

# 2018 - 2019

## Annual Report



Maryland Institute for  
Emergency Medical Services Systems

## **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.*



# 2018–2019 ANNUAL REPORT

## CONTENTS

Mission, Vision, and Key Goals.....	iii
Maryland EMS Regions.....	iv
From the Maryland EMS Board Chair.....	1
From the Executive Director.....	2
<b>MIEMSS Departmental Reports</b>	
Administration.....	3
Aeromedical Operations.....	4
Attorney General’s Office.....	4
Commercial Ambulance Licensing and Regulation.....	5
Communications Engineering Services.....	6
Compliance Office.....	8
Critical Incident Stress Management.....	9
Educational Support Services.....	9
Emergency Medical Services for Children.....	11
Emergency Operations.....	14
EMRC/SYSCOM.....	15
Government Affairs.....	15
Health Care Facilities and Special Programs.....	16
Information Technology and Data Management.....	20
Licensure and Certification.....	22
Medical Director’s Office.....	24
Quality Management.....	26
Regional Programs.....	26
<b>Maryland Trauma and Specialty Referral Centers.....</b>	<b>30</b>
<b>Designated Trauma Center Categorization.....</b>	<b>31</b>
<b>Maryland EMS System Trauma and Specialty Center Reports.....</b>	<b>31</b>
<i>Primary Adult Resource Center</i>	
R Adams Cowley Shock Trauma Center.....	31
<i>Level I Adult Trauma Center</i>	
The Johns Hopkins Hospital.....	34
<i>Level II Adult Trauma Centers</i>	
Johns Hopkins Bayview Medical Center.....	36
University of Maryland Prince George’s Hospital Center.....	37
Sinai Hospital.....	39
Suburban Hospital – Johns Hopkins Medicine.....	40
<i>Level III Adult Trauma Centers</i>	
Meritus Medical Center.....	41
Peninsula Regional Medical Center.....	42
Western Maryland Regional Medical Center.....	44
<i>Out-of-State Adult Trauma Center</i>	
MedStar Washington Hospital Center.....	45
<i>Adult Burn Centers</i>	
Johns Hopkins Bayview Medical Center.....	45
MedStar Washington Hospital Center.....	47

<b><i>Pediatric Trauma Centers</i></b>	
Johns Hopkins Children’s Center.....	47
Children’s National Medical Center.....	49
<b><i>Pediatric Burn Centers</i></b>	
Johns Hopkins Children’s Center.....	50
Children’s National Medical Center.....	52
<b><i>Eye Trauma Center</i></b>	
Wilmer Eye Institute at The Johns Hopkins Hospital.....	53
<b><i>Hand/Upper Extremity Trauma Center</i></b>	
Curtis National Hand Center, MedStar Union Memorial Hospital.....	55
<b><i>Neurotrauma Center</i></b>	
R Adams Cowley Shock Trauma Center.....	58
<b>Rehabilitation Services.....</b>	<b>59</b>
<b>Maryland-National Capital Region Emergency Response System.....</b>	<b>60</b>
<b>Emergency Health Services Department, University of Maryland Baltimore County.....</b>	<b>63</b>
<b>Maryland Poison Center, University of Maryland School of Pharmacy.....</b>	<b>63</b>
<b>National Study Center for Trauma and EMS.....</b>	<b>65</b>
<b>Maryland EMS Statistics.....</b>	<b>68</b>
<b>Maryland Trauma and Burn Statistics.....</b>	<b>75</b>
Age Distribution of Patients Treated at Pediatric or Adult Trauma Centers.....	75
Adult Trauma Statistics.....	75
Adult Burn Statistics.....	81
Pediatric Trauma Statistics.....	84
Pediatric Burn Statistics.....	88
<b>Maryland EMS Board and Statewide EMS Advisory Council.....</b>	<b>92</b>

