6%	0.4%	1.1%	2.6%	2.1%	0.7%
15 to 24 years	20.3%	17.4%	15.4%	2.3%	35.0%	21.0%	13.9%	13.7%	9.8%	11.7%
25 to 44 years	38.6%	46.2%	38.5%	9.3%	51.1%	56.2%	45.4%	21.5%	37.9%	26.6%
45 to 64 years	23.6%	29.0%	30.9%	18.2%	11.7%	18.3%	29.0%	44.0%	29.6%	21.3%
65+ years	16.8%	7.2%	14.6%	69.1%	1.6%	4.0%	10.3%	17.8%	18.6%	39.3%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival. Only pediatric patients who were treated at Adult Trauma Centers are included in this table. For patients treated at Pediatric Trauma Centers, see Pediatric Trauma Center tables and graphs.

Etiology Distribution for Patients with Blunt Injuries: Primary Admissions Only

(June 2022 to May 2023)
Source: Maryland State Trauma Registry

Etiology	Percentage
Cut or Pierce	0.3%
Fall	53.1%
Machinery/Mechanical	0.6%
Motor Vehicle Crash	25.0%
Motorcycle Crash	3.8%
Pedalcyclist Crash	1.7%
Pedestrian Incident	5.5%
Other Transport	0.1%
Natural or Environmental	0.3%
Struck by or Against	5.6%
Other	1.4%
Not Valued	2.6%
TOTAL	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Etiology Distribution for Patients with Penetrating Injuries: Primary Admissions Only

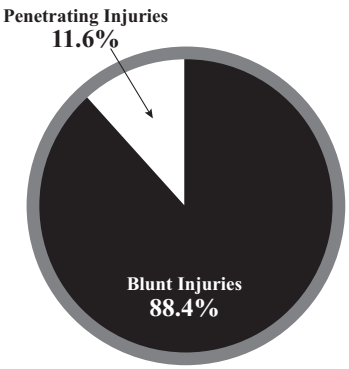
(June 2022 to May 2023)
Source: Maryland State Trauma Registry

Etiology	Percentage
Cut or Pierce	35.9%
Fall	0.7%
Firearm	59.4%
Machinery/Mechanical	0.4%
Motor Vehicle Crash	0.1%
Motorcycle Crash	0.1%
Natural or Environmental	0.7%
Struck by or Against	0.7%
Other	0.6%
Not Valued	1.4%
TOTAL	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Injury Type Distribution of Patients: Primary Admissions Only

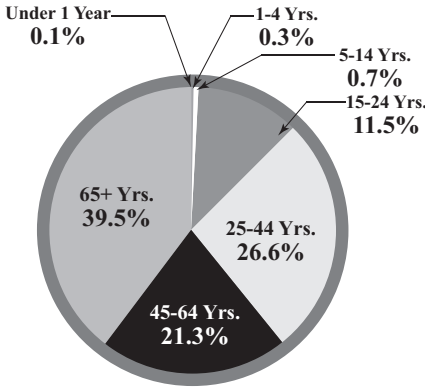
(June 2022 to May 2023)
Source: Maryland State Trauma Registry



Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Age Distribution of Patients: Primary Admissions Only

(June 2022 to May 2023)
Source: Maryland State Trauma Registry



Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival. Only pediatric patients who were treated at Adult Trauma Centers are included in this table. For patients treated at Pediatric Trauma Centers, see Pediatric Trauma Center tables and graphs.

Final Disposition of Patients: Primary Admissions Only

(3-Year Comparison)

Source: Maryland State Trauma Registry

Final Disposition	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Inpatient Rehab Facility	8.4%	8.4%	8.4%
Skilled Nursing Facility	10.8%	13.4%	13.3%
Residential Facility	1.2%	1.2%	1.0%
Specialty Referral Center	4.4%	4.3%	4.3%
Home with Services	7.8%	8.3%	8.5%
Home	52.6%	50.8%	52.4%
Acute Care Hospital	3.0%	2.3%	2.1%
Left Against Medical Advice	3.2%	2.6%	2.2%
Morgue/Died	5.1%	5.0%	4.3%
Left without Treatment	0.0%	0.1%	0.1%
Intermediate Care Facility	0.0%	0.0%	0.1%
Hospice Care	0.9%	0.9%	1.0%
Jail	1.0%	0.9%	0.8%
Psychiatric Hospital	1.2%	1.3%	1.0%
Elopement	0.3%	0.3%	0.3%
Other	0.1%	0.2%	0.2%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Injury Severity Scores of Patients with Penetrating Injuries: Primary Admissions Only

