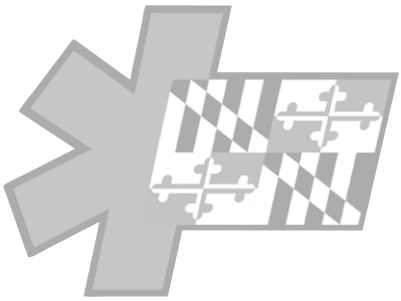
Maryland Institute for
Emergency Medical Services Systems

2020 ANNUAL REPORT

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.



2019-2020 ANNUAL REPORT

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MISSION, VISION, AND KEY GOALS

MISSION

Consistent with Maryland law and guided by the EMS Plan, to provide the resources (communications, infrastructure, grants, and training), leadership (vision, expertise, and coordination), and oversight (medical, regulatory, and administrative) necessary for Maryland's statewide emergency medical services (EMS) system to function optimally and to provide effective care to patients by reducing preventable deaths, disability, and discomfort.

VISION

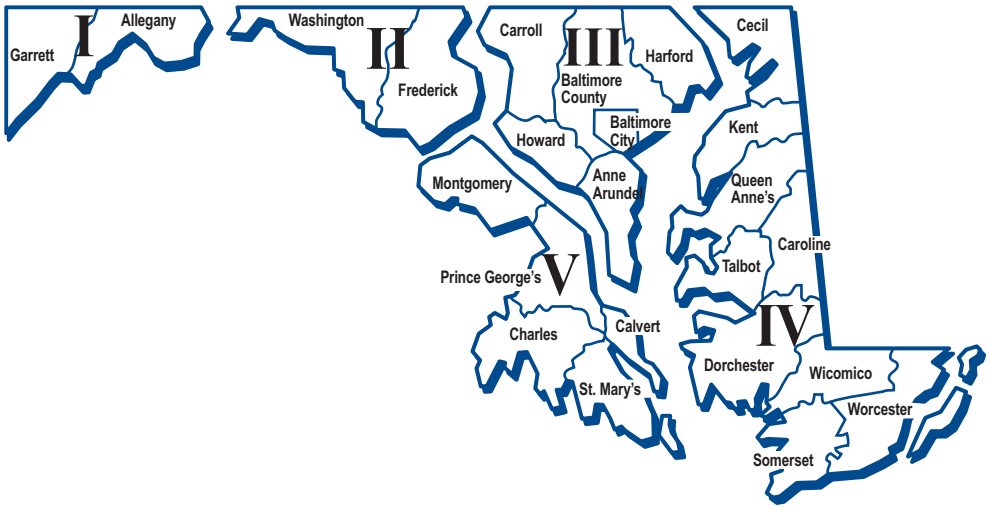
To be a state EMS system acknowledged as a leader for providing the highest quality patient care and that is sought out to help other EMS systems attain the same level of quality care.

KEY GOALS

- Provide high quality medical care to individuals receiving emergency medical services.
- Maintain a well-functioning emergency medical services system.

MARYLAND EMS REGIONS

Maryland's EMS system is composed of five regions. Each region has a Regional EMS Advisory Council composed of members who have an interest in EMS. Council responsibilities are defined by regulation, and council meetings typically cover 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 administrators support the councils, facilitate communication, and address regional EMS issues.



Clay B. Stamp, NRP
Chairman, EMS Board

FROM THE MARYLAND EMS BOARD CHAIR

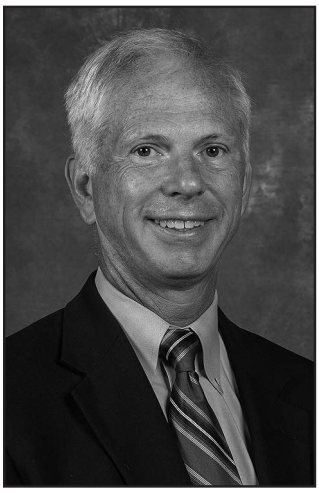
As I draft these remarks in 2020, we find ourselves in the midst of some very challenging times as a nation, as states, and as communities. The COVID-19 pandemic has thrust the medical sector into overdrive in dealing with not only highly contagious patients, but also an increasingly divided public who challenge the validity of protective measures. Collaterally, the loss of employment and the cancellation of events and activities is driving economic uncertainties.

All this being said, Maryland Emergency Medical Services continue to do what we do best – responding to the needs of our patients, ensuring they are provided with the best possible treatment, and delivering the most appropriate level of care in a timely manner. Additionally, we have witnessed firsthand the benefits of having a coordinated statewide EMS system, especially during these times.

We can all be proud of the work of our MIEMSS Executive Director, State EMS Medical Director, the MIEMSS staff, and our emergency medical services partners, all of whom have been working hand in hand with the Maryland Department of Health and the Maryland Emergency Management Agency to coordinate and support the expansion of medical surge capacity and efforts to ensure our EMS clinicians have access to the right protection and operational guidance during the COVID-19 pandemic.

On another note, the updated Maryland Emergency Medical Services Vision 2030 plan for the EMS system, developed with input from our clinicians, operational programs, regional councils, EMS partner agencies and organizations, is set to provide us, collectively, with a roadmap for the future – a roadmap to ensure that, as a statewide system, we are developing research, advancing evidenced-based protocols, embracing technology, and leveraging partnerships to deliver highly effective care and transport to those utilizing the Maryland EMS system.

Finally, as the people of Maryland continue to express the importance of our statewide EMS system, and through the support of our Governor, our legislature, and local governments, we must continue to work together to not only maintain our system, but also to seek out innovation and creativity to ensure we achieve our most important goal, which is to save lives.



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

FROM THE EXECUTIVE DIRECTOR

There is no doubt that the strength of Maryland EMS is, primarily, a reflection of the thousands of people who share their dedication and expertise, standing at the ready. In many ways, the year has been overshadowed by the challenges of COVID-19. However, other important things have occurred.

In 2019, we, the EMS system, embarked on creating a new plan for ourselves. Over the course of several months, literally hundreds of EMS clinicians, subject matter experts, and EMS stakeholders pooled their knowledge and perspectives to work on Vison 2030. A highlight of the effort was the EMS Vision 2030 Summit held in December in Annapolis. More than 200 people from across the state came together to share ideas and establish paths for future development. The result of that effort, and subsequent work by the steering committee and all who offered comments, is a plan for Maryland's EMS system in which we can all play a part. EMS Vision 2030 was adopted by the Maryland EMS Board and is available to all.

We convened the inaugural meeting of the Collaborative for Hospital Emergency Services (CHES). Nearly every hospital was represented, and any who missed the first meeting have subsequently joined the discussions. Why is this important? When we focus exclusively on specific injuries, illnesses, and patient groups, we can easily miss the big picture. The most frequent and robust interactions between field EMS clinicians and any other aspect of the healthcare system are their partners in the emergency departments. It is only appropriate to ensure that those partners have a forum and opportunity to connect with each other, to share ideas, to express concerns, and to engage in innovation. It is through CHES and a subgroup of its members that we are able to establish a more reliable, objective-based emergency department advisory system. Work in this regard continues, albeit at a slower pace than had been anticipated earlier in the year. It is very clear, however, that a new solution is desired, needed, and forthcoming.

This annual report could be easily defined by COVID-19. To do so, however, would be to overlook all the many unrelated, or in despite of, accomplishments of the EMS system and its many contributing partners. Indeed, some achievements and contributions are directly related to the COVID-19 response. We saw, across Maryland, a decrease in overall EMS activity, but patient acuity increased. For example, the per capita rate of out-of-hospital cardiac arrest increased. While travel decreased, as did the number of motor vehicle crashes, their severity seemed greater. No matter, the EMS system, and the dedicated people who comprise it, rose to every challenge, even in the face of many unknown factors.

The EMS Board and MIEMSS were given quite a bit of flexibility to prepare for and respond to the pandemic by way of an Executive Order from the Governor. Among the things we did was to provide a provisional credential to EMS clinicians who previously lapsed, were students at the conclusion of classes, and people eligible for expedited reciprocity. Nearly 1,200 EMS clinicians received provisional credentials. New regulations now provide a path for them to be credentialed in the regular stream, and dozens of people have initiated that process. What is telling of this group, and typical of Maryland's EMS clinicians in general, is that they said, "We see a problem coming; we want to help."

I would be remiss if I didn't use this opportunity to acknowledge my colleagues at MIEMSS and their incredible work to ensure that the EMS system was considered in the response to COVID-19 and that it was cared for. They have spent countless hours in coordination meetings at all levels of state government. They have managed, literally, truckloads of personal protective equipment to ensure it got to EMS clinicians throughout the state. They have kept abreast of the latest information and guidance, and tried to ensure that all EMS agencies and programs had the best information. They have coordinated the availability of COVID-19 testing materials for first responders. With help from the Maryland Department of Health, the goal has been to make testing available to keep people functioning in the system and help them address concerns for their own health. Finally, they have coordinated daily data acquisition from hospitals and field EMS. This information is being used to monitor the pandemic in real time, validate health system models, and facilitate governmental planning for recovery efforts. It is impossible to overestimate the value of a single patient care record and the collective information to which it contributes.

This truly has been a year of unprecedented challenge. This report captures the response to some of those challenges. Moreover, it encapsulates great accomplishments on behalf of hundreds of thousands of Marylanders and visitors to our state. All of the people of Maryland's EMS system should be proud!

MIEMSS DEPARTMENTAL REPORTS

ADMINISTRATION

Mission

To provide comprehensive accounting, personnel, and administrative resources in compliance with all applicable state laws, regulations, and policies in support of MIEMSS operations and overall mission.

Administration is responsible for the accounting, procurement, grant administration, and human resources functions of MIEMSS. All human resources functions are currently assigned to the Maryland Department of Budget and Management's Personnel Unit, under the guidance of MIEMSS' chief administrative officer.

The Accounting Unit provides guidance to management on various fiscal and budgetary matters. The staff develops the budget, tracks and monitors expenditures, processes accounts payables and receivables, maintains employee leave and payroll records, and deposits cash receipts. They also administer special, federal grant, and reimbursable fund appropriations.

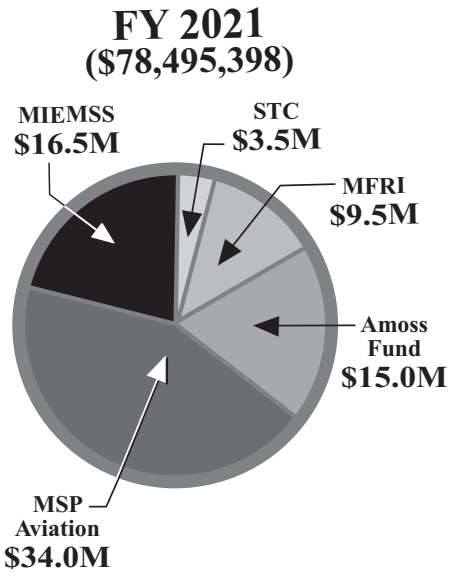
The Procurement Unit obtains all necessary supplies, materials, and services required by MIEMSS to fulfill its mission in accordance with all applicable state procurement laws and regulations. The unit is also responsible for contract and grant administration. Administration is also responsible for inventory control, fleet management, travel services, and building operations and maintenance.

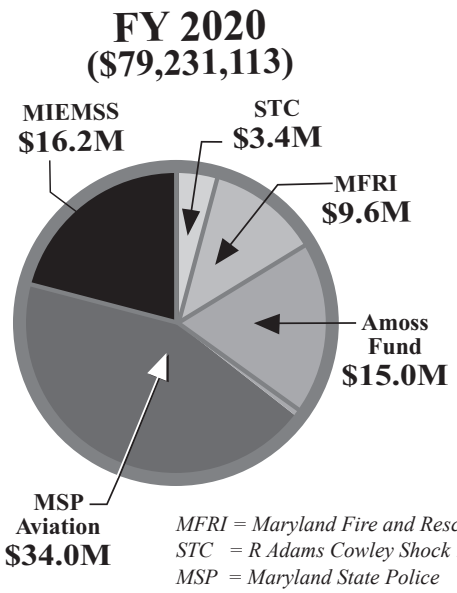
MIEMSS budget information is displayed by state object code in the chart to the right. The distribution of EMS operations funds statewide is shown below.

MIEMSS FY 2020
Expenditure by Object Code
(Includes All Funds)

FY 2020	Actual
Salaries and Wages	$9,756,186
Technical/Special Fees	1,691,410
Communication	2,417,190
Travel	358,600
Fuel and Utilities	121,046
Motor Vehicle Operations and Maintenance	241,662
Contractual Services	3,042,005
Supplies and Materials	352,248
Equipment—Replacement	134,788
Equipment—Additional	19,605
Fixed Charges	171,129
Grants	1,242,491
Land and Structures	9,978
Total Expenditure	**$19,558,338**

EMS Operations Fund





MFRI = Maryland Fire and Rescue Institute
STC = R Adams Cowley Shock Trauma Center
MSP = Maryland State Police

AEROMEDICAL OPERATIONS

Mission

To provide the physician medical support necessary to the Maryland State Police Aviation Command to meet the emergency helicopter needs of Maryland's citizens. State Aeromedical Director Douglas J. Floccare, MD, MPH, FACEP, is actively involved in ongoing training and verification of skill proficiency for state police flight paramedics. Dr. Floccare provides around-the-clock consultation support to SYSCOM for medevac requests and medical direction and is actively involved in the development of new patient care protocols and the oversight of ongoing care.

In FY 2020, the Maryland State Police Aviation Command (MSPAC) transported 1,759 patients. Of these patients, 1,749 (99%) were transported from the scene at the request of the local emergency services and 10 (1%) were transported between hospitals to a higher level of care.

Types of calls included the following:

- Motor vehicle crashes. 676
- Falls 386
- Pedestrians 80
- Gunshot wounds. 45
- Stabbings 43
- Burns 39
- Assaults. 29
- Industrial injuries 22

The MSPAC saw continued successful use of 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 done 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.

Sophisticated transport ventilators continued to add to our treatment capabilities for our sickest patients in FY 2020, allowing early initiation of lung-protective ventilation while using cutting-edge strategies to maintain blood pressure until patients can reach the operating room. FY 2020 also saw the continued participation of the MSPAC in the adult and pediatric rapid sequence intubation (RSI) pilot programs as defined in *The Maryland Medical Protocols for Emergency Medical Services*. Designed to address the needs of patients with severe head injuries, these pilot RSI protocols allow MSPAC flight paramedics to use neuromuscular blocking agents in the field to provide endotracheal intubation for patients who are not breathing adequately. To verify advanced skill proficiency, scenario-based simulation training was used. These exercises, also used for recertification in Advanced Cardiac Life Support and Pediatric Advanced Life Support training, allowed life-like simulation of patient care situations as would be faced by MSPAC flight paramedics in the course of their normal duties.

ATTORNEY GENERAL'S OFFICE

Mission

To provide 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. The Attorney General's Office also 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.

During the past fiscal year, the Attorney General's Office continued to support MIEMSS in promulgating and implementing the agency's regulations, procurement, personnel matters, and contracts, including technology initiatives. The office also assisted in the administration of several state and federal grant programs.

In FY 2020, the Attorney General's Office provided the following services to MIEMSS:

- Reviewed and prosecuted 20 cases of alleged prohibited acts by EMS clinicians and applicants, including two summary proceedings;
- Provided legal advice and support to the State Office of Commercial Ambulance Licensing and Regulation in all compliance matters, including contested cases;

- Prepared responses to 206 public information act requests, six subpoenas, and eight research requests.

Assistant attorneys general worked with MIEMSS in FY 2020 to amend various regulations, including designation standards for Comprehensive Stroke Centers and Acute Stroke Ready Centers, as well as regulations setting out requirements for the transition from provisional licensure to full licensure. They also provided advice on actions taken by the agency under the authority granted in various Emergency Declarations issued by the Governor.

Also in FY 2020, the assistant attorneys general helped prepare several information technology procurements, including, software maintenance agreements, and business associate agreements under the Health Insurance Portability and Accountability Act (HIPAA).

Other tasks completed included providing advice on MIEMSS' social media policy, various intellectual property issues, reviewing interagency memorandums of understanding, and reviewing and providing advice concerning designation of trauma and specialty referral centers and base stations. The assistant attorneys general also provided advice and support by reviewing two applications for conversion of a hospital to a freestanding emergency medical facility, specifically as to whether the hospitals will maintain adequate and appropriate delivery of emergency care within the statewide EMS system.

The assistant attorneys general participated in training for Quality Assurance Officers and s[SS2]erved on the Maryland Health Information Exchange Policy Board, the Governor's Inter-Agency Heroin and Opioid Coordinating Council, and the Attorney General's Opioid/Heroin Work Group, as well as subcommittees drafting the EMS Plan. Additionally, the assistant attorneys general provided an orientation for new members of the EMS Board.

This office routinely provides support to the Perinatal Advisory Committee and the Perinatal Referral Center reverification process, the Commercial Ambulance Services Advisory Committee, and the Pediatric Emergency Medical Advisory Committee. Assistant attorneys general also help the Office of Hospital Programs to monitor specialty referral centers for compliance with their requirements and the Office of Licensure and Certification to enforce EMS education program standards.

The Maryland Orders for Life-Sustaining Treatment (MOLST) program, which provides patients with the legal means for communicating medical care wishes to EMS and other healthcare professionals, is supported by the Attorney General's Office. The MOLST form may be downloaded by the public for use, and MIEMSS provides copies to individuals without access to the internet. MIEMSS also provides plastic bracelets for use with any MOLST insert to the public, free of charge. Additionally, MIEMSS routinely responds to phone calls and emails from the public for assistance in obtaining and using the MOLST form. MIEMSS also serves as a resource for healthcare clinicians regarding implementation of MOLST.

COMMERCIAL AMBULANCE LICENSING AND REGULATION

Mission

To provide leadership and direction to support the operations and growth of Maryland's commercial ambulance industry. Protecting the health, safety, and welfare of persons using these services is achieved 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 2020, 37 commercial ambulance services and 450 commercial ambulance units held licenses issued by the State Office of Commercial Ambulance Licensing and Regulation (SOCALR). (See page 79 for additional statistics on SOCALR licensing and operations.)

To fulfill its own mission, SOCALR remains efficient and responsive in providing service and vehicle licensure, and offers sound leadership and direction to the industry, while ensuring patient and clinician health, safety, and welfare. In doing so, SOCALR remains continuously committed to MIEMSS' organizational mission and vision. The department continues to seek opportunities to streamline internal business processes and develop strategies to enhance records management.

Based on continuous positive feedback from licensed commercial services, SOCALR continues to maintain a year-round licensure renewal schedule. As disruptions caused by the COVID-19 pandemic continue to challenge business and industry around the globe, the SOCALR team has leveraged technology to devise a remote virtual inspection (RVI) process to continue to meet the needs of commercial ambulance customers in and around Maryland. SOCALR continues to use the Commercial Ambulance Inspection Program (CAIP), a web-based application implemented in FY 2019, to conduct these RVIs.

The web-based Commercial Ambulance Licensing System (CALS) continues to serve as the platform in which applications are processed and commercial service data is stored. The system provides a real-time snapshot of the commercial resources in Maryland,

resulting in expedited data retrieval. Commercial service base surveys were ongoing throughout FY 2020. These surveys were conducted by a team of personnel from SOCALR, who provided follow-up reports outlining any corrective actions necessary to maintain COMAR Title 30.09 compliance.

The statewide Neonatal Transport Stakeholders Workgroup finalized their review of the neonatal transport personnel training and equipment requirements in FY 2020. As a result of this effort, a final draft of the COMAR neonatal transport regulations has been submitted for approval.

The SOCALR team remains committed to supporting the MIEMSS Field Operations Support Team (FOST), assisting with emergency operations efforts throughout the state, and coordinating commercial resources when disasters strike. During the last quarter of FY 2020, SOCALR played an integral role in the planning and coordination of the agency's response to the COVID-19 pandemic. Data was collected from commercial services on a daily basis to capture a near-real-time snapshot of PPE resources on hand, and unit availability. This data was used to allocate scarce PPE resources to commercial services as they became available. Through collaborative efforts with the Maryland Department of Health, SOCALR managed the operations of an ambulance strike team that was assembled for 24/7 statewide response during the COVID-19 pandemic.

SOCALR continues to work closely with commercial services and third-party ePCR vendors to ensure the smooth import of data from those platforms. During the second half of FY 2020, SOCALR personnel developed a set of criteria for use in the routine review of commercial service electronic patient care reports. Reports are randomly reviewed for completeness, and to verify the receipt of data from services that import from third-party vendors.

COMMUNICATIONS ENGINEERING SERVICES

Mission

To provide the equipment, support, and expertise necessary to operate the statewide EMS communications systems and to support public safety interoperability.

Communications Upgrade Project (CUP)

Since the approval of the Detailed Design Review (DDR) in June 2019, Overland Contracting Inc. (OCI) has been working with their subcontractors to procure the equipment and services to begin the Phase 1 deployment in MIEMSS Region V, which covers Frederick, Montgomery, Prince George's, Calvert, Charles, and St. Mary's Counties. After delivery of the equipment, the Radio-over-IP (ROIP) adapters that convert analog UHF Base Stations to the digital system and connect EMRC to the various county radio systems were deployed at radio communications tower sites between late October and continued through June. Additionally, the MIEMSS staff received technician training on the new microwave equipment in a staging location in North Carolina. The COVID-19 pandemic has impacted the communications upgrade project and daily operations as we struggle with keeping our staff safe while continuing forward momentum on the project.

Public Safety Microwave System

The MIEMSS Communications Engineering Services Department continues its leadership role in the design, implementation, and maintenance of the Statewide Public Safety Microwave System, a critical component of EMS communications in Maryland. In addition to supporting MIEMSS, this microwave system supports state public safety agencies such as the Maryland State Police (MSP); Maryland Department of Natural Resources (DNR); Maryland State Highway Administration (SHA); many county public safety radio systems; and numerous other state and federal partners, including the statewide 700 MHz radio system project (MFiRST).

Maryland FiRST: Statewide 700 MHz Radio System

MIEMSS remains an active partner in the Maryland First Responder Interoperable Radio System Team (MFiRST) program. MIEMSS serves as a member of the Radio Control Board, which is responsible for coordinating the operation and maintenance of the Statewide Public Safety Interoperability Radio System. The agency also participates on the state's Radio Control Board's Operations Committee.

MIEMSS has the necessary interfaces to the MFiRST radio system to enable all Maryland jurisdictions to leverage the MFiRST system for medical consultation. These interfaces support field clinicians operating on the MFiRST system, allowing them to obtain medical direction via the EMRC. The MFiRST's final phase in Southern Maryland is still in progress, with an anticipated completion date in 2021.

MIEMSS continues to expand its network monitoring and alarm monitoring systems to enable staff to be more efficient and to affect system repairs quickly and decisively. A major milestone was reached by the addition of Western and Southern Maryland NetGuardian alarm panels into the alarm system. Work continues to integrate the MFiRST system alarms into the MIEMSS master alarm system, providing 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.

Under an agreement with DNR, MIEMSS, and the MFiRST project, a new tower was constructed at Warrior Mountain in Allegany County to replace an existing MIEMSS tower nearby. As part of that agreement, all parties' antenna systems were installed on the new tower by MFiRST. The antenna work was successfully completed in June and MIEMSS has relocated our UHF Base Station equipment to the site and placed them into operation. This paves the way for MFiRST to complete its obligation to remove the old tower and shelter.

While it is expected that MSP aviation communications will migrate completely to the MFiRST system, it will be at least another year before there is statewide coverage for medevac helicopters. MIEMSS continues to support the VHF low-band system to allow MSP aviation to communicate across the state. With the assistance of the MSP Electronic Services Division (ESD), MIEMSS advocated for the adoption of MFiRST talkgroups and conventional 700 MHz frequencies by the Delaware State Police (DSP) Aviation Division last year to provide seamless interoperability with Delaware's fleet when it operates in Maryland. In addition, MIEMSS and ESD successfully promoted the creation and adoption of Aviation talkgroups (AVTacs) on MFiRST, which are utilized to create a common gateway between Maryland counties and aviation resources. To date, Talbot, Cecil, Queen Anne's, Kent, Harford, Allegany, Garrett, Dorchester, and Cecil Counties have adopted the use of the AVTacs, greatly benefitting the EMS continuum of care. Many other counties are considering or have committed to adopting these talkgroups as the MFiRST system completes its deployment.

Public Safety Interoperability Network

Communications Engineering Services continues to deploy, administer, and maintain 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 is being implemented, and it is vital to MIEMSS' future operations. It is a network deployed across the state and provides connectivity into MSP 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 concert with the communication upgrade project, MIEMSS has continued its strategic plan to replace older equipment in key locations in support of the project.

In concert with Baltimore County's upgrades to their legacy T1-based microwave backhaul, MIEMSS communications staff have converted our interfaces on their microwave system to Ethernet-based connections. These connections directly support the CMARC radio system and MIEMSS connectivity to key hospitals and public safety facilities. The next step in this transformation will be to integrate with the Baltimore County Multiprotocol Label Switching (MPLS) network to speed up network communications.

Based on a requirement by Motorola that jurisdictional radio systems convert to Ethernet-only backhaul, Communications Engineering Services worked closely with Prince George's County as they convert their microwave backhaul to an MPLS platform. The department staff successfully transitioned to the MPLS network and removed all legacy interfaces to Prince George's system.

Communications Systems Maintenance and Improvements

While analog technologies have served the EMS communications system and MIEMSS reliably since the early 1990s, most of the critical technology systems supporting this system have become outdated and, correspondingly, increasingly prone to failure. The risk of system failure is further exacerbated by difficulty in securing vendor support for these critical, outdated systems. The Communications Upgrade Project (CUP) will remove many of these vulnerabilities.

While Communications Engineering Services 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.

Communications Engineering Services accomplished many other notable system enhancements and conducted several other projects in FY 2020:

• Dan's Rock tower site relocation completed

- Lusby tower site relocation completed
- Mt. Hope Lusby tower site relocation completed
- Barstow tower site relocation completed
- Increased propane site monitoring
- Upgraded numerous microwave power and battery systems throughout the state to ensure reliable backup power for critical systems, and established remote control and monitoring capabilities for the power systems
- Continued support for local 9-1-1 centers through active participation on the Emergency Number Systems Board (ENSB)
- Montgomery EOB to Mt. Airy microwave backhaul upgrade
- Vienna to Princess Anne MSP microwave backhaul upgrade
- LaPlata SHA to Waldorf microwave backhaul upgrade
- Rt. 40 to Pikesville microwave backhaul upgrade
- Pikesville to Sinai microwave backhaul upgrade
- Barstow to PF MSP microwave backhaul upgrade
- Implemented an alternative connection to St. Joseph and GBMC Hospitals due to Verizon Copper Retirement in Central Maryland
- Develop new internet-based EMRC connectivity for White Oak Medical Center as an interim gap until the communications upgrade project installs the licensed microwave connection
- Work with University of Maryland Capital Regional Medical Center (UMCRMC) to construct a new microwave connection in preparation for the opening of the facility in 2021

Communications Engineering Services was successful in completing many important projects while managing constantly changing priorities at the local and state level in FY 2020. The COVID-19 pandemic has increased the difficulty in performing many duties as we try to balance the demands of the job and maintain a safe work environment for all employees. Because of the COVID-19 pandemic, the department is further hampered by the realities of changing work environments internally and with our public safety and health partners.

MIEMSS will continue to migrate systems to new, more resilient technologies that enhance services provided to the EMS community. As in past years, none of this year's successes would be possible without the dedicated staff in Communications Engineering Services and our public safety partners. Unfortunately, MIEMSS lost a critical staff member, our EMS Systems Engineer, this year due to retirement, as well as two other staff members to other job opportunities, leaving the department at one-third of our staffing level. As in years past, the department continues to struggle with meeting an increased workload with a decreased staffing level exacerbated by the state hiring freeze.

COMPLIANCE OFFICE

Mission

To ensure the health, safety, and welfare of the public as it relates to the delivery of emergency medical services by EMS clinicians throughout Maryland. To that end, the Compliance Office is responsible for ensuring quality of patient care by investigating complaints and allegations of prohibited conduct.

The Compliance Office works closely with the EMS Board, the Attorney General's Office, the Incident Review Committee (IRC), the Peer Review Panel (PRP), and EMS operational program (EMSOP) quality assurance officers statewide. The PRP is a 13-member panel comprised of physicians representing the Maryland Board of Physicians, Maryland Medical Chirurgical Society, and EMSOP medical directors. All levels of EMS clinicians are represented on this panel. The PRP reviews complaints, as well as the results of the investigations presented by the Compliance Office, and recommends corrective and disciplinary actions to the EMS Board. The State EMS Medical Director and MIEMSS Executive Director serve as ex-officio members on the PRP.

- **FY 2020 Compliance Office Activity**
  - JEMSOP reverification applications reviewed .. 15
  - Crim. background investigations completed .. 10,130
  - Incidents reported to IRC 151
  - IRC investigations initiated 191
  - IRC investigations conducted 171
  - IRC investigations (FY 2019) continued 20
  - IRC complaints forwarded to PRP 20
  - Complaints dismissed by PRP 0
  - Complaints forwarded to EMS Board 20
  - Complaints requiring service 2
  - Quality assurance officer courses conducted 1
  - Quality assurance officers trained 47
- **EMS Board Action**
  - Reprimands 5
  - Probation 14
  - Suspensions 2
  - Revocations 5
  - Remedial training 5
  - Surrenders 0
  - Evaluations 3
  - Applications denied 0
  - Dismissed 0
  - Counseling 3
  - Rehab 5
  - Random testing 5
  - OAH hearings requested 9

- Case Resolution Conferences 9
- OAH hearings conducted.....1
- OAH hearings defaulted 0
- Settlement agreements.....9

CRITICAL INCIDENT STRESS MANAGEMENT

Mission

To offer crisis support services to EMS clinicians, firefighters, law enforcement officers, dispatchers, and other emergency services personnel involved in stressful emergency incidents, and to help accelerate recovery of those individuals exhibiting symptoms of severe stress reaction.

The Maryland Critical Incident Stress Management (CISM) program offers education, defusings, and debriefings conducted by a statewide team of trained volunteers. The team consists of volunteer doctoral- or master-level psychosocial clinicians and emergency services personnel as well as fire/rescue/law enforcement peer-support individuals trained in critical incident stress management. Volunteer regional coordinators are responsible for specific geographic areas of the state and serve as points of contact, through local 9-1-1 centers and EMRC/SYSCOM, for critical incident stress management. In addition to coordination of the state CISM team, MIEMSS works closely with local CISM/peer-support teams and the International Critical Incident Stress Foundation to improve capabilities throughout the state.

In planning for FY 2020, MIEMSS anticipated the coordination of several CISM training sessions for first responders. Due to the COVID-19 outbreak, all planned training was postponed.

During the year, MIEMSS continued to coordinate a wellness workgroup focused on improving the health and wellness of all Maryland first responders. This workgroup is made up of CISM and peer support teams members from multiple fire, EMS, and law enforcement agencies. In August, the EMS Board directed MIEMSS to continue to lead this workgroup. Efforts have been temporarily slowed due to the COVID-19 outbreak.

As MIEMSS' focus changed to assisting with the statewide response to the pandemic, the focus of wellness-related efforts was likewise adjusted. Efforts related to the pandemic included the following:

- MIEMSS coordinated two statewide webinars focused on self-care, resiliency, and stress management for first responders.
- MIEMSS coordinated multiple webinars for state agency personnel involved in the COVID-19 response. In these sessions, trainers from the International Critical Incident Stress Foundation (ICISF) provided one-hour training sessions focused on stress management and self-care.
- In June, MIEMSS began coordination of a crisis support program for frontline workers in skilled nursing and other long-term care facilities. These personnel were on the front lines of the COVID-19 pandemic and were in need support.

With funding made available from the Maryland Department of Health, Behavioral Health Administration, MIEMSS contracted with the Workplace Trauma Center to provide these training sessions. This program provides virtual group and individual training and support provided by licensed mental health clinicians. Training is focused on self-care, resiliency, stress management, and general wellness. By the end of June, multiple group and individual crisis training and support sessions have been held. This project is funded through December 31, 2020.

EDUCATIONAL SUPPORT SERVICES

Mission

To contribute to MIEMSS' vision of eliminating preventable death and disability by providing to the public essential information on how to recognize an emergency, summon an EMS response, and incorporate injury prevention methods in their daily lives, as well as designing and developing educational programs for EMS clinicians through state-of-the-art technology.

Educational Support Services provides education and information to Maryland's EMS community and the public through various modes of media and communication. The department develops, designs, and produces instructional training modules and informative programs that are distributed statewide.

Print Projects

The department is responsible for the design,

photography, and editorial content of the MIEMSS Annual Report, MIEMSS website, and the Maryland EMS News monthly newsletter, which can be downloaded from MIEMSS' website and is posted on Facebook and Twitter. It is also emailed to hospital, prehospital, and emergency services personnel, and printed copies are sent to volunteer fire stations throughout the state. The newsletter keeps EMS personnel in touch with local, state, and national EMS issues. A special issue of the newsletter was devoted to the statewide opioid crisis. COVID-19-related information has also received significant coverage since the start of the pandemic. In FY 2020, Maryland EMS News covered other various topics, including:

- COVID-19-specific guidance and EMS response;
- Maryland EMS participation in the Cardiac Arrest Registry to Enhance Survival;
- MIEMSS' Licensure System;
- Emergency exercises and drills;
- Regional EMS events, educational opportunities, and other highlights;
- Adult and pediatric injury prevention news and information;
- EMS protocol updates and information;
- EMS conferences, symposiums, and continuing education courses.

Collaboration with other emergency services partners helps to support the dissemination of information to broader audiences. Departmental staff contributes content to the Maryland Fire Dispatch, the Maryland Fire and Rescue Institute's (MFRI) Bulletin, and the *Trumpet*, published by the Maryland State Firemen's Association (MSFA).

Each year, Educational Support Services staff produces *The Maryland Medical Protocols for Emergency Medical Services*, in collaboration with the Medical Director's Office, including editing, layout, and design. The complete 2020 protocol manual was made available on MIEMSS' website in July 2020 due to the COVID-19 pandemic. The printed pocket version and 5"x7" spiral-bound version of the protocols were also designed and edited by department staff. A copy of the pocket version is distributed to every Maryland EMS clinician statewide.

Media Events and Social Networking

Media events, press releases, and social networking applications were used during the year to reach target audiences on many EMS-related issues. MIEMSS engages the EMS community and the public through Facebook, Twitter, Instagram, and YouTube. Social media messaging reached thousands of EMS clinicians and members of the public throughout the year. As of June 30, 2020, nearly 11,500 users were following MIEMSS' Facebook page and more than 1,500 users were following its Twitter feed. Posts on Facebook during this period had a total reach of nearly 582,000, meaning MIEMSS' activity was seen at least that many times by users through news feeds, subscriptions, likes by other people, or shares. MIEMSS posted social media messages on various topics of interest to EMS clinicians, including important messages specifically for Maryland clinicians as well as illness and injury prevention messages intended for the public. Information about EMS conferences as well as behind-the-scenes looks at Educational Support Services projects (such as field video and photo services), safety reminders and tips, and much more were shared on social media throughout the year.

Training Support

In FY 2020, the department produced the EMS Update 2020 training video, required viewing for Maryland EMS clinicians, which included educational content as well as changes and additions to the 2020 EMS protocols. Due to the COVID-19 pandemic, the department produced a modified version of the training; the production was made available to BLS and ALS clinicians through the MIEMSS' Online Training Center and the MIEMSS YouTube channel. Department staff also produced a version of the training for hospital Base Station personnel, which was posted to the MIEMSS website and YouTube channel.

Other videos produced by Educational Support Services during the past year included the Mid-Atlantic Life Safety Conference opening video, the Maryland Fire-Rescue Memorial Foundation annual ceremony, and the annual memorial service program for the MSFA convention. This year, the MSFA Memorial Service was held virtually. With the help of Howard County Department of Fire and Rescue Services, components of the services were filmed and then edited into a two-hour ceremony for viewing on YouTube. A recruitment video for the Maryland State Police Aviation Command was produced. An EMS Week 2020 video message from MIEMSS Executive Director Dr. Ted Delbridge thanked EMS clinicians for their commitment to caring for others and highlighted their hard work during this time. Filming and production of various topics for educational lectures and programs were developed, including Pediatric Stroke and Pediatric Burns. Several online webinars were edited and made available; topics included Car Seat Tolerance, Child Passenger Safety in Hospital Emergency Departments, and Bike Safety Resources.

Educational Support Services assists with conference planning and provides technical and audiovisual support to regional and MIEMSS-sponsored continuing

education programs. Department staff designs and generates high-quality printed media, photographs, and video productions. The department contributes a variety of services to MIEMSS' educational programs, which are critical to the continuing education learning process for prehospital and hospital personnel. Staff also provides assistance and support with in-house web conferencing, video conferencing, and teleconferencing.

Maryland EMS Awards

This year, the annual Maryland EMS awards ceremony was postponed. Nominations for the EMS for Children's Right Care When It Counts Awards and the Maryland Stars of Life Awards were collected, collated, and presented to the review committee to determine the award winners. Award winners will be notified and recognized in the near future. Nominations are now being solicited for the 2021 Awards.

Outreach and Prevention

Educational Support Services provides support, including photography, design, and fabrication for MIEMSS exhibits that disseminate information about the EMS system and topics in injury and illness prevention. In FY 2020, department staff provided assistance with exhibits, various EMS conferences, and open houses. The department collaborated on many injury prevention projects with the Maryland EMS for Children program, fabricating displays, designing and printing educational materials, and producing videos, including car seat safety and bike safety messages for the public. Printed materials, banners, and public service announcements featured Maryland's prehospital and hospital personnel in prevention messages. Prior to the COVID-19 shutdown, tours of MIEMSS were conducted for local, national, and international visitors. Educational Support Services works collaboratively on multiple prevention projects and messages with other state and local government agencies. In FY 2020, the department partnered on statewide injury prevention initiatives with the Maryland Department of Transportation's Occupant Protection Emphasis Area Team, the Bicycle/Pedestrian Emphasis Area Team, the Impaired Drivers Emphasis Area Team, the Maryland Partnership for a Safer Maryland, the American Trauma Society, and the Maryland Committee on Trauma.

EMERGENCY MEDICAL SERVICES FOR CHILDREN

Mission

To provide the 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 out-of-hospital, hospital, and restorative care throughout the state. 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 will promote the health and well-being of children, youth, and their families in Maryland.

The Emergency Medical Services for Children (EMS for Children) program is responsible for a multitude of services related to emergency care for children and their families across Maryland, including:

- Coordinating the state Pediatric Emergency Medical Advisory Committee;
- Developing statewide guidelines, regulations, and resources for pediatric care;
- Conducting pediatric emergency care quality assurance and improvement through the Maryland Pediatric Quality Improvement Committee and Data Analysis and Research Team (DART);
- Providing EMS for Children representation at regional and national levels and through interagency collaboration;
- Implementing Pediatric Base Station, Pediatric Trauma, and Pediatric Burn Center regulations and designation;
- Coordinating pediatric education programs and activities for prehospital and hospital professionals;
- Managing state and federal grants related to pediatric emergency care, injury prevention, and EMS for Children research;
- Supporting the Maryland EMSC Family Advisory Network (EMS for Children State Partnership Grant);
- Promoting pediatric injury prevention activities and trainings.

Program Activities

State Pediatric Emergency Medical Advisory Committee (PEMAC) members meet bimonthly in person, with the option for web-based participation. Committee task forces meet regularly to update documents and procedures for EMS protocols, the Voluntary Ambulance Inspection Program (VAIP), interfacility transport and transfer, and pediatric facility designation. PEMAC has three standing subcommittees: Pediatric Protocol Development, Pediatric Education, and Family Advisory Network (FAN) Council. During the spring and summer of 2020, PEMAC has conducted all business on web-based platforms to provide safe distancing

during the COVID-19 pandemic.