# ***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**

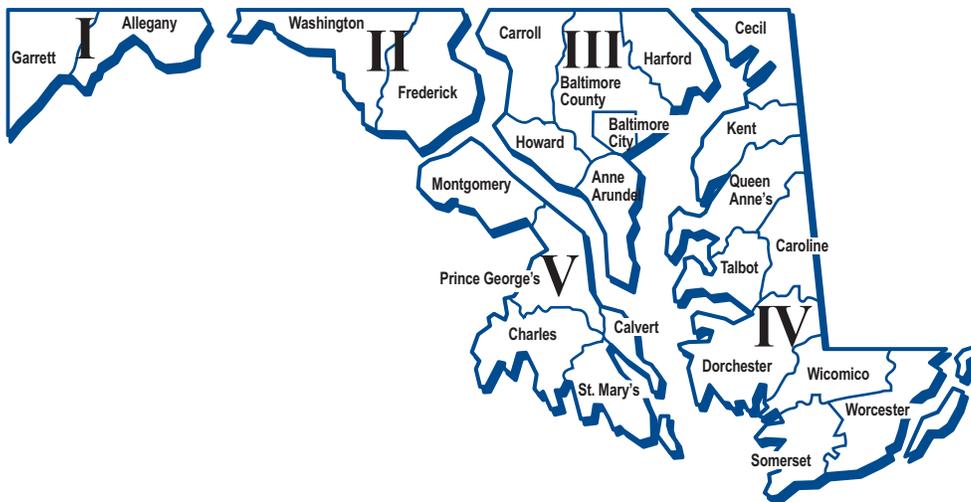
To be a state EMS system acknowledged as a leader for providing the highest quality patient care and that is sought out to help other EMS systems attain the same level of quality care.

## **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.*



## FROM THE MARYLAND EMS BOARD CHAIR



*Clay B. Stamp, NRP  
Chairman, EMS Board*

First, let me say it is truly an honor to serve as the Chairman of Maryland's Emergency Medical Services Board. As a long-serving Maryland EMS clinician and emergency manager, I have been able to witness the growth of the emergency medical services system over the years. I am proud of our past and am excited for our future.

It has been 26 years since the Maryland Legislature and Governor created the Maryland Institute for Emergency Medical Services System (MIEMSS). In creating the system, they recognized the importance of supporting Maryland's highly trained career and volunteer emergency medical services personnel, hospital emergency departments, the R Adams Cowley Shock Trauma Center, and other specialty care facilities in rendering lifesaving medical care, and understood EMS could be further enhanced by establishing a structure for the statewide system.

Since that time, through statewide collaboration with our advisory councils, MIEMSS, and the EMS Board, with the support of partner agencies and organizations and the Governors and State Legislatures we have seen significant successes, such as the implementation of statewide EMS care protocols; the building of the statewide EMS communication system; the implementation of a statewide patient care reporting system; the building of a statewide Medevac system; and, working with hospitals, the addition of specialty care centers to treat seriously ill patients, to name a few.

As we look to our future, we face exciting and yet challenging times in the healthcare and public safety sectors. Working with Dr. Ted Delbridge, MIEMSS Executive Director, and fellow Board members, my priorities in part include firming up our key partnerships, and to build new ones; to support the various elements of our system through the advancement of statewide EMS research and innovation; supporting our local jurisdictions through the regional and statewide EMS advisory councils; and, finally, investing in a comprehensive grass roots effort to build the EMS Plan for Maryland's future, which will provide a road map for opportunity.

Already I am pleased with some of the progress we are seeing across the state. Examples include the expansion of specialty referral centers for stroke and cardiac patients; the upgrade of the statewide EMS communications system; mobile-integrated health pilots operating in multiple jurisdictions designed to better service their communities while ensuring they can provide timely lifesaving services; the alternative destination protocol, which will allow relationships to be formed between jurisdictions and urgent care facilities to receive non emergent patients that may expedite service and hopefully provide some relief to emergency departments; and the integration between the statewide patient care reporting system, eMEDS®, and the Chesapeake Regional Information System for our Patients (CRISP) database, which will allow for better information exchange in the treatment of patients. These are only a few advances underway that, in addition to others, will be outlined in our EMS Plan for the future, ensuring we can get the right patient to the right care in the right amount of time.

Finally, I would like to take this opportunity to recognize the work of my predecessor Mr. Donald DeVries, who built key partnerships between organizations such as the Maryland State Firemen's Association, the Maryland Fire and Rescue Institute, the R Adams Cowley Shock Trauma Center, and the Maryland Institute for Emergency Medical Services Systems as the coordinating agency. Mr. DeVries has credited the success of these partnerships to what he refers to as "cooperative excellence," which I am honored to continue.