(3-Year Comparison)

Source: Maryland State Trauma Registry

ISS	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
1 to 12	68.8%	66.6%	70.8%
13 to 19	12.6%	13.4%	12.4%
20 to 35	13.7%	15.4%	13.5%
36 to 75	4.9%	4.6%	3.3%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Injury Severity Scores (ISS) by Injury Type: Primary Admissions Only

(June 2022 to May 2023)

Source: Maryland State Trauma Registry

ISS	Blunt	Penetrating	Total
1 to 12	78.8%	70.8%	77.8%
13 to 19	12.2%	12.4%	12.3%
20 to 35	7.9%	13.5%	8.6%
36 to 75	1.1%	3.3%	1.3%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Injury Severity Scores of Patients with Blunt Injuries: Primary Admissions Only

(3-Year Comparison)

Source: Maryland State Trauma Registry

ISS	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
1 to 12	78.0%	77.7%	78.8%
13 to 19	12.2%	12.4%	12.2%
20 to 35	8.3%	8.5%	7.9%
36 to 75	1.5%	1.4%	1.1%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

Injury Severity Scores of Patients with Either Blunt or Penetrating Injuries: Primary Admissions Only

(3-Year Comparison)

Source: Maryland State Trauma Registry

ISS	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
1 to 12	76.7%	76.2%	77.8%
13 to 19	12.3%	12.6%	12.3%
20 to 35	9.1%	9.4%	8.6%
36 to 75	1.9%	1.8%	1.3%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within six hours of emergency department arrival.

MARYLAND ADULT BURN STATISTICS

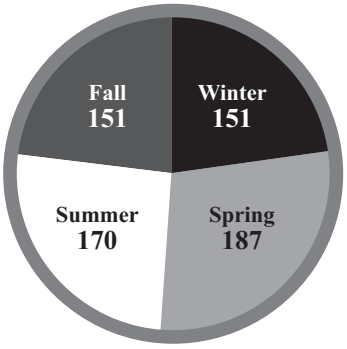
Total Number of Adult Burn Cases

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (3-Year Comparison)
Source: Maryland State Trauma Registry

Institution	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Johns Hopkins Burn Center at Bayview	835	715	659

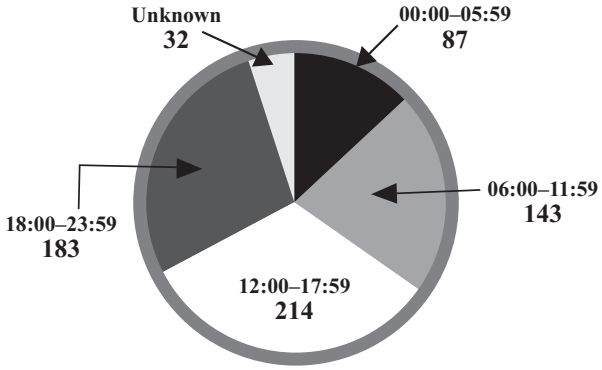
Season of Year Distribution

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry



Time of Arrival Distribution

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry



Place of Injury

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry

Place of Injury	Number
Non-Institutional Private Residence	393
Institutional Private Residence	12
School, Other Institution and Public Administrative Area	5
Street/Highway	17
Trade and Service Area	45
Industrial and Construction Area	17
Other Places	27
Unspecified Places	143
TOTAL	659

Occurrence of Injury by County

Patients Aged Fifteen and Older Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023) Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	2
Anne Arundel County	46
Baltimore County	136
Calvert County	1
Caroline County	6
Carroll County	13
Cecil County	12
Dorchester County	1
Frederick County	14
Harford County	28
Howard County	31
Montgomery County	8
Prince George's County	8
Queen Anne's County	10
Somerset County	3
Talbot County	4
Washington County	7
Wicomico County	9
Worcester County	4
Baltimore City	172
Virginia	2
West Virginia	14
Pennsylvania	18
Delaware	1
Other	4
Not Valued	105
TOTAL	659

Residence of Patients by County

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023) Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	1
Anne Arundel County	56
Baltimore County	161
Calvert County	4
Caroline County	7
Carroll County	21
Cecil County	12
Charles County	1
Dorchester County	3
Frederick County	17
Harford County	35
Howard County	32
Montgomery County	10
Prince George's County	11
Queen Anne's County	8
St. Mary's County	1
Somerset County	4
Talbot County	3
Washington County	10
Wicomico County	11
Worcester County	3
Baltimore City	193
Virginia	2
West Virginia	17
Pennsylvania	23
Delaware	5
Other	8
TOTAL	659