Jennifer F. Anders, MD, FAAP, is the Associate State EMS Medical Director for Pediatrics. She serves on MIEMSS' Protocol Review Committee (PRC) revising current medical protocols for EMS clinicians, reviewing new protocols, and recommending modifications founded on evidence-based practices. She also chairs the MIEMSS' Pediatric Quality Improvement Committee (QIC) and the Data Analysis Research Team (DART). One of the functions of the Pediatric QIC is to coordinate the Pediatric Base Station Course for pediatric and neonatal transport teams for Children's National Hospital and Johns Hopkins Children's Center, Maryland's two designated Pediatric Base Stations, which provide statewide coverage for online and offline pediatric medical direction and community education. This course is also offered to pediatric and neonatal transport team members. The Pediatric QIC is involved in ongoing QI activities, making recommendations that directly impact protocol development, revision, and advancement, as well as targeted pediatric education at conferences and seminars. Pediatric DART has four ongoing data projects: 1) pediatric rapid sequence intubation conducted by Maryland State Police and other EMS agencies, in partnership with the Johns Hopkins Hospital and Children's National Hospital; 2) data collected on the pediatric sepsis protocol for EMS clinicians; 3) cardiac arrest occurrence and Cardiac Arrest Registry to Enhance Survival (CARES) outcome reports; and 4) development of a pediatric EMS dashboard of calls and transports. Dr. Anders is also the principle investigator for a project to develop an EMS triage tool for a pediatric decision tree (PDTree), in partnership with Baltimore City and Prince George's and Queen Anne's Counties. The project is funded by an EMS for Children Targeted Issues grant awarded to the Johns Hopkins University.

Cynthia Wright-Johnson, RN, MSN, is the EMS for Children's director at MIEMSS, leading a team of grant-funded projects and the state pediatric committees and task forces. She represents the National Association of State EMS Officials' (NASEMSO) Pediatric Emergency Care Council as liaison to the American Academy of Pediatrics (AAP) Committee on Pediatric Emergency Medicine. She continues to serve as the NASEMSO representative to the advisory board of the EMSC Innovation and Improvement Center Pediatric Recognition Collaborative. She chairs the Institute for Quality Safety and Injury Prevention for the Maryland Emergency Nurses Association (ENA) and is appointed to the Maryland State Child Fatality Review Committee. Maryland EMS for Children continues to participate in NASEMSO projects that focus on safe transport of children in ambulances through representation on the Safe Transport of Children Committee and the Highway Incident Traffic Committee.

Maryland EMS for Children coordinates the 10 states and territories in the EMS for Children Atlantic Region, which meet annually to share resources. EMS for Children continues to support the Maryland ENA Council, three local ENA chapters, and the western Maryland SIG by providing meeting logistics for the Pediatric Committee of Maryland ENA and the Emergency Nurse Pediatric Course (ENPC). In August 2019, MIEMSS hosted the annual ENA delegate preparation meeting prior to their national General Assembly. Through the EMSC State Partnership Grant, infant tracheostomy manikins were provided to the ENPC faculty teams across the state to launch the new 5th edition course. The grant also supported Certification in Pediatric Emergency Nursing (CPEN) review course attended by 35 nurses from Maryland and surrounding states.

In recognition of the specialized care required for pediatric emergencies, EMS for Children Day information was shared on social media and nominations for the Right Care When It Counts award were solicited from across the state. Due to response and mitigation to COVID-19 pandemic, the state awards ceremony was postponed until later in the year.

Maryland EMS for Children State Partnership Grant

MIEMSS has a current EMS for Children State Partnership Grant from the Maternal and Child Health Bureau/Heath Resources Services Administration of the US Department of Health and Human Services. These 15 years of consecutive grant funding have focused on the continued integration of pediatric EMS into 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). The grant focuses on three new measures:

1. NEMSIS data reporting statewide which Maryland has achieved with 100% reporting in eMEDS® from all public safety agencies;
2. Creating and supporting Pediatric EMS Champions in each EMS agency, with 26 Champions participating at this time from across all five EMS regions;
3. Promoting pediatric EMS education in both skills and scenario-based training that is offered at EMS conferences and quarterly through in person workshops and online webinars or Learning Management System continuing education.

In the fall of 2019, the EMS for Children's grant supported the first Maryland EMS Quality Summit that was conducted in partnership with the MIEMSS Office of the Medical Director and Data Analysis Department. Quality Assurance officers and EMS Medical Directors from 25 EMS Operational Programs participated in a daylong summit that included state level key performance indicators, national quality improvement projects, and small group discussions on standardize report development.

The other federal measures remain unchanged. Maryland's grant continues to also support FAN Council activities and pilot QI projects through the DART.

Pediatric EMS and Hospital Education (programs primarily funded through EMSC SP Grant)

During FY 2020, the Maryland EMS for Children Department offered pediatric displays and/or pediatric topics during each of the EMS and emergency nursing educational seminars and conferences held across Maryland. Topics included pediatric strokes, pediatric assessment, pediatric transport destination decisions, and tracheostomy care. Pre-conference educational offerings included a course on responding to emergencies in children with special healthcare needs as well as a review course to help nurses prepare to take the Certified Pediatric Emergency Nurse exam. A Pediatric Education for Prehospital Professionals Third Edition (PEPP-3) hybrid course for both ALS and BLS clinicians was held at MIEMSS to provide additional continuing education for both the Pediatric EMS Champions and other EMS clinicians.

The Advanced Pediatric Life Support (APLS) course with faculty from the Johns Hopkins Children's Center, Children's National Health System and University of Maryland Hospital for Children was once again offered to physicians, nurse practitioners, and physician assistants. The course remains in a hybrid format, with pre-course work completed online and one-day, in-person training that includes lectures, high-fidelity cases and mock codes, and specific low-volume/high-risk case scenarios. For the first time, course participants were given the opportunity to also complete the American Heart Association's Heartcode Pediatric Advanced Life Support (PALS) course by adding the skills check option at the conclusion of the APLS course. Course feedback remains positive and stresses the importance of pediatric continuing education for healthcare professionals. As such, future APLS courses are planned and will continue to include the Heartcode PALS option.

Due to the COVID-19 pandemic response, EMS for Children was unable to hold its 3rd annual Pediatric EMS Champion Workshop as scheduled in April 2020. However, Pediatric EMS Champions were offered multiple webinars to share the workshop content on the new Pediatric Termination of Resuscitation protocol and provide resuscitation science background to assist with EMS clinician education.

Specific offerings are listed in an annual continuing education chart, available on MIEMSS' website. Contact the EMS for Children staff team at pepp@miemss.org for additional information on pediatric educational programs.

Child Passenger Safety and Occupant Protection Health Care Project

The Child Passenger Safety (CPS) and Occupant Protection (OP) Health Care project, which promotes occupant protection for all ages, is in its 20th year of funding from the Maryland Department of Transportation's (MDOT) Highway Safety Office (MHSO). The project uses many strategies to promote CPS/OP best practices, including training for Maryland healthcare professionals or CPS technicians, social media on MIEMSS' Facebook and Twitter accounts, development and distribution of educational materials, and assistance at car seat checks. Nationally, the rates of injury and death among child passengers due to motor vehicle crashes have decreased. However, there are high-risk groups, and no death due to vehicle crashes is acceptable. Planned grant activities were severely limited beginning in March 2020 due to the COVID-19 pandemic, but the project sought ways to reach out to healthcare providers and the public despite the stay-at-home orders and re-prioritized healthcare systems and procedures.

Some highlights of this project include:

- Conducted eight exhibits on CPS and 26 outdoor displays on the topic of heatstroke to children left in cars, reaching thousands of EMS clinicians, emergency nurses, occupational therapists, elementary school families, and others;
- Distributed approximately 18,000 educational materials on CPS/OP through exhibits, mailings, and trainings. More than 1,000 agencies received materials from this project;
- Distributed 52 child safety seats or boosters to healthcare providers for needy families;
- Loaned four special-needs car seats to hospitals for patients; provided seven special-needs occupant restraints to specialty hospitals for use with children in casts or other conditions;
- Created a new program that trained hospital emergency department staff about CPS and provided them with car seats and patient handouts to educate them on safe travel. Nine hospitals enrolled in the program;

- Assisted with teaching seven national CPS certification or renewal courses, reaching 64 healthcare providers and law enforcement professionals;
- Assisted at 11 car seat safety checks, educating more than 125 families on how to keep their children safe in their vehicle;
- Awarded three scholarships to cover healthcare professionals' costs to take the CPS technician certification course;
- Planned and conducted four webinars, reaching 176 people. Older webinars that are archived on our website had more than 150 new viewers;
- Posted approximately 60 social media messages on CPS/OP and wrote/had published seven articles (in Maryland EMS News, The Maryland Academy of Pediatrics news or the Partnership for a Safer Maryland website).
- Contact CPS@miemss.org for more information.

Bike Helmet Safety Grant

The Bike Helmet Safety project completed a third year of funding from the Maryland Department of Transportation's (MDOT) Maryland Highway Safety Office (MHSO). The project has three focuses: 1) to provide bike helmets to children, youth, and adults through partnerships with the Safe Kids local coalitions and community partners; 2) develop and disseminate bike safety messages for print and social media for distribution across the state; 3) and provide in-person training of professionals in healthcare, injury prevention, and education on the correct use and fitting of bike helmets. During this year, the project:

- Distributed 994 bike helmets for children, youth and parents through local Safe Kids partners (total helmet distribution for the three years is 2,235);
- Developed and distributed "Be Seen & Be Safe" poster and magnet focused on rider visibility across Maryland;
- Provided Bike Helmet Fit educational banners to eight of the Safe Kids partners;
- Promotion of safety messages through "You Tube" online public service announcements on bike helmet fit and safety and monthly Bike Safety Facebook safety messages;
- Participation in the MHSO Pedestrian Bike Area Emphasis Team;
- Provided training to EMS and Fire professionals and to families at the Mid-Atlantic Life Safety Conference in person and to our EMS, Fire, and Rescue partners virtually due to the changes in MSFA conferences and conventions due to the COVID-19 pandemic.
- Contact bikesafety@miemss.org for more information and to request posters

Additional Injury Prevention and Life Safety Programs

Maryland EMS for Children staff participate in national, state, and local Safe Kids coalitions, the Maryland division of the American Trauma Society (ATS), the ENA's injury prevention programs, Partnership for a Safer Maryland, the Maryland Trauma Center Network (TraumaNet), the Maryland Occupant Protection Area Emphasis Team, the Maryland Pedestrian-Bike Area Emphasis Team, and the Child Passenger Safety Board coordinated by Maryland Kids in Safety Seats. This collaboration provides a consistent flow of information to MIEMSS' five regional advisory councils and PEMAC on injury prevention resources and initiatives.

The Maryland RISK WATCH community, which has been in operation for 22 years, is led by EMS for Children in collaboration with the State Fire Marshal and the MSFA Fire Prevention and Life Safety Committee. Other partners in RISK WATCH include the Cecil County Department of Emergency Services, Johns Hopkins Pediatric Emergency Department, Peninsula Regional Medical Center, the Maryland Poison Center, and the American Trauma Society – Maryland Division (ATS).

Maryland EMS for Children is the lead agency for the Safe Kids Maryland state coalition. In FY 2020, Safe Kids Maryland hosted two statewide educational meetings and, with partners in the MSFA, State Fire Marshal, and Maryland Department of Health, supported three life safety conferences and seminars. The annual March conference was postponed until 2021 due to the COVID-19 pandemic, with speakers and topics ready to relaunch when it is safe to meeting in person. Again this year, Safe Kids Maryland participated in a Walk This Way mini-grant, with the Cecil County Department of Emergency Services taking the lead. Throughout the year, EMSC and Safe Kids Maryland promote educational displays and social media information to raise awareness of the risk to children if left in cars. Four outdoor thermometer display kits have been developed through the CPS project described above and are used throughout the state.

With the unfortunate changes in the MSFA Annual Convention and Conference during June 2020, EMSC FAN, in collaboration with Safe Kids and RISK WATCH, is developing online training for local and county injury prevention advocates. Short videos will focus on education for children, youth, and families targeting specific injury risk areas with a target audience of local EMS, Fire, and Rescue station activities that provide social distancing distribution of resources and educational messages.

EMERGENCY OPERATIONS

Mission

To enhance EMS system disaster preparedness and to coordinate the statewide EMS response to large health/ medical-related emergencies and disasters.

Preparedness Planning

Emergency operations personnel began FY 2020 by participating in many emergency and disaster preparedness efforts, including the following:

- Participated and co-chaired the Maryland Active Assailant Interagency Workgroup and subcommittees;
- National Disaster Medical System patient reception preparedness;
- Critical incident stress management team development and coordination;
- Mass casualty incident preparedness;
- Healthcare facility evacuation preparedness and exercises;
- CHEMPACK program maintenance, awareness, and operations;
- Ambulance Strike Team preparedness;
- Participated in planning and operations for Baltimore City Fleet Week (2020);
- High-consequence infectious disease (HCID) planning and preparedness, including:
  - Continued development of EMS transportation resources for HCID patient transportation;
  - Participated in planning and preparedness with the Special Pathogens Assessment Hospitals;
  - Participated with Maryland Department of Health (MDH) in regional and statewide HCID exercises planning;
  - Participated with Health and Human Services' (HHS) Region III (MDH) in planning for federal regional HCID exercises planning;
  - Develop a MIEMSS infectious disease application for Android and iOS platforms. This application will provide up-to-date information on infectious disease and other information via phones and tablets.
- Participated in the State Incident Management Team (IMT) meetings and training sessions;
- Coordinated agency Continuity of Operation (COOP) planning;
- Participated in Continuity of Operation (COOP) operations during the COVID-19 pandemic and transition of most staff to telework;
- Management of the EMS portion of the ASPR/ HHS Hospital Preparedness Program (HPP) grant programs and funding;

- Emergency operations staffing and programs are supported by HPP grant funds from the Maryland Department of Health with funds from the Hospital Preparedness Program provided by the Assistant Secretary for Preparedness and Response, U.S. Health and Human Services

Emergency Response

The focus of Emergency Operations personnel and most MIEMSS staff redirected to focus on responding to the COVID-19 pandemic beginning in February/ March 2020. Emergency operations staff assisted in coordination of the overall MIEMSS response in support of the statewide EMS system. Emergency Operations-related activities included:

- Development of an ICS structure and daily incident action planning process to organize MIEMSS response activities;
- Maintained daily situational awareness through frequent communications with federal, state, and local stakeholders;
- Activated the MIEMSS Department Operations Center (DOC) and staffed both DOC and State Emergency Operations Center (SEOC) from early March through end of the fiscal year;
- 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;
- Supported EMS transportation of patients from skilled nursing facilities experiencing COVID-19 outbreaks;
- Coordinated and maintained a state-procured ALS ambulance strike team. This team was maintained in a 24/7 state of readiness as the outbreak grew;
- MIEMSS Field Operations Support Team (FOST) personnel provided on-site support to health and medical task forces that supported skilled nursing facilities heavily impacted by the pandemic;

- MIEMSS coordinated a joint project with MDH-BHA to provide crisis mental health support to personnel working in skilled nursing and other long-term care facilities. FOST personnel provided on-site logistical support for virtual training sessions;
- Collaborated with the International Critical Incident Stress Foundation to coordinate virtual wellness training for state personnel. These sessions focused on self-care, resiliency, and stress management.

Emergency Exercises

Emergency Operations personnel participated in two exercises during the year, which included:

- Calvert Cliffs Nuclear Power Emergency Exercise (CALVEX) (July 2019);
- Naval District Washington / Anne Arundel Medical Center Active Assailant / Mass Casualty Full-Scale Drill (February 2020);
- Other planned exercises, including the EPLEX, NDMS, Maryland Region III Hospital Evacuation, and HHS Regional III HCID exercises, were all postponed due to the COVID-19 pandemic.

EMRC/SYSCOM

Mission

The Maryland EMS Communications Center is a statewide coordination and operation 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, 365 days a year.

Systems Communications (SYSCOM) at MIEMSS 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 staff assist MSPAC Duty Officers with missions involving medevac, search and rescue, law enforcement, homeland security, and disaster assessment.

The Emergency Medical Resource Center (EMRC) has a three-fold mission:

1. Provide communications linkages and facilitate medical consultations between prehospital EMS clinicians and emergency departments, trauma centers, and specialty centers;
2. Maintain and share situational awareness of the activities, capabilities, and capacities of the prehospital system and hospitals;
3. Provide initial alerting and coordination of resources and the distribution of patients during major medical incidents.

In FY 2020, the EMRC handled 145,252 telephone and radio calls. Of these calls, 133,301 were communications involving a patient or incidents with multiple patients, while 11,951 of these calls involved online medical direction. SYSCOM handled 19,564 telephone calls and 8,486 radio calls. Of these 28,050 calls, the majority 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 and response.

GOVERNMENT AFFAIRS

Mission

The MIEMSS Office of Government Affairs is the agency's liaison with the Executive and Legislative branches of Maryland government and helps develop effective statutory and regulatory approaches and solutions to a variety of prehospital emergency and healthcare issues. MIEMSS works on proposed legislation that affects all the various components of the statewide EMS system, the emergency care system, and Maryland's healthcare system as a whole. MIEMSS partners with EMS clinicians, physicians, nurses, hospitals and other healthcare providers to ensure that EMS system issues are accounted for in legislation considered by the Maryland General Assembly.

Due to the public health crisis, the 2020 Session of the Maryland General Assembly adjourned early on March 18, 2020. The shortened session, which lasted only 71 days, meant that many pieces of proposed legislation failed to advance through the legislative process. EMS-related issues that were passed and signed into law by the Governor included the following:

- The Emergency Number Systems Board (ENSB) that administers the 9-1-1 Trust Fund and oversees the State's 9-1-1 system was renamed the "Maryland 9-1-1 Board" and its roles and responsibilities, as well as those of local public safety answering points, were expanded. Entities with multiple-line telephone systems must now ensure that a line on the system can be used to dial 9-1-1 without dialing any other number.
- The Commission to Advance Next Generation 9-1-1 must report in December 2020 and 2021 on progress toward the implementation and evolution of next generation 9-1-1 across Maryland, include an evaluation of the operational needs of the 9-1-1 system, including staffing, and identify recommendations to protect against cybersecurity threats to the 9-1-1 system.

- The Maryland Emergency Management Assistance Compact was renamed the "Maryland Intrastate Emergency Management Assistance Compact". Provisions governing how participating jurisdictions request assistance under the compact were altered, as was the timeframe for when the resource-sharing provisions of the compact become effective. The requirement for jurisdictions to declare a local state of emergency to active the compact was removed.

HEALTH CARE FACILITIES AND SPECIAL PROGRAMS

Office of Hospital Programs

Mission

To implement the designation and verification processes for trauma and specialty referral centers, provide continuing evaluation of these centers for compliance with the regulations and standards in COMAR 30.08 et seq., and ensure ongoing quality monitoring of the trauma/specialty care system.

Trauma System

The Maryland trauma system is regionalized and tiered, which ensures prompt and appropriate care of the trauma patient throughout Maryland. A complete list of facilities within the Maryland trauma system, including out-of-state hospitals that receive Maryland trauma patients, is listed on page 30.

Trauma Centers

Under Code of Maryland Regulations (COMAR) 30.08.05, MIEMSS is responsible for oversight of the Maryland trauma system, the foundation of which is comprised of the nine Maryland-designated adult trauma centers and five categories of specialty referral centers: pediatric trauma, adult and pediatric burn, neurotrauma, eye, and hand/upper extremity.

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 and ill 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 Christiana Care) 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 submit data to the National Trauma Data Bank (NTDB), which assists the centers in benchmarking their trauma center with other centers around the country. Side-by-side comparisons between Maryland trauma centers and national trauma centers is completed yearly using the NTDB submitted data.

The Maryland Trauma Quality Improvement Committee (TQIC) comprises trauma program coordinators, managers, and directors; trauma performance improvement staff; trauma registrars; and injury prevention and education staff, and uses a trauma quality scorecard to review, monitor, and trend statewide compliance with these quality metrics:

- Emergency department documentation of patient's temperature;
- Emergency department documentation of patient's Glasgow Coma Scale;
- Emergency department documentation of patient's pain assessment;
- Hourly patient vital sign documentation;
- The patient required reintubation within 24 hours of extubation;
- The patient had an unplanned visit to the intensive care unit;
- The patient had an unplanned visit to the operating room;
- Antibiotic administration within one hour of arrival, excluding penetrating trauma;
- Antibiotic administration within one hour of arrival, including penetrating trauma;
- Anticoagulant reversal administration within two hours of arrival when found to be on anticoagulants;
- Trauma bypass hours per month.

The Maryland Burn Collaborative continues to meet to focus on burn data submission, standard audit indicators, and performance improvement. A Maryland burn center scorecard is in place to monitor and trend statewide compliance with the following burn quality indicators:

- 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;
- Greater than 10% TBSA first temperature within 30 minutes of arrival;
- First temperature within 30 minutes of arrival at the hospital;
- Deaths less than 10% TBSA.

An ongoing project continues to review the zip code of burn occurrences of patients seen at Maryland Burn Centers and in the Burn Registry. Outliers were identified, and the care of pediatric and adult burn patients were compared.

Stroke Core Measures (5-Year Comparison)

Core Measure	CY 2015	CY 2016	CY 2017	CY 2018	CY 2019
Percent of acute 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	91.4%	93.1%	90.7%	93.2%	93.3%
Percent of patients with ischemic stroke or TIA who receive antithrombotic therapy by the end of hospital day two	98.6%	98.8%	98.8%	98.6%	98.2%
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%	98.2%	97.9%	98.2%	98.0%
Percent of patients with an ischemic stroke or TIA prescribed antithrombotic therapy at discharge	99.3%	99.5%	99.5%	99.5%	99.6%
Percent of patients with an ischemic stroke or TIA with atrial fibrillation/flutter discharged on anticoagulation therapy	96.1%	97.7%	97.3%	98.2%	97.7%
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	98.1%	99%	99.4%	99.0%	99.0%
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	97.9%	98.3%	98.8%	98.5%	99.1%
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	87.7%	90.2%	90.7%	89.1%	89.0%
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	96.9%	97.29%	97.5%	97.5%	96.9%
Percent of patients with stroke who were assessed for rehabilitation services	98.7%	99.1%	99.5%	99.3%	99.1%

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

Primary and Comprehensive Stroke Centers

Maryland's statewide regional system approach to stroke care continues to evolve as new literature and research findings on stroke care is published. Currently, Maryland has designated 36 primary stroke centers and three comprehensive stroke centers. All stroke centers are re-designated every five years, and in FY 2020 four (4) Primary Stroke Centers (PSC) were re-designated.

In FY 2020, the Stroke Quality Improvement Committee (Stroke QIC), comprised of stroke program coordinators and medical directors, focused on ongoing and new initiatives for improving stroke care in Maryland. The ongoing initiatives include revising and updating the current Primary Stroke Center (PSC) COMAR Regulations, and the addition of a third level of stroke center designation, the Acute Stroke Ready Hospital Center (ASRHC), to the regional system of care approach. In the spring of 2020, the Stroke QIC launched two additional initiatives. Revising and updating the current Comprehensive Stroke Center (CSC) COMAR Regulations and adding a fourth level of stroke center designation, the Thrombectomy-Capable Primary Stroke Center (TCPSC), to the regional system of care approach. The TCPCS is an intermediate

level of care between the Primary Stroke Center and the Comprehensive Stroke Center. The TCPSC must meet all of the COMAR Regulation Standards for PSC designation, plus have the ability to perform mechanical endovascular thrombectomy on patients presenting as acute ischemic stroke with large vessel occlusion 24/7.

Each stroke center submits data monthly to the American Heart Association's (AHA) Get with the Guidelines® (GWTG) – Stroke registry. MIEMSS accesses the registry each month and monitors for compliance with the core performance measures for standards of care established by the AHA and American Stroke Association (ASA) (see page 16). MIEMSS utilizes this data to benchmark Maryland's compliance rate with the core performance measures to national compliance rates, as compliance has been shown to improve patient outcomes. The annual state aggregate data for CY 2019 revealed Maryland had a compliance rate of 89% or greater for each of the core performance measures, significantly higher than the AHA/ASA minimal compliance rate of 80%.

The stroke centers use GWTG data to support changes to their stroke alert protocols, improve their response times, and to share best practices and processes with each other. In FY 2020, stroke centers continued their efforts to improve door-to-intravenous tissue plasminogen activator (IV t-PA) times utilizing GWTG data. It has been well established that the sooner a patient is treated with the clot-busting fibrinolytic t-PA, the better their outcome. The AHA/ASA Target Stroke program has set a new minimal compliance rate of 75% of stroke patients who are eligible for t-PA to receive the drug within 60 minutes from time of hospital arrival ("door"). For CY 2019, Maryland's median door-to-t-PA time was 48 minutes. Additionally, 82.9% of all acute ischemic stroke patients eligible to receive t-PA had a door-to-t-PA time of 60 minutes or less.

Perinatal Referral Centers

In Maryland, there are 13 designated Level III and two designated Level IV perinatal referral centers. All perinatal referral centers are re-designated every five years. The re-designation process will begin in December 2020.

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 Level 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 with zero preventable adverse outcomes. Database elements and indicators include variables related to maternal and infant health. The MIEMSS Perinatal Advisory Committee uses this database to identify areas common to all centers that indicate a need for improvement, as well as to highlight and share best practices.

The Vermont Oxford Network (VON) is a collaborative comprised of neonatal specialty care hospitals and medical professionals that participate in a coordinated program of research, education, and quality improvement initiatives. VON maintains and analyzes data on the care and outcome of very low-birthweight infants and infants meeting other special criteria. The system provides each participating center the information necessary to conduct quality improvement projects and to benchmark their data to data from all centers in the network. MIEMSS has entered into an agreement with VON to develop the Maryland State Group Reporting Service, a comprehensive reporting option that allows Level III and Level IV perinatal referral centers in Maryland to combine data for collaborative learning and improvement. A combined report is generated that compares individual center data among all the Level III and Level IV perinatal centers. The report also includes aggregated summary group data as well as tables and figures of individual center data. MIEMSS continues to work closely with MDH in supporting all perinatal referral centers that have the ability to participate in VON.

Office of Cardiac and Special Programs

Mission

To develop and implement policies, regulations, and programs for the enhancement and improvement of the statewide EMS system and Maryland communities.

Public Access Automated External Defibrillator Program

Public high schools, middle schools, and county- or municipality-owned or operated swimming pools are

required to have AEDs, as are some public/semipublic 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 (wwwmarylandaedregistry.com), MIEMSS received and approved 266 public access AED applications in FY 2020. As of June 30, 2020, there were 8,036 locations in the state with 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.

The AED program has had 241 (23.3%) successful AED uses out of 1,033 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, 565 were witnessed, and 176 of those witnessed arrests regained a pulse at the time of EMS arrival, for a 31.2% save rate for witnessed cardiac arrests.

Cardiac Arrest Steering Committee

Maryland maintains a Cardiac Arrest Steering Committee, authorized by the State EMS Board, that serves to provide guidance to the 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 answering point engagement, prehospital cardiac arrest management performance improvement, and further development of a comprehensive statewide system for the treatment of sudden cardiac arrest. Additionally, the committee works with the MIEMSS public information team to develop public messaging campaigns related to increasing bystander use of CPR and AEDs.

Maryland STEMI System

Hospitals that comply with state standards to receive patients who are transported by EMS and are experiencing the most common type of heart attack, called an ST-elevation myocardial infarction (STEMI), are designated as cardiac interventional centers (CIC) by MIEMSS. Twenty-eight centers have been designated by MIEMSS, including four out-of-state. For STEMI patients, primary percutaneous coronary intervention (pPCI) is recognized by the American College of Cardiology and the American Heart Association (AHA) as the treatment of choice, and is generally associated with fewer complications and better outcomes than other forms of treatment. It has also been well-established that the sooner a patient is treated to relieve the blockage causing the STEMI, the better the heart muscle will recover.

All CICs submit data quarterly to the AHA's Get with the Guidelines® (GWTG) – Coronary Artery Disease (CAD) registry. MIEMSS is able to measure care for STEMI patients in Maryland as compared to national data from participating hospitals. The goal for first medical contact (FMC) to intervention in the cardiac catheterization lab ("device") time is 90 minutes or less. Data from the registry indicated that for the rolling four quarters of CY 2019, FMC-to-device in less than 90 minutes was achieved in 79.6% of STEMI patients transported by EMS, with a median time of 84 minutes.

INFORMATION TECHNOLOGY AND DATA MANAGEMENT

Mission

To improve Maryland's EMS systems by providing leadership, support, and guidance to the agency and Maryland's EMS community regarding the use of information technology and the meaning of collected EMS data.

electronic Maryland EMS Data System

The electronic Maryland EMS Data System (eMEDS®) uses commercial, off-the-shelf software provided and hosted by ImageTrend, the industry leader for emergency patient care reporting. MIEMSS owns a statewide site license for the eMEDS® system, permitting EMS services to use it at no cost and no additional burden on local funding. All 24 of Maryland's jurisdictional EMS operational programs (EMSOP) and most licensed commercial ambulance services submit patient care reports directly into eMEDS®. Maryland has one of the few truly comprehensive prehospital patient care reporting systems in the nation.

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, which includes 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 data reporting to the National EMS Information System (NEMSIS).

It also provides timely information to hospital emergency department physicians and nurses. All Maryland healthcare facilities have access to the eMEDS® Hospital Hub website to obtain prehospital patient care reports. MIEMSS also provides an interface to populate prehospital data into the Maryland State Trauma Registry and to report hospital patient outcomes back to EMS services.

eMEDS® Elite Software Project

MIEMSS has completed upgrading the State's patient care reporting system to the new Elite version of eMEDS®. Elite provides better data collection and software tools to EMS programs in Maryland. The Information Technology (IT) department, in coordination with the Office of the State Medical Director, leads this project. As of January 2, 2019, MIEMSS completed transition of all public safety jurisdictions and 18 commercial services to ImageTrend's Elite platform, now known as eMEDS®. MIEMSS is actively working with the remaining federal EMS partners to transition them as well. By the end of calendar year 2020, MIEMSS expects all EMS agencies to be transitioned to the Elite platform.

Upgrading eMEDS® to ImageTrend's Elite software program made Maryland's system compatible with the National EMS Information System (NEMSIS) Version 3.4. NEMSIS is a nationwide database for prehospital information and research, and is the de facto standard for prehospital patient care reporting. Moving eMEDS® to the Elite platform has also improved its compatibility with the Health Level Seven International (HL7) data framework, enabling better exchange of data with health information exchange systems. eMEDS® is able to function on many popular electronic tablets and laptops with a variety of operating systems so that EMS clinicians have more flexibility on the equipment they use. The Elite system also adds many new and enhanced features requested by Maryland's EMS clinicians.

One important ongoing project is the integration of eMEDS® with Chesapeake Regional Information System for our Patients (CRISP), the health information exchange service for Maryland and Washington, DC. This integration is being enhanced in order to allow additional patient care data to be received by CRISP in a timelier manner. Aligning these two systems makes prehospital emergency care information available to participating physicians and hospitals throughout the state. A future goal of the project is 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 and through mobile integrated health (MIH) initiatives. This effort will continue throughout FY 2021.

National Study Center Collaboration

MIEMSS continues to work collaboratively with the National Study Center for Trauma and Emergency Medical Systems (NSC) to the further the use of EMS data. Collaborative efforts include working on Crash Outcome Data for Enhancing Survival (CODES) project and the EMS Research Interest Group (RIG).

Teleworking

The COVID-19 pandemic has posed many challenges for everyone. MIEMSS, along with other state agencies, needed to quickly shift from an office-oriented workforce to a telework-oriented workforce. Key to the transition was maintaining the agency's ability to provide ongoing customer-focused support to the EMS community. MIEMSS was well positioned for teleworking, having an existing robust VPN setup and adequate IT resources on hand. IT seamlessly moved the agency into a remote posture while maintaining business and responding to the additional needs created by the pandemic.

Ongoing Missions

- **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. The system also automates the tracking of Emergency Medical Resource Center (EMRC) consults. The system includes a disaster recovery instance located at a data center that is geographi-

cally separate from the MIEMSS data center. MIEMSS is also planning a server refresh to upgrade the operating system and database to a more recent version.

- **Maryland Emergency Medical Resource and Alerting Database.** MIEMSS continues to host and operate the Maryland Emergency Medical Resource and Alerting Database (MEMRAD). The system includes the County/Hospital Alert Tracking System (CHATS) and Facility Resource Emergency Database (FRED) applications, which are mission-critical services for EMS operations as well as disaster response. CHATS is a public, web-based service that displays the alert status information and capacity of hospitals in Maryland and adjacent regions. FRED is utilized to alert healthcare partners of an incident or the need for aid, and allows them to indicate what resources they are able to lend to the response.
- **Trauma and Specialty Care Registries.** MIEMSS hosts and, in conjunction with Digital Innovations (DI/ESO), supports the Maryland State Trauma Registry and related specialty registries. The MIEMSS IT department continues to host the Maryland State Trauma Registry, along with Hand and Eye, and will be working with DI/ESO for further enhancements.
- **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 and SYSCOM. The IT department continues to provide 24/7 technical support to EMRC/SYSCOM in coordination with MIEMSS' Communications Engineering Services.
- **EMS Audio Recording (EMSAR) System.** MIEMSS IT worked with MIEMSS' Communications Engineering Services to develop a new way for hospitals to retrieve EMS/Hospital consult recordings through the internet using a secure portal. This was 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 the MIEMSS NICE Audio Recorder system for hospitals to review consults for quality assurance needs.
- **Help Desk and User Support.** A major ongoing mission for the IT department is to support end-users, both agency staff and EMS clinicians, statewide. MIEMSS IT hosts a help desk ticketing system supporting a number of agency departments. This system is set up to create support tickets from incoming phone calls and emails. These queues are monitored by dedicated, skilled staff, and tickets are investigated, worked on, and closed.

Two of the primary IT support queues are eMEDS® and Computer Support. The eMEDS® queue receives tickets from EMS clinicians throughout the state for issues like password resets and login issues, access questions, report writer functionality, and other eMEDS®-related issues. Computer Support receives requests for password and login issues, VPN, email, and general computer support. The eMEDS® support queue received nearly 2,000 tickets that were created and worked in FY 2020. Similarly, Computer Support received more than 800 requests that were worked in that same time period. IT strives to improve users' technology experiences by maintaining and proactively improving IT infrastructure, protecting data and systems through enhanced IT security, and providing quick resolutions to PC and application software issues.

In addition, the IT department created a new ticket queue for the EMSAR system. This queue was put in place to actively support issues that hospital staff may have with accessing or utilizing the EMSAR system.

- **Opioid Overdose Data Reporting.** MIEMSS, in compliance with state law, continues to provide data from EMS patient care reports into the Washington/Baltimore High Intensity Drug Trafficking Areas (HIDTA) Overdose Map (ODMAP) database to assist with statewide monitoring of and responding to the opioid overdose problem. MIEMSS is also collaborating with the Maryland Department of Health and other agencies to do everything possible to monitor and combat the opioid overdose epidemic in Maryland.
- **Security Improvements.** The Information Security department continues to monitor and make enhancements to the MIEMSS IT infrastructure and related systems. Security awareness training continues to be a focal point, ensuring that staff are aware of common security threats and take necessary action. MIEMSS has also worked closely with the Maryland Coordination and Analysis Center (MCAC) in identifying and reporting of threats.
- **Emergency Notification System.** MIEMSS installed an Emergency Notification System in the MIEMSS Headquarters to allow emergency messages

to be announced throughout the building. This project involved installing additional network switches, adding additional cabling throughout the building, installing a PoE speaker system, and working with the University of Maryland to connect to the MIEMSS telephone system.

■ **Computer Network Improvements.** The IT department continues to improve computer resources, network reliability, and disaster preparedness by upgrading core server, storage, and VMware systems. MIEMSS worked in conjunction with the University of Maryland to replace existing connections with new fiber and add additional connectivity for a backup network path. Furthermore, MIEMSS is working on a current project to replace equipment and provide the backup network path with enhanced reliability.

MIEMSS IT also expanded the capacity of our data storage system of our infrastructure which allows us to continue to migrate existing virtual servers and decommission old and end-of-life technology. In addition, this has allowed for the migration of backup data to the additional storage, ensuring that backup data is readily available when needed. Additional storage has also positioned MIEMSS for completion of projects such as data requests and mission critical collaborations with partners.

■ **Strengthen Data Analysis.** Recognizing the importance of accurate, timely, and accessible prehospital patient care data, MIEMSS has continued to expand data analysis capability through the use of local copies of hosted eMEDS® and the Licensure System databases. The emphasis continues on statistical reporting, key metrics for system-wide quality improvement and assurance, and practical applications of EMS and hospital data.

■ **EMS Portal.** Additionally, the MIEMSS Data Management department worked with the Licensing and Certification department to create an EMS Portal to provide local jurisdictions the ability to create and run custom educational reports. This enhances jurisdictional awareness of educational needs for affiliated clinicians.

Future Projects

■ **Mobile Apps.** MIEMSS' IT and Data Management departments are working alongside several groups within MIEMSS on the creation of mobile applications. These mobile apps will provide clinicians and stakeholders the ability to easily obtain information necessary for emergency response while on the go. The Ambulances at Hospitals app utilizes CAD data from the MIEMSS eMEDS® local database copy, and will provide information related to status of ambulances at hospitals to help clinicians make critical decisions on transport destination. The Infectious Disease app provides relevant information about MIEMSS protocols as well as contact information necessary in support of at-patient side care.

■ **Public Website.** MIEMSS IT will be working with the Educational Support Services (ESS) department to update the MIEMSS public website. The IT department, alongside the Data Management department, will work on upgrading the existing IT infrastructure of the website. ESS will be working with IT and Data Management, along with other departments within MIEMSS, to update the content and organization of the public website. This upgrade and enhancement will make the public-facing website easier to navigate and find relevant data for visitors.

LICENSURE AND CERTIFICATION

Mission

To coordinate 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.

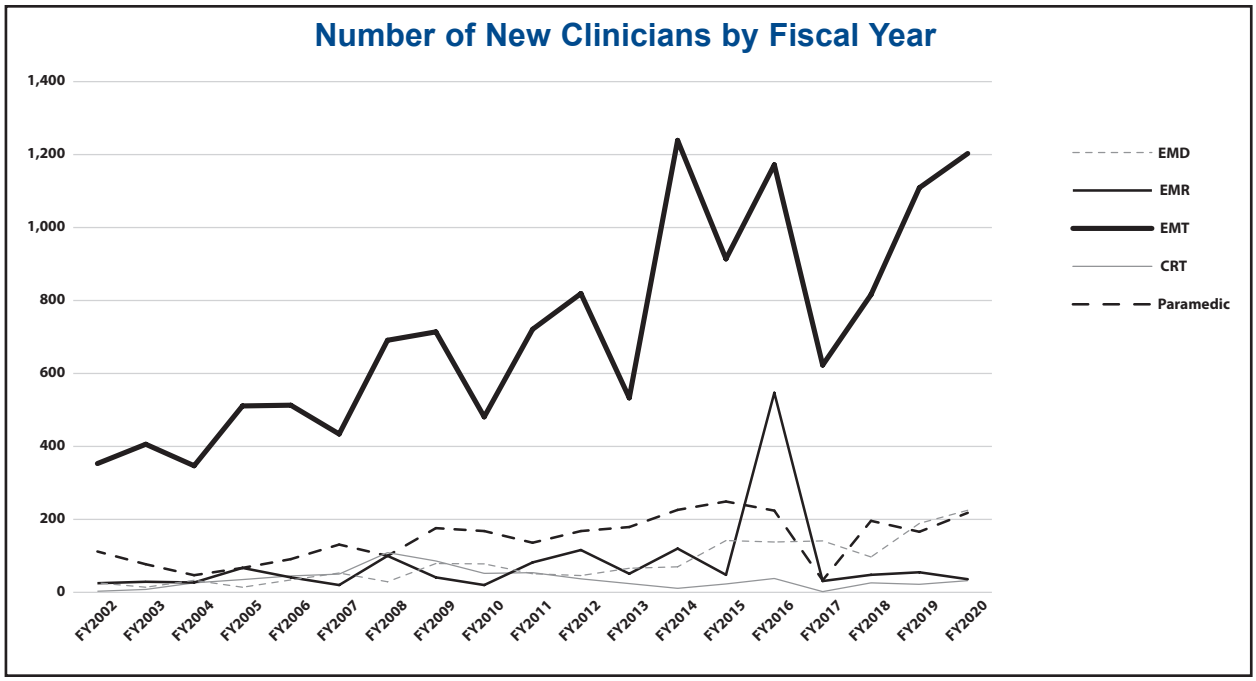
Maryland EMS Clinicians and Education Programs

■ **FY 2020 EMS Clinician Data.** Licensure and Certification had a steady workload in FY 2020, issu-

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

Level	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
EMD	1,058	1,320	1,377	1,066	1,110
EMR	2,020	1,589	1,136	662	603
TOTAL	**3,078**	**2,909**	**2,513**	**1,728**	**1,713**

EMT	15,839	16,069	15,485	14,853	14,875
CRT	662	619	587	575	546
Paramedic	3,293	3,336	3,278	3,491	3,573
TOTAL	**19,794**	**20,024**	**19,350**	**18,919**	**18,994**



ing 1,714 initial prehospital clinician certifications and licenses and renewing 5,104 certifications and licenses. The vast majority of new entrants into Maryland EMS are through an initial emergency medical technician (EMT) clinician course. Guided by an executive order form the Governor to augment the EMS workforce during the COVID-19 emergency, Licensure and Certification issued 868 provisional EMS certifications and licenses.