I would also like to recognize the longstanding dedication and commitment of Dr. Robert Bass, former MIEMSS Executive Director, who over the years provided skilled direction that shaped the MIEMSS organization and system, and Dr. Rick Alcorta, State EMS Medical Director, whose energy, expertise, and willingness to serve have made a difference across Maryland.

I also want to personally thank you for your commitment and dedication to our system and the citizens of Maryland.



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

## **FROM THE EXECUTIVE DIRECTOR**

**T**he people of Maryland are proud of their EMS system. Perhaps it's because they have needed it, or seen it in action. Maybe it's because they know one or more EMS clinicians, and they are proud of them. In the past year, Maryland's 18,919 knowledgeable and dedicated volunteer and career EMS clinicians responded to more than one million calls for help, at all hours of every day.

What most people probably don't know is that Maryland's EMS system is a well-choreographed effort involving thousands of people with a unifying goal: saving lives. This report is about that – the abundant energy, the immense collaboration, the incredible expertise, and the unwavering commitment of people to save the lives of other people. Here, we provide a mere glimpse of their efforts and results.

When I joined Maryland EMS and MIEMSS in February, there were things of which I was certain, and some other things I learned quickly. Maryland's EMS system has enjoyed stable, thoughtful, and inclusive leadership for decades. Consequently, its fabric is strong and tradition is valued. MIEMSS plays an important coordinating role.

Part of the tradition MIEMSS coordinates is that of engaging system stakeholders in planning and executing policies and rules. During any given week, dozens, if not hundreds, of people come to the MIEMSS offices to share their expertise and perspectives, collaborating and coordinating on issues related to the care of trauma, cardiac, stroke, pediatric, and perinatal patients; EMS clinician protocol development; air medical services; ambulance transportation; licensing and compliance; and all sorts of other matters. Therein lies one of the important strengths of our system: the desire of people to come together to ensure it is continually improving.

We live in a time of unprecedented pace of change of all sorts. Some include the expectations and availability of information, the rate of discovery and understanding, the nature of our surrounding healthcare system, and expectations from within our communities. We must account for these, and have been doing so. We have embarked on processes to streamline protocols for EMS clinicians, providing them in a state-of-the-art format and with more timely updates as indicated. By year's end, nearly all EMS jurisdictions will provide encounter-detailed patient information to the Chesapeake Regional Information System for our Patients (CRISP), capitalizing on the value of EMS care as part of a healthcare continuum. We are working with some jurisdictions to facilitate transport of certain patients to facilities other than emergency departments, where needed care might be more efficiently provided. Further, several programs are exploring "mobile-integrated health" – intervening before a person's medical problem results in a 9-1-1 call. These are just a few examples of innovation.

The question might be, "What next?" To that end, we have embarked on creating a new, updated Maryland EMS Plan. By early 2020, we will have a new map to guide us into the foreseeable future. Dozens of subject matter experts have come together to formulate relevant sections. By the time the Plan is finalized, hundreds of EMS stakeholders will have provided input. For, as it has been said, it is not the plan that is so important; it is the planning. Breathing life into our new Plan will be the job for all of us.

Prior to Maryland EMS and MIEMSS, I had spent my career as an EMS physician at the University of Pittsburgh and East Carolina University. I was drawn from North Carolina to Maryland to be part of something big and something uniquely special – a legacy. This report is one reflection of just how big and special Maryland EMS is. At the heart of it all is a system to save lives!

# 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.

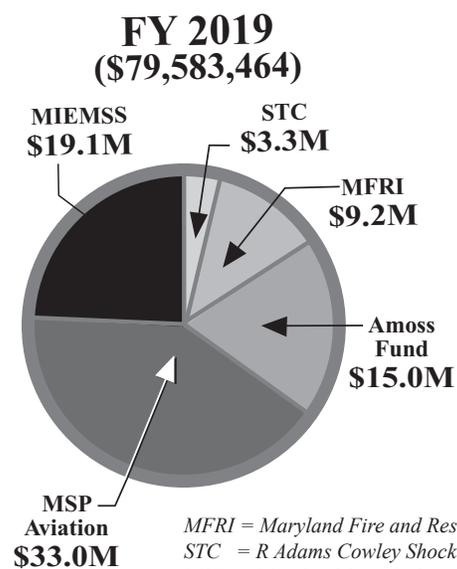
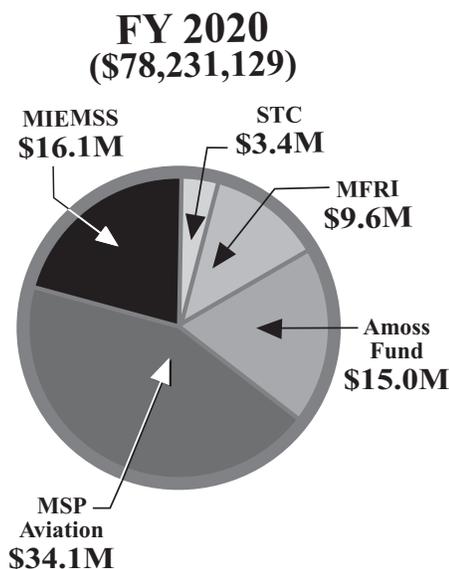
The Procurement Unit obtains all necessary supplies, materials, and services required by MIEMSS to fulfill its mission in accordance with all applicable state procurement laws and regulations. The unit is also responsible for contract and grant administration. Administration is also responsible for inventory 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 2019 Expenditure by Object Code (Includes All Funds)