Mode of Patient Transport

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023) Source: Maryland State Trauma Registry

Modality Type	Number
Ground Ambulance	337
Helicopter	32
Other*	253
Not Valued	37
TOTAL	659

**Note: The category "Other" includes patients who were brought in by fixed wing ambulance, private or public vehicles, or were walk-ins.*

Etiology of Injuries by Age

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Other Non-Burn	Not Valued	Total
			Flame	Contact	Scald					
15 to 24 years	2	2	17	14	27	0	2	1	16	81
25 to 44 years	7	5	73	47	103	6	0	2	38	281
45 to 64 years	2	4	57	32	58	6	3	3	30	195
65 years and over	0	1	36	16	24	3	1	0	21	102
Total	11	12	183	109	212	15	6	6	105	659

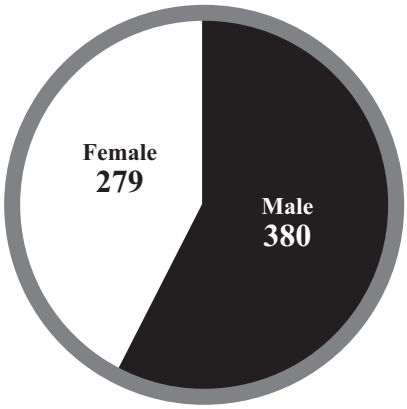
Final Disposition of Patients

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (3-Year Comparison)
Source: Maryland State Trauma Registry

Final Disposition	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Home	689	573	524
Home with Services	65	32	33
Transfer to Another Acute Care Facility	1	0	2
Discharged to Extended Care Facility	0	1	0
Discharged to Alternate Caregiver	1	0	1
Rehabilitation Facility	5	2	5
Skilled Nursing Facility	22	14	25
Psychiatric Hospital	6	5	8
Morgue/Died	8	17	12
Left Against Medical Advice or Discontinued Care	22	19	8
Jail	3	5	5
Hospice	4	2	2
Other	2	0	0
Not Valued	7	45	34
TOTAL	835	715	659

Gender Profile

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry



Number of Injuries by Age

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (3-Year Comparison)
Source: Maryland State Trauma Registry

Age Range	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
15 to 24 years	105	102	81
25 to 44 years	348	267	281
45 to 64 years	270	253	195
65 years and over	112	93	102
TOTAL	835	715	659

MARYLAND PEDIATRIC TRAUMA STATISTICS

Legend Code	
Children's National Health System	CNHS
Johns Hopkins Pediatric Trauma Center	JHP

Total Cases Treated at Pediatric Trauma Centers

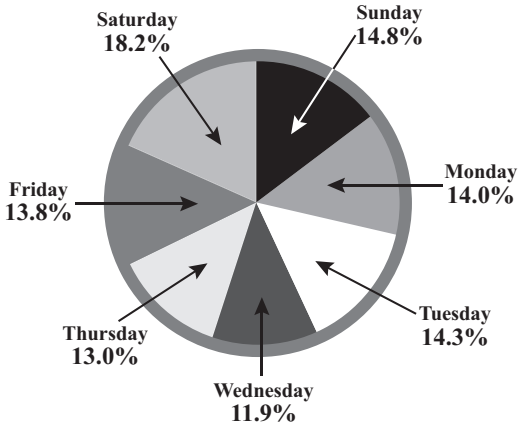
(3-Year Comparison)
Source: Maryland State Trauma Registry

Trauma Center	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
CNHS	826	911	849
JHP	762	894	1027
TOTAL	1,588	1,805	1,876

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Health System data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

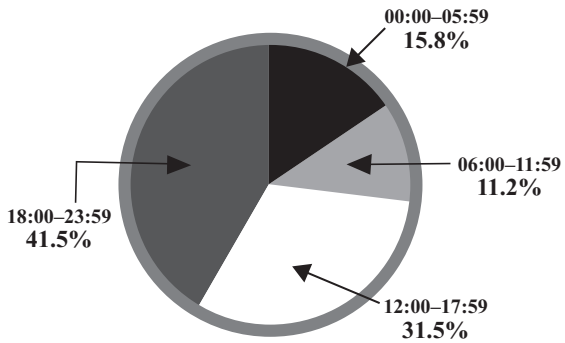
Emergency Department Arrivals by Day of Week: Children Treated at Pediatric Trauma Centers