There was a decline in the number of emergency medical responders (EMR), as many law enforcement organizations utilize the Law Enforcement Emergency Medical Care Course (LEEMCC) for required medical training, and some were lost through attrition.

The chart above depicts the number of newly certified EMTs by fiscal year. Although the numbers fluctuate, hundreds of EMTs enter the Maryland EMS system each year. 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 cardiac rescue technicians (CRT) declined slightly this year. Some clinicians have upgraded to the paramedic level, while others have downgraded to basic life support (BLS) certifications. The National Registry of EMTs (NREMT) no longer certifies clinicians at the Intermediate/99 (I/99) level. Maryland, however, will continue to license existing CRTs as long as they meet all State requirements for license renewal prior to the end of each licensure period.

The number of Maryland clinicians is shown on page 21. Licensure and Certification worked 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, MIEMSS' distance learning management system, reached 52,291 registered users in FY 2020. Of those registered users, 10,095 clinicians were active in the Online Training Center during the same period. The Online Training Center hosted 40 active courses in FY 2020. Several new courses were made available this year, including Maryland ALS Update 2020, Maryland BLS Update 2020, Pediatric Burns, Pediatric Tracheostomy Management, Neonatal Resuscitation, Med-4 Podcast, Viral Syndrome Pandemic Triage Protocol, and Obtaining Swab Specimens for COVID testing. Projected course topics for FY 2021 include the Maryland EMS Updates for 2021, ALS and BLS Protocol Orientation Courses, and 2020 NCCP State Content courses that will help ALS clinicians fulfill the State National Continued Competency Program (NCCP) content for recertification. The Office of Licensure and Certification, in conjunction with ImageTrend® and MIEMSS' Information Technology Department, continues to expand and enhance functionality in the Online Training Center while working towards 100% grade capture into clinician continuing education records in the Licensure sys-

tem. Moving into FY 2021, Licensure and Certification will continue to review possible upgrades to the Online Training Center, including plans to conduct a major version upgrade of the Online Training Center website.

Maryland Clinician Registry for Licensure and Certification

MIEMSS continues to implement critical improvements to the electronic Licensure/Certification System that will support seamless processing and enhance functionality. The number of users in the Licensure System continues to increase. The system allows for more efficient processing and the ability to communicate electronically to providers across the spectrum. With continual feedback from the eLicensure Statewide Steering Committee and the EMS community at-large, Licensure and Certification is making great progress on improving system functionality, while meeting the needs of its stakeholders.

Further system enhancements, coupled with quality management, have made it possible to process with greater efficiency while providing faster turnaround times.

MEDICAL DIRECTOR'S OFFICE

Mission

To provide leadership and coordination for state medical programs, protocols, and quality assurance; to liaison with the regional programs and clinical facilities; and to promote creative, responsive, and scientifically sound programs for the delivery of medical care to all citizens.

EMS Quality Improvement Summit

The Office of the State EMS Medical Director (OMD) hosted the inaugural Maryland EMS Quality Improvement Summit on November 14, 2019. In partnership with Maryland EMS for Children, OMD hosted medical directors and QA/QI officers from nearly all of Maryland's jurisdictions for an interactive discussion of clinical quality measures for EMS. Each jurisdiction received a report detailing their progress on key performance measures, which were derived from EMS Compass and California Performance Measures.

Additionally, participants received updates from Dr. Jon Krohmer, NHTSA Office of EMS, regarding National EMS Quality Alliance (NEMSQA) objectives and revised national key performance measures. Dr. Jen Anders, Associate State Medical Director for Pediatrics, presented pediatric quality improvement data from recent projects.

Finally, in small group sessions, the medical directors and QA/QI officers provided valuable feedback, which will shape our statewide continuous quality improvement efforts for the coming years. The group plans to meet longitudinally to continue evaluation of our EMS system's clinical performance, particularly as it relates to cardiac, trauma, stroke, and pediatric patients.

CHEMPACK Program

MIEMSS coordinates the CHEMPACK program for first responders in the State of Maryland, in partnership with the HHS 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 allows 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. The CHEMPACK inventory is closely monitored, and near-expiring medications were replaced this year by MIEMSS Regional and Emergency Operations personnel using the new Drop Ship Program.

The Maryland Medical Protocols for Emergency Medical Services

The information located in the full protocol book is the official medical reference for EMS clinicians. Some major protocol additions and changes have been made this year, including the following:

- ***Epinephrine Administration:*** The administration of epinephrine in cardiac arrest has been modified to limit dosing during resuscitation based on findings of survival with good neurologic outcome. In addition, epinephrine is now the drug of choice for treating hypotension secondary to shock, replacing dopamine as the primary EMS vasopressor.
- ***Pediatric Termination of Resuscitation (TOR):*** The indication for TOR has been expanded to include considerations for patients who have not yet reached their 18th birthday when meeting specific criteria. The protocol was approved after research and statewide focus groups were conducted by the Pediatric Emergency Medical Advisory Council (PEMAC).
- ***Adult Rapid Sequence Intubation (RSI):*** Adult RSI has been moved from a pilot protocol to an optional supplemental protocol that continues to require a jurisdictional application for approval to be submitted to the State EMS Medical Director. The RSI procedure and program educational requirements have been updated with contributions from jurisdictions participating in the protocol.

- ***Heat Emergencies:*** Language has been added to allow for a team management approach of care with EMS clinicians and team/event physicians on the scene specifically allowing for the initiation and continuation of active cooling measures.
- ***Ketamine:*** The use of ketamine has been expanded to allow for use in the ventilatory difficulty secondary to bucking or combativeness protocol, as well as allowing for treatment of CPR-induced awareness for all ALS clinicians.
- ***Fluid Resuscitation:*** Based on literature review and current best practices, dosing recommendations have been modified to limit the amount of intravenous fluid administered to trauma patients, with a goal to improve outcomes for patients in hemorrhagic shock. The updated recommendations come from work conducted by members of the Protocol Review Committee and subject matter experts from area trauma centers.
- ***Ketorolac:*** This medication has been added to the formulary as an optional non-opioid medication for treatment of acute pain. Interested jurisdictions should submit an OSP application to the State EMS Medical Director if they wish to carry this medication.

COVID-19 Protocols and Clinical Guidance

Dr. Timothy Chizmar, State EMS Medical Director, continues to work closely with the MIEMSS Infectious Diseases program to ensure that EMS clinicians have access to the latest clinical guidance regarding COVID-19. In early 2020, MIEMSS held twice-weekly calls with EMSOPs and published frequent updates concerning personal protective equipment, patient treatment guidelines, and management of potential exposures for EMS clinicians.

In addition, the OMD produced the Viral Pandemic Triage Protocol, which enables EMS clinicians to advise certain patients with suspected viral syndrome on home self-care, as opposed to immediate transport to an emergency department. Terbutaline was also introduced to offer an alternative to nebulized medications for treatment of patients with wheezing or bronchospasm. This medication may help to limit the generation of aerosols, which contribute to the spread of COVID-19.

Base Stations

There are 47 base stations designated by the EMS Board. All physicians and nurses who answer a base station radio are required to successfully complete the MIEMSS-approved Base Station Communications Course for Emergency Department Personnel and the 2020 Maryland EMS Updates for Hospital Base Station Personnel training video, so they can communicate with EMS clinicians and provide appropriate online medical consultation and direction. MIEMSS' Base Station Communications Course for Emergency Department Personnel was offered at multiple hospitals in FY 2020, resulting in 514 base station certificates issued to emergency department (ED) physicians and nurses. Additionally, four ED physicians became MIEMSS-approved base station instructors.

CARES Program

MIEMSS has been working 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. The prehospital information can then be directly exported by MIEMSS 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. A drowning module was added to CARES to collect eight new data elements which will provide important information about drowning events.

As of January 2017, all 24 EMSOP jurisdictions, the sub-divisions within jurisdictions, and Maryland hospitals and Freestanding Emergency Medical Facilities submit their cardiac arrest information to CARES. Statewide data for calendar years 2017 through 2019 is now included in CARES National Reports (see CY 2019 data on page 75).

A poster entitled "Pediatric High Performance CPR Protocol and Educational Rollout for EMS Professionals" was presented at the federal EMS for Children Grantee Conference in August 2019 in Fairfax, Virginia. The authors were Karen O'Connell, MD, Jennifer Anders, MD, William Fritz, NRP, Danielle Joy, RN, Richard High, EMT, and Cynthia Wright-Johnson, MSN, who worked with a team of Pediatric EMS Champions across Maryland to implement this new protocol in 2018 and 2019. The data incorporated into the training and this poster included Maryland pediatric cardiac arrest data from CARES.

Two factors have demonstrated a significant impact on survival from sudden cardiac arrest: early

cardiopulmonary resuscitation (CPR) and early defibrillation. CPR training has become a required training 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.

Opioid Crisis in Maryland

Dr. Chizmar works closely with the Maryland Opioid Operational Command Center, which was established by Executive Order signed by Governor Larry Hogan declaring a State of Emergency in response to the opioid crisis in Maryland. Governor Hogan subsequently extended this declared State of Emergency by Executive Order. For its part, MIEMSS has implemented multiple strategies in an effort to reduce morbidity and mortality related to opioid overdoses.

- Authorized all EMS clinicians to administer naloxone;
- Enhanced EMS clinician education and community awareness on opioids.
- Promoted distribution of an opioid overdose information and crisis hotline card by EMS clinicians to patients and their family members;
- Presented "Maryland EMS: Naloxone Leave-Behind" at the OOCC Best Practices Conference with jurisdictional leaders from Baltimore City, Charles County, and Howard County (Dr. Chizmar, February 2020);
- Presented "State of the Practice: Maryland EMS Responds to the Opioid Crisis" for MIEMSS/UMBC Prehospital Opioid Treatment & Best Practices webinar (Dr. Chizmar, June 2020);
- Thirteen (13) of Maryland's jurisdictional EMSOPs currently participate in the Naloxone Leave Behind Pilot Protocol, which allows EMS clinicians to supply an opioid overdose kit with naloxone to adult patients most at risk (history of previous overdose);
- Partnered with the Maryland Department of Health to identify individuals who need treatment for opioid use disorder;
- Encouraged EMSOPs to share identified opioid overdose information with local health officers so they can provide peer support and rehabilitation opportunities;
- Reporting opioid overdose data to the Washington/Baltimore High Intensity Drug Trafficking Area Overdose Map (ODMAP), which provides real-time overdose surveillance data across jurisdictions, as required by law.

QUALITY MANAGEMENT

Mission

To support both MIEMSS and the EMS community in their continuous quality-improvement initiatives and commitment to a customer-based way of doing business. Successfully accomplishing this is not simply dependent upon recognizing that the ultimate customer is a patient in need of timely, proficient, and compassionate care, but understanding and improving the processes that maintain a well-functioning EMS system for the delivery of quality medical care.

MIEMSS' Quality Management program supports requests for information, query design, and results interpretation, and also educates data owners and managers in process improvement, enhancing the ability to effect improvement in related fields. Data analysis and process examination form the basis of much of the program's responsibilities.

Managing for Results

MIEMSS is required to submit Managing for Results (MFR) updates along with its fiscal year budget requests to the Maryland Department of Budget and Management. MIEMSS has met the MFR requirements this year, which include re-evaluation of key goals, objectives, and strategies; development of action plans; and creation and monitoring of performance indicators.

Two MFR goals were established by MIEMSS: 1) provide high-quality medical care to individuals receiving emergency medical services and 2) maintain a well-functioning emergency medical services system. The measures for successful achievement of these goals include two objectives: 1) maintain statewide trauma patient care performance above the national norm at a 95% or higher statistical level of confidence and 2) transport at least 89% of seriously injured patients to a designated trauma center throughout the calendar year.

EMS Surveillance Measures

MIEMSS has maintained 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 scene incident patients statewide.

Since FY 2017, EMS encounters resulting in naloxone administration for opioid overdose patients are identified and reported to the MDH and the Opioid Operational Command Center. This non-confidential data set is used, along with other resources, to monitor the incidents of opioid overdoses and help plan effective strategies in combating the crisis.

Data Confidentiality

MIEMSS maintains or has access to eight confidential databases used in ensuring quality EMS care delivery. 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 2,200 data requests.

REGIONAL PROGRAMS

Mission

To provide leadership and support to the state-wide 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.

The Regional Programs Division consists of five regional offices, geographically dispersed throughout the state, staffed by regional administrators and administrative staff. Each office is responsible for monitoring the operation of their assigned region of the statewide EMS system. They serve as technical experts to EMS jurisdictions, hospitals, and other system partners on emergency medical services systems coordination and development. Each regional administrator works with jurisdictional EMS operational programs to ensure efficient and effective emergency care is available at all times. Additionally, the regional administrators support the agency's Emergency Operations program by participating in local, regional and/or state-wide emergency prevention, preparedness, response, and recovery efforts.

Regional EMS Advisory Councils

By statute, each region of the statewide EMS system has a regional EMS advisory council tasked with advising MIEMSS on EMS function within each particular region. Each council provides a forum for regional coordination of the EMS system among neighboring jurisdictions, hospitals, emergency management personnel, public safety answering points, local health departments, and other EMS system partners. The councils collaborate on matters related to regional EMS conferences, EMS clinician training, quality improvement, emergency preparedness and response, and mutual aid activities.

Each regional office provides administrative support to their regional EMS advisory council. The regional administrators provide technical expertise to the councils and serve as a conduit between each council and MIEMSS headquarters.

Prehospital EMS Performance Improvement Initiatives

The Regional Programs Division staff members serve as the lead for a number of systemic prehospital EMS performance improvement initiatives. During FY 2020, the division worked on the following systemic performance improvement initiatives:

- **eMEDS®/CRISP Integration Project.** This project provides a bi-directional data linkage between eMEDS® and the Chesapeake Regional Information Information System for our Patients (CRISP), the State's designated health information exchange. This data linkage has provided a number of products to EMS system partners including access to prehospital care summaries by hospital staff, notification to EMS jurisdictions of exposure to certain infectious diseases, and the ability for EMS quality assurance officers to review an EMS patient's hospital outcomes. It is projected that this project will continue to develop to provide resources to Maryland's EMS System.
- **eMEDS®/ESSENCE Integration Project.** This project provides a unidirectional data linkage between eMEDS® and the Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE), the State's syndromic surveillance system. This system has allowed the Maryland Department of Health's emergency preparedness epidemiology staff with access to Maryland's EMS data to work to identify emerging trends in infectious disease in an effort to better protect Marylanders.

EMS System Monitoring

The Regional Programs Division staff members work diligently to acquire and monitor data to be used for the coordination of the statewide EMS system. The staff manages the Maryland Emergency Medical Resources and Alerting Database (MEMRAD), a system designed to provide near real-time monitoring of the EMS System by tracking hospital alert status, healthcare system disaster preparedness, and

near real-time bed status tracking during disasters. Additionally, during FY 2020, the staff worked developed a hospital status tracking system in response to the COVID-19 pandemic that provides partner agencies and the State's political leadership with daily updates on hospital capacity and COVID-19 patient readiness.

Prehospital EMS System Grant Administration

The regional offices work with the SEMSAC Regional Affairs Committee and the Regional EMS Advisory Councils to administer a statewide grants program, providing funding directly to the jurisdictional EMS operational programs.

- **Hospital Preparedness Program.** The Hospital Preparedness Program (HPP), administered by the US Department of Health and Human Services, provides funding to local healthcare coalitions, hospitals, and EMS agencies to enhance emergency preparedness and coordination of healthcare operations. During FY 2020, Regional Programs continued to support HPP by representing local EMS jurisdictions on regional healthcare coalitions that coordinate funding priorities for the program. The Region I Office serves to administer all HPP funds received by MIEMSS.
- **EMS Naloxone Grant.** In FY 2017, Governor Larry Hogan declared a State of Emergency in response to the increase in opioid overdose cases in Maryland. As a direct result of the opioid crisis, EMS jurisdictions realized a sudden increase in naloxone procurement costs. To offset those costs, MIEMSS has worked with the MDH Behavioral Health Administration and the Maryland Opioid Operational Command Center to develop a naloxone reimbursement program that provides funds directly to the jurisdictional EMS operational programs to offset the cost burden of increased naloxone demand. Additionally, during FY 2020, MIEMSS worked with the UMBC Department of Emergency Health Services to conduct a statewide review of the burden of opioid overdoses to and best-practices of Maryland's EMS jurisdictions.
- **Maryland EMS Operations Fund Grant Programs.** The regional programs office coordinates or supports the coordination of all three of the MEMSOF-funded grant programs, including the Cardiac Devices Grant, the ALS Training Grant, and the Emergency Medical Dispatch Training Grant.

Regional Medical Direction

The regional offices coordinate with the Regional EMS Advisory Councils to administer a system of Regional EMS Medical Directors that report to the State EMS Medical Director and serve as a resource to the jurisdictional EMS medical directors. The Regional Administrators work with the Regional Medical Directors to administer the statewide EMS base station program, develop the regional systems of specialty care centers, coordinate the regional trauma systems, and ensure that high-quality prehospital care is available to all residents and visitors of Maryland.

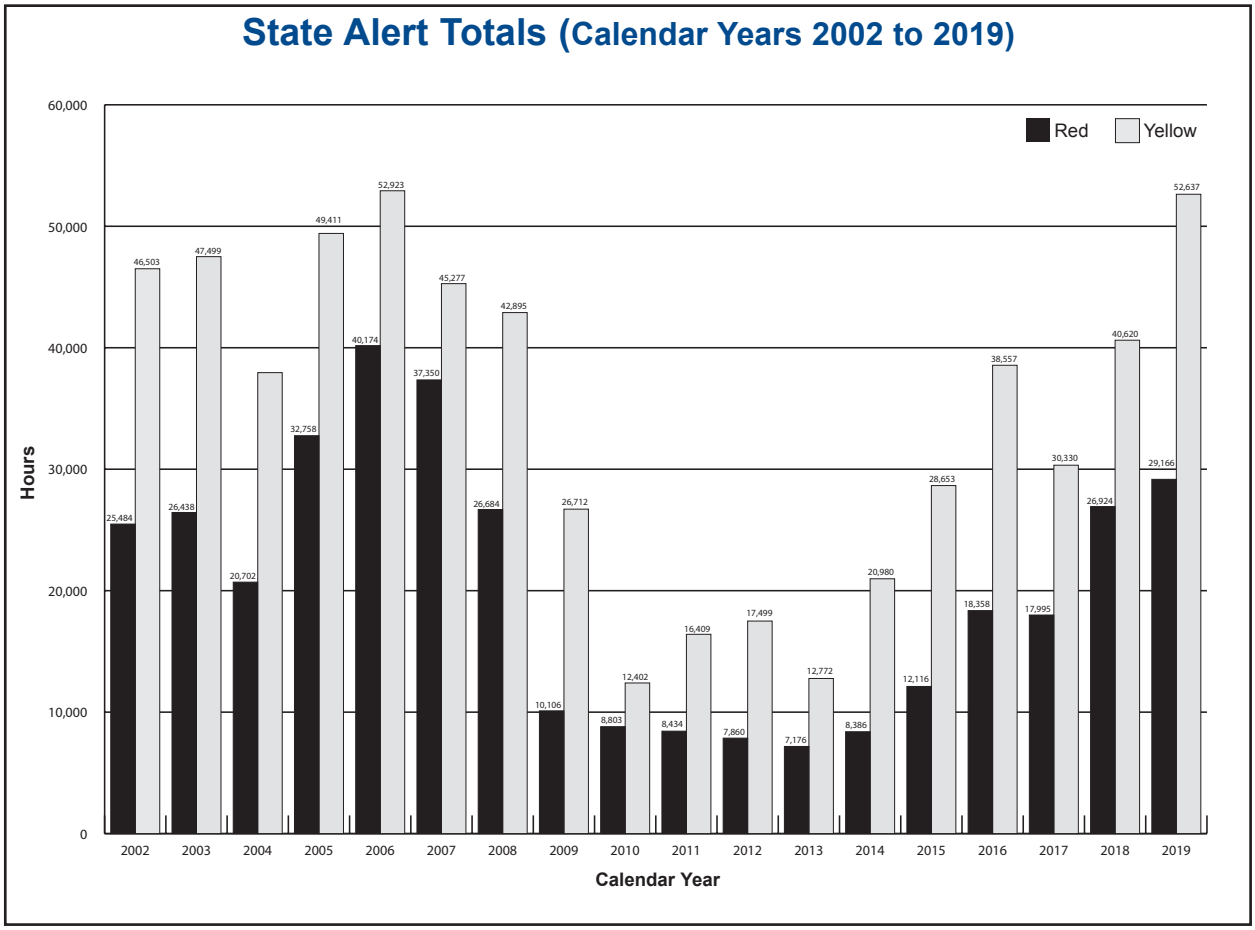
Grant Programs

MIEMSS regional offices coordinate a statewide grant program comprised of competitive and non-competitive direct and pass-through grants designed for use by the jurisdictional EMS operational programs. This includes managing the grant award process, ensuring that periodic reports are completed, and inventorying any physical assets gained as a result of the grants, per state and federal requirements. Each regional office also conducts an annual inventory of equipment and assets obtained from previous grants and those on loan to local jurisdictions. For an accounting of the funds administered through the regional offices, see below.

- **Hospital Preparedness Program.** The Hospital Preparedness Program (HPP), administered by the US Department of Health and Human Services, provides funding to local healthcare coalitions, hospitals, and EMS agencies to enhance emergency preparedness and coordination of operations. In FY 2020, Regional Programs continued to support the HPP by representing

MIEMSS Grant Disbursements (FY 2020) by Region

	Cardiac Devices Grant for Fiscal Year 2020	ALS Training Funds	Emergency Dispatch Programs	Naloxone	Totals By Region
Region I	$79,314	$28,000	$0	$0	$107,314
Region II	$14,927	$28,000	$11,128	$10,168	$64,223
Region III	$144,298	$98,000	$6,190	$157,375	$405,863
Region IV	$65,989	$67,998	$19,883	$0	$153,870
Region V	$115,873	$78,000	$10,799	$32,458	$237,129
Total	$420,401	$299,998	$48,000	$200,000	$968,399



local EMS jurisdictions on regional healthcare coalitions that coordinate funding priorities for the program.

Region I serves as the main point of contact for any HPP funds acquired by MIEMSS, which are utilized by Emergency Operations. Region I is also the point of contact for HPP grant funding for each EMSOP, ensuring applications are completed, submitted, and funds are expended appropriately. During CY 2020, the Regional Programs staff assisted the Maryland Department of Health's Hospital Preparedness Program staff with coordinating and administering each of the four regional healthcare coalitions.

■ **State Homeland Security Grant Program.** A percentage of the State Homeland Security Grant Program (SHSGP) funding from the US Department of Homeland Security must be allocated to EMS agencies. The Maryland Emergency Management Agency (MEMA) and MIEMSS continued their partnership in meeting this federal requirement. Funding priorities are established by MEMA in consultation with the Statewide EMS Services Advisory Council (SEMSAC). Projects concerning active assailant preparedness and incident management team development and training received top consideration for 2020 grant funds. Through a competitive grant process, EMSOPs received $201,000 in disbursements. MIEMSS, MEMA, and the SEMSAC Regional Affairs Committee are working collaboratively to improve the SHSGP review and allocation process for the coming years.

■ **EMS Naloxone Grant.** In FY 2017, Governor Larry Hogan declared a State of Emergency in response to the increase in opioid overdose cases in Maryland. Because of the opioid crisis, Maryland EMSOPs experienced a substantial increase in the use of naloxone administered by EMS providers to patients suffering an opioid overdose. Medicare, Medicaid, and, in many cases, private insurance do not reimburse EMS when a patient is not transported to a hospital (i.e., the patient recovered on scene or died). As a result, Maryland EMSOPs had an uncompensated expense of approximately $40.00 for each dose of naloxone administered. In many cases, more than a single dose of naloxone was administered.

The Maryland Behavioral Health Administration

(BHA), the Governor's Opioid Operational Command Center, and MIEMSS partnered to provide financial relief to EMSOPs that carry the increased burden of providing naloxone without reimbursement. In FY 2020, MIEMSS received grant funds from BHA, which were passed-through to the EMSOPs to help defray unreimbursed naloxone costs. The distribution of grant funds by MIEMSS region is displayed below.

■ **MIEMSS-Funded Grants.** MIEMSS provides funding from its budget for several programs. Funds for EMS clinician training programs support initial and continuing education, and a matching fund grant supports the purchase of automated external defibrillators (AED), monitor defibrillators, and other diagnostic equipment by local EMS agencies and companies.

Communications Systems

The Regional Programs Division serves to support the Office of Information Technology and Communications in the management of the statewide EMS communications system. During FY 2020, the regional administrators continued DEMSTEL system testing, coordinated statement-of-work development for the Communications Upgrade Project, and worked closely with the EMS jurisdictions in the further development of regional communications systems.

Voluntary Ambulance Inspection Program

The regional offices continue to oversee and coordinate the Voluntary Ambulance Inspection Program (VAIP) throughout the state. During FY 2020, the division spearheaded a comprehensive review of the VAIP standards and implementation of the necessary updates. The regional administrators continue to support the jurisdictional EMS operational programs by performing ambulance inspections at the request of any jurisdiction.

- BLS Transport.....125
- BLS Non-Transport.....224
- ALS Transport.....211
- ALS Non-Transport.....80

Health and Medical Emergency Preparedness

The regional offices are the first line of defense in supporting local jurisdictions in response to emergencies affecting the state's health and medical systems. Each regional office is actively involved in the Regional Health and Medical Coalitions, administered by the Maryland Department of Health. During FY 2020, each of the regional administrators was actively engaged in the State's response to the COVID-19 pandemic, with several of them serving in interagency coordination roles and providing data support to the state's response to COVID-19. Additionally, regional administrators supported the MIEMSS emergency operations

team by responding as members of the State Incident Management Team, MIEMSS Field Operations Support Team, and Statewide Ambulance Strike Team.

Annual Resources Survey

The division coordinates the Annual Jurisdictional EMSOP Resources Survey. During FY 2020, Maryland's jurisdictional EMSOPs delivered emergency medical care with the below resources:

- BLS Transport Units.....253
- BLS Non-Transport Units.....151
- BLS Equipped Fire Apparatus.....650
- ALS Transport Units.....371
- ALS Supervisor Units.....38
- ALS Non-Transport Units.....30
- ALS Equipped Fire Apparatus.....140

Emergency Medical Services Research

Division staff work with the State EMS Medical Director and the University of Maryland School of Medicine's National Study Center for Trauma and Emergency Medical Systems to coordinate a statewide EMS research interest group. Several members of the regional programs staff are actively involved in EMS research projects, leading to one publication in a scholarly journal and three presentations at national EMS or public health conferences.

MARYLAND TRAUMA AND SPECIALTY REFERRAL CENTERS

MARYLAND DESIGNATED ADULT TRAUMA CENTERS
(For explanation of differences in levels, see Trauma Center Categorization chart on page 31)

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 Adult Trauma Center, 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 Regional Health, Cheverly (MIEMSS Region V)

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

OUT-OF-STATE HOSPITALS (with MOUs)

- Adult Trauma Center/Christiana Care 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
  - Peninsula Regional Medical Center
  - 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 Regional Health
- 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
- The Wilmer Eye Institute/The Johns Hopkins Hospital, Baltimore City

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

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

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

Perinatal Referral Centers
- Anne Arundel Medical Center
- Frederick Memorial Hospital
- 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 Capital Regional Health
- 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 Franklin Square 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
- Peninsula Regional Medical Center
- Shady Grove Adventist Hospital
- Sinai Hospital
- St. Agnes Hospital
- Suburban Hospital–JHM
- University of Maryland (UM) Medical Center Midtown Campus
- UM Baltimore Washington Medical Center
- UM Capital Regional Health
- 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

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
Attending trauma surgeon who is fellowship-trained and is in the hospital at all times	X			
Dedicated facilities (Resuscitation Unit, Operating Room, and Intensive Care Unit) 24 hours	X			
Facilities (Resuscitation Unit, Operating Room, and Intensive Care Unit) available at all times	X	X	X	X
Trauma Surgeon available in the hospital at all times	X	X	X	
On-call Trauma Surgeon available within 30 minutes of call				X
Anesthesiologist in the hospital at all times and dedicated to trauma care	X			
Anesthesiologist in the hospital at all times but shared with other services		X	X	X
Orthopedic Surgeon in the hospital at all times and dedicated to trauma care	X	X		
Orthopedic Surgeon available within 30 minutes of call			X	X
Neurosurgeon in the hospital at all times and dedicated to trauma care	X			
Neurosurgeon in the hospital at all times but shared with other services		X		
On-call Neurosurgeon available within 30 minutes of call			X	X
Fellowship-trained/board-certified surgical director of the Intensive Care Unit	X	X		
Physician with privileges in critical care on duty in the Intensive Care Unit 24 hrs/day	X	X	X	
Comprehensive Trauma Research Program	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

The R Adams Cowley Shock Trauma Center (RACSTC), located within the University of Maryland Medical Center, serves as the state's Primary Adult Resource Center. RACSTC treated 5,860 primary trauma patients from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry. (See pages 80 to 85 for additional patient data.) Over this 12-month period, 85% of patients admitted to the Shock Trauma Center arrived by ground transportation and 15% arrived by air. Demographic data obtained indicate that the majority of admissions were male (57%) and aged 15-35 years (38%), followed by patients aged 56 or older (35%) and 36-55 (26%).

Mission

The R Adams Cowley Shock Trauma Center is a multidisciplinary clinical, educational, and research institution dedicated to world-class standards in the prevention and management of critical injury and illness. Its highly specialized medical personnel and dedicated resources are focused on a single mission: to eradicate preventable death and disability, thus reducing the personal tragedy and overall costs associated with severe injury. This mission is continuously pursued through state-of-the-art clinical care services, active research, didactic and hands-on clinical education, and prevention programs.

Primary Adult Resource Center Trauma Staff

Physician-in-Chief:
Thomas M. Scalea, MD, FACS, MCCM
Senior Vice-President of Nursing and Operations:
Karen E. Doyle, DNP, MBA, MS, RN, NEA-BC, FAAN

Center for Hyperbaric Medicine

The Center for Hyperbaric Medicine 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.

As the only multi-place chamber in Maryland, the Center is capable of simultaneously accommodating 10 patients on stretchers or 23 seated patients. Hyperbaric therapy provides oxygen to all parts of the body in amounts greater than possible under normal conditions by providing 100% oxygen under increased atmospheric pressure. The center can treat a wide spectrum of patients 24/7, from the most critically ill inpatients to ambulatory outpatients.

In FY 2020, therapeutic hyperbaric oxygen treatment (HBO) was provided for a total of 527 dives during 1,392 dive hours, of which 24 dive hours were an emergency (1.0%), 45% were inpatients, and 54% were outpatients. The practitioners from the Center for Hyperbaric and Dive Medicine have a long history of treating divers suffering from decompression sickness and are available 24 hours/day for consultation and treatment of dive emergencies. In addition, four specially trained physicians provide fitness-to-dive physicals for new recreational or commercial divers, as well as providing consultation with patients who have previously suffered dive accidents.

Accomplishments:

- Melissa Schroeder had a poster on Creative Staffing in HBO accepted to the June 2020 UHMS Annual Scientific Meeting;
- The HBO nurses are critical care-trained and rotate through the Multi-Trauma Critical Care Unit taking care of COVID-19 and other critical patients to hone their skills;
- The HBO team developed a head tent ventilation for COVID-19 patients who are hypoxic.

The GO-TEAM

RACSTC maintains an advanced resuscitative team, the GO-TEAM, which treats serious injuries at the incident scene. The GO-TEAM augments Maryland's statewide EMS system by providing critical care and surgical services beyond the scope of pre-hospital emergency care clinicians. Each dispatched GO-TEAM includes an attending physician and a certified nurse anesthetist. In FY 2020, there were 13 requests for the GO-TEAM, with four deployments.

Center for the Sustainment of Trauma and Readiness Skills

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 we have begun providing these experiences to Walter Reed nurses and technicians.

FY 2020 Annual Report

- **Notable Accomplishments.**
  - The Shock Trauma center started a Trauma Vascular Clinic in 2019. The clinic is run by two trauma surgeons and an advanced practice provider, with one of the goals being to ensure timely removal of Inter Venous Catheter (IVC) filters;
  - Dr. Paul Thurman had a scientific article published. Thurman P. "Mixed Shock States: A Case for the Pulmonary Artery Catheter". *AACN Advanced Critical Care*. 2020; 31 (1):67-74;
  - McQuillan, KA, Makic MBF. (eds.) (2020). *Trauma Nursing: From Resuscitation Through Rehabilitation* (5th ed.). St. Louis, MO: Elsevier. Over 16 RACSTC nurses served as authors and numerous others from the Center served as chapter reviewers. The text was endorsed by both the Society of Trauma Nurses and the American Association of Critical Care Nurses;
  - NTCC: Ashleigh Boidock, DNP, RN, CCRN – Presentation at National Association of Clinical Nurse Specialists 2020 Annual Conference.
  - Dr. Beth Cipra published an article. Cipra, E. J. (2019). "Implementation of a Risk Assessment Tool to Reduce Aspiration Pneumonia in Non-Stroke Patients". Clinical Nurse Specialist, 33(6), 279-283;
  - The newly created Discharge Improvement Taskforce has impacted several aspects of patient care: inpatient through outpatient. The committee identifies potential gaps in current practice that can impact safe patient discharges;
  - Stacey Graham created a triage communication tool that decreased the number of postings back and forth between provider and triage nurse. The tool facilitated faster resolution to patient issues/questions;
  - Sami Schwartz was accepted for a presentation at AAACN. The purpose of this project was to partner Ambulatory Services (AS) nursing leaders and staff with the affiliated school of nursing (SON) to provide a pilot student nurse practicum. This program focused on acute and ambulatory skills development to bridge the AS education-to-practice gap. The practicum experience successfully provided nursing students an opportunity to develop essential ambulatory nursing skills as they transition from the classroom to independent nursing practice;
  - Missy Schroeder was accepted for a presentation on Creative Staffing Solutions for Hyperbaric Medicine at Shock Trauma at the UHMS 2020 Annual Scientific Meeting;
  - Continued efforts to improve chamber safety and operations have initiated new professional relationships with other North American Hyperbaric Chambers;
  - Educated over 250 IMC nurses throughout the facility on basic ventilator skills and basic knowledge of ICU medications for potential ventilated

patients being moved to IMC level of care;
- EBP project on NTCC: Improving Pain Assessment for Traumatic Brain Injury Patients Through the Implementation of a Behavioral Pain Scale;
- Working with Palliative Care and colleagues from the Medical ICU to develop a Guideline for End of Life Care throughout the trauma center and medical center.

■ **Critical Care Resuscitation Unit (CCRU) PI Projects.**
- "Improving Door to Thrombectomy Times in Stroke Patients Admitted to the CCRU". Nathaniel Woods;
- "CCRU Impella Training. Development of Training Program to Assess for Competency of Impella Device". Katelyn Wheeler;
- "Increasing Advanced Certification Rate in CCRU: From Development to Evaluation". Suzanne Jacetzold;
- "Lab Draw Education for CCRU Trauma Technicians and Registered Nurses to Eliminate Lab Errors". Rachel Bartock;
- "The Critical Care Resuscitation Unit Transfers More Patients From Emergency Departments Faster and is Associated With Improved Outcomes". *Journal of Emergency Medicine*, February 2020. Ashley Aitken;
- "A Resuscitation Unit's Nursing Protocol for Monitoring Stroke Patients Undergoing Thrombectomy". Society of Critical Care Medicine Conference, February 2020. Presentation by Nathaniel Woods;
- "Post Procedure Guideline: Code Stroke – NTI", April 2020. Poster Presentation by Mary Ellen Dietrich, Louis Lee, Nathaniel Woods.

■ **Quality Management and Improvement.** RACSTC maintains a complete and comprehensive quality management program. All aspects of care from prehospital trauma-line consulting to peer review of patient deaths and complications are monitored through the quality program, benchmarked to the best practices of other institutions, and continually improved. The program integrates quality activities of other specialty services that provide care to critically ill and severely injured patients. The multidisciplinary Quality Improvement Committee is responsible for outlining the quality program, monitoring performance, and developing new initiatives.

■ **Injury Prevention Programs and Initiatives.** In keeping with the mission of preventing severe injury and death, RACSTC's Center for Injury Prevention and Policy (CIPP) focuses on identifying injury trends and developing prevention education programs. In FY 2020, CIPP presented 295 events reaching 13,371 students and community members with important prevention messages. Several injury-prevention programs operate within CIPP, including the Violence Intervention Program; the Bridge Program, aimed at breaking the cycle of domestic or intimate partner violence; Promoting Healthy Alternatives for Teens, designed to expose youth to the consequences associated with poor decision-making; the Trauma Prevention Program; Saving Maryland's At-Risk Teens, targeting high school students involved in dangerous behaviors related to drug and/or alcohol abuse; the Trauma Survivors Network; and the Stop the Bleed® campaign, designed to educate community members on how to stop life-threatening bleeding with tourniquet application and wound packing.

The Stop the Bleed® program has completed over 70 events, training more than 2,555 people. The program has touched and informed countless others through community outreach, such as the B'More Healthy Expo, as well as numerous local news segments and articles about this life-saving skill. RACSTC's Stop the Bleed® program succeeds through the strong voluntary collaboration between our clinical employees and community partners. Our intention is to continue impacting our Maryland community and teach anyone and everyone how to "Stop the Bleed® and Save a Life".

■ **Emergency Medical Services and Nursing Continuing Education.** RACSTC continues to expand and advance educational programs focused on patient care trends by delivering lectures and participating in case reviews with local jurisdictions. In FY 2020, evening educational programs open to EMS clinicians and nurses were held two times and linked via live broadcast to 24 remote sites across the state. Many EMS clinicians participated in an ALS airway course (offered four times in FY 2020) that included didactic and simulation learning. In addition, a virtual tour video was created to allow more EMS students, clinicians, and first responders to better understand the process of transporting a patient to RACSTC. EMS clinicians are permitted to observe procedures in the Trauma Resuscitation Unit or in the Critical Care Unit.

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 pre-med students, military medics, nurses, high school trainers, nurse practitioners, and physicians.

The Clinical Simulation Center has a robust educational schedule and has built environments to mimic every phase of patient care within the Primary Adult Resource Center. The Center hosts many certification

courses, including Advanced Trauma Life Support, Fundamental Critical Care Support, Advanced Trauma Care for Nurses, and Maintenance of Certification in Anesthesiology. Advanced trauma skills training includes Basic Endovascular Skills for Trauma, as well as extracorporeal membrane oxygenation and ultrasound training. Due to restriction from the COVID-19 pandemic, traditional simulation and education halted, allowing for the center to provide space for Personal Protective Equipment distribution and fit testing for our employees and faculty to safely treat patients. During the pandemic, over 50,000 people moved through the center every month for PPE and fit testing. In addition, the center supported serology testing for COVID-19 antibodies and research, having tested over 5,000 employees and providers.