FY 2019	Actual
Salaries and Wages.....	\$9,122,589
Technical/Special Fees.....	1,709,532
Communication.....	2,770,041
Travel .....	650,600
Fuel and Utilities.....	133,825
Motor Vehicle Operations and Maintenance.....	311,085
Contractual Services .....	2,497,373
Supplies and Materials.....	453,655
Equipment—Replacement .....	270,536
Equipment—Additional .....	27,525
Fixed Charges .....	174,070
Grants.....	1,408,147
Land and Structures .....	32,100
<b>Total Expenditure.....</b>	<b>\$19,561,078</b>

## 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 2019, there were 1,824 patients transported by the Maryland State Police Aviation Command (MSPAC). Of these patients, 1,811 (99%) were transported from the scene at the request of the local emergency services and 13 (1%) were transported between hospitals to a higher level of care.

Types of calls included the following:

• Motor vehicle crashes .....	698
• Falls .....	470
• Pedestrians .....	78
• Stabbings .....	49
• Assaults .....	46
• Burns .....	45
• Gunshot wounds .....	36
• Industrial injuries .....	18

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 in FY 2019 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 were added to our treatment capabilities for our sickest patients in FY 2019, allowing early initiation of lung-protective ventilation while using cutting-edge strategies to maintain blood pressure until patients can reach the operating room. FY 2019 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 Providers. 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 2019, the Attorney General's Office provided the following services to MIEMSS:

- Reviewed and prosecuted 50 cases of alleged prohibited acts by EMS clinicians and applicants;
- 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 137 public information act requests, six subpoenas, and five research requests.

Assistant Attorneys General worked with MIEMSS in FY 2019 to amend various regulations, including the standards for designation of burn centers. They also provided advice on mobile integrated health programs, and participated in a legislatively mandated study group on reimbursement for new models of EMS care.

Also in FY 2019, the Assistant Attorneys General helped prepare several information technology procurements, including an upgrade to the MIEMSS statewide communications system, the Maryland Emergency Medical Resource and Alerting Database (MEMRAD) information system, and software maintenance agreements.

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 an application for conversion of a hospital to a free-standing emergency medical facility, specifically as to whether the hospital will maintain adequate and appropriate delivery of emergency care within the statewide EMS system.

The Assistant Attorneys General made educational presentations at several venues in FY 2019, including the EMS Care and Miltenberger Conferences, the Advanced Disaster Life Support course, and the Office of Health Care Quality Grand Rounds, and served on the Maryland Health Information Exchange Policy Board, as well as the Governor's Inter-Agency Heroin and Opioid Coordinating Council. 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 providers 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 2019, 39 commercial ambulance services and 466 commercial ambulance units held licenses issued by the State Office of Commercial Ambulance Licensing and Regulation (SOCALR). (See page 73 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 provider health, safety, and welfare. In doing so, SOCALR remains continuously committed to MIEMSS' organizational mission and vision. The department has streamlined internal business processes and developed strategies to enhance records management.

Upon the completion of the first full cycle of year-round licensure renewal, SOCALR is pleased to report that the change has resulted in a more efficient process marked by a reduction in processing errors. Licensed services have also provided positive feedback based on the ability of services to choose their annual renewal month. An additional added benefit of the year-round process is an increase in process consistency among inspectors, as the distributed inspection season allows for the use of fewer part-time inspectors. SOCALR personnel also provide support to MIEMSS Regional Programs by assisting with the Voluntary Ambulance Inspection Program as needed throughout Maryland (see page 28 for more information).