(June 2022 to May 2023)
Source: Maryland State Trauma Registry



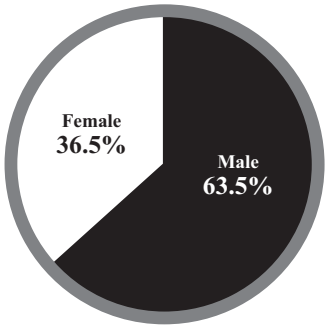
Emergency Department Arrivals by Time of Day: Children Treated at Pediatric Trauma Centers

(June 2022 to May 2023)
Source: Maryland State Trauma Registry



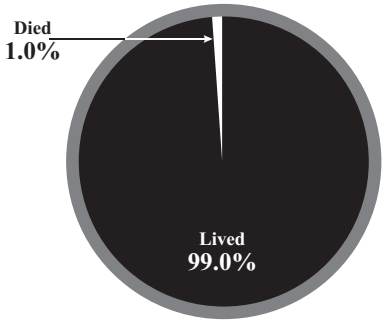
Gender Profile: Children Treated at Pediatric Trauma Centers

(June 2022 to May 2023)
Source: Maryland State Trauma Registry



Outcome Profile: Children Treated at Pediatric Trauma Centers

(June 2022 to May 2023)
Source: Maryland State Trauma Registry



Note: For children who were treated at adult trauma centers, see Maryland Adult Trauma Report. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children that were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Mode of Patient Transport by Center: Scene Origin Cases Only

Children Treated at Pediatric Trauma Centers
(June 2022 to May 2023)
Source: Maryland State Trauma Registry

Modality Type	CNHS	JHP	Total
Ground Ambulance	76.3%	63.3%	67.2%
Helicopter	17.2%	9.5%	11.8%
Other	6.5%	27.2%	21.0%
TOTAL	100.0%	100.0%	100.0%

Note: Only patients brought directly from the scene to a Trauma Center are included in this table. For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Origin of Patient Transport by Center

Children Treated at Pediatric Trauma Centers
(June 2022 to May 2023)
Source: Maryland State Trauma Registry

Origin	CNHS	JHP	Total
Scene of Injury	37.8%	71.8%	56.5%
Hospital Transfer	57.5%	23.4%	38.8%
Other	4.7%	4.8%	4.7%
TOTAL	100.0%	100.0%	100.0%

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Injury Type

Children Treated at Pediatric Trauma Centers
(3-Year Comparison)
Source: Maryland State Trauma Registry

Injury Type	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Blunt	85.2%	86.5%	85.0%
Penetrating	6.8%	4.5%	5.0%
Burn	0.1%	0.0%	0.0%
Near Drowning	1.1%	0.7%	1.1%
Hanging	0.3%	0.4%	0.3%
Ingestion	0.1%	0.1%	0.1%
Crush	0.2%	0.1%	0.1%
Animal Bite/Human Bite	6.2%	7.5%	8.3%
Other	0.0%	0.2%	0.1%
TOTAL	100.0%	100.0%	100.0%

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Mechanism of Injury

Children Treated at Pediatric Trauma Centers
(3-Year Comparison)
Source: Maryland State Trauma Registry

Mechanism of Injury	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Cut/Pierce	3.0%	1.7%	1.8%
Drowning/Submersion	0.9%	0.4%	1.0%
Falls	36.2%	34.2%	30.9%
Firearm	3.0%	2.4%	3.3%
Machinery/Mechanical	0.4%	0.5%	1.4%
MVT - Occupant	21.6%	20.0%	19.6%
MVT - Motorcyclist	0.6%	1.3%	1.0%
MVT - Pedal Cyclist	7.3%	4.5%	4.4%
MVT - Pedestrian	6.6%	8.9%	8.5%
Other Transport	0.3%	0.2%	0.0%
Natural/Environmental	6.9%	8.0%	8.7%
Struck by/Against	6.3%	9.8%	9.8%
Abuse	4.7%	4.1%	5.8%
Other	1.1%	2.3%	1.9%
Not Valued	1.1%	1.7%	1.9%
TOTAL	100.0%	100.0%	100.0%

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Etiology of Injuries by Age

Children Treated at Pediatric Trauma Centers (June 2022 to May 2023)
Source: Maryland State Trauma Registry

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Cut/Pierce	Struck by/ Against	Pedal Cyclist	Other	Total
Under 1 year	4.6%	0.0%	0.0%	15.2%	0.0%	2.9%	1.1%	0.0%	15.3%	8.8%
1 to 4 years	20.8%	0.0%	7.5%	30.0%	9.8%	26.5%	9.7%	6.1%	25.1%	21.1%
5 to 9 years	29.8%	16.7%	31.3%	29.3%	13.1%	26.5%	18.9%	30.5%	24.6%	27.0%
10 to 14 years	34.7%	72.2%	48.7%	20.0%	54.1%	32.3%	45.4%	62.2%	22.6%	32.2%
15+ years	10.1%	11.1%	12.5%	5.5%	23.0%	11.8%	24.9%	1.2%	12.4%	10.9%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Statistics.