- **Fellowships and Residencies.** The Surgical Critical Care Fellowship Program is the largest Accreditation Council for Graduate Medical Education (ACGME) training program in the country. RACSTC offers 21 fellowship positions in surgical critical care, anesthesiology, orthopaedic surgery, emergency medicine, and acute care surgery specialties. The ACGME-accredited University of Maryland Orthopaedic Traumatology Fellowship is considered to be the foremost orthopaedic trauma fellowship worldwide. The fellowship aims to educate orthopaedic surgeons to become clinically proficient in managing the musculoskeletal injuries of the severely or multiple injured patient in an interdisciplinary environment.

The American College of Surgeons designated RACSTC as the training site for both students and course instructors in Maryland. Critical care and surgical skills training courses are offered to providers from around the world. In FY 2020, over 800 classes were provided to healthcare workers, including medical students, EMS clinicians, attending physicians, and nurses.

- **Research.** Clinical research at RACSTC is conducted 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, resuscitation, surgical outcomes, patient safety, and injury prevention. It is the first research center in the nation dedicated exclusively to the study of trauma, its complications, and prevention. There are currently more than 25 clinical studies being conducted at RACSTC. The diversity of the studies is impressive, covering nearly all body regions and systems. Study areas include, but are not limited to, spinal cord injury, traumatic brain injury, hemorrhagic shock, venous thromboembolism therapies, acute kidney injury, and the biomechanics of motor vehicle crash-related injury.

All RACSTC research projects are designed to enhance the trauma system's ability to resuscitate, stabilize, and treat the needs of trauma patients. A few of the current studies that exemplify this goal are the Department of Defense-funded "Use of Acupuncture in Potentiating Functional Recovery in Spinal Cord Injury", "Emergency Preservation and Resuscitation for Cardiac Arrest from Trauma", and the industry-funded "Humacyte's Human Acellular Vessel for Use as a Vascular Bypass or Interposition Vessel in Patients with Limb-threatening Peripheral Arterial Trauma". We are also contributing to the Hyperbaric Oxygen Brain Injury Treatment (HOBIT) trial, a very large multi-center NIH trial on traumatic brain injury.

Dr. Sam Tisherman's research focuses on the management of severe hemorrhagic shock and cardiac arrest, using an innovative technique called Emergency Preservation and Resuscitation (EPR). This technique involves infusing ice-cold saline into the aorta (the major artery carrying blood from the heart), where it circulates throughout the body to quickly drop body temperature to 50 degrees Fahrenheit.

- **Rehabilitation Services.** Post-acute inpatient and outpatient services for RACSTC patients are primarily provided by the University of Maryland Rehabilitation & Orthopaedic Institute and the UMMC Midtown Campus.

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 treated 1,604 trauma patients from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry. (See pages 80 to 85 for additional patient data.) Adult trauma services are provided by the Division of Acute Care Surgery.

Mission

The mission of Johns Hopkins Medicine is to improve 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, health care professionals, and the public; conducts biomedical research; and provides patient-centered medicine to prevent, diagnose, and treat human illness.

Adult Trauma Center Staff

Adult Trauma Medical Director:
Kent A. Stevens, MD, MPH, FACS

Adult Trauma Program Manager:
Kathy Noll, MSN, TCRN

FY 2020 Annual Report

■ **Notable Accomplishments.** JHH is again ranked #3 in the nation based on U.S. News and World Report's Best Hospitals 2020-2021 rankings. The trauma and emergency surgery departments of JHH and Johns Hopkins Bayview Medical Center (JHBMC) are unified under a single Division of Acute Care Surgery.

Johns Hopkins Medicine's trauma surgeons, advanced practice providers, and nurses have been on the frontlines providing care to patients during the COVID-19 pandemic. The hospital has provided care for almost 1,000 confirmed positive COVID-19 admitted patients. Trauma cases during this time saw an increase in number and COVID-19 positivity as the economy opened up. Johns Hopkins researchers have received $35 million in funding from the U.S. Department of Defense (DOD) Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense (JPEO-CBRND), on behalf of the Defense Health Agency, for two nationwide clinical trials to test the effectiveness of a convalescent blood plasma outpatient treatment.

Kent Stevens, MD, MPH, FACS, is the Director of Adult Trauma Services, effective February 1, 2019. His research interests include Injury Prevention; Global Surgery; Trauma Care in Resource-Poor Settings; Trauma System Development; and Trauma Outcomes. Dr. Stevens has provided leadership for the Adult Trauma Service provider redeployment during the COVID-19 pandemic.

David Efron, MD, FACS, served as the Vice Chair for Acute Care Surgery and Clinical Care Integration. Dr. Efron was also the Medical Director for the JHH Capacity Command Center and Chief, Trauma and Acute Care Surgery, encompassing trauma, emergency surgery, and emergency critical care in the Department of Surgery. He successfully led the integration of our clinical services at JHBMC and now will be responsible for helping to integrate our clinical services in acute care surgery and trauma at Howard County General Hospital, Suburban Hospital (Level II Trauma Center), East Baltimore, and JHBMC.

Joseph V. Sakran, MD, MPH, MPA, FACS, Associate Chief of the Division of Acute Care Surgery and Director of Emergency General Surgery, is the Vice Chair of the Maryland Committee on Trauma. Dr. Sakran is on sabbatical as the Robert Wood Johnson Health Policy Fellow. In this capacity, Dr. Sakran is focused on developing health-related legislative and regulatory issues with members of Congress and the executive branch. Dr. Sakran is also President-Elect of the American College of Surgeons (ACS) – Maryland Chapter, and Vice-Chair of the Maryland ACS – Committee on Trauma.

Elliott R. Haut, MD, PhD, FACS, Vice Chair of Quality, Safety & Service for the Department of Surgery, is the Immediate Past-President of the Eastern Association for the Surgery of Trauma (EAST) and serves as Chair of Maryland TraumaNet. He has recently joined the Board of Directors of the Coalition for National Trauma Research (CNTR). Dr. Haut serves as the Associate Editor for Social Media for Trauma Surgery & Acute Care Open (TSACO).

JHH was the first health care organization in Maryland to receive the Magnet designation for excellence in nursing practice from the American Nurses Credentialing Center. The hospital received Magnet re-designation in 2008, 2013, and 2018.

■ **Quality Management and Improvement.** JHH continues to be a leader in the field of quality and safety. Dr. Elliott Haut, the current Vice Chair of Quality, Safety & Service for the Department of Surgery at JHH, has worked to improve outcomes and eliminate preventable harm. The Agency for Healthcare Research and Quality has used Dr. Haut's Deep Vein Thrombosis (DVT) Collaborative at JHH to highlight the use of clinical decision support to prevent thromboembolism in hospitalized trauma patients.

The Joint Commission ranked JHH a Top Performer on Key Quality Measures. The "Top Performer" designation is reserved for accredited hospitals that consistently follow best practices in patient safety. Consistent with that, JHH's Armstrong Institute for Patient Safety and Quality continues to focus on eliminating preventable harm to patients.

■ **Injury Prevention Programs and Initiatives.** The Stop the Bleed® education campaign continued to gain momentum with plans utilizing JHH professionals to offer bimonthly classes for staff while continuing to reach out to individuals and groups in Baltimore and the surrounding communities. Stop the Bleed® classes were also offered to victims of violence and their families during their hospital stay. Dr. Matthew Levy, Senior Medical Officer for the Hopkins Center for Law Enforcement Medicine and an Associate Professor of Emergency Medicine, has worked on designing the Stop the Bleed® (STB) program on the national level, and he continues to teach hemorrhage control to civilian law enforcement as well as tactical and emergency medical service teams as part of Tactical Combat Casualty Care (TCCC). Dr. Levy and Dr. Haut have also collaborated on STB research amongst victims of trauma recidivism. JHH planned its third annual Trauma Survivors Day Celebration for May in conjunction with JHH Peds Trauma and the Wilmer

Eye Institute, but due to the pandemic, this program will need to be rescheduled. The Distracted Driving Program and Falls Prevention activities will likewise need to be rescheduled.

Prevention of gun violence at the local, state, and national levels continues to be a focus of the JHH injury prevention program. Dr. Joseph Sakran, a JHH trauma surgeon, has played a major role in this effort working at the nexus of medicine, public health, and public policy. Dr. Sakran serves as the Chair of the Injury Control and Violence Prevention Committee for the Eastern Association for the Surgery of Trauma. Dr. Sakran is often an invited speaker on gun violence on Capitol Hill and has worked with numerous elected officials, including the current Presidential candidates, to advise them on a pathway forward for make communities safer from gun violence.

The Hopkins Responder Violence Intervention Program (VIP) provides intervention services to patients who have sustained an injury from a gunshot wound, stabbing, or assault. The program's aim is to interrupt cycles of intentional violence (shooting, stabbing, and assaults) and future reinjury or death. Responders work directly in the hospital with patients during the golden moment of patient vulnerability after the episode of trauma. They also provide follow-up visits to connect victims to community employment services, substance abuse counseling, and legal assistance.

The Johns Hopkins Center for Gun Policy and Research, a division of the Johns Hopkins Bloomberg School of Public Health (JHBSPH), continued to bring its expertise to the issues related to gun violence prevention. The center provides input into the effectiveness of programs and policies aimed at reducing violence, as well as information for legislators and public health professionals on effective interventions.

■ **Emergency Medical Services and Nursing Continuing Education.** Matthew Levy, D.O. M.Sc., associate professor of Emergency Medicine Services, is the Region III Medical Director for the Maryland Institute for Emergency Medical Services Systems (MIEMSS), Maryland's state EMS agency. In this role, Dr. Levy collaborates with other EMS medical directors and works closely with state EMS officials on projects and programs in Maryland, including EMS system quality assurance, protocol, and program development.

Michael Millin, MD, MPH, Associate Professor of Emergency Medicine, was appointed to serve on the Statewide Emergency Medical Services Advisory Council (SEMSAC). SEMSAC is a 31-member council that advises and assists the Maryland Emergency Medical Services Board, which governs all EMS activities in the state. Dr. Millin has sponsored a number of EMS protocols for the State.

Kathy Noll, MSN, TCRN, continues to serve as a member of the Executive Committee in her role as Treasurer of TraumaNet, and she is the Maryland State Chair for the Society of Trauma Nurses. Ms. Noll is a regular instructor for Advanced Trauma Care for Nurses (ATCN) courses, and she is a member of the Maryland Trauma Quality Improvement Committee (TQIC). Ms. Noll has provided leadership for consolidating policies and protocols across Hopkins trauma centers.

Judy Schroeder, MS, RN-BC, continues to lead trauma quality improvement activities at JHH. She plans the yearly Trauma Survivor's Day Celebration across JHH trauma divisions, and has been instrumental in developing a Stop the Bleed® training program for Hopkins providers and staff. Raiza De LaCruz received the 2020 KJ Consulting award for Outstanding Trauma Registry Professional.

Trauma Education continues as a priority for the trauma center. Trauma attending physicians at JHH teach Advanced Trauma Operative Management, Advanced Trauma Life Support, and Advanced Surgical Skills for Exposure in Trauma, and Rural Trauma Team Development courses. Many of the trauma physicians were also invited speakers at numerous national and international conferences this past year. They have added expertise as session moderators, visiting professors, and keynote speakers throughout the country, and have conducted presentations for members of the US Congress and military. Dr. Greg Osgood, Chief of the Division of Orthopedic Trauma, continues to deliver lectures nationwide on orthopedic trauma techniques. An enhancement to these courses is the Johns Hopkins Medicine Simulation Center, a state-of-the-art training facility that allows trauma care professionals to refine advanced techniques utilizing practice scenarios and debriefings. Through a partnership between emergency medicine and trauma staff, clinicians are challenged to hone assessment skills, improve patient safety, and increase interdisciplinary teamwork.

■ **Fellowships and Residencies.** The Adult Trauma program welcomes two new Acute Care Surgery/ Trauma Fellows, Crisantos Torresa, MD, and Jafar Haghshenas, MD. Dr. Pamela Lipsett directs the Surgical Critical Care Fellowship. Dr. Christian Jones is the Acute Care Surgery Fellowship Director. The program graduates two critical care Fellows each year.

■ **Research.** As an academic medical center, all attending trauma center faculty maintain research interest and expertise through a trauma research program directed by Dr. Haut. Extramural research funding of over $4 million in grants and contracts have been awarded to projects with trauma surgery faculty serving as primary investigators, some of which have culminated in notable publications and presentations.

Extramural funding has come from sources including 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 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.

JHH maintains a unique collegial relationship with JHBSPH that encompasses all facets of ongoing research. Drs. Haut and Stevens have joint faculty appointments at JHBSPH, and Dr. Haut runs the Surgery Faculty – Student Mentoring Program, which pairs master's students with faculty to perform clinical and outcomes research. The success of this program has been published in JAMA Surgery, and has trained over 100 students resulting in over 200 peer-reviewed manuscripts.

■ **Rehabilitation Services.** The JHH Department of Physical Medicine and Rehabilitation (PM&R) continues to provide a wide range of rehabilitation services to trauma patients, from the bedside to inpatient rehab and home services. The Comprehensive Integrated Inpatient Rehabilitation Program, opened in 2017, 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 JHH PM&R also sponsors a yearly national rehabilitation conference. This year's conference focus will be on 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, and Harford and Cecil Counties. JHBMC treated 4,050 trauma patients from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry. (See pages 80 to 85 for additional patient data.) Adult trauma care services at JHBMC are provided by the Division of Acute Care Surgery.

Mission

As a member of Johns Hopkins Medicine, Johns Hopkins Bayview Medical Center provides compassionate health care that is focused on the uniqueness and the dignity of every patient. The program is committed to providing 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, team-oriented approach. Under the collaborative leadership of specialized physicians, nurses, and members of the allied healthcare team, the program continues to evolve through implementation of protocols to address patient, community, and institutional needs.

Adult Trauma Center Staff

Adult Trauma Medical Director:
Raymond Fang, MD, FACS
Adult Trauma Program Manager:
Afton Jamerson, BSN, RN, TCRN, CEN

FY 2020 Annual Report

■ **Notable Accomplishments.** JHBMC is the third busiest trauma center in the state by patient volume. The trauma and emergency surgery departments of JHBMC and the Johns Hopkins Hospital are unified under a single Division of Acute Care Surgery and provide trauma attending physician support for both the Johns Hopkins Hospital and JHBMC. The Departments of Trauma Surgery, Anesthesia, Emergency Medicine, and Nursing implemented four trauma activation drills simulating various trauma activation scenarios, which were videotaped and reviewed by participants during debriefings. The drills were facilitated by a Trauma attending physician, ED Trauma Performance Improvement Nurse, and ED Safety Specialist. These drills resulted in changes to the trauma room and equipment layout, staff positioning, and improved communication between the interdisciplinary teams.

■ **Quality Management and Improvement.** JHBMC continues to strengthen its quality management process and improve patient care and outcomes at the individual and system level. The multi-disciplinary Trauma Joint Practice Committee maintained its formal department liaison membership in emergency medicine, trauma surgery, orthopaedic surgery, and neurosurgery and has initiated case reviews as part of the committee purpose to enhance collaboration and identify improvement opportunities. Trauma and Emergency Medicine provider and nursing leadership

implemented monthly performance Improvement case review sessions, which supported the development of the performance improvement RN role within the Emergency Department. This role assisted in providing on-site nursing education and coaching during actual trauma activations as part of a trauma professional development process for staff new to trauma care

JHBMC continues to see an increase in the number penetrating trauma cases and, as a result of the Tier III activation level initiation, are serving a larger group of patients who have fall-related injuries and are at risk for complications associated with anticoagulant use and older age. JHBMC implemented thromboelastography in fall 2019 as part of our management of all trauma patients. This diagnostic laboratory study facilitates goal-directed blood product replacement therapy to the trauma patient.

- **Injury Prevention Programs and Initiatives.** JHBMC planned to focus on injury prevention initiatives for the two most common injury mechanisms presenting at the trauma center: falls and motor vehicle crashes. However, the COVID-19 pandemic required the cancellation of the Distracted Driving Prevention event in April as well as the Trauma Survivor Day in May. As part of the nationwide Stop the Bleed® campaign, JHBMC continued to provide hemorrhage control training to hospital staff, local EMS, and the members of the community in fall and winter 2019. The COVID-19 pandemic also required cancellation of the spring sessions.
- **Emergency Medical Services and Nursing Continuing Education.** JHBMC again supported semi-annual education for 81 EMS clinicians with presentations that included trauma and burn injury content at a full-day, on-site educational seminar in fall 2019 and a virtual presentation seminar in spring 2020. Expanding the knowledge of front-line nurses at JHBMC is crucial to improving patient outcomes. JHBMC continued to ensure our nursing staff attends the Society of Trauma Nurses' Advanced Trauma Care for Nurses that is offered through the Maryland Committee on Trauma (COT), with 27 registered nurses attending. Afton Jamerson, Trauma Program Manager, has joined the faculty for this course, as well. Five registered nurses obtained national certification in trauma nursing (TCRN). Dr. Fang continues to be an Advanced Trauma Life Support Course Director and Instructor for courses offered through the Maryland COT.
- **Research.** The integrated Division of Acute Care Surgery provides JHBMC with opportunities to join new and ongoing research initiatives focused on sustained injuries, clinical management, and mechanism of injury.
- **Rehabilitation.** Approximately one-third of admitted trauma patients require a period of rehabilitative care after hospitalization, especially older patients with preexisting, preinjury comorbidities. JHBMC has access to an inpatient rehabilitation center on its campus to care for its large patient population over the age of 65. JHBMC works with social work and case management services to assess each individual patient's care needs prior to hospital release, while remaining cognizant of potential financial constraints related to insurance network coverage.

Level II Adult Trauma Center

University of Maryland Capital Region Health, Prince George's Hospital Center

3001 Hospital Drive, Cheverly, Maryland
MIEMSS Region V

University of Maryland Capital Region Health/ Prince George's Hospital Center (UMPGHC) is a designated Level II Adult Trauma Center serving Prince George's County and other adjacent areas, including Washington, DC. The hospital is in close proximity to four major highways, making the facility a prime location for EMS transport for both Prince George's County and the DC area. UMPGHC treated 3,090 trauma patients from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry. (See pages 80 to 85 for additional patient data.) The adult trauma center at UMPGHC is the second busiest trauma center in Maryland.

Mission

The University of Maryland Capital Region Health/ Prince George's Hospital Center is committed to restoring the quality of life for all of our patients, beginning with prehospital communication, and extending during their hospital stay and long after discharge. Our dedication to our patients extends to their families and the communities in which they live by providing state-of-the-art clinical care delivered with compassion, dignity, and respect. We demonstrate our mission by providing exemplary care for each of our patients and their families, enhancing health and wellness, providing highly specialized services to a broad community, and building an environment where each person is valued and respected. Our mission is to the community, both in treatment of diseases as well as in the pursuit of prevention strategies.

Adult Trauma Center Staff

Adult Trauma Medical Director:
Brandon Bruns, MD, FACS

Adult Trauma Program Manager:
Dawn Moreland, BSN, RN, TCRN

FY 2020 Annual Report

■ **Notable Accomplishments.** After seven years at the R Adams Cowley Shock Trauma Center, Brandon Bruns joined the group as the Trauma Medical Director in September 2019; Dawn Moreland returned as Trauma Program Director after a brief period away.

After Dr. Bruns' arrival, he immediately recruited two additional acute care surgeons, both starting in September 2020. The total acute care surgery faculty will now consist of six full-time surgeons.

Two acute care surgery residents presented at the annual Maryland State Committee on Trauma paper competition, placing second and fourth, respectively, for "Changing Scenery: How Much Will 5 Miles Affect Our Trauma System" and "Violence Prevention: Maximizing Our Chances of Success".

Our move to the new University of Maryland Regional Medical Center will occur in summer 2021. It includes a state-of-the-art trauma resuscitation unit with four bays and a procedure room, one hybrid operating room, multiple in-patient units to aid in the care and recovery of injured patients, and a new and improved electronic health records system.

■ **Quality Management and Improvement.** UMPGHC acute care surgery performance and quality management processes include collaboration with multidisciplinary care teams incorporating clinical expertise and best practices. Our timely outcomes and process improvement plans are fulfilled through multiple monthly comprehensive case reviews, along with input from care management and utilization review for throughput management. Strong collaborations enable the acute care surgery program to have an overall institutional commitment to the care of the injured patient and ensures access to necessary resources.

■ **Injury Prevention Programs and Initiatives.** Multiple education and awareness activities for Stop the Bleed® and motor vehicle crashes from distracted, drowsy, and under-the-influence driving continued for the community, hospital staff, and visitors. Unfortunately, the COVID-19 pandemic has paused additional community education and outreach efforts.

Our Capital Region Violence Intervention Program (CAP-VIP) continues to make strides in interrupting the cycle of violence and associated recidivism. Our weekly virtual Men's Trauma Recovery Empowerment Model (M-TREM) meetings allow for continued contact with survivors ensuring the necessary mental health and resource support needed for a full recovery, post-discharge, are identified and provided.

The UMPGHC Traumatic Brain Injury Support Group for survivors and caregivers is now held via a monthly virtual platform and continues to address resource and support needs.

■ **Emergency Medical Services and Nursing Continuing Education.** UMPGHC offers ongoing education to nursing staff for the care of the injured patient, including a 16-hour orientation to the care of the injured patient, Trauma Nursing Core Course (TNCC) and multiple unit-specific, online and in-house extended-learning opportunities. UMPGHC expanded its nursing and graduate medical education program to include military personnel from joint-base institutions to allow pre-deployment, hands-on experience and exposure.

■ **Research.** UMPGHC's Trauma Registry supports internal, local, and multi-institutional research to support efforts to identify trends, improve outcomes, and evaluate injury prevention efforts.

■ **Rehabilitation.** We maintain a constant collaboration with the Physical Medicine and Rehabilitation Center to ensure that the physical, occupational, and speech-language therapy needs of the injured patient are met. Acute Care Rehab and Gladys Spellman Chronic Care Vent units are located in-house, creating additional opportunities for internal long-term care and support.

Level II Adult Trauma Center

Sinai Hospital

2401 West Belvedere Avenue, Baltimore, Maryland
MIEMSS Region III

Sinai Hospital (Sinai) is a designated Level II Adult Trauma Center serving the Greater Baltimore metropolitan area. Sinai treated 2,014 trauma patients from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry. (See pages 80 to 85 for additional patient data.) Adult trauma services at Sinai are provided by the Acute Care Division of Surgery.

Mission

Sinai Hospital is part the LifeBridge Health System. Under the new leadership of President, Daniel Blum, our mission is to maintain and improve the health of the individuals and communities we serve through compassionate, high-quality care. LifeBridge Health offers comprehensive treatment and preventative wellness services. In addition, Sinai Hospital is dedicated to educating medical students and residents, and engaging in research to improve lives throughout Maryland and worldwide.

Adult Trauma Center Staff

Trauma Medical Director:
Hashim Hesham, MD, FACS
Trauma Program Manager:
James Gannon MS, RN, CEN

FY 2020 Annual Report

■ **Notable Accomplishments.** Dr. Marcie Feinman, MD, MEHP (M.Ed), FACS, became the Associate Division Chief for Acute Care surgery and the Program Director for the surgical residency at Sinai Hospital on July 1, 2019. She has a strong background in education, having completed her Master's in Education for the Health Professions from Johns Hopkins in 2017. Dr. Feinman hopes to utilize her knowledge and expertise in curriculum development to enhance trauma simulations, improve trauma morbidity and mortality, and co-chair Trauma CME conferences.

Dr. Farheen Qurashi, MD, FACS, was appointed Medical Director of the Surgical Intensive Care Unit at Sinai Hospital on July 1, 2019. She continues to be a National Surgical Quality Improvement Program Champion. She completed her General Surgery Residency training at the University of Missouri – Kansas City School of Medicine and Surgical Critical Care Fellowship at MedStar Washington Hospital Center in Washington, DC. She is a Board Member of the Maryland Chapter of the American College of Surgeons and of Doctors for America. She serves on the Injury Control and Violence Prevention Committee for the Eastern Association for the Surgery of Trauma.

Tanika Thompson, DNP, RN, NEA-BC, CPHQ, joined Sinai's Division of Trauma in December 2019 as the Trauma Performance Improvement Coordinator. Ms. Thompson has served as the Surgical Quality Nurse Coordinator for the Department of Surgery since December 2018 and has been with Sinai Hospital for 13 years. Her expertise in quality and performance assessment and improvement have proven to be essential in the continued program evaluation, making Sinai's Division of Trauma one of the best in the Baltimore area.

James Gannon, MS, RN, CEN, volunteered to become the Communication Chairperson for TraumaNet, Maryland's trauma systems multidisciplinary advocacy group, in August 2019. Through this role, Mr. Gannon has actively updated the TraumaNet website and social media account to provide essential Maryland trauma news, trauma education, support, and injury prevention on a worldwide platform. In May 2020, Mr. Gannon was also elected to the Vice-Chair position of TraumaNet.

■ **Injury Prevention Programs and Initiatives.** Sinai continues to be active in community injury prevention initiatives. The Street Violence Intervention Program (SVIP) continues to expand in Baltimore's Park Heights community, and Sinai's trauma program has continued working closely with the Kujichagulia Center and Safe Streets to identify trauma patients who are victims of street violence. Through this partnership, trauma patients with violent or criminal lifestyles are rapidly identified and the SVIP team intervenes to offer them safety, positive and productive growth opportunities, and other support the individual may need. We continue to attempt to recognize persons susceptible to street violence and intervene before they commit another act of violence or become a victim to trauma themselves.

In conjunction with the Maryland Committee on Trauma, Sinai continues to participate in Stop the Bleed®, a nationwide campaign training the public how to utilize tourniquets and wound packing to control bleeding until first responders arrive. Sinai has continued training first-line responders within the LifeBridge Health (LBH) system and branched out into the surrounding Park Heights community. In March 2020, Sinai's Division of Trauma also partnered with the Mayor's Office of Emergency Management as well as the Baltimore City Police and Fire Departments to hold an all-day House of Worship Preparedness Workshop. Members from Trauma Services taught Stop the Bleed® to high-ranking members of Baltimore's faith-based community.

Sinai's Division of Trauma traveled to the School of the Cathedral of Mary Our Queen in January 2020 to spend the day speaking with children in K-2nd grade discussing injury prevention, helmet safety, and home safety.

This past year, Dr. Qurashi joined members of TraumaNet to provide falls prevention education on "Midday Maryland" for Baltimore's WMAR-TV Channel 2. Dr Qurashi discussed the importance of falls awareness, in-home safety, and education to prevent at home falls.

As a member of TraumaNet, Sinai is actively involved in state legislation that affects trauma patients and trauma care providers. Mr. Gannon joined members of TraumaNet to successfully petition the State's legislature to maintain Maryland's motorcycle helmet safety laws, as well as traveling to Washington, DC, to educate members of the US Senate and US House of Representatives on trauma legislation that was passed but left unappropriated for funding.

■ **Quality Measures and Improvement.** Sinai Trauma Services continues to be active in quality improvement initiatives. Partnering with a now system-wide LBH Quality and Patient Safety Department and various multidisciplinary hospital committees allows

Trauma Services to concurrently and retrospectively review cases at both individual and system levels. Sinai staff routinely reviews and implements best practices to improve the care and experience for its trauma population.

Throughout the COVID-19 pandemic, Sinai's Division of Trauma volunteered to play a significant role and provide the best and safest care to our patients seeking trauma and medical attention at Sinai. During the initial days of the pandemic, Trauma Services rapidly developed procedures to minimize the risk of COVID-19 transmission to staff and patients in our Emergency Department trauma bays using evolving Centers for Disease Control and American College of Surgeons Committee on Trauma recommendations. Sinai's Acute Care general surgeons Dr. Hesham, Dr. Feinman, Dr. Qurashi, Dr. Mark Blum, and Dr. Lingxiang Ye all assisted in the Medical Intensive Care Unit helping to cover those critically ill with the virus as our ICUs began to fill to capacity. Dr. Joshua Wolf and former Sinai surgery resident, now-attending surgeon Dr. Shane Svoboda volunteered to temporarily take attending trauma calls to maximize essential critical care resources. Our surgical Advanced Practice Providers all assisted with the LBH COVID-19 hotline and performed tele-triage in Sinai's Virtual Hospital.

In April 2020, Mr. Gannon joined LBH's Governor's Strike Team for Nursing Homes. Under the direction of LBH's Director of Post-Acute Care Collaborative, Jonathan Eldridge, and in coordination with the Governor's Office, MIEMSS, Maryland National Guard, local and state Health Departments and Federal Disaster Medical Assistance Teams, the LBH team assessed nursing homes' vulnerability to COVID-19, developed strategic planning to minimize the spread of the virus, and tested thousands of nursing home residents and staff in Baltimore City, Baltimore County, and Carroll County. LBH was a lead Strike Team in the interagency response that included MIEMSS and the Maryland Department of Health, under Governor Larry Hogan.

- **Emergency Medical Services and Nursing Continuing Education.** In FY 2020, Sinai expanded its second annual Treating Trauma: Care Across the Continuum Conference. The course is comprised of local experts who deliver innovative and evidence-based presentations on current topics in trauma care, including prehospital, inpatient, and post-discharge phases. The conference included hands-on training exercises such as Stop the Bleed® and a mass casualty SimWars exercise. Sinai Hospital offered this conference free of charge to Maryland's frontline Emergency Medical System personnel.

In collaboration with Sinai's Emergency Preparedness Committee, Sinai's Division of Trauma actively participates in ongoing emergency preparedness and disaster response training. In FY 2020, this included a full-scale hospital evacuation exercise and Hospital Incident Command leadership trainings.

Many trauma staff members at Sinai teach Trauma Nurse Core Course (TNCC), Emergency Nurse Pediatric Course (ENPC), Advanced Trauma Life Support (ATLS), Advanced Cardiac Life Support (ACLS), Pediatric Advanced Life Supports (PALS), and Basic Life Support (BLS). Many of these courses are offered at the hospital and are open to staff as well as providers in the community. The simulation lab at Sinai has continued to grow, providing hands-on instruction, multidisciplinary training, and team-building opportunities. Sinai also supports schools across Maryland by training nurses, advanced practice providers, and EMS clinicians, among others.

- **Fellowships and Residencies.** Sinai continues to boast a full staff of fellowship-trained acute care surgeons providing in-house 24/7 coverage, 18 surgical residents ranging from interns through fifth year who have extensive training in trauma care, and a dedicated and experienced advanced practice provider staff.

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 also 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. They also complete a four-week rotation at the R Adams Cowley Shock Trauma Center during their post-graduate III year focusing on treating soft-tissue injuries.

- **Research.** LBH Department of Research provides opportunities for all levels of providers and staff to participate in research initiatives, including those that advance trauma care.
- **Rehabilitation.** Sinai rehabilitation services are integrated throughout the patient's hospital stay. When a patient is ready for discharge, Sinai can accommodate them in a 57-bed inpatient rehabilitation center. A full spectrum of acute and subacute rehabilitation services is offered, including pain management, aquatic therapy, physical therapy, occupational therapy, and speech-language and swallow therapies. The rehabilitation center also offers programs such as driving evaluations and return-to-work programs.

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 is also easily accessible from Frederick and Prince George's Counties. Suburban treated 1,254 trauma patients from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry. (See pages 80 to 85 for additional patient data.) Adult trauma services at Suburban are provided by the Trauma and Emergency Surgery Section of the Department of Surgery.

Mission

Suburban Hospital's mission is improving health with skill and compassion. As a member of Johns Hopkins Medicine, Suburban Hospital is committed to fostering the development of an integrated and innovative system of care that provides state-of-the-art clinical care, supported by a strong base of medical research and education. The Board of Trustees continues to reaffirm its commitment to providing all the resources and the infrastructure necessary for a Level II trauma designation, and the entire staff of Suburban Hospital remains dedicated to the delivery of safe and individualized quality medical care that is so much appreciated by patients and families.

Adult Trauma Center Staff

Trauma Medical Director:
Dany Westerband, MD, FACS
Trauma Program Director:
Melissa E. Meyers, RN, BSN, MBA, TCRN

FY 2020 Report

■ **Notable Accomplishments.** Suburban Hospital's campus-wide transformation was completed in March 2020. The renovations included a 300,000 sq. ft. addition, a parking garage and dedicated ambulance driveway with direct access to the Emergency Department entrance, and the construction of an upgraded suite of 14 state-of-the-art operating rooms adjacent to the trauma bay, including one hybrid operating room for enhanced imaging capabilities during procedures. In addition to the operating suite, 108 new private patient rooms with enhanced infection control and patient privacy were added.

■ **Injury Prevention Programs and Initiatives.** A Fall Prevention Fair was held in September 2019. Suburban trauma nurses also participated in a drug and alcohol education series for high-risk youth, focusing on a discussion of the effects of alcohol and drugs with the young participants, and highlighting the consequences of those poor decisions and dangerous behaviors which often land them in the trauma bay. Due to COVID-19, all Stop The Bleed® programs were suspended in March. Since September 2016, Suburban had been an active participant in the national Stop the Bleed® campaign, thanks to generous donations made by the Wolpoff Family Foundation. These funds were used to purchase training mannequins and tourniquets, as well as wall-mounted Stop the Bleed® kits that remain strategically placed throughout the hospital.

■ **Quality Management and Improvement.** In an effort to identify opportunities for improvement at all levels, Suburban's comprehensive care review process was significantly strengthened to include a review of every trauma chart by the trauma clinical data abstractor, the trauma performance improvement nurses, the trauma program director, and the trauma medical director. In addition, all deaths, transfers out, and complications continue to be presented at the monthly multidisciplinary trauma Morbidity and Mortality Conference.

■ **Emergency Medical Services and Nursing Continuing Education.** Suburban's Emergency Department continues to be a training site for prehospital care clinicians through an agreement with the Montgomery County Training Academy and Montgomery County Community College.
Due to the COVID-19 pandemic, the spring 2020 Critical Issues in Trauma seminar was cancelled. However, the conference is expected to be offered in the spring of 2021.

■ **Fellowships and Residencies.** Suburban has had a longstanding agreement with Walter Reed Military Medical Center for the training of fourth-year surgical residents who rotate through the trauma and emergency surgery service, within the context of their affiliated surgical residency program.

■ **Research.** Suburban continues to participate in the National Institutes of Health study on mild to moderate traumatic brain injuries, with the goal of advancing knowledge on mechanisms of brain injury and recovery, and developing better diagnostic tools and more effective treatments.

■ **Rehabilitation.** Suburban retains a memorandum of understanding with Adventist HealthCare Rehabilitation Center to provide rehabilitation services. Occupational, physical, and speech therapy are provided onsite to trauma patients during their hospital stay. All admitted trauma patients are assigned a case manager who works closely with the trauma team to make 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. MMC treated 1,922 trauma patients from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry (See pages 80 to 85 for additional patient data). Adult trauma services are provided by the staff of the emergency department.

Mission

To improve the health status of our region by providing comprehensive health services to patients and families.

Adult Trauma Center Staff

Trauma Medical Director:
Frank Collins, MD
Trauma Program Manager:
Susie Burleson, DNP, MBA, RN

FY 2020 Annual Report

■ **Notable Accomplishments.** In FY 2020, MMC provided continuing education through its biannual trauma conferences to more than 300 providers, including EMS, hospital staff, and other local health care providers outside the organization.

In September, the trauma center staff participated in Falls Day, an initiative of the Maryland Trauma Quality Improvement Committee to decrease the number of falls across the state.

Injury prevention classes for the community reached more than 2,200 individuals in FY 2020. Notably, MMC's car seat program assisted with 75 car seat checks throughout the year and its loaner program provided 70 car seats to families in need of a child passenger safety seat. Stop the Bleed® classes were held throughout the region, reaching approximately 1,600 people.

■ **Quality Management and Improvement.** Throughout the past year, MMC trauma center staff worked to improve trauma documentation. To help identify those patients who do not present as trauma patients, but clearly meet the trauma criteria, the staff ensures that each patient has a complete vital signs assessment on arrival and discharge. MMC has begun to implement electronic standard orders, used for all patients admitted by trauma surgeons, to improve standardized care for trauma patients through the implementation of EPIC. The trauma team has also re-designed the workflow in the trauma rooms to allow for better movement and care of the trauma patient.

■ **Injury Prevention Programs and Initiatives.** In FY 2020, MMC participated in statewide injury prevention days, promoting distracted driving awareness and falls prevention. MMC trauma staff taught several Stepping On classes in the community to help decrease falls among the elderly.

MMC worked collaboratively with Safe Kids Washington County to provide bicycle, fire, poison, sun, and pedestrian safety education to 1,135 children in the community. MMC provided first-grade tours to all local elementary schools' students and injury prevention was discussed during these tours.

In addition to car seat checks and loaner programs (see Notable Accomplishments at left), 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 virtual car seat checks to assist families with proper installation.

■ **Emergency Medical Services and Nursing Continuing Education.** In FY 2020, MMC organized free trauma conferences for staff and EMS partners and provided trauma nurse core curriculum and emergency nursing pediatric care courses at the hospital.

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 has a professional nursing research council that studies evidence-based best practices in nursing, including a study on nurses' perception of "quiet time" in the critical care Unit.

■ **Rehabilitation.** Meritus Total Rehab Care (TRC) is the largest, most comprehensive rehabilitation center in the region, providing care in an inpatient hospital unit, as well as at an outpatient facility located in Robinwood Professional Center, adjacent to the hospital. The medical director, nursing staff, therapists, social workers, and program managers at TRC work together to provide innovative treatment to patients. A full range of rehabilitation programs is available at the center, including comprehensive adult inpatient rehabilitation, outpatient pediatric and adult services, traumatic brain injury rehabilitation, and an inpatient joint replacement program. TRC's inpatient rehabilitation unit is certified to meet national rehabilitation standards as set forth by the Commission on Accreditation of Rehabilitation Facilities.

Level III Adult Trauma Center

Peninsula Regional Medical Center

100 East Carroll Street, Salisbury, Maryland
MIEMSS Region IV

Peninsula Regional Medical Center (PRMC) is a designated Level III Adult Trauma Center serving the Delmarva Peninsula, Sussex County in southern Delaware, and Accomack County in Northern Virginia. PRMC treated 1,162 trauma patients from June 1, 2019, to May 31, 2020, according to the Maryland State Trauma Registry. (See pages 80 to 85 for additional patient data.) Adult trauma services at PRMC are provided by the Emergency/Trauma Center.

Mission

Improve the health of the communities we serve.

Adult Trauma Center Staff

Trauma Medical Director:
Brion McCutcheon, MD
Trauma Program Manager:
Kari Cheezum, MSN, RN, CEN, TCRN

FY 2020 Annual Report

■ **Notable Accomplishments.** In May 2019, Kari Cheezum became the chair of the statewide Trauma Quality Improvement Committee. In June 2019, the staff in the Trauma Department became Certified Child Passenger Safety Technicians and have assisted with child safety seat checks on the lower Eastern Shore. High-fidelity trauma simulation training was implemented, as well as a dedicated trauma skills day, as part of the orientation program to improve trauma care to the patients we serve.

■ **Quality Management and Improvement.** PRMC has been working on several quality improvement initiatives this past year. In an effort to continue to improve trauma documentation, trauma and ED leadership continue to work with the EPIC healthcare software team to improve Trauma Narrator, an EPIC proprietary application, making it more user-friendly for clinicians. Working with clinical staff, a multi-disciplinary team continues to work to improve quality metrics, including vital signs, antibiotics for open fractures, and time to head CT.

■ **Injury Prevention Programs and Initiatives.** PRMC continues to coordinate and participate in community-based injury prevention initiatives. In fall 2019, PRMC partnered with the MAC center and participated in the Maryland Trauma Quality Improvement Committee's statewide fall injury prevention initiative. Staff also continue to support the nationwide Stop the Bleed® campaign to deliver hemorrhage control education to the public by offering training to local businesses, organizations, private clubs, churches, and community members. Trauma Center staff also presented Stop the Bleed® at several healthcare conferences over the past year.

Working with the ATS Maryland Division and local communities, PRMC continues to hold wellness events for the public. As a Community Partner with Safe Kids, Trauma Center staff received a grant for water safety and provided education to children and families on how to stay safe in pools and open water at several community events. Trauma staff also received bike helmets and provided helmets and safety education to children and families. In August 2019, staff partnered with the Salisbury Police Department at National Night Out and provided over 90 helmets and education to each child and family that received a bike from the event. They also continue to be active members of the Ocean City Pedestrian Safety Task Force, which focuses on improving pedestrian safety throughout Worcester County.