SOCALR continues to utilize the web-based Commercial Ambulance Licensing System (CALs) to process applications. The system provides a real-time

snapshot of the commercial resources in Maryland, resulting in expedited data retrieval. SOCALR has successfully implemented an electronic payment processing capability using electronic funds transfers, and can now accept credit card payments for licensing fees. In collaboration with MIEMSS Data Management and MIEMSS IT personnel, SOCALR has worked to deploy the Commercial Ambulance Inspection Program (CAIP), which is a web-based application intended for use when conducting commercial ambulance inspections. The application, which is currently in the testing phase, will replace the current paper-based process, and will integrate with CALS, providing automatic transmittal of all inspections to the CALS vehicle record.

Commercial service base surveys continued throughout FY 2019. Surveys were conducted by a team of personnel from SOCALR, who provided follow-up reports outlining any corrective action necessary to maintain COMAR Title 30.09 compliance.

Formed in fall 2018, the statewide Neonatal Transport Stakeholders Workgroup worked diligently throughout the winter and spring to develop draft revisions to the COMAR neonatal transport regulations. Workgroup members from commercial ambulance services and hospital neonatal intensive care units worked collaboratively to address the specialized transport needs of the neonatal patient with the limited neonatal transport resources available. The group also reviewed the current equipment requirements for neonatal transport and provided recommendations based on current treatment practices. The workgroup will continue into FY 2020, charged with reviewing transport team composition, training, and QA practices.

The SOCALR team remains committed to supporting MIEMSS' Field Operations Support Team, assisting with emergency operations efforts throughout the state, and coordinating commercial resources when disasters strike. In June, SOCALR met internally to refine emergency operations procedures, and subsequently conducted a no-notice exercise to determine the availability of commercial ambulance transport resources in the event of a disaster. The response from the commercial services community was overwhelming, indicating the availability over 140 transport units in a period of less than two hours.

The successful transition of all commercial services utilizing the eMEDS<sup>®</sup> electronic patient care reporting platform to the eMEDS<sup>®</sup> Elite platform (see page 20 for more information about the Elite software platform) was completed in early FY 2019. SOCALR continues to work closely with commercial services and third-party ePCR vendors to ensure the smooth import of data from those platforms.

## 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)

On May 16, 2018, after many years of identifying and refining new system requirements, and moving through the state procurement processes, the Maryland Board of Public Works approved MIEMSS' contract award to Overland Contracting Incorporated (OCI) to upgrade the statewide EMS communications systems. This will be the most significant enhancement of the EMS system within the last 20 years and has required countless hours of planning to transform the core components of the EMS communications system. On May 21, MIEMSS officially launched the project; the first major undertaking was to begin surveying approximately 200 tower sites and 50 hospitals within and adjacent to the state, and this step was completed by July 23.

Key members of the MIEMSS technical team travelled to the Intertalk Systems in Halifax, Nova Scotia, in November to inspect and test the console systems to be installed at MIEMSS headquarters before they shipped. Once this equipment arrived and was installed at MIEMSS HQ, the Preliminary Functional Validation (PFV) test was completed. The PFV phase ensured that the console equipment's core functions would work with a subset of the MIEMSS infrastructure within the Baltimore area. The key functions of patching, transmitter steering, and voting subsystems were tested to be compliant with the technical requirements. The successful completion of these two key steps allowed the vendor to move on to the next major step in the process.

MIEMSS began working with the vendor to develop the Detailed Design Review (DDR) documents, which are a cohesive, written, document detailing the OCI's responsibilities, including details on the IP and microwave engineering, configurations, equipment/hardware, software, and services. This also includes how OCI will accomplish the work (Implementation Plan and Transition Plan) and clear and realistic timelines to accomplish the tasks. The DDR documentation, site drawings, site narratives, network plan, and implementation and transition plan were jointly reviewed by MIEMSS and the OCI, and MIEMSS approved the DDR on June 21.

Since the June approval, OCI has begun working with their subcontractors to procure the equipment and services, based upon the DDR documents, to begin the Phase 1 deployment in MIEMSS Region V, which covers Frederick, Montgomery, Prince George's, Calvert, Charles, and St. Mary's Counties.