Number of Injuries and Deaths by Age

Children Treated at Pediatric Trauma Centers
(June 2022 to May 2023)
Source: Maryland State Trauma Registry

Age	Number of Injured Patients		Number of Deaths	
	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	167	161	5	4
1 to 4 years	395	372	2	2
5 to 9 years	501	474	4	4
10 to 14 years	606	563	7	6
15+ years	207	200	1	1
TOTAL	1,876	1,770	19	17

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Number of Injuries by Age

Children Treated at Pediatric Trauma Centers
(3-Year Comparison)
Source: Maryland State Trauma Registry

Age	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Under 1 year	179	185	167
1 to 4 years	384	365	395
5 to 9 years	442	490	501
10 to 14 years	446	596	606
15+ years	137	169	207
TOTAL	1,588	1,805	1,876

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Number of Deaths by Age

Children Treated at Pediatric Trauma Centers
(3-Year Comparison)
Source: Maryland State Trauma Registry

Age	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Under 1 year	3	5	5
1 to 4 years	5	2	2
5 to 9 years	2	7	4
10 to 14 years	8	4	7
15+ years	2	0	1
TOTAL	20	18	19

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Final Disposition of Patients

Children Treated at Pediatric Trauma Centers
(3-Year Comparison)
Source: Maryland State Trauma Registry

Final Disposition	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Inpatient Rehab Facility	1.8%	1.7%	1.4%
Residential Facility	0.0%	0.1%	0.1%
Specialty Referral Center	0.1%	0.0%	0.0%
Home with Services	0.6%	0.9%	0.6%
Home	93.7%	94.7%	94.6%
Acute Care Hospital	0.8%	0.3%	0.5%
Left Against Medical Advice	0.1%	0.0%	0.1%
Morgue/Died	1.3%	1.0%	1.0%
Left without Treatment	0.0%	0.1%	0.0%
Foster Care	1.1%	0.6%	1.1%
Intermediate Care Facility	0.1%	0.0%	0.0%
Jail	0.0%	0.0%	0.2%
Psychiatric Hospital	0.4%	0.5%	0.3%
Elopement	0.0%	0.1%	0.1%
TOTAL	100.0%	100.0%	100.0%

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Etiology of Injuries by Age

Children Treated at Pediatric Trauma Centers or Adult Trauma Centers (June 2022 to May 2023)
Source: Maryland State Trauma Registry

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Cut/Pierce	Struck by/ Against	Pedal Cyclist	Other	Total
Under 1 year	5.4%	0.0%	0.0%	18.2%	0.0%	8.3%	1.3%	0.0%	16.4%	10.8%
1 to 4 years	21.9%	0.0%	9.6%	33.0%	11.1%	27.8%	13.7%	7.3%	29.9%	24.6%
5 to 9 years	30.8%	21.1%	36.3%	29.9%	14.8%	27.8%	25.0%	29.2%	28.8%	29.5%
10 to 14 years	41.9%	78.9%	54.1%	18.9%	74.1%	36.1%	60.0%	63.5%	24.9%	35.1%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Occurrence of Injury by County: Scene Origin Cases Only

Children Treated at Pediatric Trauma Centers
(June 2022 to May 2023)
Source: Maryland State Trauma Registry

County of Injury	Number
Anne Arundel County	57
Baltimore County	185
Calvert County	17
Caroline County	10
Carroll County	22
Cecil County	4
Charles County	24
Dorchester County	2
Frederick County	13
Harford County	33
Howard County	23
Kent County	7
Montgomery County	57
Prince George's County	175
Queen Anne's County	5
St. Mary's County	19
Somerset County	2
Talbot County	3
Washington County	7
Wicomico County	4
Worcester County	4
Baltimore City	368
Washington, DC	11
Pennsylvania	1
Delaware	1
Not Valued	5
TOTAL	1,059

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. Scene origin cases represent 56.4% of the total cases treated at Pediatric Trauma Centers. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Residence of Patients by County: Scene Origin Cases Only

Children Treated at Pediatric Trauma Centers
(June 2022 to May 2023)
Source: Maryland State Trauma Registry