Since becoming Certified Child Passenger Safety Technicians, the Trauma Center staff has participated in several seat checks on the lower Eastern Shore, as well as provided information at health fairs and community events for families.

■ **Emergency Medical Services and Nursing Continuing Education.** PRMC continues to assist in planning, coordinating, and sponsoring regular educational events for prehospital and hospital health care providers. A multidisciplinary group coordinates and sponsors the annual Topics in Trauma Conference, now in its 29th year. Conference topics are applicable to the daily practice of prehospital care as well as to advanced inpatient trauma care. This annual regional conference continues to attract nurses and EMS clinicians from Maryland, Delaware, Pennsylvania, and Virginia. As in previous years, in FY 2020, PRMC continued to provide educational classes, such as Advanced Life ALS Skills and paramedic recertifications/refreshers, to EMS clinicians in Worcester, Wicomico, and Somerset Counties. PRMC also supports Wor-Wic Community College EMS programs as a clinical site for students.

■ **Rehabilitation.** PRMC maintains an in-house rehabilitation program that offers physical, occupational, and speech therapy. 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 a designated Level III Adult Trauma Center serving Allegany and Garrett Counties. UPMC Western Maryland treated 512 trauma patients from June 1, 2019, to May 31, 2020, according to the Maryland State Trauma Registry. (See pages 80 to 85 for additional patient data.) Adult trauma services at UPMC Western Maryland are provided by the Emergency Department.

Mission

We are dedicated to providing patient-centered care and improving the health and well-being of people in the communities we serve.

A Vision for the Future

UPMC Western Maryland is recognized as the:

- *Best Place to Deliver Quality Patient Care;*
- *Best Place to Work;*
- *Best Place to Transform Care Delivery;*
- *Best Place to Reduce the Total Cost of Care;*
- *Best Place to Refer Patients.*

Core Values

- *Integrity – Demonstrate honesty and straightforwardness in all relationships;*
- *Innovation – Pursue continuous improvement through creative new ideas, methods, and Practices;*
- *Compassion – Show care and kindness to all we serve and with whom we work;*
- *Accountability – Ensure effective stewardship of the community's trust;*
- *Respect – Demonstrate a high regard for the dignity and worth of each person;*
- *Excellence – Strive for superior performance in all that we do.*

Adult Trauma Center Staff

Trauma Medical Director: Milton Lum, MD, FACS
Trauma Program Manager: Elizabeth Wooster, RN
Trauma Registrar: Christine Clites

FY 2020 Annual Report

■ **Quality Management and Improvement.** Effective February 1, 2020, Western Maryland Health System officially became UPMC Western Maryland, merging into the University of Pittsburgh Medical Center (UPMC) hospital network to ensure a future of high-quality patient care for communities in western Maryland and the surrounding region for generations to come. Becoming part of UPMC allows us to further enhance healthcare services, leverage UPMC's innovation and clinical expertise, advance quality initiatives, and continue our longstanding commitment to provide superior, compassionate care to patients throughout our tri-state service region. In FY 2020, trauma services at UPMC Western Maryland utilized policies to standardize patient care and improve patient outcomes based on evidence-based best practices. UPMC Western Maryland is enrolled in the American College of Surgeons Trauma Quality Improvement Program in an effort to streamline and benchmark quality.

UPMC Western Maryland's multidisciplinary team approach is designed to serve the unique needs of each patient. In addition, staff work diligently to facilitate communication between hospital and prehospital personnel. To support this goal, 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, and the Maryland Trauma Center Network (TraumaNet), Maryland EMS Protocol Revision Team for Trauma, Allegany County Emergency Services Quality Assurance Board, Allegany County Medical Review Board, Maryland Region I & II Healthcare Council, the MIEMSS Region I Prehospital Care and Quality Improvement Committee, and has served on the State of Maryland EMS Plan Steering Committee.

■ **Injury Prevention Programs and Initiatives.** Allegany County Department of Emergency Services and Garrett County Department of Public Safety to teach Stop the Bleed® courses to local EMS/fire/law enforcement and citizens of MIEMSS Region I and surrounding bordering counties in Pennsylvania and West Virginia. Efforts continue throughout the region, with 108 current instructors serving requests for the Stop the Bleed® program.

UPMC Western Maryland also participated in Distracted Driving Prevention Awareness Day in April 2020, an initiative of the Maryland Trauma Quality Improvement Committee. UPMC Western Maryland has partnered with the YMCA and HRDC to provide Stepping On classes. Stepping On is a proven program designed to build confidence and reduce falls for adults. Stepping On leaders coach you to recognize your risk of falling and help you build the balance, strength, and practical skills you need to avoid falling. You learn in a fun, hands-on way, putting information to use from the very first session.

■ **Emergency Medical Services and Nursing Continuing Education.** UPMC Western Maryland is the trauma education hub for MIEMSS Region I and offers continuing education credit for Advanced Cardiac Life Support, Pediatric Advanced Life Support, Neonatal Advanced Life Support, and Trauma Nursing Core Course. UPMC Western Maryland also offers cadaver lab clinical competency for physicians, nurses, and paramedics. UPMC Western Maryland is part of the planning team and provides course lectures yearly at the Annual Miltenberger Emergency Services Seminar. UPMC Western Maryland educational offerings also include skills training for nurses, emergency department technicians, and EMS clinicians, as well as multidisciplinary case reviews.

■ **Rehabilitation.** The 13-bed Comprehensive Inpatient Rehabilitation Unit, located within UPMC Western Maryland, operates 24/7 to provide rehabilitation services to its trauma patients. Although each patient's needs are unique, the overall mission of the inpatient program is to improve ability for self-care, movement, and communication; reduce limitations; promote wellness and self-worth; plan for after rehabilitation care; and return individuals to their homes and communities.

UPMC Western Maryland is "Caring for What Matters Most".

Adult Trauma Center

MedStar Washington Hospital Center

110 Irving Street, NW, Washington, DC

Adult Trauma Center Staff

Adult Trauma Medical Director:
Jack A. Sava, MD, FACS
Adult Trauma Administrative Director:
Susan Kennedy, RN, BSN

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.

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.

MedSTAR is verified by the American College of Surgeons as a Level 1 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. MedSTAR treated 2,279 trauma patients in FY 2020.

Mission

MWHC is dedicated to delivering exceptional patient-first health care. We provide the region with the highest quality and latest medical advances through excellence in patient care, education, and research. Our guiding principle is to treat each patient as we would a member of our own family by providing the best medical treatment with care and compassion, responsive service, and intelligent use of resources. Through this achievement, we will be recognized as a national model for excellence in patient-centered care.

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 2020, JHBMC treated 791 patients – 272 inpatients and 519 patients either in the emergency room or under observation.

Mission

JHBMC, a member of Johns Hopkins Medicine, provides compassionate health care focused on the uniqueness and dignity of each person we serve. We offer this care in an environment that promotes, embraces, and honors the diversity of our global community. With a rich and long tradition of medical care, education and research, we are dedicated to providing and advancing medicine that is respectful and nurturing of the lives of those we touch.

Adult Trauma Center Staff

Burn Medical Director:
C. Scott Hultman, MD, MBA, FACS
Burn Fellowship Program Director:
Julie Caffrey, DO, MS
Burn Program Coordinator:
Emily Werthman, MSN, RN

FY 2020 Annual Report

■ **Notable Accomplishments.** In FY 2020, the Johns Hopkins Burn Center continued its tradition of excellence in patient care with the continued support of vital programs rooted in evidence-based practice. Current initiatives to better serve the patients of the Burn Center include quality improvement programs aimed at decreasing hospital acquired infections, decreasing pain, improving functional outcomes of burn patients, and further improving fluid resuscitation in large burns. In addition, the research program of the Johns Hopkins Burn Center remains vital, with multiple peer-reviewed publications and presentations at both regional and national conferences. The Burn Center also serves a vital role in educating about burn care through educational offerings for prehospital and hospital-based clinicians, including students. This year, in light of precautions related to the COVID-19 pandemic, the Burn Center pivoted its education and outreach to include virtual options.

The Johns Hopkins Burn Center maintains American Burn Association (ABA) verification, thus making it the only adult ABA-verified burn center in the state of Maryland. In FY 2020, the ABA re-verified the Burn Center.

■ **Quality Management and Improvement**. The Burn Center maintains a system for tracking and responding to a variety of quality improvement metrics including time to the operating room, hospital-acquired infections, 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**. The Johns Hopkins Burn Center realizes the importance of community outreach and education. Carrie Cox, MS, RN, is the Community Outreach and Education Coordinator for the Burn Center.

In FY 2020, the Burn Center participated in various fire safety programs for adults, the Kiwanis Community Burn Prevention Program for school-age children, the Safe Babies Program, the Juvenile Fire-setter Program for at-risk youth and their parents, and numerous statewide health and safety fairs. In addition, burn staff continue to participate in outreach activities with burn survivors, including World Burn Congress, SOAR, and the JHBMC burn survivor support group.

■ **Prehospital/EMS/Nursing Continuing Education**. Prehospital clinician education includes Advanced Burn Life Support Courses coordinated at our institution biannually. These courses will resume in October. The Burn Center offers an EMS/Firefighter Burn Course throughout the region for prehospital clinicians. We participate annually in ALS updates for Baltimore City and many counties within Maryland. We also lecture frequently at EMS Regional Conferences and offer education through our institution's EMS Care Conference. In FY 2020, the Burn Center provided much of this education virtually.

Clinical education for healthcare professionals who may come into contact with burn patients throughout the region is of vital importance for the Burn Center. Examples of the clinical education programs currently provided by the Burn Center include: Advanced Burn Life Support (ABLS) provider certification courses; the Emergency Department Burn Poster Program; the Military Burn Education Program, in conjunction with Shock Trauma (C-STARS); and onsite clinical training for medical, nursing, rehabilitation, psychology, and dietician students. The Burn Center also provides educational presentations at many colleges and universities throughout the region for various health disciplines including, physician assistants, nurses, physical and occupational therapy, and prehospital clinicians.

■ **Fellowships/Residencies**. The Johns Hopkins Burn Center provides annual fellowship training for physicians in both general and plastic surgery tracks, and has been doing so for over 20 years. We also provide 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.

■ **Research**. Currently, there are research collaborations with many disciplines, including critical care, nursing, nutrition, rehabilitation, and psychology. The Michael D. Hendrix Burn Research Laboratory actively studies the non-healing wound environment in animal models, and is looking at ways to improve burn wound healing.

Some of our research this past year includes:

- Reduction in bioburden in the Burn Center;
- Inappropriate transfers of burn patients;
- Validation of the Defense and Veteran Pain Rating Scale (DVPRS);
- The incidence of medical device-related pressure injuries;
- Prevalence and associated predictors for patients developing chronic, neuropathic pain;
- Early ambulation as part of enhances recovery after burn surgery;
- The influence of laser Doppler imaging on the clinical judgement of different health professionals;
- Metoprolol-induced pemphigus foliaceous;
- Development of heterotopic ossification.

The Burn Center publishes its findings and presents at various local, regional, and national conferences.

In 2019, Burn Center staff were invited to present at the ABA Conference, the Mid-Atlantic Region Burn Conference, the American Society of Plastic Surgeons meeting, the Armstrong Institute Symposium, and the American College of Surgeons conference. Staff also wrote textbook chapters and published in various peer-reviewed journals, including *The Journal of Burn Care and Research, BURNS, Burns Trauma, Cureus*, and the *Annals of Plastic Surgery*.

■ **Rehabilitation**. The Johns Hopkins Burn Rehabilitation Department is dedicated to rehabilitating burn survivors. The staff includes one full-time and one PRN occupational therapist, as well as three full-time and three PRN physical therapists.

Every patient admitted to the Burn Center is seen by PT/OT within the first 24 hours. The Burn Center evaluated 272 inpatients this year. Most burn inpatients are treated on a daily basis in our onsite burn rehabilitation gym. This year, the Burn Center rehabilitation gym replaced an existing facial mask system with a state-of-the-art facial mask scanner that provides patients with facial burns custom masks to treat their scars.

The rehabilitation staff work with case management and social work to discharge patients to appropriate levels of care. There is a close working relationship with the Johns Hopkins Specialty Hospital for inpatient rehabilitation. The burn rehabilitation staff have also provided in-services to outside therapy practices, where patients are going for therapy, and are always available for consultation. On average, a burn outpatient participates in therapy four days a week, for 1-1.5 hours of therapy each session.

Adult Burn Center

MedStar Washington Hospital Center

110 Irving Street, NW, Washington, DC

Adult Burn Center Staff

Adult Burn Medical Director:
Jeffrey Shupp, MD
Burn Outreach and Prevention Coordinator:
Angela White, BSHCM

The Burn Center at MedStar Washington Hospital Center is the adult regional burn center for Southern Maryland, Northern Virginia, eastern West Virginia, and Washington, DC. The Burn Center is verified by the American Burn Association as a regional Level 1 Burn Center in addition to level 1 Trauma Center by the Committee on Trauma of the American College of Surgeons.

MedStar Washington Hospital Center provides comprehensive, acute, and rehabilitative burn care through a multidisciplinary team approach. The burn surgeons are board-certified general surgeons with extensive experience in burn care, surgical treatment, and burn reconstruction. The Burn Center has expanded the laser program for dyspigmentation and scar reduction. The burn team members—physicians, nurses, rehabilitation therapists, respiratory therapists, nutritionists, and social workers—are specially-trained and experienced to address the special needs of burn patients. The Burn Center is proud to announce that we have recently embedded a psychologist on our team to meet the psychological needs of our patients and their families.

The 20-bed facility features an intensive care unit with its own operating room and tanking facility, as well as an intermediate care/rehabilitation unit, both of which provide wound care and progressive rehabilitation. With 1,019 admissions annually, the Burn Center provides care for an array of thermal, electrical, and chemical injuries, as well as soft-tissue lesions. The burn clinic provides outpatient burn care for more than 1,220 patients annually.

Pediatric Trauma Center

Johns Hopkins Children's Center

1800 Orleans Street, Baltimore, Maryland

Johns Hopkins Children's Center (JHCC) is a designated Level I Pediatric Trauma Center serving Maryland and the surrounding region. JHCC is a 205-bed, state-of-the-art hospital with an expansive pediatric emergency department equipped with dedicated pediatric trauma resuscitation bays, a 40-bed Pediatric Intensive Care Unit (PICU), and a pediatric operative suite outfitted with dedicated emergency operating rooms for pediatric trauma patients. The Pediatric Trauma Center at JHCC treated over 750 trauma-injured children from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry. (See pages 89 to 92 for additional patient data.)

Mission

The mission of the Pediatric Trauma Center at the Johns Hopkins Children's Center is to make a positive difference in the lives of children through pediatric injury prevention, education, evidenced-based research, and excellent care of injured children. The center's vision is comprised of three elements:

1. *To eliminate injury as the leading cause of death and illness among children by relentlessly pursuing comprehensive injury prevention, providing the highest level of injury care, and participating in injury prevention research;*

2. *To establish and implement specific policies, procedures, and guidelines that ensure prompt and optimal care by pediatric professionals to the seriously injured pediatric patient;*
3. *To evaluate the effectiveness of the trauma care delivered by ongoing evidence-based research and performance improvement programs.*

Pediatric Trauma Center Staff

Pediatric Trauma Medical Director: Isam Nasr, MD
Pediatric Trauma Program Manager:
Susan Ziegfeld, MSN, PNP-BC
Pediatric Trauma Coordinator:
Rebecca Gardner, BSN, RN, RNC
Pediatric Injury Prevention Coordinator:
Beatrice Braithwaite, MPH

FY 2020 Annual Report

■ **Notable Accomplishments.** The Johns Hopkins Hospital has been designated as a Magnet hospital four times. Magnet designation, from the American Nurses Credentialing Center, is the highest and most prestigious credential a healthcare organization can achieve for nursing innovation, excellence, and quality patient care.

■ **Quality Management and Improvement.** The pediatric trauma performance improvement (PI) program at JHCC had another productive year. Trauma statistics continue to be presented monthly at the PI Committee meeting. Metrics such as Total Patients, Readmission, Primary Injury Type, Prehospital Intubation, Average PICU Days, Deaths, and Average Hours in the ED are reported on a monthly basis. Safety and quality dashboards are also presented monthly, reflecting metrics such as Surgeon and Anesthesiologist Arrival Time to Alpha Traumas, CLABSIs, and CAUTIs, PED Throughput for Trauma Admissions, and Time to Washout and Antibiotics for Open Long Bone Fractures. New metrics, such as Time to CT Head and Time to CT Abdomen, are in the queue for FY 2021. This data is shared with the group with the goals being transparency and the opportunity to identify areas of improvement in a timely fashion.

The JHCC strives for a culture of reporting that encourages openness, transparency, and learning. The Hopkins Event Reporting Online (HERO) is the forum used by staff. The purpose of the HERO system is to learn from adverse events and near-misses so changes can be made to improve patient safety. Events can be reported anonymously and are directed to key leaders for review.

■ **Injury Prevention Programs and Initiatives.** JHCC has a robust injury prevention program, offering services to its patients, families, community, and staff. Multidisciplinary teams of child passenger safety technicians (CPSTs) are available to provide car seat fittings and assist with on-site installations. Prior to the COVID-19 pandemic, car seat events were held in person by appointment, whereas now, education is administered virtually or by using a demo chair in the patient's room. Standard and special needs car seats were purchased with grants received from the Maryland Trauma Network and JHCC.

The Injury Prevention Program launched a new Twitter platform on various injury prevention topics, such as burn and fire prevention, car seat safety, poison prevention, helmet safety, and violence prevention. Since its inception, the Injury Prevention Program has posted more than 400 tweets and gained over 100 followers. On National Gun Violence Awareness Day (June 5), our "Why We Wear Orange" tweet received over 26,000 views, 43 retweets, and 75 likes. The team also participates on "Twitter Chats" with Prevent Child Injury and other organizations on Stay at Home Safety.

JHCC is increasing Stop the Bleed® education, thanks to a grant. Stop the Bleed® classes will be taught to staff, patients, and families on the adolescent unit. Each patient who successfully completes the class will receive their own Stop the Bleed® kit. Each healthcare worker who commits to teaching in the community will receive their own Stop the Bleed® training kit. Once a healthcare provider has taken the Stop the Bleed® course, they can become an instructor and lead Stop the Bleed® classes. By increasing the number of instructors, we will, in turn, increase the number of classes each year. This train-the-trainer model will continually increase the number of staff, patients, and family members who are trained in Stop the Bleed®.

■ **Emergency Medical Services and Nursing Continuation Education.** JHCC continues to offer 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 competency in comprehensive pediatric airway management. Trauma staff provide ongoing education and case reviews to referring facilities.

The Johns Hopkins Simulations Center is a fully accredited, state-of-the-art training facility that incorporates standardized patients and teaching associates, human patient simulation, virtual reality, task trainers, and computerized simulation to help clinicians with trauma education and preparedness.

■ **Fellowships and Residencies.** The Division of Pediatric Surgery at Johns Hopkins has a two-year fellowship program approved by the Accreditation Council for Graduate Medical Education. A new fellow starts each year, allowing a junior and senior fellow to train concurrently. Under the direction of the general pediatric

surgery attending, fellows are responsible for the management of all trauma patients. Six months of fellowship are completed at the University of Maryland Medical Center, and the remaining 18 months are at JHCC.

■ **Research.** Multidisciplinary collaboration among different specialties is of the utmost importance in the ultimate goal of improving the overall care of our pediatric trauma patients.

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. A sample of some of the research in which the pediatric trauma program is involved is as follows:

- The Pediatric Trauma Program is part of a National Institutes of Health-funded, multi-institutional, five-year study that tackles the important issue of drug and alcohol abuse in the pediatric trauma population. The aim of this study is to better understand how nurses, social workers, and doctors within pediatric hospitals talk to their patients about alcohol and drug use. Recognizing the relationship between adolescent drug and alcohol use and injury, this study aims to implement a screening process and referral to treatment. We are currently in year two of this five-year study.
- Basic science trauma research is also an important tenet of the program. Several investigators in different disciplines are actively studying the neuroinflammatory pathways that are involved in pediatric traumatic brain injury. Other research efforts include studying the adherence to a trauma checklist during our highest trauma activations, evaluating the association of elevated white blood cell count and other inflammatory markers that are clinically significant in pediatric trauma patients, and assessing the interplay between genetically influenced biologic processes and environment with respect to recovery after pediatric traumatic brain injury using MRI markers.
- Maryland Trauma Network provided a grant to assess how the COVID-19 pandemic, with social distancing and stay-at-home orders, has 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 .We will evaluate the prevalence and patterns of injuries sustained in the home during the pandemic, including those that required medical care and those that did not. We also hope to describe the reasons that may have contributed to participant decisions to delay or avoid obtaining in-person medical care.

The team maintains an active role in national trauma meetings. Several team members have presented their research projects in these meetings. Some have followed with manuscript submission and, ultimately, publication.

■ **Rehabilitation.** JHCC has a state-of-the-art pediatric rehabilitation program that offers both inpatient rehabilitation and comprehensive outpatient services. Therapists, in addition to our injury prevention coordinator, are certified child passenger safety technicians (CPSTs) and support the injury prevention program. JHCC collaborates with the Kennedy Krieger Institute (KKI) and Mount Washington Pediatric Hospital (MWPH) for children needing inpatient rehabilitation. The Commission on Accreditation of Rehabilitation Facilities (CARF) accredits both programs.

The Brain Injury Clinical Research Center at KKI is directed by Dr. Stacy Suskauer, a pediatric physiatrist and the pediatric rehabilitation medicine liaison to the Pediatric Trauma Center at JHCC. Dr. Suskauer' s research program spans the range of severity of pediatric traumatic brain injury from concussion to severe brain injuries associated with disorders of consciousness. Her projects include development and use of sensitive behavioral measures to characterize outcomes, study of brain-behavior relationships using functional and structural imaging modalities, and early clinical trials with the goal of optimizing outcomes.

Pediatric Trauma Center

Children's National Hospital

111 Michigan Avenue, NW, Washington, DC

Children's National Hospital (CNH) is a Pediatric Trauma Center established by a memorandum of understanding with MIEMSS that serves Washington, DC; multiple counties within Maryland, including Montgomery and Prince George's; Southern Maryland, and certain regions of adjacent states. CNH treated 1,006 trauma-injured children, including 687 of who reside in Maryland, from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry. (See pages 89 to 92 for additional patient data.) There were 336 children from Maryland treated in the Trauma Code Room. Pediatric trauma services at CNH are provided by the Division of Emergency Trauma and Burn Surgery.

Mission

At Children's National Hospital, we strive to excel in care, advocacy, and education. We demonstrate this by providing a quality healthcare experience for our patients and families, improving healthcare outcomes

for children regionally, nationally, and internationally, and by leading the creation of innovated solutions to pediatric health challenges. The commitment of our staff, physicians, volunteers, students, and community partners to our mission permits us to maintain a tradition of quality care, which is the hallmark of Children's National Hospital.

Pediatric Trauma Center Staff

Pediatric Trauma Medical Director:
Randall S. Burd, MD, PhD
Pediatric Trauma Program Manager:
Jennifer Fritzeen, MSN, RN

FY 2020 Annual Report

■ **Notable Accomplishments.** In FY 2020, CNH, in partnership with the Cerner Corporation as the lead hospital, completed development of Cerner's electronic trauma flowsheet. This electronic flowsheet will enable Cerner-based trauma centers to have integrated electronic documentation of trauma bay activities and orders, and it will also facilitate easy data upload into the Trauma Registry. CNH and Cerner plan to launch the electronic documentation within the 2020 calendar year.

Children's National Hospital continued to have a national presence in the leadership of the Pediatric Trauma Society in FY 2020. Dr. Burd sits as the immediate past president for the Pediatric Trauma Society. Jennifer Fritzeen is the chairman of the Program Committee and Elizabeth Waibel is the chairman of the Advance Practice Committee.

■ **Quality Management and Improvement.** The Pediatric Trauma Center has a robust quality improvement program, which includes periodic submissions to the Pediatric Trauma Quality Improvement Program (TQIP), an initiative of the American College of Surgeons Committee on Trauma. The TQIP provides adjusted benchmarking for pediatric trauma centers to track outcomes and improve patient care. Based on TQIP data, CNH is able to benchmark nationally and evaluate its patient care. In FY 2020, benchmarking skeletal survey completion in child abuse cases was launched.

There were several quality initiatives undertaken by the Trauma Center in FY 2020. A high-impact example is the continued effort to improve Code Room Efficiency. This project is designed to decrease code room time while increasing the quality of the care rendered. Phased focus projects have been scheduled to meet the overall goal of the project. Completed improvements in FY 2020 include improved efficiency in blood and blood product administration and improved efficiency of surgical procedures in the code room. Current improvement initiative includes IV access decision tree to improve efficiency.

Children's National continues to improve outreach and follow-up efforts to outside hospitals and EMS agencies. Since January 2018, we have used a program that allows the Trauma and Burn Surgery Service to template individualized feedback sent through a protected server to transferring facilities or EMS units. The program has allowed CNH to communicate and have online dialog with 74% of our transferring centers.

■ **Injury Prevention Programs and Initiatives.** In FY 2020, Safe Kids DC's flagship initiative continued to be child passenger safety. The program performs car seat inspections and installations as a partner of Buckle Up!, an initiative resulting from the long-standing partnership between Safe Kids Worldwide and General Motors. Car seat inspections are performed at the Sheikh Zayed Campus, the Children's Health Center at Town Hall Education Arts Recreation Campus, and at a local birthing hospital weekly.

In FY 2020, the Trauma Center continued its partnership with the Freddie Mac Child and Adolescent Protection Center in an effort to provide informed education to the public on the effects and prevention of abusive head trauma. The Period of Purple Crying, a program designed to teach families the risk of inflicted abusive head trauma during infancy, was initially offered only to families admitted to CNH, birthing centers, prenatal clinics, parenting groups, and school systems in Washington, DC, furthering increasing outreach to the public. Additionally, CNH maintains a four-year old partnership with the Childhelp organization to provide intake call center services for the National Child Abuse Hotline.

■ **Emergency Medical Services and Nursing Continuing Education.** Several trauma educational programs were offered at CNH in FY 2020. Trauma Update, a half-day trauma and burn conference, was offered in person in the fall and virtually in the spring. Over 100 nurses, respiratory therapists, EMTs, and paramedics attended each event. The fourth annual Child Abuse Prevention Symposium was canceled due to the COVID-19 pandemic in April. To continue the ability to provide Child Abuse Prevention and Awareness education, the Trauma Service, in collaboration with the Freddie Mac Child and Adolescent Protection Center, created a monthly virtual learning series. To date, over 900 individuals have taken part in a multitude of educational offerings. This format was expanded to provide virtual monthly educational offerings to all CNH nursing staff caring for trauma patients. In FY 2020, CNH hosted the 2nd Annual Pediatrics for EMS symposium, with double the attendance from the previous year. The symposium was an eight-hour day, with the first four hours being didactic

and the latter part of the day skills stations. Topics included blast and burn injuries, triage, special needs patients, neonates, and the pediatric airway. CNH has increased activity in the Stop the Bleed® campaign to teach traumatic hemorrhagic control.

■ **Research.** The Trauma Center maintains an active research program with multiyear studies in place. The trauma research team, in collaboration with teams from Drexel and Rutgers, have two major studies: a $3 million, multiyear ROI grant to build an Intention-aware Recommender System for Improving Trauma Resuscitation Outcomes, and an NSF grant to recognize activities to reduce delays in fast-response teamwork.

A research collaboration was initiated in FY 2020 with the trauma centers in DC to study gunshot wound recidivism and trauma in light of the COVID-19 pandemic.

Seven research papers have been accepted and published by clinicians within the Trauma Surgery Service.

■ **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 CNH, including 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.

Pediatric Burn Center

Johns Hopkins Children's Center

1800 Orleans Street, Baltimore, Maryland

Johns Hopkins Children's Center (JHCC) is verified by the American Burn Association and designated by the Maryland Institute of Emergency Service System as a level one Pediatric Burn Center. According to the Maryland State Trauma Registry, JHCC treated over 300 burn-injured children, including 146 admissions, from June 1, 2019, through May 31, 2020. (See pages 93 to 96 for additional patient data.) Patients are followed in the outpatient burn clinic and, if necessary, are referred to our burn late effects clinic. This multi-disciplinary clinic is focused on the physical and emotional recovery after a burn injury. Laser burn treatment is available for those patients who develop symptomatic scarring.

Mission

The mission of the JHCC pediatric burn center is to make a positive difference in the lives of children through pediatric burn injury prevention, education, evidence-based research, and excellent care of burned children. The center's vision comprises three elements:

1. *To eliminate injury as the leading cause of death and illness among children by relentlessly pursuing comprehensive injury prevention, providing the highest level of injury care, and participating in injury prevention research;*
2. *To establish and implement specific policies, procedures, and guidelines that ensure prompt and optimal care to the seriously burned pediatric patient by pediatric professionals;*
3. *To evaluate the effectiveness of the burn care delivered by ongoing evidence-based research and performance improvement programs.*

Pediatric Burn Center Staff

Pediatric Burn Medical Director:
Alejandro Garcia, MD, FACS, FAAP
Pediatric Burn Program Manager:
Susan Ziegfeld, MSN, PNP-BC
Pediatric Burn Performance Improvement (PI) Coordinator:
Rebecca Gardner, BSN, RN-C
Pediatric Injury Prevention Coordinator:
Beatrice Brathwaite, MPH
Pediatric Psychologist:
Carisa Parrish, PhD

FY 2020 Annual Report

■ **Notable Accomplishments.** The pediatric burn clinic now provides multi-disciplinary appointments via telemedicine. Patients and families now have the convenience of seeing their provider without leaving their home.

■ **Quality Management and Improvement.** The Pediatric Burn PI Committee is a multidisciplinary committee focused on overall program PI. The role of this committee is to review programmatic data trends regarding performance, review existing policies as needed, assess and implement new regulatory requirements and recommendations, develop and track implementation of action plans stemming from morbidity and mortality review, and develop and track implementation of additional action plans as raised from data trends and committee members. This committee evaluates the progress of action plans until resolution and monitors for recurrence. Burn statistics are presented at the monthly PI Committee Meeting. Metrics such as Total Patients, TBSA, Burn Etiology, Burn Consults, ED Length of Stay, Hospital Length of Stay, and Deaths are reported on a monthly basis. The total for the current year as well as the prior year's total are shown. Safety and quality dashboards are also pre-

sented monthly, reflecting metrics such as Median Time to First Pain Medication, Median Time to Debridement, CLABSIs, and CAUTIs. This data is shared with the group with the goals being transparency and the opportunity to identify areas of improvement in a timely fashion. The PI Coordinator reviews all emergency department visits for burn patients. Once burn patients are identified, the patient chart is reviewed daily and tracked until discharge.

The pediatric burn team established the Pediatric Injury Quality Improvement Consortium (PIQIC), a network of four similar pediatric burn centers, in 2016. Through this consortium, two years of data has been collected, which will help with determining best practices and benchmarks in pediatric burn care.

Pediatric psychology is an integral part of the pediatric burn team, providing inpatient and outpatient clinical services to patients and their families. Screenings include standardized instruments to assess child quality of life and child and parent distress. Interventions support optimal adherence to medical recommendations and patient and family coping with the sequelae of traumatic injury. A dedicated burn psychologist at JHCC leads efforts to collaborate with other pediatric burn centers through PIQIC, to establish a focused psychology screening process across sites, including establishment of PI measures.

■ **Injury Prevention Programs and Initiatives.** JHCC has a robust injury prevention program for patients, families, and the community. The injury prevention team has established relationships with elementary schools, youth groups, religious institutions, and summer camps to provide burn prevention education. Using data from the burn registry, high-risk areas are identified and relevant injury prevention topics are addressed. Pediatric burn nurses and the injury prevention team participate in community outreach events, such as health fairs, festivals, and sporting events

Most of our injury prevention activities have been put on hold due to the COVID-19 pandemic. The Injury Prevention Team has been gearing up to get back into full swing on burn prevention and outreach once we return to a somewhat normal routine. The Injury Prevention Team has started to look at the burn registry data to determine the most common etiology and to be able to tailor our prevention and outreach efforts to that specific cause. Before the global pandemic, our senior injury prevention coordinator and our community outreach specialist spent time in the Pediatric Emergency Room and our Harriet Lane Clinic, educating on burn prevention and handing out fact sheets and oven mitts, during Burn Awareness Week, in February.

■ **Emergency Medical Services and Nursing Continuing Education.** JHCC provides burn education on initial management along with case reviews to referring hospitals.

JHCC continues to offer monthly training to prehospital clinicians and students that includes lectures, case reviews, and simulation. Maryland State Police paramedics train alongside pediatric anesthesiologists in the operating room to maintain competency in comprehensive pediatric airway management.

The Pediatric Base Station provides online medical direction to EMS clinicians and has an active QI plan for evaluation and feedback.

The Johns Hopkins Simulations Center is a fully accredited, state-of-the-art training facility that incorporates standardized patients and teaching associates, human patient simulation, virtual reality, task trainers, and computerized simulation to help clinicians with trauma education and preparedness.

■ **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 is accepted, allowing a junior and senior fellow to train concurrently. Under the direction of the general pediatric surgery attending, the fellows are responsible for the management of all trauma and burn patients at JHCC. Six months of the first year of fellowship are scheduled at the University of Maryland Medical Center, and the remaining 18 months are at JHCC. The pediatric psychology fellowship program includes an opportunity to train with burn patients. A psychology fellow and/or attending physician meets all burn patients while inpatient. Additionally, a burn fellow and/or attending physician staffs our outpatient clinic.

■ **Research.** The pediatric burn staff at JHCC continues to present their work in person or virtually at national meetings. Research initiatives include evaluating child quality of life and parent PTSD and depression symptoms following pediatric burn injury; parent perceptions of pediatric burn healing process and 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.** A state-of-the-art pediatric rehabilitation program that offers inpatient rehabilitation and comprehensive outpatient services is available at JHCC. The hospital collaborates with Mount Washington Pediatric Hospital (MWPH) for burn patients needing continual inpatient rehabilitation. MWPH is accredited 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.

Pediatric Burn Center

Children's National Hospital

111 Michigan Avenue, NW, Washington, DC

Children's National Hospital (CNH) is a Pediatric Burn Center established by a memorandum of understanding with MIEMSS that serves Washington, DC; multiple counties within Maryland, including Montgomery and Prince George's; Southern Maryland, and certain regions of adjacent states. CNH treated 231 burn-injured children who reside in Maryland from June 1, 2019, through May 31, 2020, according to the Maryland State Trauma Registry. (See pages 89 to 92 for additional patient data.) Of the 231 burn-injured children, 37 were admitted and two were readmitted as inpatients, and 192 were emergency department (ED) visits. There were an additional 285 burn clinic visits. Pediatric burn services at CNH are provided by the Division of Emergency Trauma and Burn Surgery.

Mission

At Children's National Hospital, we strive to excel in care, advocacy, and education. We demonstrate this by providing a quality healthcare experience for our patients and families, improving healthcare outcomes for children regionally, nationally, and internationally, and by leading the creation of innovated solutions to pediatric health challenges. The commitment of our staff, physicians, volunteers, students, and community partners to our mission permits us to maintain a tradition of quality care, which is the hallmark of CNH.

Pediatric Burn Center Staff

Pediatric Burn Medical Director:
Randall S. Burd, MD, PhD
Pediatric Burn Program Manager:
Jennifer Fritzeen, MSN, RN, PCNS

FY 2020 Annual Report

■ **Notable Accomplishments.** As the care of burn injuries shifts to outpatient management, there is an increased need to offer families multimodal burn care education that expands on the written and verbal instruction received at the time of injury. To meet this need, CNH partnered with the DC Firefighter Foundation to develop After the Burn, a series of 15 videos focusing on different aspects of care after a child sustains a burn injury, as well as burn prevention. Examples of videos include dressing changes, nutrition, stretching exercises, and instruction on preparing for a clinic visit. All burn patient families are provided information on the videos, which are available through CNH's YouTube channel at https://bit.ly/afterthebur n. The series of videos is being utilized by our patients and families, as well as a broad national audience.

Burn patients require extended care as the burn injury heals and we start focusing on scar prevention, stretching, and post-wound care. Clinic visits in this post-acute phase are amenable through telehealth visits. These telehealth visits allow families to interact with a burn nurse practitioner, physical therapist, and psychologist (as needed) in the comfort of their home. Telehealth burn care decreases loss of work time for parents, and saves them the sometimes complex trip into the hospital. Telehealth launched in late February 2020 and has quickly become a popular option for burn patients in the post-acute phase of care.

■ **Quality Management and Improvement.** The pediatric burn center has a robust quality improvement program. The PI 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 scaring/contractures, psychologic needs or other complexities in care. Additionally, the burn team continues to work on improving care. Several projects in FY 2020 focused on the enhancement of burn care. In 2020, we continued the collaboration between the Burn Surgery department, the Infection Disease Service, the Hospitalist Service, and Critical Care Medicine; this project encompasses the development of a burn fever protocol and order set, as well as the development of an early-warning tool that can be used in tandem with PEWS assessment in the burn patient. The goal in developing these tools is to assist the clinical team with indications of SIRS or early sepsis with clear and standardized intervention.

Continuing to improve upon the TBSA agreement initiated in FY 2018, the Burn Surgery service has partnered with computer engineers to develop a TBSA calculator phone application that will provide a more accurate method of TBSA assessment. This application was in the testing phase in early 2020. Testing was halted due to the COVID-19 pandemic, and will resume when it is safe to continue human subject research. To date, we have been able to complete two full experiments, with promising results.

In the outpatient setting, the burn team has continued to make improvements in addressing pain/anxiety during burn care treatment. The burn clinic now has a dedicated child life therapist and part-time psychologist to assist in painful procedures. Liberal use of our dedicated burn operating room (for inpatient and outpatient procedures) has also improved care.

CNH is one of five charter members of the Pediatric Injury Quality Improvement Consortium. This consortium has implemented five pediatric burn benchmarks with one year of data. This data will assist in the development of best practice protocol in burn care, and contribute to multicenter research in burn management.

■ **Injury Prevention Programs and Initiatives.** In FY 2020, the Burn Center collaborated with the DC Firefighters Burn Foundation to offer educational opportunities in the community. CNH partnered with the Foundation to sponsor a burn prevention fair that was attended by over 250 children and their families. Burn Prevention Day included interactive stations to teach children and families about common safety risks in the home. The After the Burn series includes two burn-prevention videos: "Burn Prevention: Home Safety" and "Burn Prevention: What to Do if There is a Fire". Since the launch of the series, these burn prevention videos have garnered over 7,500 views. Funding supplied by Trauma Net and the DC Firefighter Burn Foundation provided the opportunity to create a social media campaign on burn prevention, emphasizing that most pediatric burn injuries are preventable.

■ **Emergency Medical Services and Nursing Continuing Education.** CNH offered several burn educational programs in FY 2020. Trauma Update, a half-day trauma and burn conference, was offered in the fall of 2019. Over 100 nurses, respiratory therapists, EMTs, and paramedics attended this in-person event.

CNH also sponsored the attendance of over 15 nurses, therapists, and physicians at the Northeast Regional Burn Conference, as well as that of eight nurses and therapists at the American Burn Association National Conference.

The EMS Pediatric Symposium continued for a second year in 2020. The initial symposium included a TBSA skills station where EMS clinicians, utilizing multiple examples of burn-injured children, used both the phone-based application and the palm method to determine TBSA. The number of participants in the 2nd Annual Pediatrics for EMS more than doubled from the previous year. The first four hours of the daylong symposium offered didactic instruction, while the latter four hours featured skills stations. Topics included blast and burn injuries, triage, special needs patients, neonates, and the pediatric airway.

■ **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 in FY 2018, 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.