## Public Safety Microwave System

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 appoints a staff representative to serve 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.

Western EMRC's interface with MFiRST was operational in August 2018 and in concert with Allegany County's effort to begin operating on MFiRST. MIEMSS' direct interoperability with MFiRST supports field clinicians operating on this system and allows all field clinicians in the Western EMRC serving area to obtain medical direction via the EMRC.

MIEMSS continues to expand its network monitoring and alarm monitoring system to enable staff to be more efficient and to affect system repairs quickly and decisively. 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 the MFiRST radio infrastructure. This year, the department installed enhanced alarm monitoring at many additional tower sites.

## 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



will be constructed, 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)
- Washington-Allegany-Garrett Interoperable Network (WAGIN)
- Coordinated Highways Action Response Team (CHART)
- Maryland Incident Management Interoperability Communications System (MIMICS)
- Maryland Law Enforcement Information Network (MLEIN)
- Other systems monitoring/controlling the state's public safety microwave network and tower infrastructure

## 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 had become outdated and, correspondingly, increasingly prone to failure. The risk of system failure was further exacerbated by difficulty in securing vendor support for these critical systems. The communications upgrade project 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. While it is projected that MSP aviation communications will migrate completely to the MFiRST system, it will be several years before there is statewide coverage for medevac helicopters. 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, allowing for more seamless interoperability with Delaware's fleet when it responds to incidents 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.

Communications Engineering Services accomplished many other notable system enhancements and conducted several other projects in FY 2019:

- Naylor Mill tower site relocation completed
- Increased propane monitoring site monitoring
- Leonardtown lowband installation
- Walter Reed addition
- Purchase 15 replacement microwave links
- Provided conventional communication circuits on MIEMSS infrastructure to help Garrett County PSAP to integrate with the MFiRST system
- 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
- Continued support for local 9-1-1 centers through active participation on the Emergency Number Systems Board
- Developed interim connectivity to Washington Adventist White Oak Medical Center

Communications Engineering Services was successful in completing many important projects while managing constantly changing priorities at the local and state level in FY 2019. 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 the Communications Engineering Services Department and MIEMSS' public safety partners.

## 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 Provider 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 2019 Compliance Office Activity

• JEMSOP reverification applications reviewed ..	20
• Crim. background investigations completed ..	8,329
• Incidents reported to IRC .....	144
• IRC investigations initiated .....	208
• IRC investigations conducted .....	200
• IRC investigations (FY 2018) continued .....	8
• IRC complaints forwarded to PRP .....	50
• Complaints dismissed by PRP .....	2
• Complaints forwarded to EMS Board .....	48
• Complaints requiring service .....	8
• Quality assurance officer courses conducted .....	3
• Quality assurance officers trained .....	92

### ■ EMS Board Action

• Reprimands .....	3
• Probation .....	9
• Suspensions .....	4
• Revocations .....	4
• Remedial training .....	5
• Surrenders .....	0
• Evaluations .....	0
• Applications denied .....	1
• Dismissed .....	2
• Counseling .....	2
• Rehab .....	5
• Random testing .....	5
• OAH hearings requested .....	9
• Case Resolution Conferences .....	9
• OAH hearings conducted .....	0
• OAH hearings defaulted .....	0
• Settlement agreements .....	9

## Quality Assurance

The Compliance Office continues to coordinate quality assurance/quality improvement (QA/QI) officer courses for EMSOPs, licensed commercial ambulance services, and company-level QA/QI officers. MIEMSS' Quality Assurance Officer Course is continually updated to keep pace with current topics.

## 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 FY 2019, MIEMSS continued to focus on promoting and enhancing CISM capabilities through symposiums and training. The December 2018 CISM symposium hosted by MIEMSS brought together representatives from CISM and other crisis response teams in Maryland to share resources and build effective collaboration. Mutual aid and collaboration has proven beneficial to clinicians needing this service following traumatic events.

### CISM Training

In partnership with the City of Annapolis Fire Department, MIEMSS offered a two-day Strategic Response to Crisis course. Over 40 CISM team members from 20 different teams from throughout Maryland attended the program.

In April 2019, MIEMSS sponsored a one-day first responder health and wellness course at the EMS Care Conference in Ocean City, Maryland.