County of Residence	Number
Anne Arundel County	68
Baltimore County	172
Calvert County	8
Caroline County	7
Carroll County	18
Cecil County	4
Charles County	27
Dorchester County	5
Frederick County	13
Harford County	31
Howard County	23
Kent County	6
Montgomery County	66
Prince George's County	134
Queen Anne's County	5
St. Mary's County	18
Somerset County	1
Talbot County	1
Washington County	7
Wicomico County	4
Worcester City	2
Baltimore City	369
Virginia	6
West Virginia	1
Washington, DC	39
Pennsylvania	11
Delaware	3
Other	10
TOTAL	1,059

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. Scene origin cases represent 56.4% of the total cases treated at Pediatric Trauma Centers. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Children with Protective Devices at Time of Trauma Incident

Children Treated at Pediatric Trauma Centers
(3-Year Comparison)
Source: Maryland State Trauma Registry

Protective Device	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
None	45.0%	45.8%	46.3%
Seatbelt	4.5%	3.9%	2.9%
Airbag & Seatbelt	15.2%	18.9%	16.5%
Airbag Only	10.1%	9.9%	11.3%
Infant/Child Seat	13.1%	10.9%	12.2%
Protective Helmet	11.8%	10.2%	10.2%
Padding/Protective Clothing	0.0%	0.2%	0.3%
Other Protective Device	0.3%	0.2%	0.3%
TOTAL	100.0%	100.0%	100.0%

Note: Children were involved in motor vehicle, motorcycle, bicycle, and sports-related incidents only. For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Hospital data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

MARYLAND PEDIATRIC BURN STATISTICS

Total Number of Pediatric Burn Cases

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (3-Year Comparison)
Source: Maryland State Trauma Registry

Institution	Legend Code	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Children's National Health System Pediatric Burn Center	CNHSPBC	276	263	231
Johns Hopkins Pediatric Burn Center	JHPBC	330	321	380
Johns Hopkins Burn Center at Bayview	JHBC	1	41	42
TOTAL		607	625	653

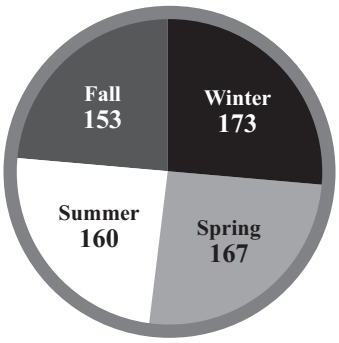
Place of Injury

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry

Place of Injury	Number
Non-Institutional Private Residence	566
School, Other Institution and Public Administrative Area	10
Sport and Athletic Areas	3
Street/Highway	10
Trade and Service Area	7
Farm	3
Other Places	21
Unspecified Places	33
TOTAL	653

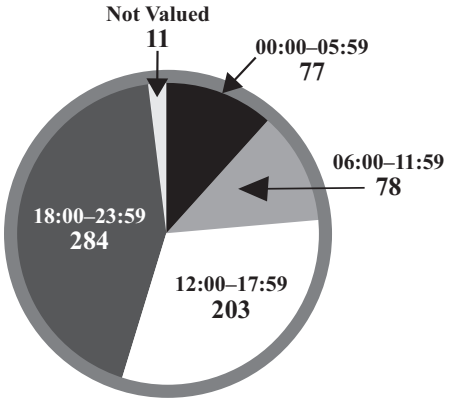
Season of Year Distribution

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry



Time of Arrival Distribution

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry



Occurrence of Injury by County

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry

County of Injury	Number
Anne Arundel County	40
Baltimore County	97
Calvert County	4
Caroline County	2
Carroll County	12
Cecil County	4
Charles County	11
Dorchester County	4
Frederick County	18
Harford County	17
Howard County	16
Montgomery County	90
Prince George's County	103
Queen Anne's County	4
St. Mary's County	11
Somerset County	1
Washington County	5
Wicomico County	8
Worcester County	2
Baltimore City	138
Virginia	4
West Virginia	1
Pennsylvania	6
Washington, DC	1
Delaware	1
Other	2
Not Valued	51
TOTAL	653

Residence of Patients by County

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry

County of Residence	Number
Anne Arundel County	41
Baltimore County	105
Calvert County	5
Caroline County	2
Carroll County	15
Cecil County	5
Charles County	10
Dorchester County	3
Frederick County	18
Harford County	21
Howard County	21
Montgomery County	89
Prince George's County	102
Queen Anne's County	4
St. Mary's County	10
Somerset County	1
Washington County	5
Wicomico County	8
Worcester County	1
Baltimore City	156
Virginia	5
West Virginia	1
Washington, DC	5
Pennsylvania	5
Delaware	4
Other	11
TOTAL	653