Carrie Tully, PhD, received an internal grant to examine family resilience after pediatric burn injury. This one-year pilot grant completed data collection in FY 2020. Data is now being analyzed for publication. The use of social media for burn prevention was evaluated to study the feasibility of a social media campaign to promote the After the Burn videos for pediatric burn injury prevention. This study demonstrated that social media is a feasible modality for delivering public health messages focused on preventing pediatric burn injuries.

■ **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 expanded their care in FY 2020 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.

Eye Trauma Center

Wilmer Eye Institute at The Johns Hopkins Hospital

1800 Orleans Street, Baltimore, Maryland

The Wilmer Eye Trauma Center (ETC) based at the Johns Hopkins Hospital (JHH) is the sole designated facility in Maryland specializing in the diagnosis, treatment, and long-term management of ocular trauma. Dedicated eye treatment rooms, operating rooms, diagnostic and procedural equipment and supplies, and on-call coverage in every subspecialty ensure that patients are treated at the highest standard of care, 24/7. The Wilmer team comprises 170 full-time faculty members and over 700 staff members.

Mission

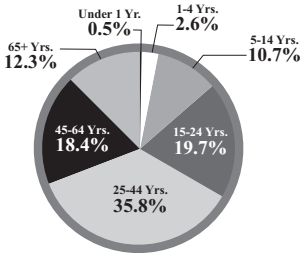
The mission of the Wilmer Eye Institute is to use and develop the finest scientific evidence to promote improved ophthalmic care and the reduction of visual

Wilmer Eye Institute at The Johns Hopkins Hospital Demographics

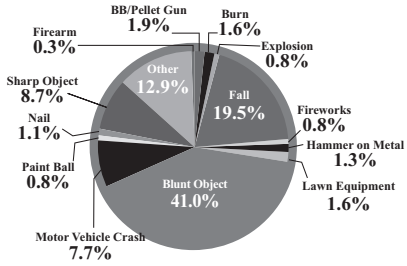
(June 2019 to May 2020)

Source: Maryland Eye Trauma Registry

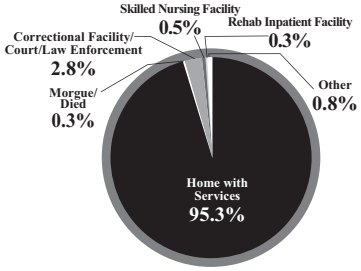
Age



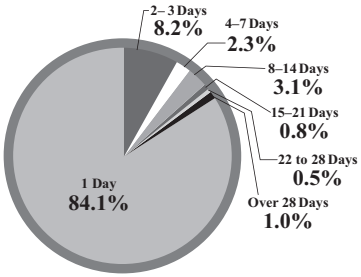
Injury Type



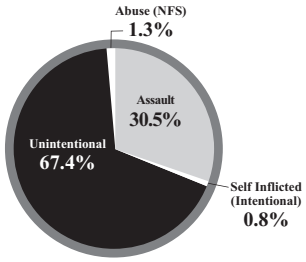
Final Disposition



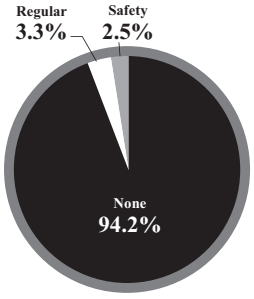
Length of Stay



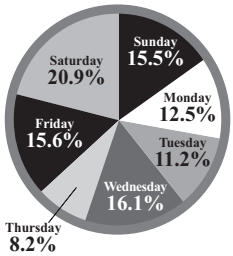
Intentionality



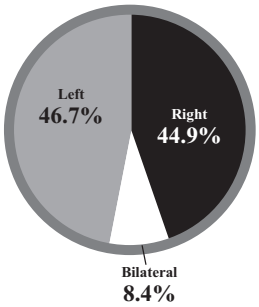
Eye Protection



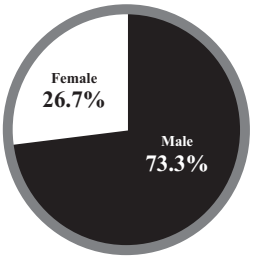
Day of Week



Eye Injured



Gender



disability in a collaborative environment that combines compassionate patient care, innovative research, and the training of future leaders in ophthalmology and visual sciences. The Institute's core values are integrity, excellence, diversity and teamwork, innovation, and commitment to scientific rigor. The objectives of the Eye Trauma Center are optimal clinical management of severe ocular injuries, to conduct research into the natural history of eye trauma, to develop new treatments for ocular trauma, and to initiate and support eye trauma education and prevention activities.

Eye Trauma Center Staff

Eye Trauma Medical Director:
Fasika Woreta, MD, MPH

Eye Trauma Coordinator:
Shailaja Chopde, MSN, RN

FY 2020 Annual Report

■ **Notable Accomplishments.** The Wilmer ETC continues to maintain 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, 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 health-care delivery, and highest-quality experience and outcomes for our patients.

With consultation of Dr. Tina Tran, Chief of Anesthesia at Wilmer's Bendann Surgical Pavilion, the Wilmer ETC and JHH EDs worked on and further refined protocols for pre-surgical screening and work-up of ocular trauma patients arriving to JHH; simplifying criteria, eliminating non-relevant lab work and testing that patients might otherwise undergo by default, and thereby helping to improve speed of triage and transfer to an eye operating room (OR). Continual quality improvement in this domain is now facilitated by a real-time feedback loop maintained between all teams.

After many months of planning across JHH Risk Management, Compliance, Corporate Security, Transportation, ACCM, EDs, Nursing, and Ophthalmology teams, JHH executive leadership approved the plan to create a new patient transport pathway between main Hospital buildings (including Wilmer clinics and the EDs) and physically-separated Bendann Surgical Pavilion, via basement tunnel. This project involved minor construction, installation of automated external defibrillators along the new route, multidisciplinary education and orientation, and coordinated, on-call coverage between Security and Transportation personnel to safely convey medically-stable patients across the campus. This pathway is now active and has already contributed to meaningful reduction in Wilmer ETC reliance on Johns Hopkins Lifeline transport services (reduced delays in transport and also improved ambulance access for truly acute patients).

Most recently, the Wilmer ETC recruited a second physician assistant to assist with coverage of ophthalmology consultations in JHH Adult and Pediatric ED settings, helping improve cross-coverage, promote more timely patient access to care, and improve the Wilmer Ophthalmology Residency experience through reduced duty hour burden. The Wilmer ETC also focused on improving local trauma care resources across care settings, including further addition of minor equipment, disposable supplies, and storage options to JHH and Bayview EDs for residents and attending physicians.

The JHH Adult Emergency Department and Wilmer ETC have also been collaborating on a pilot project that is set to launch within the next quarter, and focused on reducing wait times and total costs of care. Wilmer's Resident clinic at JHH, which recently rebranded itself as the Patient Access Center for the Eye (PACE), is working on building and keeping in reserve a few same-day and same-week appointment slots dedicated for patients who arrive to the ED but have non-acute eye issues. This will allow ED registrars to direct-schedule patients for an Ophthalmology follow-up visit, reducing patient time in the ED and shifting services to a more responsible venue of care.

The COVID-19 pandemic and ongoing public health emergency, of course, represent the most significant impacts and challenges for the global healthcare industry from FY 2020 onward. When elective surgery was temporarily suspended across Johns Hopkins campuses between mid-March and early summer 2020, the Wilmer ETC continued to maintain operations and care for patients with the most urgent and emergent eye care needs.

Dr. Woreta and Wilmer faculty chiefs from all subspecialty divisions immediately jumped into action by developing a detailed prioritization scheme for surgery that has since been adopted by the American Academy of Ophthalmology, categorizing all OR procedures into one of five tiers: emergent, urgent, semi-urgent, semi-elective, and elective. During the shutdown, the Wilmer ETC concentrated its highest-priority surgical activity within two to three daily operating rooms at the Bendann Surgical Pavilion, helping to conserve critical PPE, pharmaceutical, and other supply resources for the benefit of the Johns Hopkins Health System.

Wilmer faculty leaders also developed a targeted list of urgent/emergent clinical indications warranting examination and care of patients under investigation (PUIs) and/or patients with confirmed SARS-CoV-2 infection within the clinic setting, and worked with Hospital Epidemiology & Infection Control and Facilities to create a dedicated, negative pressure exam room within its JHH clinic to accommodate these emergency visits with heightened PPE and safety protocols. All Wilmer physicians and practices carefully monitored and triaged patient lists based on acuity, to assure standard of care and best manage those with vision issues that progressed in urgency over time. Nursing, anesthesia, ophthalmologists, and other care team members rose to every challenge with tremendous skill, dedication, and fortitude.

■ **Quality Management and Improvement.** Wilmer ETC core members – its Director (Dr. Woreta), Associate Director (Dr. Tom Johnson, Assistant Chief of Service, for FY 2020; Dr. Ravi Pandit for FY 2021), Trauma Program Coordinator (Ms. Chopde), and Assistant Administrator (Rahul Shah) participate 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. This workgroup reports up through the Quality Improvement Committee of the Wilmer Eye Institute, which also convenes on a quarterly basis, and is directly aligned with the overall quality and safety structure and institutional initiatives at JHH.

Members of the ETC team continue to meet with JHH Adult and Pediatric ED leaders on at least a quarterly basis 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 and workflow as described above.

- **Injury Prevention Programs and Initiatives.** Wilmer ETC nurses participate annually in Johns Hopkins Fall Prevention Awareness Fairs, which most recently took place on September 10, 2019, at JHH, and several volunteer at a local community health fair and provide free vision and health screenings. Prior to the COVID-19 pandemic, Ms. Chopde and team were also scheduled to participate in MIEMSS' Distracted Driving Fair in April 2020. The Wilmer ETC was also in line to participate for the first time in the annual JHH Trauma Survivor's Day event in late May (but impacted by COVID-19), alongside JHH Adult and Pediatric Trauma programs, and had identified a patient – a survivor of an accidental gunshot injury – to honor and help promote eye injury prevention topics during the program. Dr. Woreta is continuing work with medical students and other collaborators in analyzing data and considering interventions for populations who are more susceptible to ocular trauma. Dr. Woreta and a collaborator, Eileen McDonald, M.S., Director of the Children's Safety Center of the Johns Hopkins Center for Injury Research and Policy, also coauthored a web article about fireworks safety that was published on the Johns Hopkins website just ahead of the Fourth of July holiday.
- **Continuing Education.** Each year, ETC physicians and nurses provide education on eye trauma identification and management to multidisciplinary care teams within JHH adult and pediatric EDs, which serve as primary points of entry for ocular trauma patients. Dr. Woreta participated in JHH Adult Trauma's Core Lecture Series CME program on February 5, 2020. Though delayed indefinitely due to COVID-19, the lineup for Wilmer's Annual Nursing & Ophthalmic Technician Conference for 2020 had included three ocular trauma topics for an audience of upward of 150 persons. Wilmer's Center of Excellence in Ophthalmology Surgical Education & Training, OphSET, continues to play a role in supporting ocular trauma coursework and associated "hands-on" wet lab practicums. On June 20, 2020, Dr. Woreta, in partnership with collaborators and sponsors from the American Society of Ophthalmic Trauma, Asia Pacific Ophthalmic Trauma Society, the Society of Military Ophthalmologists, and Houston Methodist, hosted the first annual Virtual Resident Ophthalmic Trauma Competition via Zoom. This CME event gave ophthalmology residents, ophthalmologists in practice, and medical students a platform to make seven-minute presentations on their exciting ocular trauma research and clinical observations, including in the domain of disaster/humanitarian medicine (most topically, COVID-19 studies and case presentations).
- **Fellowships and Residencies.** The Wilmer Eye Institute supports a three-year ophthalmology residency program, which accepts five residents per program year. Wilmer residents, alongside assistant chiefs of service, faculty attending physicians, and staff are highly active participants in the assessment and management of ETC patients in the ED, on inpatient floors, in the clinic, and in the operating room. Virtually all clinical divisions of Wilmer also offer subspecialty fellowship/advanced specialty training programs. Additionally, Wilmer's robust research enterprise supports a large volume of research fellows each year.
- **Research.** Trauma-related publications by ETC faculty in FY 2020 covered a variety of topics, including neuro-ophthalmologic concerns and traumatic brain injury impacts, same-day clinic access vs. ED-based care impacts on both total costs of care and also ophthalmology trainee education; efficacy of orbital fracture repair supplies, trends and disparities in costs for inpatient ocular trauma care in the US; immunosuppression and COVID-19 implications for eye patients; longitudinal review of eye trauma in falls presenting to ED settings; 10-year review of eye-related ED visits vs. opioid epidemic trends; and diagnosis, scoring, and imaging considerations associated with pediatric ocular trauma. Dr. Woreta was a direct contributor to research on topics that included review of pediatric firearm-related injuries, ophthalmology residents' self-perceived preparedness and competence for open-globe repair, US national trends in imaging rates for eye-related ED visits, characteristics of orbital floor fractures in the US from 2006 – 2017, and characteristics of open-globe injuries in the US from 2006-2014.
- **Rehabilitation 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. 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.

Hand/Upper Extremity Trauma Center

Curtis National Hand Center, MedStar Union Memorial Hospital

201 East University Parkway, Baltimore, Maryland 21218
Region III

Located in Baltimore City, the Curtis National Hand Center at MedStar Union Memorial Hospital serves as the state's referral center for the specialized care of injuries to the hand, wrist, forearm, and elbow. In FY 2020, the Hand Center's emergency department cared for 1,861 patients with acute hand injuries, nearly 19% of which were transported by public safety ambulance or medevac helicopter. The unique nature of the Hand Center's services also draws acutely injured patients from a broad geographic region, including Pennsylvania, Delaware, Virginia, West Virginia, and Washington, DC. Whether from within Baltimore City or as far as these other neighboring states, the onsite heliport facilitates reduced travel times and improves the speed of intervention for the most critically injured.

The Hand Center's expertise in management of challenging bone and soft tissue trauma is supplemented by advanced microsurgery skill. The handling of fractures, complex soft-tissue coverage problems, and amputations requiring replantation continue to be the Curtis National Hand Center's major focus.

The acute trauma unit is staffed by specialists in orthopedic and plastic surgery with subspecialty training in hand and upper extremity surgery. The team is available 24/7/365 for the care of the trauma patient. 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. This transfer center receives 995 calls/year for transfer or consultation. These are rapidly and efficiently routed to the hand surgeons on call. Call logs of these transfer requests demonstrate an acceptance rate of greater than 95% of these patients to the Curtis National Hand Center. The remaining cases (less than 5%) are determined to not require transfer emergently and are provided outpatient follow-up at the Hand Center or are referred for other specialty care due to associated injuries (e.g., burns, ophthalmologic injury, spine injury).

Mission

The Curtis National Hand Center at MedStar Union Memorial Hospital remains committed to handling acute injuries and providing reconstructive surgery for Maryland's trauma victims. The 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.

Trauma Staff

Trauma Medical Director: James P. Higgins, MD
Trauma Program Administrator: Peggy Patten
Trauma Program Coordinator: Cynthia Johnson

FY 2020 Annual Report

■ **COVID-19 Precaustions and Trauma Management.** In FY 2020, the Hand Center initiated a myriad of operational and structural changes to *successfully maintain uninterrupted trauma care for the state of Maryland*. These included:

- Relocated and enlarged dedicated hand trauma suite in the MedStar Union Memorial Hospital (MUMH) emergency department. The suite provides greater efficiency for management of hand trauma patients with the ability to better isolate these patients from the rest of the ED. The suite is immediately adjacent to the operating room and enables the team to deliver the patients for operative care without overhead pages throughout the ED hallways.
- The MUMH ED created an isolation area for COVID patients to best enable continued maintenance of other emergency services (including hand trauma).
- Rapid on-site COVID-19 testing was initiated for all trauma patients.
- The MUMH operating suite created COVID specific rooms as well as a preoperative/intraoperative and postoperative protocol for the management of COVID+ patients necessitating emergent trauma operative care.
- Hand Surgery offices established telemedicine capability for the preoperative and postoperative care of patients appropriate for this platform. This was widely used for elective, urgent and emergent postoperative and preoperative visits/consultation when possible.
- Hand Trauma team members were separated into platoons for the purposes of insuring a healthy complement of providers throughout the course of the pandemic. In the event of a team member(s) becoming COVID-19-positive, isolation and quarantine of other members would be limited.
- Hand therapy visits for postoperative trauma patients were also provided virtually when needed to minimize the risk of compromising function due to the pandemic restrictions.

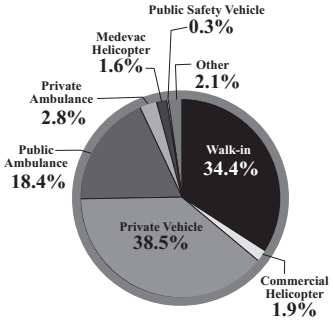
The Curtis National Hand Center at MedStar Union Memorial Hospital

(July 2019 to June 2020)

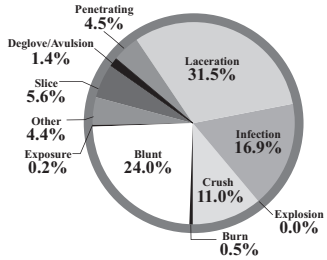
Source: The Curtis National Hand Center

n = 392

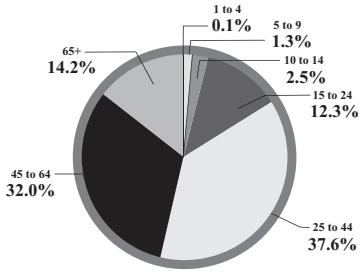
Transport Mode



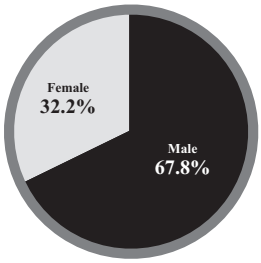
Injury Type



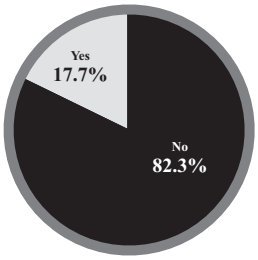
Age



Gender



Work Related



■ **Professional Education.** The Hand Center expanded its academic offerings, increased collaboration with affiliated institutions, and increased participation by friends and alumni around the region and country.

The Hand Center's dynamic Regional Hand Surgery Symposium has been enhanced, and its visiting lecture series has expanded to include impactful speakers who have challenged faculty and staff with new ideas related to innovations in arthroscopy, congenital surgery, osteocartilagenous arthroplasty, microsurgery, allotransplantation, brachial plexus surgery, and forearm and elbow pathology.

Much of the 2020 academic calendar was maintained virtually to ensure the safety of our providers and patients. The ease and accessibility of the virtual format resulted in the Hand Center having more guest speakers and events than ever before, with access to these events available to a wider number of learners nationally. It has enabled our team members to exchange ideas not only on surgical trauma management and technique, but also the evolving "best practice" topics surrounding care delivery in the era of a pandemic.

■ **Quality Management and Improvement.** The Curtis National Hand Center 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. At a monthly morbidity and mortality conference, challenging and readmitted cases are presented for evaluation and to review outcomes. The Hand Center has also completed conversion to electronic data capture and data entry into the Maryland Trauma Registry, improving the quality and completeness of data collection. With expanded data and analytic capabilities, the Hand Center has launched quality improvement initiatives aimed at improving triage and transfer, evaluating its 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 2020, the Hand Center initiated community and hospital visitor outreach via social media and hospital digital wall screens that provided injury prevention information about falls, lawnmower, fireworks, and snow blower safety. The center's trauma coordinator participates each year in a statewide distracted driving injury prevention initiative. The Hand Center Trauma Medical Director, Dr. James P. Higgins, has been active

with speaking engagements throughout the state and surrounding areas. Dr. Ryan Katz has been designated the hand center's trauma education liaison, meeting with field providers at state wide meetings and in community hospitals to improve communication and feedback on coordination of trauma transfers.

■ **Prehospital/EMS/Nursing Continuing Education.** Managing hand and upper extremity trauma requires a multi-faceted system of communication, cooperation, and professional execution. The basic elements of the system include: 1) prehospital communication and determination for transfer suitability, 2) Specialty Center presentation and intake, 3) progress through a clinical system designed to handle traumatic injuries of the hand and upper extremity, and 4) collection and analysis of data related to the care of traumatic injuries of the hand and upper extremity to optimize clinical outcomes and provide a foundation from which to build an educational platform.

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 ER staff. Hand trauma labs are scheduled on a regular basis, giving staff the opportunity to learn, practice, and update their skills.

■ **Fellowships/Residencies.** The Hand Center is one of the largest training centers for hand surgery. Our fellowship training program is highly sought after by the best plastic surgery and orthopedic surgery trainees in the world and prepares all of our graduates for management of complex upper extremity problems. The surgeons of the Hand Center have contributed some of the most important and regularly referenced publications about care of the injured hand and upper extremity and continue to lecture worldwide on hand trauma.

■ **Research.** Aviram Giladi, MD, MS, a surgeon at the Curtis National Hand Center with additional training in statistics and research methodology, is the research director. With protected time and hospital support for research work, the investigative efforts across the Hand Center have grown exponentially in the past few years. By devoting committed time and resources, there are numerous research and educational studies ongoing with frequent publications in the highest-impact specialty peer-reviewed journals.

Research projects, funded by internal and external sources, look at a wide range of issues, including microsurgery, peripheral nerve surgery and augmenting nerve recovery, bone and soft-tissue problems, and reconstruction after trauma. We have also expanded our 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. This focus of our research work centers on our role as a regional trauma center, and we are studying the impact of health policy changes on triage and transfers, how telehealth can improve remote triage as well as post-operative follow-up, and various approaches to improving care quality in a regionalized hand and upper extremity trauma center. All of these expanded efforts include collaborations with other experts, in our region and across the world, to promote expanded thinking and new developments across all our research.

■ **Rehabilitation.** The rehabilitation team at the Hand Center, and across the MedStar rehabilitation network, works closely with the hand surgeons at the Hand Center to establish a treatment plan for each patient. With these well-crafted plans, our therapy team can facilitate supervised and independent therapy sessions for our patients based on everyone's situation and need.

Additionally, therapists teach and guide each patient to maximize the use of the injured or otherwise limited extremity while preventing re-injury or worsening of their condition. Therapists educate patients on the disease process, the healing process, and the rationale for the prescribed therapy techniques, and regularly communicate with the primary surgeon should problems, issues, or challenges arise. In 2020, prior to the COVID-19 pandemic, our hand therapy teams began establishing tele-therapy visits. Since the start of the pandemic, these offerings have expanded substantially across the MedStar network. We have in-person as well as tele-therapy visits for our patients, so they can progress well in their recovery while maintaining proper precautions.

A complete suite of rehabilitation services is offered, including:

- Management of acute or chronic pain;
- Protective splinting for immobilization and controlled motion, post-operatively 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, facilitate joint motion and tendon gliding, and decrease hypersensitivity;
- Whirlpools to assist with wound healing;
- Work hardening and functional testing;
- Social worker consultations.

Neurotrauma Center

R Adams Cowley Shock Trauma Center

22 S. Greene Street, Baltimore, Maryland

The Neurotrauma Center at the R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, provides comprehensive management for patients with injuries of the brain, spinal cord, and spinal column. According to the Maryland State Trauma Registry, from June 1, 2019, to May 31, 2020, the Neurotrauma Center provided care to 2,364 patients with traumatic brain injuries, 528 patients with spinal column or spinal cord injuries, and 441 patients who suffered from both traumatic brain and spinal column or spinal cord injuries. (See pages 80 to 85 for additional patient data.)

A dedicated, highly trained, and experienced multidisciplinary clinical staff including 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 are available at the Neurotrauma Center.

At the Neurotrauma Center, 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 multidisciplinary 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 the required resources for critical care with the addition of specialized intracranial pressure monitoring, including fiber optic, intraparenchymal, and intraventricular.

The 24-bed Neurotrauma Intermediate Care Unit (NTIMC) provides multidisciplinary 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.

Mission

The R Adams Cowley Shock Trauma Center is a multidisciplinary clinical, educational, and research institution dedicated to world-class standards in the prevention and management of critical injury and illness. Its highly specialized medical personnel and dedicated resources are focused on a single mission: to eradicate preventable death and disability and thus reduce the personal tragedy and overall costs associated with severe injury. This mission is continuously pursued through state-of-the-art clinical care services, active research, didactic and hands-on clinical education, and prevention programs.

Neurotrauma Center Staff

Trauma Medical Co-Director:
Bizhan Aarabi, MD, FACS, FACSC
Trauma Medical Co-Director:
Gary Schwartzbauer, MD, PhD

FY 2020 Annual Report

- **Notable Accomplishments.** During the COVID-19 pandemic, the R Adams Cowley Shock Trauma Center played a major role in the care of stricken Marylanders, with those patients with concomitant neurologic injury coming to the Neurotrauma Center. Due to the excellent planning and direction from the Hospital Incident Command System, Unit leadership and, very importantly, Nursing and Environmental Services in the front lines daily, achieved great outcomes in the face of this crisis. Daily, weekly, and monthly debriefings were organized by Nursing leadership to troubleshoot, ease stress and improve patient care. Despite the increased patient care demands, the Neurotrauma Center continued to achieve the notable accomplishments below:
  - EBP project on NTCC: Improving Pain Assessment for Traumatic Brain Injury Patients Through the Implementation of a Behavioral Pain Scale;
  - Goal for IMC Nurses to complete concussion certification from BIAMD;
  - Karen Memphis, BSN, RN, Clinical Nurse I from the NTCC currently serves as a member of the Brain Injury Association of Maryland Board of Directors.
- **Publications.**
  - Chapters on Traumatic Brain Injuries and Spinal Cord Injuries in the text *Trauma Nursing: From Resuscitation Through Rehabilitation* (5th ed.) authored by nurses from the Neurotrauma Critical Care Unit.
  - Scarboro, M, Massetti J, Aresco C. (2020). Traumatic brain injuries. In McQuillan, KA,

Makic MBF. (eds.) *Trauma Nursing: From Resuscitation Through Rehabilitation* (5th ed.). St. Louis, MO: Elsevier, pp. 332-409.

- Russo McCourt, T. (2020). Spinal cord injuries. In McQuillan, KA, Makic MBF. (eds.) *Trauma Nursing: From Resuscitation Through Rehabilitation* (5th ed.). St. Louis, MO: Elsevier, pp. 454-502.

■ **NTCC Donation Committee.** The nurse-driven Committee on Neurotrauma Critical Care focuses on honoring and improving care of our donor patients and their families through education and team engagement. This committee has initiated and expanded the Walk of Honor and Moment of Silence into a robust program to honor those giving the gift of life. This committee has also hosted seminars and unit activities for our multidisciplinary team to improve knowledge in care of the organ donor, and this team continually engages in community activities to honor organ donors. NTCC Donation Committee received the Innovation and Improvement award from the Living Legacy Foundation at the Biennial Hospital Partners Conference. NTCC Donation Resource Team received the 2019 Living Legacy Award for Innovation and Improvement.

- Karen Memphis, RN, SCNI
- Breana McKinnon, MPH, BSN, RN
- Sara Reihl, RN, BSN, TCRN, FNE-A
- Kathryn Miska, BSN, RN
- Celeste Ellerbe, US

■ **AHRQ Safety Program and NTCC.** In March 2018, NTCC joined the AHRQ Safety Program for Intensive Care Units: Preventing CLABSI and CAUTI (AHRQ, 2018). For fiscal year (FY) 2018, the cumulative standardized infection ratio (SIR) rate was 2.00 for CLABSI. The purpose of this initiative was to improve patient care and reduce healthcare associated infection (HAI) rates in our complex neurotrauma patients. This was completed through nurse and multidisciplinary leadership, engagement, and accountability. NTCC has created a cultural change, and for FY 2019 and through FY 2020, NTCC's SIR rate for CLABSI remains an impressive 0.00 [Reference: Agency for Healthcare Research and Quality (AHRQ). (2018). "AHRQ Safety Program for Intensive Care Units: Preventing CLABSI and CAUTI". Retrieved from https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/preventing/index.html].

■ **Quality Management and Improvement.**

- Oral presentation scheduled for March 2020 STN conference, resubmitting for 2021 Conference due to COVID.
- Throughout FY 2020, CLABSI SIR rate remains at 0.00.
- The Neurotrauma Critical Care Unit has remained free of central line associated bloodstream infection for over two years.
- Monthly multidisciplinary reviews on unique Neurotrauma cases Q&A.

■ **Presentations.**

- Oral Presentation accepted for March 2020 STN TraumaCon Conference: NTCC Cultural Shift in Preventing CLABSI: AHRQ Safety Program for Intensive Care Unit. This was cancelled secondary to the COVID-19 pandemic, resubmitting for 2021 STN conference. Presenters: Kaitlyn Cipra, BSN, RN, Shawna Feeley, BSN, RN, TCRN, and Samantha Adams, BSN, RN
- Poster Presentation accepted by National Association of Clinical Nurse Specialists 2020 Annual Conference: Improving Pain Assessment for Traumatic Brain Injury Patients through the Implementation of a Behavioral Pain Scale. Presenter: Ashleigh Boidock, BSN, RN, CCRN

■ **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, listed on page 32, operate within CIPP.

■ **Emergency Medical Services and Nursing Continuing Education.** The Neurotrauma Center has reformatted its Trauma Theory course to incorporate a number of simulations, including modules focusing on care of patients with spinal cord injury and traumatic brain injury.

■ **Research.** The Neurotrauma Center employs a multidisciplinary team of clinical experts that utilizes evidence-based treatment strategies designed to ensure immediate diagnostic and therapeutic access for patients with traumatic brain, spinal column and spinal cord injuries. The staff and faculty of the Neurotrauma Center avails its clinical and research expertise globally to healthcare providers. Trauma-related publications by Neurotrauma faculty in FY 2020 covered a variety of topics. Articles in peer-reviewed journals and Neurotrauma-related grant research projects have included advances in traumatic brain injury, successful donation after organ dysfunction and failure following brain death, physiologic features of brain death, and treatment changes for traumatic brain injury among older adults in a trauma center, and the use of acupuncture for spinal cord injury patients. Clinical trials that have been activated for enrollment or approved by the IRB include:

- genetic analysis of trauma patients that will hopefully someday tailor trauma care;
- optimizing brain oxygen supply following TBI using a brain oxygen monitor;

- cooling patients with spinal cord injury to improve outcomes;
- and one exciting multicenter trial looks to treat TBI patients with a drug developed by a University of Maryland researcher and neurosurgeon.

We are also completing data collection for a nurse-led study, funded by the Society of Trauma Nursing, entitled "Prevalence and Predicative Characteristics of Agitation in Patients with Traumatic Brain Injury in the Acute Care Setting".

The following members of the R Adams Cowley Shock Trauma Center served on the Neurotrauma Delphi consensus panel as part of the National Trauma Research Action Plan (NTRAP) project: Sam Galvagno, DO, PhD, MS; Karen A. McQuillan, MS, RN, CNS-BC, CCN, CNRN, TCRN, FAAN; Gary Schwartzbauer, MD, PhD; and Daniel Gelb, MD. The panel is using an online Delphi protocol to determine where the primary research gaps exist for traumatic brain and spinal cord injuries. The NTRAP project is supported by a grant from the Department of Defense, managed by the Coalition for National Trauma Research (CNTR). When complete, the NTRAP will provide the framework for a coordinated research program that identifies critical gaps in trauma research and focuses research efforts across federal agencies and within the civilian and military medical sectors.

Karen McQuillan, MS, RN, CNS-BC participates on the American College of Surgeons (ACS) Committee on Trauma (COT) Trauma Quality Program (TQP) development of the Spine Injury Best Practices Guidelines.

We have also received Institutional Review Board approval and grant funding from the Society of Trauma Nursing for a nurse-led study that will quantify the prevalence and predictive factors for agitation in patients with traumatic brain injury in the acute care setting. This follows adoption of the Agitated Behavioral Scale by staff as a regularly used tool to assess and communicate agitation severity. Ongoing trials include looking at treatment of TBI using hyperbaric oxygen and another into whether acupuncture can alleviate pain and improve quality of life following spinal cord injury.

■ **Rehabilitation.** Part of the recovery process must start at the very instant patients arrive at the Neurotrauma Center, with the ultimate aim of stabilization of critical injuries followed by early rehabilitation.

The Neurotrauma Center'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 & Orthopaedic Institute.

Rehabilitation Services

Designated trauma centers within the Maryland EMS system are required to have means 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 is begun as soon as possible following admission.

Patients who have experienced multiple trauma as a result of a motor vehicle crash, fall, sports-related injury, or assault, 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 gun-shot wounds. The goal is to enable the patients to resume the greatest level of functioning by regaining strength and range of motion.

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. Rehabilitation care generally comprises physical, occupational, and speech therapy, which integrate resources identified below. 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, are considered for rehabilitation placement.

Physical Therapy

A physical therapist visits the patient at the bedside or in a physical therapy setting while in the acute care hospital. Physical therapists have special training to increase mobility, strength, balance, and flexibility after an injury. 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, spinal cord, and the brain. Patients may continue to see a physical therapist at home or at an outpatient center after leaving the hospital.

Top Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Aged 15 and Over) (June 2019 to May 2020)

Source: Maryland State Trauma Registry

Rehabilitation Center	Number
Adventist Health Care	69
Encompass Health Rehabilitation Hospital	83
Genesis Health Care	33
HCR Manor Care	13
Johns Hopkins Bayview Specialty Hospital Inpatient Rehabilitation	31
Johns Hopkins Hospital Inpatient Rehabilitation Center	18
MedStar National Rehabilitation Network	36
Sava Senior Care	13
Sinai Rehabilitation Center	49
University of Maryland Capital Region Health Physical Rehabilitation Center & Stroke Specualty Program	16
University of Maryland Rehabilitation & Orthopaedic Institute	303

Note: Total patients aged 15 and over that went to rehabilitation centers = 1,157

Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Aged 14 and Under) (June 2019 to May 2020)

Source: Maryland State Trauma Registry

Rehabilitation Center	Number
HSC Pediatric Center, DC	2
Kennedy Krieger Institute	5
Mt. Washington Pediatric Hospital	7
MedStar National Rehabilitation Network	7
Nemours/Alfred I. DuPont Hospital for Children	1
Penn State Children's Hospital (Hershey Campus)	1

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

Occupational Therapy

Occupational therapists focus on restoring a patient's ability to perform everyday tasks such as getting dressed, eating, driving, and taking a shower. Occupational therapy is offered in the hospital and at home.

Speech Therapy

Speech therapists help patients regain the ability to communicate with others. These services are used frequently after traumatic brain injury. Speech therapists also help patients 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.

Maryland-National Capital Region Emergency Response System

Program Overview

The Maryland-National Capital Region Emergency Response System (MDERS) is a federally funded program administered by the Maryland Institute of Emergency Medical Services Systems (MIEMSS). The organization integrates fire, rescue, emergency medical services, law enforcement, emergency management, public health, and health care systems to ensure a coordinated response to emergency incidents. The program provides direct support to the Maryland-National Capital Region (NCR), which includes Montgomery and Prince George's Counties, and works closely with its partner entities in Northern Virginia and Washington, DC.

A significant portion of the annual program budget, which is provided through NCR Urban Area Security Initiative funds, is managed by MIEMSS. The agency is also the entity primarily responsible for employment of support personnel, contractual support from outside entities, and training and exercise initiatives.

MDERS was established to optimize responses to emergency incidents through communication, collaboration, and coordination of multiple agencies, disciplines, and jurisdictions. The MDERS Steering Committee, comprised of representatives from five core disciplines (emergency management, fire/EMS, hospitals, law enforcement, and public health), provides strategic direction for the program. The committee membership includes state officials in addition to representatives from Montgomery and Prince George's Counties.

The direction of the Steering Committee is carried out by a full-time staff of 11 that includes a director; program managers; planners; a financial administrator; and logistics, training, and exercise coordinators. The MDERS main office is co-located with MIEMSS Region V in College Park, and a supplementary office

is located at the Montgomery County Public Safety Headquarters in Gaithersburg.

In FY 2020, MDERS continued to assist stakeholders with enhancing response capabilities by providing staffing to plan, and develop policy; develop and deliver training and exercise opportunities; and acquire equipment to support the missions of its partner agencies.

Investment Overview

The NCR Homeland Security Executive Committee approves the MDERS budget, including these notable investments and regional projects.

- **FirstWatch System Monitoring System.** MDERS manages the FirstWatch program for the NCR. The program is designed to provide real-time situational awareness, aggregate data sources, analyze data against target performance metrics, evaluate call-taking efficiency, and monitor patient care for quality assurance. This year, the project expanded, complementing the FirstWatch situational awareness software already operational in the NCR, including the expansion of triggers and reports for Montgomery County Fire Rescue Service, Prince George's County Fire/EMS, and implementation in additional Northern Virginia jurisdictions. This project continues to expand communication capability by providing real-time tracking of resource use and depletion, transportation decisions, and healthcare system stresses.
- **Tactical Emergency Casualty Care for Law Enforcement.** MDERS supports many aspects of Tactical Emergency Casualty Care throughout the Maryland-NCR. Funding purchased a patient care manikin and carrying case set. Adding this mobile equipment enables instructors to travel to satellite facilities and conduct high-fidelity simulations and training. MDERS' continued support connects students to training at their worksite, improving efficiencies and effectiveness of the program. This process provides interdepartmental and regional opportunities to review information and identify best practices.
- **Medical Resource Officer for Public Health Emergency Preparedness.** MDERS funds two staff members, one in Prince George's County and one in Montgomery County, to coordinate the Medical Resource Corp Volunteers. These activities include the oversight, administrative guidance, recruitment, credentialing, background clearances, training, exercise opportunities, deployment protocols, and development of emergency plans and tools to prepare volunteers for the vast range of activities they support. The goal of this program is to strengthen individual, community, and workplace preparedness for emergency events and foster volunteer participation.
- **Small Unmanned Aerial Systems (sUAS) for Public Safety Agencies.** MDERS supports policy development, purchase, training, and maintenance programs for small unmanned aerial systems (sUAS) for use by public safety agencies in Montgomery and Prince George's County. These resources provide responders with real-time situational awareness and scene assessments during complex and hazardous situations, during which access is limited or direct observation by a responder is dangerous. MDERS staff assisted all recipient agencies in policy work, procurement processes, and planning with the Department of Homeland Security, Federal Emergency Management Agency (FEMA), and the State Administrative Agency. The program outcome is to integrate new and emerging sUAS policy, processes, and technology into the daily routine of public safety agencies.
- **Incident Command Support for the Montgomery County Fire and Rescue Service (MCFRS).** This project completed the infrastructure components for the Montgomery County Fire and Rescue Service Command Officer Professional Development Instruction Laboratory. The additional radios, radio headsets, hardware stations, and simulation software licenses build the lab infrastructure. These labs provide the technical platform to provide a controlled environment that simulates an emergency scene. The labs feature multiple simulations of emergency incidents to include vehicle response, radio communications, personnel interactions, changing scene conditions, and responses to incident commander actions. MDERS supports this activity to develop safe, efficient, and effective behaviors by incident commanders to deploy interdepartmental, interjurisdictional, and regional partner resources to manage fire and rescue emergency incidents.
- **Public Access Trauma Care.** Over the past several years, MDERS has invested heavily in Tactical Emergency Casualty Care. This program, which is a civilian version of military medicine, was designed to treat victims of life-threatening trauma, oftentimes induced by violence. This capability has been built into law enforcement, fire/rescue/EMS, and hospitals. This year, MDERS continued to push to include the entire continuum of care by providing bystanders with the tools and training to become immediate responders. This is a critical capability with these time-sensitive injuries, when traditional EMS will not have access or the quantity of patients will demand empowered civilians to assist. MDERS is working with Montgomery County Public Schools to provide kits, cabinets, and training in all 207 schools within the county. Prince George's County has chosen to first equip administrative buildings, courts, libraries, community centers, and police stations, which are funded through this MDERS

program. Furthermore, this grant will also purchase supplies to equip school security personnel with bleeding control equipment. MDERS has also invested in approximately 50 training caches to allow community agencies and groups to deliver this training.