Each of these training sessions was supported by a grant from the Maryland Department of Health with funds

from the Hospital Preparedness Program provided by the Assistant Secretary for Preparedness and Response, US Department of Health and Human Services.

In the coming year, the focus of the MIEMSS CISM program will be enhancing health, wellness, and CISM/peer-support capabilities in Maryland through training and collaborative efforts with state and local teams.

## 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 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. This year, a special issue of the newsletter was devoted to the statewide opioid crisis. In FY 2019, *Maryland EMS News* covered other various topics, including:

- Annual Maryland EMS awards
- EMS Week appreciation and news
- 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 Providers*, in collaboration with the Medical Director's Office, including editing, layout, and design. The complete 2019 protocol manual was made available on MIEMSS' website in early 2019. 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, and YouTube. Social media messaging reached thousands of EMS providers and members of the public throughout the year. As of June 30, 2019, nearly 10,500 users were following MIEMSS' Facebook page and nearly 1,400 users were following its Twitter feed. Posts on Facebook during this period had a total reach of nearly 395,000, 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 and EMS Week celebrations for clinicians, 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 2019, the department produced the EMS Update 2019 training video, required viewing for Maryland EMS clinicians, which included educational content as well as changes and additions to the 2019 EMS protocols. The production was made available to clinicians through the MIEMSS' Online Training Center or on disc for company-level drills. Department staff also produced a version of the training for hospital Base Station personnel.

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 and video eulogies for the MSFA convention, Stop the Bleed PSA, and filming of various topics for educational lectures and programs for the Online Training Center.

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**

During EMS Week in May 2019, the annual Maryland EMS awards ceremony was held in Annapolis. Both EMS for Children's Right Care When It Counts Awards and the Maryland Stars of Life Awards were presented, as were Governor's proclamations in recognition of EMS for Children Day and EMS Week. This year, Lieutenant Governor Boyd K. Rutherford joined MIEMSS Executive Director Ted Delbridge, MD, MPH, and EMS Board Chair Clay B. Stamp in presenting the awards. Press releases were distributed statewide and the event and award winners were covered by local and statewide media outlets.

### **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 2019, department staff provided assistance with exhibits at the MSFA annual convention, the annual Maryland Association of Counties summer convention, and various other 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 messages for the public. Printed materials, banners, and public service announcements featured Maryland's prehospital and hospital personnel in prevention messages. A major campaign regarding bike safety was undertaken this year.

With the assistance of Educational Support Services, tours of MIEMSS were conducted for local, national, and international visitors throughout the year. Visitors from Germany, China, England, and Ireland were among the international audiences that came to learn about Maryland's trauma and EMS system.

Educational Support Services works collaboratively on multiple prevention projects with other state and local government agencies. In FY 2019, 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, the Maryland Committee on Trauma, and the Center for Injury Prevention and Policy at the R Adams Cowley Shock Trauma Center.

## **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 (EMSC 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.

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 Medical Center 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 Medical Center; 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. In 2018, Wright-Johnson was appointed 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 Ad Hoc Committee and the Highway Incident Traffic Committee. Recommendations from this committee are shared with MIEMSS' Ambulance Safety Committee, VAIP Committee, regional councils, and their educational councils.

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 2018, MIEMSS hosted the annual ENA delegate preparation meeting prior to their national General Assembly.

In recognition of the specialized care required for pediatric emergencies, EMS for Children Day was celebrated on May 22, 2019. Also on this day, five Maryland children received a Right Care When It Counts award for demonstrating one of the "10 Steps to Take in an Emergency" or one of the "10 Ways to Be Better Prepared for an Emergency". This annual awards ceremony is promoted as one of the FAN Council projects.

### **Maryland EMS for Children State Partnership Grant**

MIEMSS has a current EMS for Children State Partnership Grant from the Maternal and Child Health Bureau/Health Resources Services Administration of the US Department of Health and Human Services. These

14 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: NEMSIS data reporting statewide, creating and supporting pediatric EMS champions in each EMS agency, and promoting pediatric EMS education in both skills and scenario-based training. The other federal measures remain unchanged. Maryland's grant continues to also support FAN Council activities and pilot QI projects through the DART. In FY 2019, FAN developed a train-the-trainer module for the Pediatric EMS Champions entitled "Emergency Ready Families".