Mode of Patient Transport to Burn Center

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry

Modality Type	CNHSPBC	JHPBC	JHBC	Total
Ground Ambulance	82	164	2	248
Helicopter	5	11	0	16
Other*	144	205	40	389
TOTAL	231	380	42	653

**Note: The category "Other" includes patients who were brought in by fixed wing ambulance, private or public vehicles, or were walk-ins.*

Origin of Patient Transport by Burn Center

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry

Origin Type	CNHSPBC	JHPBC	JHBC	Total
Scene of Injury	91	165	21	277
Hospital Transfer	70	157	0	227
Other	66	47	21	134
Not Valued	4	11	0	15
TOTAL	231	380	42	653

Etiology of Injury by Age of Patients

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Unknown	Total
			Flame	Contact	Scald				
Under 1 year	0	0	1	17	28	0	3	3	52
1 to 4 years	4	3	12	123	160	3	3	9	317
5 to 9 years	6	2	10	61	68	5	0	4	156
10 to 14 years	1	0	21	25	36	2	6	2	93
15 years and over	2	0	8	9	10	1	1	4	35
Total	13	5	52	235	302	11	13	22	653

Final Disposition of Patients

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (3-Year Comparison)
Source: Maryland State Trauma Registry

Final Disposition	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Home	571	585	603
Home with Services	20	14	15
Transfer to an Acute Care Facility	0	10	14
Rehabilitation Facility	4	4	1
Skilled Nursing Facility	2	0	0
Morgue/Died	1	4	4
Left Against Medical Advice	1	0	7
Alternate Caregiver	4	3	2
Foster Care	2	2	5
Transfer to Inpatient Psychiatric Facility	1	2	1
Not Valued	1	1	1
TOTAL	607	625	653

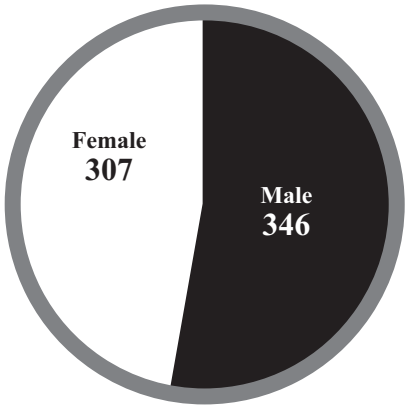
Total Body Surface Area (TBSA) Burned by Length of Stay in Days

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022 to May 2023)
Source: Maryland State Trauma Registry

Length of Stay	Less Than 10% TBSA	10 - 19% TBSA	20% or Greater TBSA	Not Valued	Total
1 Day	432	6	3	57	498
2 - 3 Days	54	4	0	13	71
4 - 7 Days	33	6	1	2	42
8 - 14 Days	8	7	1	1	17
15 - 21 Days	1	3	1	0	5
22 - 28 Days	0	1	0	1	2
Over 28 Days	0	0	0	0	0
Not Valued	16	0	0	2	18
TOTAL	544	27	6	76	653

Gender Profile

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2022to May 2023)
Source: Maryland State Trauma Registry



Number of Injuries by Age

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (3-Year Comparison)
Source: Maryland State Trauma Registry

Age Range	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Under 1 year	69	69	52
1 to 4 years	325	308	317
5 to 9 years	119	137	156
10 to 14 years	74	76	93
15 years and over	20	35	35
TOTAL	607	625	653

Number of Patients Treated at the Pediatric Burn Clinics at Johns Hopkins Pediatric Center and Children's National Hospital

(3-Year Comparison)
Source: Maryland State Trauma Registry

	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Unique Patients	718	790	763
Total Pediatric Burn Clinic Visits	1,383	1,548	1,479

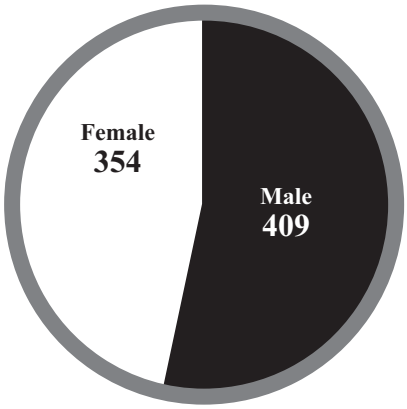
Number of Patients by Age Treated at the Burn Clinics at Johns Hopkins Pediatric Center and Children's National Hospital