- **Mass Casualty Incident Response Support.** Since its inception, MDERS has provided support for mass casualty incident (MCI) response and management as one of its key capability targets. This year's funding provided the sustainment of the Handtevy Medical Calculation System for Montgomery County Fire and Rescue Service and Prince George's County Fire and EMS Department. This portable pediatric medication calculation tool set includes a color measuring tape, smartphone access, and hard copy reference materials. Benefits of the program include easy-to-use products, simple storage and application, and accurate delivery of medications. MDERS has also procured additional wireless vital sign monitors both departments for use during MCIs. These devices allow for personnel to monitor and treat a larger number of patients simultaneously by offering remote vital sign and cardiac monitoring capability.
- **Tactical Medical Equipment for Law Enforcement.** MDERS supported the purchased of two heavy duty vehicles and a LifePak 15 cardiac monitor for the Montgomery County Police Department Special Operations Division. The vehicles provide for quick response to terrorist and complex coordinated attack events. One vehicle provides Tactical Emergency Medical Services (TEMS) support. The second all-wheel drive van delivers logistic support for deployment during active violence incidents. The LifePak 15 provides cardiac and biomedical assessment tools for use by advanced life support credentialed law enforcement personnel assigned to the TEMS program.
- **Emergency Management Response Enhancement.** MDERS supported regional emergency management agencies in the purchase of response vehicles, personal field deployment kits, and office field deployment kits. These resources provide emergency management personnel with the tools necessary to respond to terrorist and complex coordinated attack events. The goal is to support field operations at the scene with a smooth transition from emergency services to community recovery. These kits include portable radio chargers, portable radio batteries, identification card printers, thermal printers, wireless access point, laptops, extension cords, and headlamps. This will allow emergency management officials to perform critical functions without relying upon allied agency support.
- **Tactical Emergency Medical Services for the Prince George's County Fire/EMS Department.** As part of the ongoing support for Tactical Emergency Medical Services (TEMS), this project purchased two vehicles for the Prince George's County Fire/EMS Department TEMS program. Each vehicle includes a quick-access cabinet storage for medical equipment and supplies. The TEMS team serves the Prince George's County Police Department Special Operations Division and includes paramedics from the Prince George's County Fire/EMS Department. The team provides emergency medical treatment in austere environments under high threat, primarily to law enforcement personnel engaged in special operations.
- **Tactical Equipment for Law Enforcement.** MDERS continues to support Maryland-NCR Special Weapons and Tactics (SWAT) team members in Montgomery County and Prince George's County. This year, MDERS provided allocations to purchase a Tyler bench for the Prince George's County Police Department Aviation section. Funds also supported the purchase of a quick response vehicle, low-light vision devices, small robots, and helmet safety strobe devices for law enforcement officers. These items are part of law enforcement capability response to terrorist events or complex coordinated attacks.
- **Training and Exercise Program.** MDERS supports initiatives for training and exercises that encourage development of local critical incident response capabilities. The program follows the federal Homeland Security Exercise and Evaluation Program model to ensure consistent results and improvement plans that lead to increased readiness. As part of the capability development process, this program is responsible for sending stakeholders to several specialized trainings and conferences, including these events conducted in FY 2020:
  - All-Hazard Incident Management Training
  - Small Unmanned Aerial Systems Pilot Training
  - Advanced Law Enforcement Rapid Response Training (ALERRT) at Texas State University
  - Assessment and Training Solutions Live Tissue Lab Training
  - Direct Action Resource Center Basic Counterterrorism Training
  - Direct Action Resource Center Advanced Operational Breach Techniques
  - Direct Action Resource Center Breaching and Program Supervisors Training
  - Direct Action Resource Center Supervisors and Managers Course
  - Direct Action Resource Center Tactical Supervisors and Managers Course
  - Federal Aviation Administration Unmanned Aerial Systems Symposium
  - Forced Entry Tactical Training 8th Annual Breachers Circle
  - Forced Entry Tactical Training Explosive Breaching Course

- Homeland Security Exercise and Evaluation Course Training
- International Association of Fire Chiefs Hazardous Materials Conference
- Journal of Emergency Medical Services Conference
- Joint Commission Emergency Preparedness Conference
- Large Caliber Rifle Course
- Maryland Emergency Management Association Conference
- National Healthcare Coalition Conference
- National Homeland Security Conference
- National Tactical Officers Association Command Class
- Pinnacle EMS Conference
- Project Management Course
- Professional Writers Course
- Special Operations Medical Association (SOMA) Conference
- Tomahawk Tactical Entry Course

Additional Activities

■ **EMS Tabletop Exercises.** The Maryland-National Capital Region Emergency Response System (MDERS) conducted the second phase of table-top exercises (TTX) with Emergency Medical Services Duty Officers from the Prince George's County Fire/EMS Department and Montgomery County Fire and Rescue Service (MCFRS). The goal of the exercises was to refine and assess the EMS Duty Officer's ability to effectively manage mass casualty and multi-patient incidents. A series of incidents were developed to challenge the personnel with increasing complexity. Both departments hosted multiple sessions creating a strong collaboration between the counties. The after-action report listed several key areas for development in policy, process, and activities to support the terrorist incident or complex coordinate attack.

■ Leadership Summit**.** MDERS supported a select group of mid-to senior-level leaders from in and around the Maryland-National Capital Region response community to explore core leadership principles and skills proven to have an impact in times of crisis. The inaugural Leadership Seminar was held on October 9, 2019, at the William F. Bolger Center in Potomac, MD. The event featured presentations from two world-renowned leadership scholars: Dr. Kathleen Kiernan, homeland security expert and founder and CEO of Kiernan Group Holdings, Inc., and Eric McNulty, Associate Director of the National Preparedness Leadership Initiative at Harvard University.

■ Support to regional workgroups**.** MDERS staff support or lead workgroups and initiatives and serve on various committees. As an example, MDERS leads a Law Enforcement-EMS working group that assesses regional needs and builds target capabilities for integration of law enforcement and EMS.

■ Participation in high-threat workgroups**.** Staff participate on a regular schedule with the NCR Complex Coordinated Attack Workgroup, Maryland State Police–led Active Assailant Workgroup, and annual NCR Threat Hazard Identification and Risk Analysis (THIRA) initiative.

■ Representation in Regional Activities**.** MDERS represents its stakeholders by holding positions on certain regional committees hosted through the Metropolitan Washington Council of Governments. As a conduit between the local jurisdictions and the larger NCR, MDERS minimizes the burden on participants while ensuring their interests are represented and supported through regional funding. MDERS staff members participate in meetings and activities, including involvement in Regional Emergency Support Function Committees; Regional Programmatic Working Groups; Regional Planning Guidance Working Group; the NCR Emergency Response System; the NCR Complex Coordinated Attack Workgroup; and the NCR Homeland Security Executive Committee, Policy Group, and Advisory Council.

Summary

Through its many programs and projects, MDERS facilitates collaboration of regional resources in responding to emergency incidents, including terror attacks. By way of regular communication, the MDERS Steering Committee assists local subject matter experts representing emergency response disciplines in defining their critical needs. Through a standard and cooperative method, capability gaps are closed in a comprehensive fashion that complements the missions and objectives of all partners. MDERS continues to build a collaborative community of all emergency response partners throughout the Maryland-NCR and beyond. Joint capabilities that transcend traditional jurisdictional and disciplinary boundaries continue to provide citizens with superior response during both routine and large-scale emergency incidents.

Department of Emergency Health Services, 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). It provides undergraduate, master's, and doctoral level education to future and existing prehospital and emergency public health clinicians, emergency management, and

disaster health leaders. Since its formation in the 1980s as the research and education arm of MIEMSS, 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.

The 2019-2020 academic year was one unlike any other for students and faculty, as we strived to continue our mission of public service, education, and research for EHS during the COVID-19 pandemic. In mid-spring of 2020, the whole of the UMBC campus transitioned to entirely online education as the remainder of the state was subject to stay-at-home orders. Although clinical rotations for our paramedic students were halted, we were fortunate to be able to continue the remainder of our undergraduate and graduate level didactic education online. While frontliners across the state and nation battled COVID-19, many of the EHS faculty and students joined them as we continued to serve as volunteer EMTs, flight paramedics, and emergency physicians.

Dr. J. Lee Jenkins, the department's chair, and Gary Williams, the clinical coordinator, are continuing work on a grant funded by the National Science Foundation to study the physiologic stress response of paramedic trainees during high-fidelity simulation. The goal of the project is to ultimately use this data to develop innovative teaching models to improve clinician stress response. Dr. Lucy Wilson, the graduate program director, has served as a consultant to many agencies in their COVID-19 response.

As the spring and summer continued, our paramedic students, through the leadership of our Paramedic Director, Kyle Bates, have been safely able to return to campus to continue skills training. We are currently working to improve access to clinical rotations for our students and increasing simulation opportunities. The first PhD program in Emergency Services at UMBC has now been available for three years, through EHS in conjunction with the Department of Public Policy, and is showing success in enrollment. Students may concentrate in either emergency health or emergency management.

Maryland Poison Center, University of Maryland School of Pharmacy

Mission

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, the Maryland Poison Center (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, 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. Bruce D. Anderson, PharmD, DABAT, serves as MPC's executive director, and Joshua King, MD, is the medical director. The poison specialists who work at MPC are pharmacists and nurses who are certified as specialists in poison information (CSPI) by AAPCC. The 17 specialists at MPC have over 260 years of combined poison center experience, ensuring that callers have access to experienced, qualified, and well-trained staff.

In CY 2019, MPC received more than 36,000 calls. While 29,000 of these calls involved a human exposure, the remaining 7,000 were requests for information or involved animal exposures. Children under the age of 6 accounted for 36% of poison exposures. The top five causes of poisoning were analgesics, sedatives/antipsychotics, antidepressants, household cleaners, and stimulant/street drugs. The large majority 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 1,700 cases in CY 2019. In 9% 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 continues to work 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.

The center also partners with MDH'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 responding to calls about overdose as well as helping the state document naloxone administration by the lay

public and law enforcement officers. In CY 2019, MPC was involved in over 800 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. Research published or presented at scientific meetings in CY 2019 included:

- Iron packaging regulations in the United States and pediatric morbidity: a retrospective cohort study;
- Prepacked naloxone kit administration for suspected opioid overdose in the era of illicitly manufactured fentanyl: a retrospective study of regional poison center data;
- Toxicity of acute exploratory amphetamine-salt medication in amphetamine-naïve pediatrics: a retrospective cohort study;
- Characterization of intentional-abuse venlafaxine exposures reported to poison control centers in the United States;
- Outcomes of acute exploratory pediatric lithium ingestions;
- Extracorporeal removal of poisons and toxins;
- The penetration of literature describing bupropion-related harm after overdose in the non-toxicology-related literature: a scoping review (abstract) – NACCT Nashville;
- Nicotine pod ingestions, a clinical conundrum: a case series (abstract) – NACCT Nashville.

MPC's public education efforts are intended to help prevent poisonings from occurring and to increase awareness of the Center's services. Angel Bivens, BS Pharm, MBA, CSPI, is MPC's assistant director of operations and public education and Emily Paterson, BS, CHES, is MPC's public education and communication specialist. In CY 2019, MPC attended 55 programs throughout Maryland, reaching approximately 3,010 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. More than 275,000 pieces of educational materials (brochures, magnets, telephone stickers, Mr. Yuk stickers, teachers' kits, and more) were distributed at programs, schools, health fairs, and by direct mailings.

National Poison Prevention Week (March 17-23, 2019) activities included mailings to emergency departments throughout the state. To provide Poison Prevention Week kits to elementary schools, MPC partnered with Safe Kids Carroll County, Safe Kids Frederick County, Safe Kids Washington County, and Cecil County Department of Emergency Services, in their respective counties, and seven additional county school nurses to offer Poison Prevention Week Kits to elementary schools. Schools could choose from a list of activities to increase awareness of poison safety to the students and their families. In all, 166 schools participated, reaching around 80,000 students.

MPC publishes Poison Prevention Press, a bimonthly e-newsletter for the public that highlights poison safety topics. Articles published in 2019 included "Cough and Cold Medicine Safety"; "Top 3 Poisons of 2018: Children"; "Top 3 Poisons of 2018: Adults and Older Adults"; "Understanding Safe Storage"; "Take Charge of Your Health"; and "What You Should Know About Marijuana (Cannabis)". MPC's Facebook page shares content with the public on topics related to poison prevention and safety. In CY 2019, MPC generated 263 posts and saw an increase of 406 followers. MPC's Twitter account (@MDPoisonCtr) also shares content for the public. In CY 2019, MPC shared 266 tweets and saw an increase of 110 followers. In CY 2019, MPC's blog, e-Antidote, had 23 new posts and 2,200 visitors.

MPC's Twitter account for healthcare providers, @MPCToxTidbits, posts clinical and medical toxicology content. The account tweeted 181 times in CY 2019, garnering more than 135,000 impressions and 4,000 engagements.

Health professional education is coordinated by Eric Schuetz, BS Pharm, CSPI. Programs and materials are designed to help health professionals better assess and manage poisoning and overdose cases. In CY 2019, 17 programs were presented by MPC staff at hospitals, EMS/fire departments, colleges, professional conferences (state, regional, and national), and through online webinars. More than 725 physicians, nurses, EMS clinicians, pharmacists, physician assistants, and other health professionals attended these programs and webinars. MPC also provides on-site training for physicians, pharmacists, and EMS clinicians. MPC's Twitter account for healthcare providers, @MPCToxTidbits, posts clinical and medical toxicology content. MPC tweeted 181 times in CY 2019, garnering more than 135,000 impressions and 3,000 engagements.

ToxTidbits is a monthly e-newsletter that covers important toxicology information, updates, and news for health professionals. Among the topics addressed in CY 2019 were "Vilazodone"; "Anavip"; "Dinitrophenol"; "Xylazine"; "Metformin Associated Lactic Acidosis"; and "Metal Fume Fever". ToxTidbits is emailed to subscribers and faxed to every emergency department in MPC's service area.

Reason for Poisoning (CY 2019)

Circumstance	*Number of Patients*	*Percentage*
Unintentional	19,863	68.5
Intentional	7,763	26.8
Adverse Reaction	915	3.1
Other and Unknown	472	1.6
TOTAL	29,013	100.0

Medical Outcome of Poisoning (CY 2019)

Medical Outcome	*Number of Patients*	*Percentage*
No Effect/Minor Effect	22,945	79.1
Moderate Effect	2,431	8.4
Major Effect	1,131	3.9
Death	72	0.2
Other and Unknown	2,434	8.4
TOTAL	29,013	100.0

Location of Poisoning Exposure by MIEMSS Region (CY 2019)

Region	*Number of Exposures*	*Percentage*
Region I	726	2.7
Region II	2,496	8.6
Region III	16,560	57.1
Region IV	3,008	10.4
Region V*	2,964	10.2
Unknown County/ Other state	3,189	11.0
TOTAL	29,013	100.0

Note: The human exposure data in this report does not reflect approximately 6,000 cases that were misrouted by telecommunication carriers and managed by another poison center.

**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, DC. 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.*

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 2007, in an effort to further basic, translational, and clinical studies in injury research, the University of Maryland School of Medicine (UMSOM) designated NSC as an Organized Research Center (ORC). Since then, the Shock, Trauma, and Anesthesiology Research ORC (STAR-ORC) has become a world-class, multidisciplinary research and educational center that focuses on brain injuries, critical care and organ support, resuscitation, surgical outcomes, patient safety, and injury prevention. UMSOM's Program in Trauma and Department of Anesthesiology operate within the STAR-ORC, as does NSC.

Professor of Anesthesiology and Vice-Chair for Translational Research Wei Chao, MD, PhD, FAHA, and Professor of Surgery and Director of Translational Research Rosemary A. Kozar, MD, PhD, lead the STAR-ORC. Dr. Kozar is also the interim director of the NSC. Dr. Chao, Dr. Kozar, Thomas M. Scalea, MD, from the R Adams Cowley Shock Trauma Center (STC), and Peter Rock, MD, from the UMSOM Department of Anesthesiology, form the STAR-ORC Executive Committee.

NSC experienced several staffing changes in FY 2020. Cinzia Cirillo, PhD, and Daniel Knopp, MMP, left the NSC for other careers in traffic safety. The NSC continues its collaborations with Mr. Knopp. Kartik Kaushik, PhD, was hired as a full-time faculty member and provides significant statistical modeling and data analysis skills for the NSC. Chenfeng Xiong, PhD, joined NSC in a part-time capacity with a joint faculty appointment between University of Maryland College Park, Department of Civil and Environmental Engineering, and UMSOM to work on the Transportation and Health Initiative (THI). In addition, Komal Bhagat, MPH, CPH, RN joined the NSC as a Lead Research Analyst. She is an Epidemiologist and informatics analyst with experience specializing in data management, statistical analysis, report writing, and research methodology. Dr. Roumen Vesselinov, Dr. Margaret Lauerman, and Dr. Kaushik continue their roles as PI on the NSC projects.

Research Activities

NSC, in conjunction with R Adams Cowley Shock Trauma Center, has been a leading participant in the Crash Injury Research and Engineering Network (CIREN) funded by the National Highway Traffic Safety Administration (NHTSA), and continues working with the Crash Outcome Data Evaluation System (CODES), which is currently funded by the Maryland Department of Transportation's Maryland Highway

Safety Office (MHSO). NSC is one of the centers awarded the CIREN project on an annually renewable basis.

During the 2019-2020 contract year, approximately 65 cases were enrolled into CIREN and a comprehensive investigation was conducted for each. Monthly case reviews were held, and NSC hosted NHTSA administrators and members of the Maryland Highway Safety Office on several occasions. In addition to MHSO, the UMD CIREN center has developed partnerships with the Maryland State Police, Baltimore County Police Department, Prince George's County Police Department, Office of the Chief Medical Examiner (OCME), and Maryland Department of Transportation's Motor Vehicle Administration (MVA). CIREN cases are frequently used as part of biomechanics presentations at the STC. The CIREN team was invited to share its research at the Maryland State Firemen's Association Convention in June 2019 and at a Prince George's County Biomechanics Class in July 2019.

The NSC received a grant from NHTSA to study

crash risk and toxicology prevalence among all roadway users. With the onset of the COVID-19 pandemic, the study has since expanded to include COVID-19 surveillance among the entire trauma population. This all-encompassing study has resulted in more than 1,000 collected blood samples, with over half being roadway users. Blood samples are shipped daily to labs in North Carolina and California to conduct toxicology and SARS CoV-2 testing. Multiple platforms such as the Maryland State Police Automated Crash Reporting System (ACRS), EPIC, and the Research Management System (RMS) are used to collect various data points. For every enrollment this data includes demographics, mechanism of injury, EMS, treatments and outcomes, crash, and COVID-19 screening/testing.

NSC continues its partnership 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 linked traffic records and hospital data (i.e., CODES data) to examine the types and severity of injuries sustained by older occupants in motor vehicle crashes. This CDC CODES grant was awarded for three years (9/1/2017 - 8/31/2020) and is expected to continue under a no-cost extension through 8/31/2021. In early 2020, NSC staff completed linking the databases for 2008-2016. Based on the linked data, an analysis was made of the cost of non-fatal motor vehicle crash injury in older adults (65 or older). The results of the analysis were presented at the 2019 Traffic Records Forum. Additional efforts involved the linking of police crash records from 2016 with 2012-2016 driver citation data obtained from the Maryland District Court system to determine if older drivers with a history of citations have a higher crash risk than those without. In a separate study, toxicology findings obtained from the R Adams Cowley Shock Trauma Center were integrated with the linked crash-hospital data to examine the types of drugs that are associated with crash and injury characteristics of older drivers. The results of the toxicology analysis will be presented at the 2020 Traffic Records Forum.

NSC has compiled information from a variety of statewide databases to enable in-depth analyses of highway safety programs. The compiled CODES data sets are a valuable resource to Maryland's highway safety and injury prevention community. Data provided through the Maryland CODES program are used for portions of the Maryland Strategic Highway Safety Plan (SHSP), Highway Safety Plan, MHSO Annual Report, and to support a number of problem identification and program evaluation activities across the state. NSC staff members facilitate the Traffic Records Coordinating Committee and participate as data coordinators on SHSP Implementation and Emphasis Area Teams. Last year, NSC produced Problem Identification Reports and Program Area Briefs for local jurisdictions to aid in the development of Local Strategic Highway Safety Plans.

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. During the past year, NSC staff conducted analyses on seat belt use, impaired driving, older drivers, distracted driving, bicycle crashes, and pedestrians. NSC was also involved in the Buckle Up Phone Down Campaign being conducted in Southern and Western Maryland.

For the eighth consecutive year, NSC supervised and reported findings of the 2019 Maryland Front Seat Belt Use Project. A similar study was conducted for the Maryland Back Seat Belt Use Project for the fourth consecutive year. As part of another project with MHSO, NSC worked with the OCME to conduct toxicology tests on fatally injured motor vehicle drivers and pedestrians. The testing identified the use of marijuana as well as a battery of other licit and illicit drugs with regard to age, gender, and mechanism of injury.

In a separate study funded by the MHSO, NSC staff have been given access to the Drug Recognition Expert (DRE) database. Currently, these data are being merged with the Maryland Citation database obtained from the Maryland District Courts to analyze traffic-related charges in relation to positive drug screen results and to identify repeat offenders. The NSC has also collaborated with the MHSO to create traffic safety surveys for multiple traffic-related program areas. These surveys will be made available online later in 2020 to Maryland residents in an effort to gain an improved perspective of current driver behaviors.

In FY 2020, NSC and Impact Research, LLC, initiated a study to model the relationship between changes in key behavioral, economic, policy, environmental, and demographic factors in Maryland with observed changes in serious and fatal injury crashes by county from 2010 to 2017. NSC statisticians identified appropriate data sources and variables to be compiled for use in the modeling instruments and, in FY 2020, added 2018 data. These models will provide a better understanding of factors playing a role in crash trends in Maryland. A website is currently under construction to allow decision-makers and other stakeholders to estimate the expected change in injury-involved crashes expected for a given change in each risk factor.

The NSC continued with the Pedestrian Fatality Reviews to support the Pedestrian and Bicycle Emphasis Area Team (PBEAT) as part of the State's Strategic Highway Safety Plan. The team consists of a program manager (MHSO), p-BEAT members, a crash reconstructionist (law enforcement), community health personnel, researchers, epidemiologist, planners, EMS personnel, engineers, nurses and physicians. The goal of this multidisciplinary team is to review as many

pedestrian-involved fatalities from 2016 as possible throughout the year, determine related contributing factors and cause of each pedestrian fatality, and identify potential countermeasures. Eighty cases have been reviewed thus far, with more scheduled.

NSC also provided key data support to Baltimore City's Dockless Vehicle Program. In addition, NSC staff participated in the E-scooter Injury Surveillance Workgroup started by the University of North Carolina Highway Safety Research Center. The workgroup was successful in getting Micro-Mobility Codes added to the existing ICD-10-CM codes.

Currently, a relational database management system (RDBMS) is under development by researchers from UMCP and NSC as part of the Transportation and Health Initiative. The system will include crash data, hospital inpatient and outpatient records, citation data, and vehicle data. The team is also exploring the possibility of adding traffic-related characteristics from the Vehicle Probe Project (VPP data), Coordinated Highway Action Response Team (CHART)-related data available under the Regional Integrated Transportation Information System (RITIS) system, and EMS data. Once the system is completed, the integrated database will be used for all types of sophisticated analyses and modeling. Recently, the team developed a model for evaluating injury severity using crash data and studied the bias resulting from the police assessment of injury severity. A future project will involve an examination of opportunities to improve patient outcomes for older victims of motor vehicle crashes in rural Maryland.

The NSC was funded by the Maryland Department of Health to take part in CDC's multi-state medical records review, designed to develop injury case definitions using emergency department data. We conducted this injury surveillance project by performing medical chart extractions to analyze the use of specific ICD-10 codes for patients with traumatic brain injuries. NSC evaluated adult medical charts and worked in conjunction with Johns Hopkins, whose team conducted pediatric medical chart extractions. Other states also completing this project included Colorado, Kentucky, and Massachusetts. The preliminary results from this project identified what percentage of cases assigned a specific ICD-10, related to traumatic brain injuries, showed sufficient evidence of a TBI in the ED medical documentation. Overall, NSC analyzed more than 800 medical chart extractions.

NSC partners with CDC to measure the reduction of blood alcohol levels among fatally-injured persons from the time of initial testing at STC to the testing conducted by OCME, with a finding that blood alcohol concentration decreases with resuscitation. NSC partnered with the Maryland Department of Health this past year on two projects. Both projects focused on the accuracy of ICD-10 coding for persons treated at STC. The first project found that injury coding of an intentional injury is frequently different between observers. The second project has entered the analytical stage and is focused on traumatic brain injury.

NSC staff either attended or were set to attend and present at various national and local conferences before restrictions were put in place due to the pandemic. These meetings included the International Traffic Records Forum, SHSP Implementation Team meetings, Lifesavers Conference, Towson University GIS Conference, Law Enforcement Supervisors Training, NHTSA Region 3 Pedestrian Safety Summit, the 2020 Crash Reconstruction Symposium, and the Maryland Highway Safety Summit. Presentation topics included pedestrian fatality review, data quality improvement, and proper documentation of occupant seat belt use.

Training Activities

NSC currently has Anthony Herrera, a Graduate Research Assistant, on staff. He is working on the CDC CODES grant and is assisting in the development of the Injury Outcomes Data Evaluation System (IODES).

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. NSC staff members were instrumental in the publication of at least 10 manuscripts by University of Maryland, Baltimore researchers between June 2019 and May 2020. At least two additional papers have been accepted for publication and three are still in various stages of critical review. At least 12 abstracts supported by NSC staff members were submitted to various injury-related conferences.

MIEMSS-NSC Memorandum of Understanding

In addition to staff from NSC, the Maryland Emergency Medical Services Systems Research Interest Group (MEMSS-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 nationally. Over the past five years, MEMSS-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.

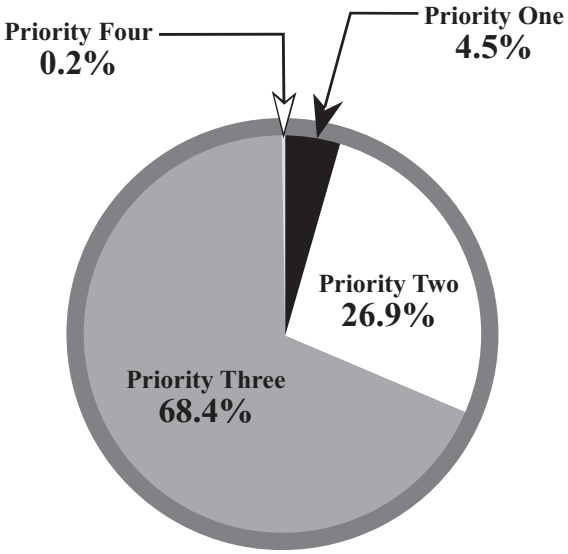
NSC members continue to serve on several MIEMSS committees and provide assistance to advance the agency's mission.

MARYLAND EMS STATISTICS

Types of EMS Calls

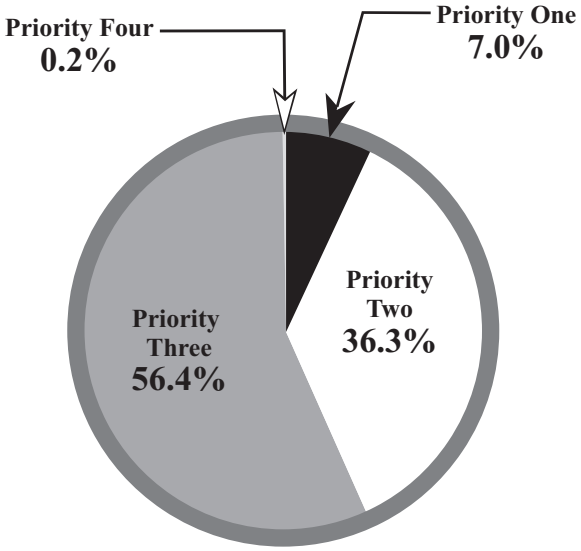
Patient Priority For Injury Transports

Fiscal Year 2020



Patient Priority For Medical Transports

Fiscal Year 2020



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*

Patient Care Reporting Records Submitted to MIEMSS by Maryland Jurisdictions

The electronic Maryland EMS Data System (eMEDS®) is a third generation system, hosted by MIEMSS, that enables Maryland's EMS providers to document, submit, 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 24 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 2020.

eMEDS® Records Submitted to MIEMSS per Fiscal Year 2020 Quarter[1]

Reporting Between: 7/1/2019 - 06/30/2020

Jurisdiction	Elite Implementation[2]	1st Qtr. FY 2020	2nd Qtr. FY 2020	3rd Qtr. FY 2020	4th Qtr. FY 2020	Total
Allegany County	5/7/2018	3,948	3,983	3,708	3,525	15,164
Anne Arundel County*	5/29/2018	20,918	20,381	19,499	16,747	77,545
Baltimore City	12/3/2018	60,750	51,802	52,740	52,795	218,087
Baltimore County*	7/24/2018	33,311	32,914	31,890	28,032	126,147
Calvert County	8/28/2018	4,952	4,532	4,373	4,406	18,263
Caroline County	6/11/2018	1,571	1,445	1,449	1,527	5,992
Carroll County	1/2/2019	5,059	4,986	5,034	3,981	19,060
Cecil County	8/1/2018	7.263	7,089	6,913	6,844	28,109
Charles County	6/1/2018	7,514	7,459	6,994	5,856	27,823
Dorchester County	5/21/2018	1,986	1,778	1,877	1,799	7,440
Frederick County	10/1/2018	11,997	12,003	11,598	10,745	46,343
Garrett County	5/7/2018	1,171	1,040	1,078	872	4,161
Harford County*	3/30/2018	8,320	8,156	8,175	6,891	31,542
Howard County	12/11/2018	6,376	6,223	5,828	3,813	22,240
Kent County	6/11/2018	1,343	1,263	1,235	1,418	5,259
Montgomery County	9/4/2018	21,601	20,983	21,004	17,777	81,365
Prince George's County	10/1/2018	54,243	54,966	51,247	30,764	191,220
Queen Anne's County	12/18/2017	1,969	1,769	1,800	1,605	7,143
Somerset County	7/16/2018	796	768	825	764	3,153
St. Mary's County	7/16/2018	5,489	5,178	5,303	4,913	20,883
Talbot County	12/18/2017	2,052	1,834	1,684	1,685	7,255
Washington County	6/25/2018	7,790	7,604	7,391	6,548	29,333
Wicomico County	5/14/2018	4,240	4,071	3,923	3,665	15,899
Worcester County*	5/14/2018	3,971	2,371	2,155	2,683	11,180
Jurisdictional Total		278,630	264,598	257,723	219,655	1,020,606

*Jurisdictional EMSOPs not listed separately but incorporated herein include Aberdeen Proving Ground Fire Department, Annapolis City, BWI Airport Fire & Rescue, Ft. Meade Fire Department, US Naval Academy EMS, Martin State Airport, and Ocean City.

[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.

[2]MIEMSS has upgraded to ImageTrend's Elite Platform to support the eMEDS® patient care reporting system. The upgrade moves MIEMSS from the NEMSIS 2.2.1 data standard to the NEMSIS 3.4 data standard. Several jurisdictions have moved to the Elite platform, and MIEMSS is actively working to move the remaining jurisdictions.

Cardiac Arrest Registry to Enhance Survival (CARES)
CY 2019 Registry Data

Demographic Information	Maryland	National
Mean Age (years)	62.7	62.4
% Males	60.3%	62.2%
% Females	39.7%	37.8%

Arrest Witnessed?	Maryland	National
Witnessed by Bystander	32.6%	38.0%
Witnessed by 9-1-1 Provider	12.5%	12.5%
Unwitnessed	54.9%	49.5%

Who Initiated CPR?	Maryland	National
Not Applicable	0.0%	0.1%
Bystander	43.1%	41.6%
First Responder	21.3%	27.9%
Emergency Medical Services (EMS)	35.6%	30.4%

Who First Defibrillated the Patient?	Maryland	National
Not Applicable	73.7%	68.8%
Bystander	1.8%	1.7%
First Responder	3.6%	6.0%
Emergency Medical Services (EMS)	20.9%	23.4%

***Non-Traumatic Etiology Survival Rates are calculated as follows:**

Overall: Number of survivors out of total resuscitations attempted by 9-1-1 responders

Utstein: Survivors of arrests witnessed by bystanders where the patients had shockable rhythms out of total arrests witnessed by bystanders where the patients had shockable rhythms

Utstein Bystander: Survivors of arrests witnessed by bystanders where the patients had shockable rhythms and bystanders either performed CPR and/or applied AEDs out of total arrests witnessed by bystanders where the patients had shockable rhythms and bystanders either performed CPR and/or applied AEDs

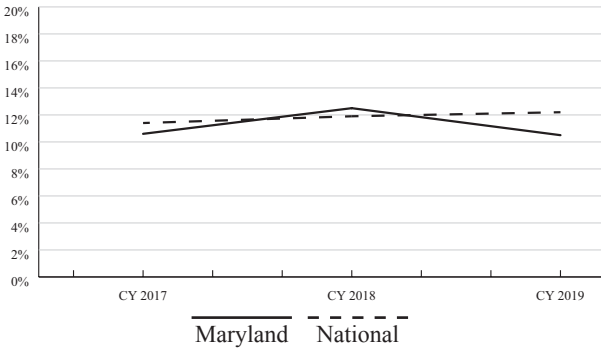
****Bystander Intervention Rates are calculated as follows:**

Bystander CPR: Arrests that occurred before the arrival of 9-1-1 and that did not occur in a nursing home, health care facility, physician's office, clinic, or hospital, in which CPR was initiated by lay persons, out of all arrests that occurred before the arrival of 9-1-1 and that did not occur in a nursing home, health care facility, physician's office, clinic, or hospital

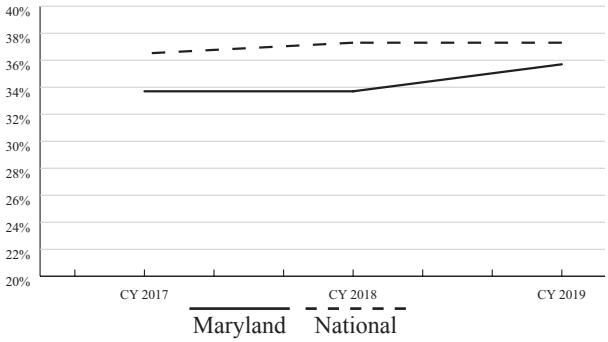
Bystander AED Use: Arrests that occurred before the arrival of 9-1-1 and that did not occur in a nursing home, health care facility, physician's office, clinic, or hospital, in which AEDs were initially applied by lay persons out of all arrests that occurred before the arrival of 9-1-1 and that did not occur in a nursing home, health care facility, physician's office, clinic or hospital

Cardiac Arrest Registry to Enhance Survival (CARES)
CY 2017 through CY 2019 (Source: CARES Registry)

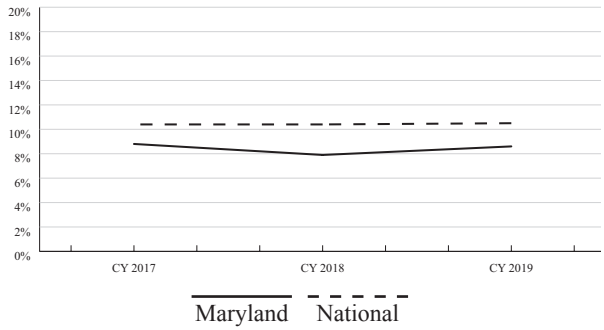
Maryland and National Public AED Use Rates



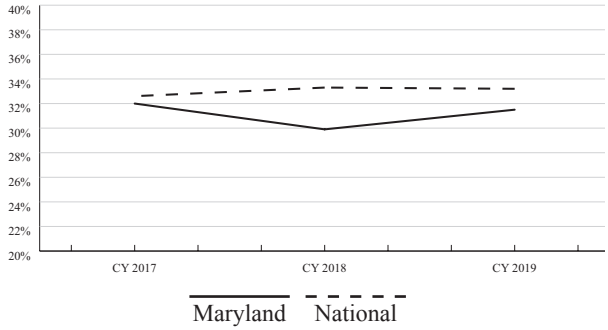
Maryland and National Utstein Bystander Survival Rates



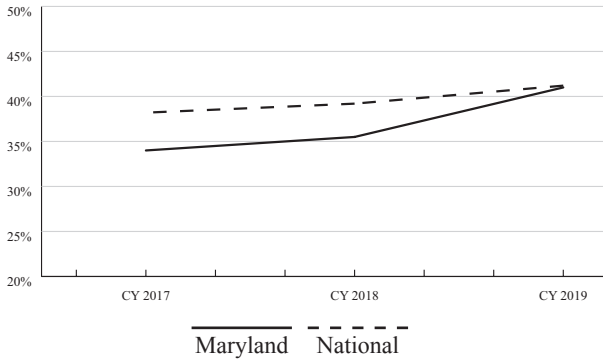
Maryland and National Overall Survival Rates



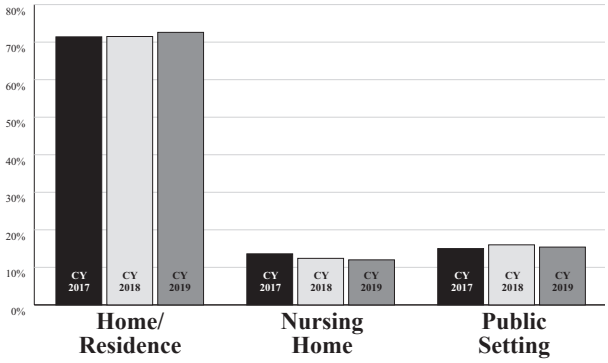
Maryland and National Utstein Survival Rates



Maryland and National Bystander CPR Rates



Location of Arrest



*See page 76 for survival rate formulas. **See page 76 for intervention rate formulas.