(3-Year Comparison)
Source: Maryland State Trauma Registry

Age Range	June 2020 to May 2021	June 2021 to May 2022	June 2022 to May 2023
Under 1 year	70	77	68
1 to 4 years	381	399	375
5 to 9 years	146	165	170
10 to 14 years	92	105	102
15 years and over	29	44	48
TOTAL	718	790	763

Gender Profile

Patients Treated at the Pediatric Burn Clinics at Johns Hopkins Pediatric Center and Children's National Hospital (June 2022 to May 2023)
Source: Maryland State Trauma Registry

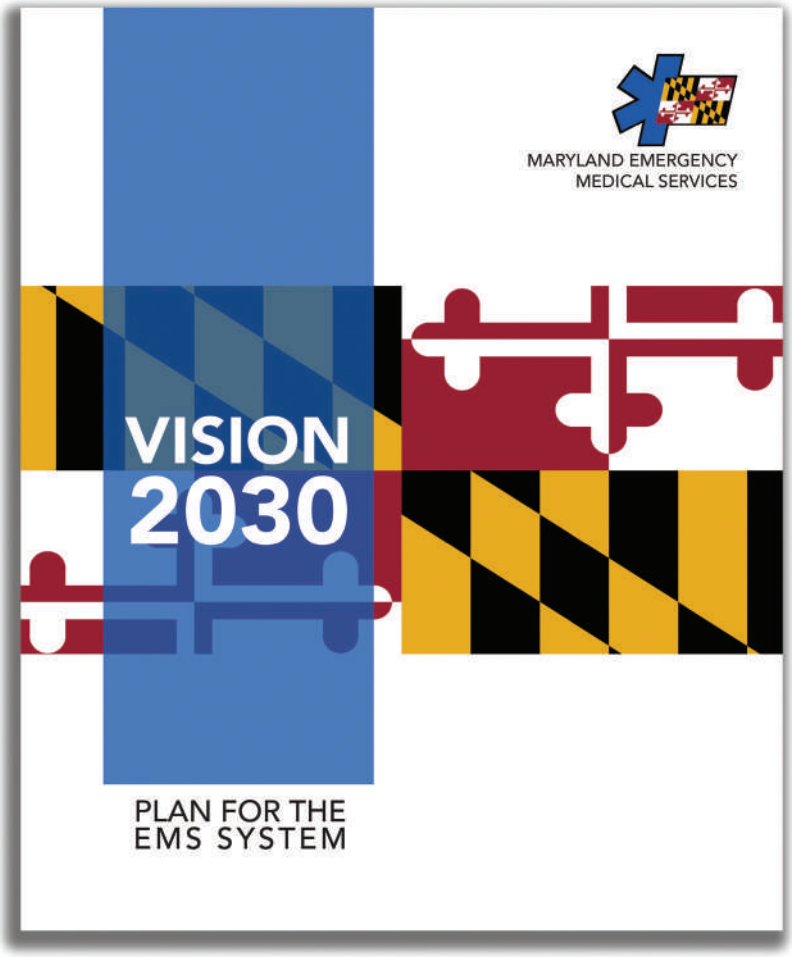


Etiology of Injuries by Age

Patients Treated at the Pediatric Burn Clinics
At Johns Hopkins Pediatric Center and Children's National Medical Center (June 2022 to May 2023)
Source: Maryland State Trauma Registry

			Thermal							
Age Range	Electrical	Chemical	Flame	Contact	Scald	Inhalation	Other Burn	Other Non-Burn	Unknown	Total
Under 1 year	0	1	0	23	36	0	6	0	2	68
1 to 4 years	0	0	14	166	184	0	7	0	4	375
5 to 9 years	1	1	14	75	70	1	5	0	3	170
10 to 14 years	0	0	13	36	42	0	8	0	3	102
15 years and over	3	1	9	11	22	0	0	1	1	48
Total	4	3	50	311	354	1	26	1	13	763

EPILOGUE



Consistent with Maryland law and guided by the Vision 2030 as our roadmap, MIEMSS strives to fulfill its mission of reducing preventable deaths, disability, and discomfort among the citizens and visitors of Maryland. For questions regarding any of MIEMSS' services and functions please visit www.MIEMSS.org.

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Wes Moore

LIEUTENANT GOVERNOR

Aruna Miller

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Maryland Institute for Emergency Medical Services Systems (MIEMSS)

Theodore R. Delbridge, MD, MPH, FACEP, FAEMS – Executive Director
653 W. Pratt Street, Baltimore, MD 21201-1536


MARYLAND EMS
50
YEARS
1973 - 2023