Public Safety EMS Units

Patient Transportation Vehicles

Region	Ambulances				Ambu Buses		
	BLS		ALS		Type I	Type II	Type III
	Total Equipped	Staffed 24/7	Total Equipped	Staffed 24/7	20 + Pts	10 - 19 Pts	< 10 Pts
Region I	0	0	29	13	0	0	0
Region II	30	26	23	12	1	0	0
Region III	57	10	153	112	0	2	3
Region IV	32	3	126	46	0	1	4
Region V	134	76	40	38	3	0	0
STATEWIDE TOTAL	253	115	371	221	4	3	7

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 providers 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

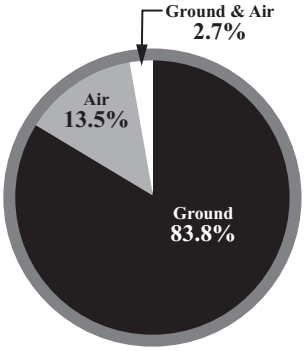
Region	Non-Transport Support					Disaster Supplies**		
	BLS First Response	Suppression BLS First Response	ALS Chase			MCSU Type I (100+ Pts)	MCSU Type II (50 Pts)	MCSU Type III (25 Pts)
			Non-Supervisory	Supervisory	ALS Engines			
Region I	6	36	5	1	0	0	2	1
Region II	18	53	11	4	0	0	1	2
Region III	56	276	2	21	97	2	5	4
Region IV	23	67	8	5	0	0	1	5
Region V	48	223	4	7	43	3	2	4
STATEWIDE TOTAL	151	655	30	38	140	5	11	16

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

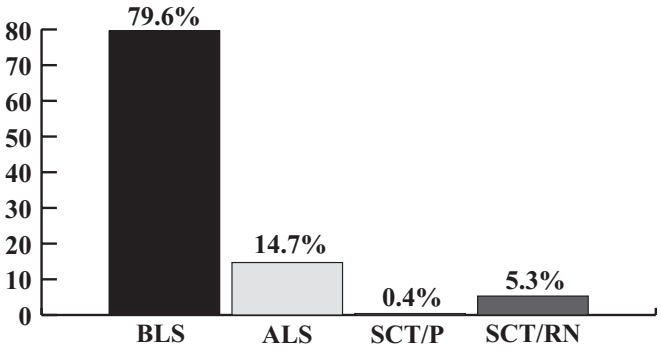
Maryland-Licensed Commercial Ambulance FY 2020 Statistics

Source: MIEMSS Commercial Ambulance Licensing System

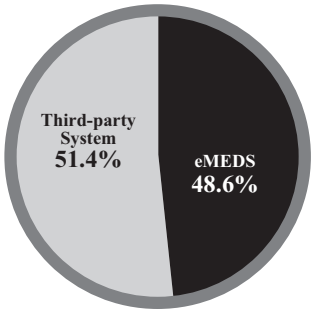
Total Number of Services
n = 37



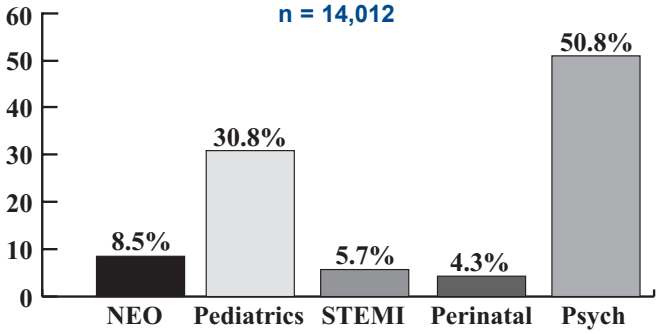
Transports by Type
n = 249,623



ePCR Reporting Software Platform
n = 37



Transports of Special Populations
n = 14,012



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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Under 1 year	217	244	208
1 to 4 years	490	441	416
5 to 9 years	510	474	459
10 to 14 years	536	510	530
15 to 24 years	3,766	3,287	3,381
25 to 44 years	6,671	6,864	6,386
45 to 64 years	5,262	5,129	5,045
65+ years	5,087	5,205	6,406
Unknown	12	23	15
TOTAL	22,551	22,177	22,846

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

Total Cases Reported by Trauma Centers

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

Trauma Center	June 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
The Johns Hopkins Bayview Medical Center	2,652	2,503	4,052*
The Johns Hopkins Medical System	1,702	7,703	1,604
Meritus Medical Center	1,288	1,729	1,922
Peninsula Regional Medical Center	1,372	1,360	1,161
R Adams Cowley Shock Trauma Center	6,149	6,202	5,839
Sinai Hospital of Baltimore	1,954	1,943	2,017
Suburban Hospital – Johns Hopkins Medicine	1,681	1,446	1,254
University of Maryland Capital Regional Health	3,703	3,398	3,090
UPMC Western Maryland	563	500	511
TOTAL	21,064	20,784	21,450

**Note: Implementation in February 2019 of a new Tier 3 Emergency Department Response activation (ED response of the Trauma Team) for Johns Hopkins Bayview Medical Center.*

**** Maryland Trauma Statistics are based on patient discharge data from June 2019 to May 2020.***

Occurrence of Injury by County: Scene Origin Cases Only

(June 2019 to May 2020)
Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	347
Anne Arundel County	819
Baltimore County	3,709
Calvert County	130
Caroline County	41
Carroll County	232
Cecil County	45
Charles County	202
Dorchester County	56
Frederick County	403
Garrett County	32
Harford County	667
Howard County	349
Kent County	35
Montgomery County	1,156
Prince George's County	1,963
Queen Anne's County	59
St. Mary's County	164
Somerset County	94
Talbot County	43
Washington County	1,221
Wicomico County	357
Worcester County	211
Baltimore City	4,408
Virginia	42
West Virginia	90
Pennsylvania	238
Washington, DC	234
Delaware	70
Other	12
Not Indicated	701
TOTAL	18,130

Note: Scene origin cases represent 84.5% of the total trauma cases treated statewide.

Residence of Patients by County: Scene Origin Cases Only

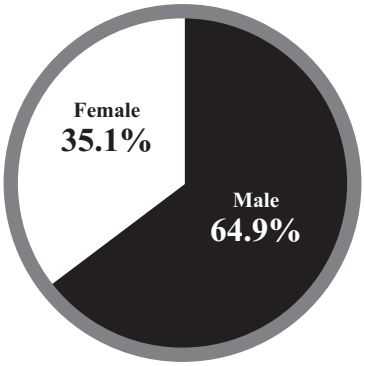
(June 2019 to May 2020)
Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	292
Anne Arundel County	923
Baltimore County	3,850
Calvert County	141
Caroline County	39
Carroll County	287
Cecil County	69
Charles County	202
Dorchester County	48
Frederick County	358
Garrett County	32
Harford County	712
Howard County	359
Kent County	36
Montgomery County	1,076
Prince George's County	1,788
Queen Anne's County	60
St. Mary's County	165
Somerset County	84
Talbot County	32
Washington County	1,195
Wicomico County	322
Worcester County	133
Baltimore City	3,933
Virginia	258
West Virginia	213
Pennsylvania	447
Washington, DC	458
Delaware	125
Other	283
Not Indicated	210
TOTAL	18,130

Note: Scene origin cases represent 84.5% of the total trauma cases treated statewide.

Gender Profile: Primary Admissions Only

(June 2019 to May 2020)
Source: Maryland State Trauma Registry



Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
None	21.5%	24.5%	24.1%
Seatbelt	15.0%	13.4%	11.3%
Airbag and Seatbelt	35.5%	36.9%	37.8%
Airbag Only	12.1%	10.5%	11.6%
Infant/Child Seat	0.2%	0.2%	0.1%
Protective Helmet	14.5%	13.9%	14.6%
Padding/Protective Clothing	0.1%	0.1%	0.1%
Other Protective Device	1.0%	0.1%	0.1%
Unknown	0.1%	0.4%	0.3%
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 6 hours of emergency department arrival.

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

(June 2019 to May 2020)
Source: Maryland State Trauma Registry

Modality Type	BVMC	JHH	MMC	PEN	SH	STC	SUB	UMCRH	UPMCWM	TOTAL
Ground Ambulance	95.4%	83.1%	78.5%	94.3%	88.7%	80.0%	96.4%	87.6%	77.7%	87.0%
Helicopter	0.0%	0.8%	0.4%	3.8%	0.1%	17.8%	0.1%	9.6%	2.7%	5.8%
Other	4.6%	16.1%	21.1%	1.9%	11.2%	2.2%	3.5%	2.8%	19.6%	7.2%
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.

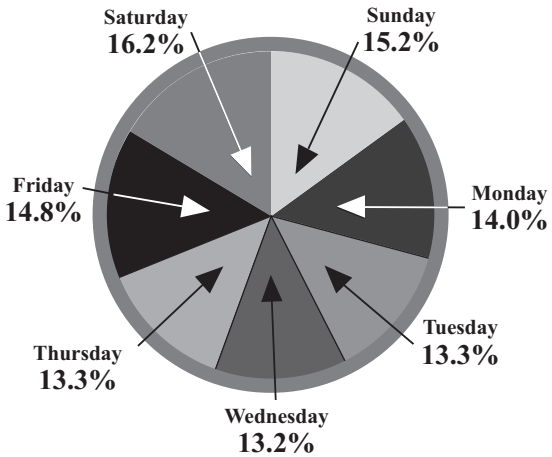
Origin of Patient Transport to Trauma Centers

(June 2019 to May 2020)
Source: Maryland State Trauma Registry

Origin Type	BVMC	JHH	MMC	PEN	SH	STC	SUB	UMCRH	UPMCWM	TOTAL
Scene of Injury	93.0%	83.5%	95.2%	70.2%	95.9%	68.4%	94.9%	90.3%	96.5%	84.6%
Hospital Transfer	0.1%	4.4%	0.2%	3.0%	3.3%	31.6%	3.4%	3.2%	0.6%	10.1%
Other	6.9%	12.1%	4.6%	26.8%	0.8%	0.0%	1.7%	6.5%	2.9%	5.3%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

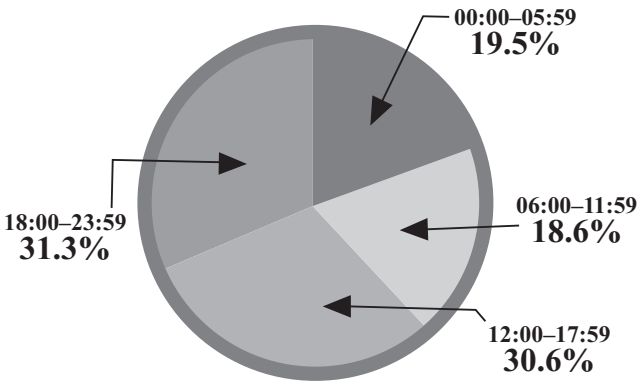
Emergency Department Arrivals by Day of Week: Primary Admissions Only

(June 2019 to May 2020)
Source: Maryland State Trauma Registry



Emergency Department Arrivals by Time of Day: Primary Admissions Only

(June 2019 to May 2020)
Source: Maryland State Trauma Registry



Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival.

Number of Deaths by Age

(3-Year Comparison)

Source: Maryland State Trauma Registry

Age	June 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Under 1 year	3	1	0
1 to 4 years	0	1	0
5 to 14 years	2	3	2
15 to 24 years	121	109	148
25 to 44 years	249	255	261
45 to 64 years	157	177	136
65+ years	269	262	280
Unknown	6	12	11
TOTAL	807	820	838
Deaths Overall as a Percentage of the Total Injuries Treated	3.8%	3.9%	3.9%

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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Under 1 year	45	57	38
1 to 4 years	127	119	90
5 to 14 years	205	217	206
15 to 24 years	3,655	3,171	3,266
25 to 44 years	6,671	6,863	6,384
45 to 64 years	5,262	5,129	5,045
65+ years	5,087	5,205	6,406
Unknown	12	23	15
TOTAL	21,064	20,784	21,450

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 2019 to May 2020)

Source: Maryland State Trauma Registry

Age	Number of Injured Patients: Total	Number of Injured Patients: Maryland Residents	Number of Deaths: Total	Number of Deaths: Maryland Residents
Under 1 year	38	36	0	0
1 to 4 years	90	75	0	0
5 to 14 years	206	161	2	2
15 to 24 years	3,266	2,884	148	130
25 to 44 years	6,384	5,552	261	221
45 to 64 years	5,045	4,450	136	111
65+ years	6,406	5,948	280	248
Unknown	15	13	11	11
TOTAL	21,450	19,119	838	723

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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Cut or Pierce	5.8%	5.7%	6.1%
Drowning/Submersion	0.1%	0.0%	0.1%
Fall	37.3%	38.4%	43.0%
Fire or Flame	0.4%	0.4%	0.4%
Hot Object or Substance	0.1%	0.2%	0.1%
Firearm	7.6%	7.6%	7.8%
Machinery/Mechanical	0.6%	0.5%	0.7%
Motor Vehicle Crash	27.0%	26.0%	22.9%
Motorcycle Crash	3.8%	3.8%	3.3%
Pedal Cycle Crash	1.8%	2.0%	1.9%
Pedestrian Incident	5.4%	5.5%	4.6%
Other Transport	0.2%	0.1%	0.1%
Natural or Environmental	0.4%	0.3%	0.5%
Poisoning	0.3%	0.5%	0.3%
Struck by or Against	7.8%	7.7%	6.9%
Other	1.4%	1.3%	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 6 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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Negative	24.5%	22.9%	23.1%
Positive	16.3%	15.6%	15.0%
Undetermined	59.2%	61.5%	61.9%
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.

Etiology of Injuries by Age: Primary Admissions Only

(June 2019 to May 2019)

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%	0.1%	0.0%	0.0%	0.3%	0.0%	1.1%	0.1%
1 to 4 years	0.1%	0.0%	0.3%	0.3%	0.1%	0.0%	0.4%	1.0%	2.6%	0.3%
5 to 14 years	0.6%	0.0%	1.0%	0.5%	0.1%	0.3%	1.1%	3.1%	2.4%	0.7%
15 to 24 years	20.0%	18.5%	13.6%	2.9%	39.0%	18.3%	14.2%	11.9%	11.3%	12.8%
25 to 44 years	37.7%	40.2%	33.9%	10.5%	50.6%	52.8%	46.9%	25.8%	37.3%	28.2%
45 to 64 years	24.2%	33.2%	33.9%	23.4%	8.1%	24.7%	29.3%	40.8%	30.9%	24.3%
65+ years	17.4%	8.1%	17.3%	62.3%	2.1%	3.9%	8.2%	17.4%	14.4%	33.6%
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 6 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 2019 to May 2020)

Source: Maryland State Trauma Registry

Etiology	Percentage
Cut or Pierce	0.3%
Fall	50.3%
Machinery/Mechanical	0.7%
Motor Vehicle Crash	26.9%
Motorcycle Crash	3.9%
Pedalcyclist Crash	2.2%
Pedestrian Incident	5.4%
Other Transport	0.2%
Natural or Environmental	0.2%
Struck by or Against	7.9%
Other	1.1%
Not Valued	0.9%
TOTAL	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival.

Etiology Distribution for Patients with Penetrating Injuries: Primary Admissions Only

(June 2019 to May 2020)

Source: Maryland State Trauma Registry

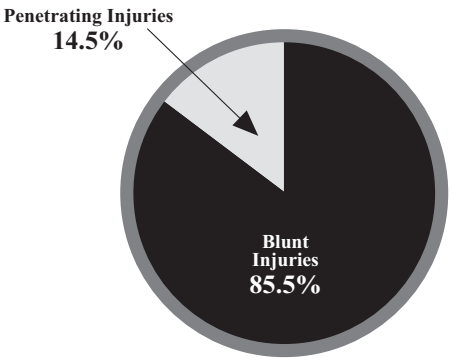
Etiology	Percentage
Cut or Pierce	40.6%
Fall	1.4%
Firearm	53.8%
Machinery/Mechanical	0.5%
Motor Vehicle Crash	0.4%
Pedalcyclist Crash	0.1%
Natural or Environmental	0.5%
Struck by or Against	1.0%
Other	0.3%
Not Valued	1.4%
TOTAL	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival.

Injury Type Distribution of Patients: Primary Admissions Only

(June 2019 to May 2020)

Source: Maryland State Trauma Registry

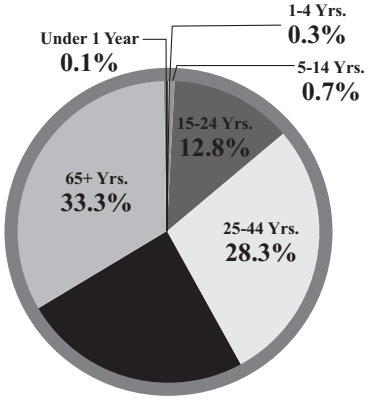


Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival.

Age Distribution of Patients: Primary Admissions Only

(June 2019 to May 2020)

Source: Maryland State Trauma Registry



Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Inpatient Rehab Facility	9.9%	7.5%	7.4%
Skilled Nursing Facility	8.4%	9.7%	10.2%
Residential Facility	0.8%	0.9%	1.3%
Specialty Referral Center	4.4%	4.2%	4.2%
Home with Services	4.5%	5.5%	6.3%
Home	56.9%	57.4%	56.4%
Acute Care Hospital	2.9%	3.1%	2.6%
Against Medical Advice	2.7%	2.3%	2.5%
Morgue/Died	5.3%	5.5%	5.4%
Left without Treatment	0.0%	0.1%	0.0%
Hospice Care	0.5%	0.5%	0.7%
Jail	1.8%	1.5%	1.2%
Psychiatric Hospital	1.3%	1.3%	1.4%
Elopement	0.3%	0.4%	0.3%
Other	0.3%	0.1%	0.1%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
1 to 12	72.3%	72.1%	71.4%
13 to 19	11.1%	11.4%	11.8%
20 to 35	12.9%	12.3%	11.9%
36 to 75	3.7%	4.2%	4.9%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival.

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

(June 2019 to May 2020)

Source: Maryland State Trauma Registry

ISS	Blunt	Penetrating	Total
1 to 12	78.5%	71.4%	77.5%
13 to 19	12.1%	11.8%	12.0%
20 to 35	8.1%	11.9%	8.7%
36 to 75	1.3%	4.9%	1.8%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
1 to 12	77.7%	76.8%	78.5%
13 to 19	12.8%	13.2%	12.1%
20 to 35	8.1%	8.6%	8.1%
36 to 75	1.4%	1.4%	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 6 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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
1 to 12	76.8%	76.1%	77.5%
13 to 19	12.6%	12.9%	12.0%
20 to 35	8.8%	9.2%	8.7%
36 to 75	1.8%	1.8%	1.8%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival.

MARYLAND ADULT BURN STATISTICS

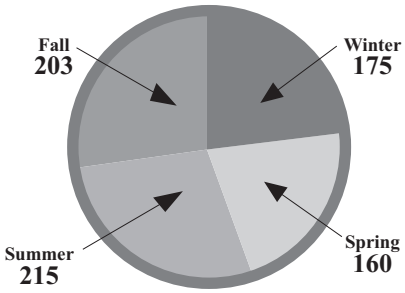
Total Number of Adult Burn Cases

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

Institution	June 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Johns Hopkins Burn Center at Bayview	883	794	753

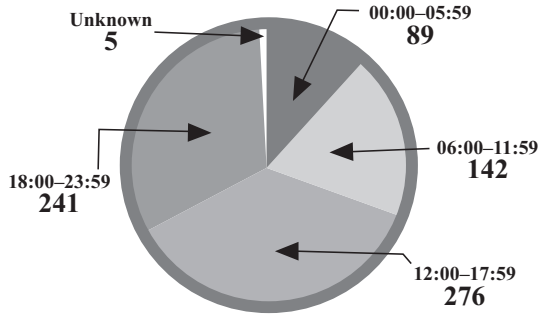
Season of Year Distribution

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
Source: Maryland State Trauma Registry



Time of Arrival Distribution

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
Source: Maryland State Trauma Registry



Place of Injury

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
Source: Maryland State Trauma Registry

Place of Injury	Number
Non-Institutional Private Residence	457
Institutional Private Residence	14
School, Other Institution and Public Administrative Area	14
Sports and Athletic Area	1
Street/Highway	27
Trade and Service Area	58
Industrial and Construction Area	37
Other Places	33
Unspecified Places	112
TOTAL	753

Occurrence of Injury by County

Patients Aged Fifteen and Older Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	2
Anne Arundel County	48
Baltimore County	144
Caroline County	4
Carroll County	7
Cecil County	8
Charles County	3
Dorchester County	7
Frederick County	21
Garrett County	1
Harford County	32
Howard County	17
Kent County	1
Montgomery County	3
Prince George's County	8
Queen Anne's County	4
Somerset County	2
Talbot County	2
Washington County	15
Wicomico County	12
Worcester County	6
Baltimore City	193
Virginia	5
West Virginia	17
District of Columbia	1
Pennsylvania	14
Delaware	1
Other	5
Not Valued	170
TOTAL	753

Residence of Patients by County

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	2
Anne Arundel County	60
Baltimore County	201
Caroline County	6
Carroll County	7
Cecil County	11
Charles County	3
Dorchester County	9
Frederick County	21
Garrett County	1
Harford County	40
Howard County	31
Kent County	1
Montgomery County	7
Prince George's County	7
Queen Anne's County	10
St. Mary's County	1
Somerset County	3
Talbot County	4
Washington County	17
Wicomico County	15
Worcester County	6
Baltimore City	238
Virginia	7
West Virginia	14
District of Columbia	4
Pennsylvania	19
Delaware	2
Other	4
Not Valued	2
TOTAL	753

Mode of Patient Transport

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
Source: Maryland State Trauma Registry

Modality Type	Number
Ground Ambulance	364
Helicopter	45
Other*	336
Not Valued	8
TOTAL	753

**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 2019 to May 2020)
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	0	2	22	10	47	1	0	2	19	103
25 to 44 years	4	7	68	48	133	5	2	0	42	309
45 to 64 years	6	7	66	31	99	4	0	2	22	237
65 years and over	1	3	41	16	33	1	0	2	7	104
Total	11	19	197	105	312	11	2	6	90	753

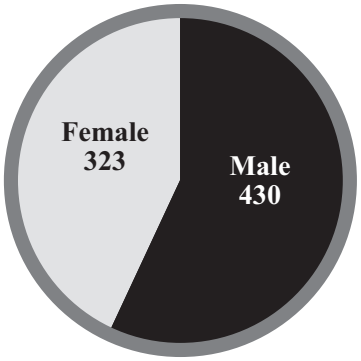
Final Disposition of Patients

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

Final Disposition	June 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Home	715	630	591
Home with Services	68	74	77
Transfer to Another Acute Care Facility	0	2	0
Transfer to Another Service	0	1	1
Discharge to Extended Care Facility	0	1	1
Discharge to Alternate Caregiver	2	3	0
Rehabilitation Facility	9	7	4
Skilled Nursing Facility	33	29	22
Psychiatric Hospital	7	3	5
Morgue/Died	18	11	12
Left Against Medical Advice or Discontinued Care	16	19	21
Jail	8	4	6
Hospice	2	1	2
Other	2	2	0
Not Valued	3	7	11
TOTAL	883	794	753

Gender Profile

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview
(June 2019 to May 2020)
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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
15 to 24 years	151	119	103
25 to 44 years	327	320	309
45 to 64 years	295	250	237
65 years and over	110	105	104
TOTAL	883	794	753

MARYLAND PEDIATRIC TRAUMA STATISTICS

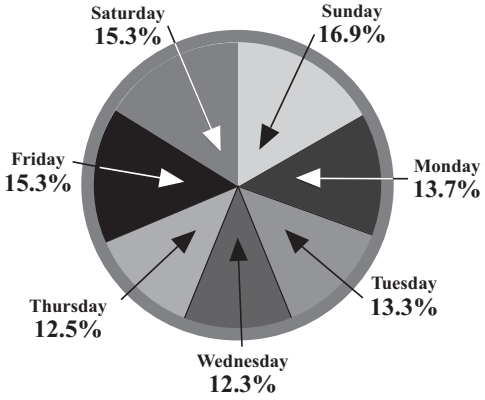
Legend Code	
Children's National Hospital	CNH
Johns Hopkins Pediatric Trauma Center	JHP

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

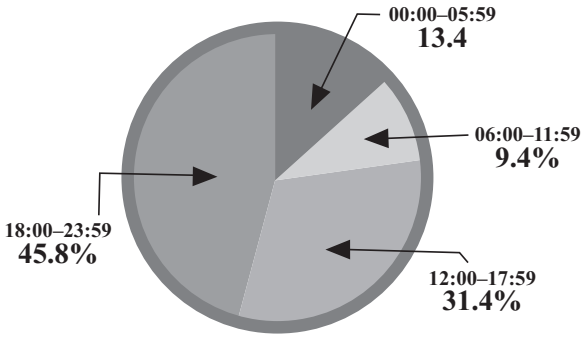
Trauma Center	June 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
CNHS	712	637	689
JHP	775	756	707
TOTAL	1,487	1,393	1,396

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.

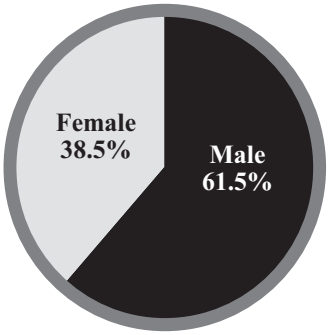
Emergency Department Arrivals by Day of Week: Children Treated at Pediatric Trauma Centers
(June 2019 to May 2020)
Source: Maryland State Trauma Registry



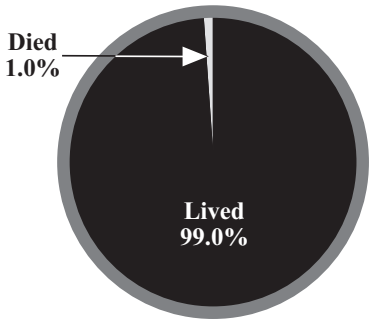
Emergency Department Arrivals by Time of Day: Children Treated at Pediatric Trauma Centers
(June 2019 to May 2020)
Source: Maryland State Trauma Registry



Gender Profile: Children Treated at Pediatric Trauma Centers
(June 2019 to May 2020)
Source: Maryland State Trauma Registry



Outcome Profile: Children Treated at Pediatric Trauma Centers
(June 2019 to May 2020)
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 2019 to May 2020)
Source: Maryland State Trauma Registry

Modality Type	CNH	JHP	Total
Ground Ambulance	65.1%	74.7%	70.6%
Helicopter	18.8%	16.6%	17.5%
Other	16.1%	8.7%	11.9%
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 2019 to May 2020)
Source: Maryland State Trauma Registry

Origin	CNH	JHP	Total
Scene of Injury	47.9%	61.5%	54.8%
Hospital Transfer	36.4%	30.3%	33.3%
Other	15.7%	8.2%	11.9%
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.

Injury Type

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

Injury Type	June 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Blunt	93.6%	94.6%	92.6%
Penetrating	4.3%	3.8%	6.1%
Burn	0.1%	0.0%	0.1%
Near Drowning	1.4%	1.2%	0.9%
Hanging	0.1%	0.1%	0.0%
Ingestion	0.1%	0.0%	0.0%
Crush	0.0%	0.1%	0.0%
Animal Bite/Human Bite	0.3%	0.1%	0.3%
Other	0.1%	0.1%	0.0%
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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Cut/Pierce	1.7%	1.9%	2.9%
Drowning/Submersion	1.4%	1.2%	0.9%
Falls	39.8%	40.8%	37.6%
Fire/Flame	0.1%	0.0%	0.1%
Firearm	1.4%	1.4%	1.4%
Machinery/Mechanical	0.2%	0.4%	0.4%
MVT - Occupant	19.3%	22.7%	23.3%
MVT - Motorcyclist	0.1%	0.6%	0.3%
MVT - Pedal Cyclist	6.1%	3.9%	6.5%
MVT - Pedestrian	9.8%	8.7%	6.9%
Other Transport	0.1%	0.4%	0.0%
Natural/Environmental	2.5%	1.7%	3.2%
Struck by/Against	9.8%	7.0%	7.8%
Abuse	4.6%	5.1%	5.2%
Other	1.7%	2.2%	1.3%
Not Valued	1.4%	2.0%	2.2%
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 2019 to May 2020)
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	4.3%	0.0%	1.0%	16.8%	0.0%	0.0%	6.4%	0.0%	33.7%	11.9%
1 to 4 years	20.0%	0.0%	23.7%	29.5%	5.0%	22.5%	14.7%	7.7%	28.6%	23.4%
5 to 9 years	31.1%	25.0%	36.1%	27.4%	10.0%	20.0%	19.3%	38.5%	15.6%	27.2%
10 to 14 years	33.2%	75.0%	35.1%	20.4%	70.0%	45.0%	38.5%	50.5%	15.6%	29.0%
15+ years	11.4%	0.0%	4.1%	5.9%	15.0%	12.5%	21.1%	3.3%	6.5%	8.5%
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 2019 to May 2020)
Source: Maryland State Trauma Registry

Age	Number of Injured Patients		Number of Deaths	
	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	170	159	3	3
1 to 4 years	326	304	7	7
5 to 9 years	376	350	4	4
10 to 14 years	407	387	0	0
15+ years	117	110	0	0
TOTAL	1,396	1,310	14	14

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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Under 1 year	172	187	170
1 to 4 years	363	322	326
5 to 9 years	412	376	376
10 to 14 years	429	391	407
15+ years	111	117	117
TOTAL	1,487	1,393	1,396

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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Under 1 year	4	3	3
1 to 4 years	7	4	7
5 to 9 years	0	5	4
10 to 14 years	2	12	0
15+ years	3	4	0
TOTAL	16	28	14

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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Inpatient Rehab Facility	1.9%	3.3%	1.7%
Skilled Nursing Facility	0.1%	0.1%	0.0%
Specialty Referral Center	0.2%	0.2%	0.1%
Home with Services	0.4%	0.4%	0.4%
Home	94.0%	92.7%	95.1%
Acute Care Hospital	0.5%	0.1%	0.6%
Morgue/Died	1.1%	2.0%	1.0%
Foster Care	1.1%	0.8%	0.6%
Hospice Care	0.1%	0.0%	0.0%
Jail	0.1%	0.2%	0.0%
Psychiatric Hospital	0.5%	0.1%	0.4%
Elopement	0.0%	0.1%	0.0%
Other	0.0%	0.0%	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 2019 to May 2020)
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	5.1%	0.0%	0.9%	18.4%	0.0%	0.0%	9.6%	0.0%	31.0%	12.8%
1 to 4 years	23.0%	0.0%	21.6%	31.8%	10.0%	22.0%	15.4%	9.0%	32.1%	25.7%
5 to 9 years	33.7%	20.0%	35.3%	27.4%	10.0%	22.0%	25.0%	37.8%	19.3%	28.7%
10 to 14 years	38.2%	80.0%	42.2%	22.4%	80.0%	56.0%	50.0%	53.2%	17.6%	32.8%
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 2019 to May 2020)
Source: Maryland State Trauma Registry

County of Injury	Number
Anne Arundel County	45
Baltimore County	128
Calvert County	12
Caroline County	1
Carroll County	15
Cecil County	8
Charles County	24
Dorchester County	2
Frederick County	22
Garrett County	1
Harford County	23
Howard County	20
Kent County	2
Montgomery County	75
Prince George's County	152
Queen Anne's County	5
St. Mary's County	19
Talbot County	2
Washington County	12
Wicomico County	3
Worcester County	4
Baltimore City	157
Virginia	2
Washington, DC	22
Pennsylvania	1
Not Indicated	8
TOTAL	765

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 54.8% 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 2019 to May 2020)
Source: Maryland State Trauma Registry

County of Residence	Number
Anne Arundel County	46
Baltimore County	117
Calvert County	11
Carroll County	16
Cecil County	7
Charles County	24
Dorchester County	3
Frederick County	21
Harford County	24
Howard County	19
Kent County	2
Montgomery County	79
Prince George's County	155
Queen Anne's County	1
St. Mary's County	18
Talbot County	1
Washington County	9
Wicomico County	4
Worcester County	2
Baltimore City	154
Virginia	5
West Virginia	2
Pennsylvania	8
Washington, DC	23
Delaware	1
Other	12
Not Valued	1
TOTAL	765

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 52.0% 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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
None	49.6%	45.0%	41.8%
Seatbelt	6.7%	6.6%	4.8%
Airbag & Seatbelt	15.2%	16.3%	20.1%
Airbag Only	6.5%	8.0%	5.9%
Infant/Child Seat	11.4%	16.7%	15.0%
Protective Helmet	10.2%	7.4%	12.2%
Padding/Protective Clothing	0.2%	0.0%	0.2%
Unknown	0.2%	0.0%	0.0%
TOTAL	100.0%	100.0%	100.0%

Note: Children 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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Children's National Hospital	CNHBC	287	235	231
Johns Hopkins Pediatric Burn Center	JHPBC	393	345	355
Johns Hopkins Burn Center at Bayview	JHBC	51	56	39
TOTAL		731	636	625

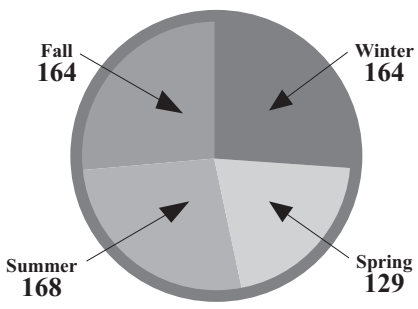
Place of Injury

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
Source: Maryland State Trauma Registry

Place of Injury	Number
Non-Institutional Private Residence	541
Institutional Private Residence	1
School, Other Institution and Public Administrative Area	13
Street/Highway	3
Trade and Service Area	14
Other Places	19
Unspecified Places	34
TOTAL	625

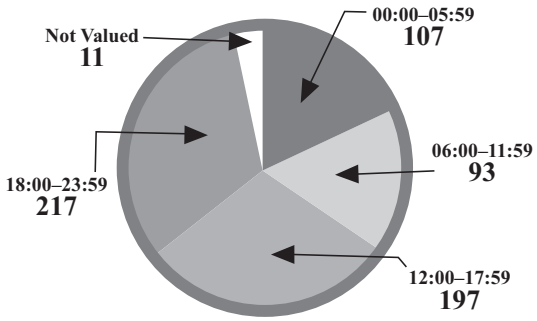
Season of Year Distribution

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
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 2019 to May 2020)
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 2019 to May 2020)
Source: Maryland State Trauma Registry

County of Injury	Number
Anne Arundel County	46
Baltimore County	91
Calvert County	2
Caroline County	2
Carroll County	6
Cecil County	5
Charles County	11
Dorchester County	1
Frederick County	11
Harford County	17
Howard County	18
Montgomery County	67
Prince George's County	115
Queen Anne's County	1
Somerset County	1
St. Mary's County	11
Talbot County	2
Washington County	9
Wicomico County	2
Worcester County	1
Baltimore City	132
Virginia	2
West Virginia	3
Pennsylvania	4
Washington, DC	3
Delaware	1
Other	4
Not Valued	57
TOTAL	625

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 2019 to May 2020)
Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	1
Anne Arundel County	48
Baltimore County	90
Calvert County	2
Caroline County	2
Carroll County	11
Cecil County	4
Charles County	11
Dorchester County	3
Frederick County	12
Harford County	23
Howard County	21
Montgomery County	67
Prince George's County	122
Queen Anne's County	3
Somerset County	1
St. Mary's County	12
Talbot County	2
Washington County	10
Wicomico County	2
Worcester County	1
Baltimore City	154
West Virginia	3
Pennsylvania	5
Washington, DC	3
Delaware	2
Other	10
TOTAL	625

Mode 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 2019 to May 2020)
Source: Maryland State Trauma Registry

Modality Type	CNHSPBC	JHPBC	JHBC	Total
Ground Ambulance	70	185	0	255
Helicopter	5	6	0	11
Other*	154	162	38	354
Not Valued	2	2	1	5
TOTAL	231	355	39	625

**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 2019 to May 2020)
Source: Maryland State Trauma Registry

Origin Type	CNHSPBC	JHPBC	JHBC	Total
Scene of Injury	72	126	15	213
Hospital Transfer	57	127	3	187
Other	93	60	21	174
Not Valued	9	42	0	51
TOTAL	231	355	39	625

Etiology of Injury by Age

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
Source: Maryland State Trauma Registry

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Other Non-Burn	Unknown	Total
			Flame	Contact	Scald					
Under 1 year	1	1	1	30	37	1	1	0	7	79
1 to 4 years	6	4	13	135	150	3	3	0	15	329
5 to 9 years	3	0	12	36	49	4	4	0	10	118
10 to 14 years	0	0	16	18	41	0	1	0	5	81
15 years and over	1	0	2	4	8	0	0	1	2	18
Total	11	5	44	223	285	8	9	1	39	625

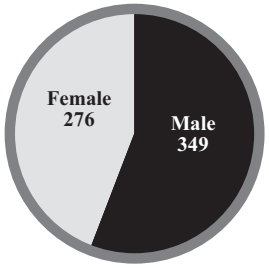
Final Disposition of Patients

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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Home	645	573	573
Home with Services	42	35	19
Transfer to an Acute Care Facility	17	13	5
Transfer to Another Service	0	0	2
Rehabilitation Facility	6	10	9
Skilled Nursing Facility	0	0	3
Morgue/Died	3	0	1
Left Against Medical Advice	0	0	3
Alternate Caregiver	8	2	0
Foster Care	6	2	5
Transfer to Inpatient Psychiatric Facility	1	0	1
Jail or Prison	1	0	0
Not Valued	2	1	2
TOTAL	731	636	625

Gender Profile

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2019 to May 2020)
Source: Maryland State Trauma Registry



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 2019 to May 2020)
Source: Maryland State Trauma Registry

Length of Stay	Less Than 10% TBSA	10 - 19% TBSA	20% or Greater TBSA	Not Valued	Total
1 Day	440	7	0	64	511
2 - 3 Days	32	4	0	11	47
4 - 7 Days	16	1	0	3	20
8 - 14 Days	6	7	1	1	15
15 - 21 Days	2	3	0	0	5
22 - 28 Days	1	2	0	0	3
Over 28 Days	0	0	4	1	5
Not Valued	14	0	1	4	19
TOTAL	511	24	6	84	625

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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Under 1 year	85	71	79
1 to 4 years	375	329	329
5 to 9 years	135	114	118
10 to 14 years	104	101	81
15 years and over	32	21	18
TOTAL	731	636	625

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 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Unique Patients	794	772	722
Total Pediatric Burn Clinic Visits	1,674	1,623	1,481

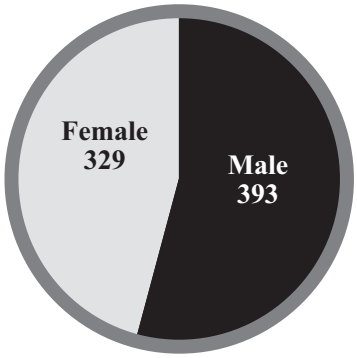
Number of Patients by Age Treated at the Burn Clinics at Johns Hopkins Pediatric Center and Children's National Hospital

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

Age Range	June 2017 to May 2018	June 2018 to May 2019	June 2019 to May 2020
Under 1 year	91	85	79
1 to 4 years	430	386	378
5 to 9 years	139	161	135
10 to 14 years	109	114	108
15 years and over	25	26	22
TOTAL	794	772	722

Gender Profile

Patients Treated at the Pediatric Burn Clinics at Johns Hopkins Pediatric Center and Children's National Hospital (June 2019 to May 2020)
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 Hospital (June 2019 to May 2020)
Source: Maryland State Trauma Registry

			Thermal					
Age Range	Electrical	Chemical	Flame	Contact	Scald	Other Burn	Unknown	Total
Under 1 year	1	0	1	28	46	1	2	79
1 to 4 years	2	3	13	177	169	2	12	378
5 to 9 years	2	0	14	55	57	2	5	135
10 to 14 years	0	0	12	37	55	3	1	108
15 years and over	1	0	5	2	12	0	2	22
Total	6	3	45	299	339	8	22	722

GOVERNOR OF MARYLAND

Larry Hogan

LIEUTENANT GOVERNOR

Boyd K. Rutherford

MARYLAND EMS BOARD (July 2019-June 2020)

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Career Firefighter

Sherry B. Adams
Vice-Chairperson
Secretary, Maryland Department of Health, Designee

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Hospital Administrator

Stephan Cox
Volunteer Firefighter

William Frohna, MD
Emergency Medical Services Physician

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Board of Regents, Designee

Sally Showalter, RN
Public at Large <175,000

Mary Alice Vanhoy, MSN, RN, CEN, CPEN, NREMT-P
Emergency Medical Services Nurse

Dany Westerband, MD, FACS
Trauma Physician

Wayne Tiemersma, NRP
Chairperson, Statewide EMS Advisory Council

Public at Large – Vacant

STATEWIDE EMS ADVISORY COUNCIL (July 2019-June 2020)

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Representing EMS Region I
Advisory Council

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Vice Chairperson
Representing R Adams Cowley Shock Trauma Center

Timothy J. Kerns, PhD
Maryland Department of Transportation

Timothy Burns
Representing Professional Fire Fighters of Maryland

Chief John Filer
Representing Metropolitan Fire Chiefs

Eric Smothers, NREMT-P
Representing EMS Region II
Advisory Council

Chief James U. Matz
Representing EMS Region III
Advisory Council

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Representing Region IV EMS
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Representing EMS Region V
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Representing National Study Center for Trauma and Emergency Medical Systems

Jeffery L. Fillmore, MD
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Michael J. Rosellini
Representing Maryland Commercial Ambulance Services

Wade Gaasch, MD
Representing MedChi, The Maryland State Medical Society

Captain Keith McMinn, Assistant Commander
Representing Maryland State Police Aviation Command

Katherine Burroughs, MS, PA-C
Maryland Hospital Association

Wayne Dyott
Representing General Public in a county with a population of < 175,000

Lisa C. Tenney, RN
Representing General Public

Kathleen Grote, NREMT-P
Representing General Public

Karen Vogel, RN, CEN
Representing the Maryland Emergency Nurses Association

Melissa E. Meyers, RN, BSN, MBA, TCRN
Representing Maryland TraumaNet

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Wynee Hawk, RN, JD
Maryland Board of Physicians

American Association of Critical Care Nurses, Maryland Chapter – Vacant

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Maryland Institute for Emergency Medical Services Systems (MIEMSS)

Theodore R. Delbridge, MD, MPH, FACEP, FAEM – Executive Director
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