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

During each of the EMS and emergency nursing educational seminars and conferences in Maryland held during FY 2019, pediatric displays and/or pediatric topics were included. Specific topics were pediatric trauma tools, pediatric assessment, pediatric burns, emergency-ready families, and high-performance CPR. Each conference held a pediatric pre-conference session, which featured the American Heart Association's (AHA) Pediatric Emergency Assessment, Recognition, and Stabilization (PEARS), offered in conjunction with a local AHA Training Center. A PEARS Course was also offered in Southern Maryland. Additionally, a Pediatric Education for Prehospital Professionals Third Edition (PEPP-3) hybrid course for both ALS and BLS providers was presented at MIEMSS.

EMS for Children continues to offer 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 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. Courses continue to be planned for the future due to ongoing positive evaluations that stress the importance of pediatric continuing education for physicians and advanced practice clinicians as a component of Pediatric ED Readiness.

EMS for Children presented its 2<sup>nd</sup> Pediatric EMS Champion Workshop during EMS Care 2019 in April. This instructor workshop included training on Emergency-Ready Families, Pediatric Assessment,

and Pediatric Burns. Throughout the year, a dedicated implementation team presented the Pediatric High-Performance CPR workshop across Maryland. This EMS Pediatric module includes didactic education, skills checklist for infant and child CPR, and two scenarios. Over 325 EMS professionals received the training, and they uniformly demonstrated improved quality of CPR with the high-fidelity manikins. This workshop was presented at the Maryland Resuscitation Academy and the NASEMSO annual meeting. An academic poster will be presented in August at the federal EMSC Grantee Meeting covering the 18 months of work on Pediatric HP CPR protocol implementation.

EMS for Children sponsored a Certified Pediatric Emergency Nurse (CPEN) Review Course as a pre-conference at EMS Care 2019 in Ocean City. Over 40 nurses attended the comprehensive course with the goal of furthering their knowledge of pediatric emergencies and completing their CPEN certification.

Specific offerings are listed in an annual continuing education chart, available on MIEMSS' website.

### **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 19th year of funding from the Maryland Department of Transportation's (MDOT) Highway Safety Office (HSO). 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 number of motor vehicle crashes has increased, while rates of injury and death among children have decreased. As education on and use of car seats and boosters has slowly increased, we hope that this grant has contributed to safer children.

Some highlights of this project include:

- Conducted 13 exhibits on CPS and 23 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 14,000 educational materials on CPS/OP through exhibits, mailings, and trainings. More than 875 agencies received materials from this project.
- Distributed 60 child safety seats and 15 dolls to healthcare professionals working in newborn nurseries or NICUs for training their staff or for needy families.



- Planned and conducted a daylong in-service on CPS for 47 newborn nursery or NICU nurses from 29 Maryland hospitals. Offered the nurses 6.5 CEUs.
- Taught two trainings on special needs CPS, reaching 33 providers—one was a statewide update and the other for Sinai Hospital's Rubin Institute.
- Assisted with teaching six national CPS certification courses, reaching 60 healthcare providers and law enforcement professionals.
- Assisted at 18 car seat safety checks, educating more than 200 families on how to keep their children safe in their vehicle.
- Awarded five scholarships to cover healthcare professionals' costs to take the CPS technician certification course.
- Planned and conducted two webinars, reaching 133 people.
- Posted 16 social media messages on CPS/OP and wrote/had published five articles for publication in Maryland EMS News.
- Distributed Drowsy Driving Awareness and Prevention Kits to nine new agencies. Had 10 trauma centers use their kits during "Distracted Driving Awareness Week". Created a poster summarizing Maryland's drowsy driving prevention campaign and presented it at the national Lifesavers Traffic Safety Conference in Louisville, KY.

### **Bike Helmet Safety Grant**

The Bike Helmet Safety project completed a second year of funding from the Maryland Department of Transportation's (MDOT) Highway Safety Office (HSO). 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 the first two years, the project has:

- Distributed over 500 bike helmets through local Safe Kids partners
- Developed and distributed Bike Helmet “Right Fit” posters across Maryland
- Filmed, produced, and distributed through online media two public service announcements on bike helmet fit and safety
- Joined the MHSO Pedestrian Bike Area Emphasis Team and shared these resources
- Provided training to EMS and Fire professionals and to families at the 2018 and 2019 MSFA Conventions in the “Steps to Safety” program

### **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 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 21 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 2019, 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. Again this year, Safe Kids Maryland participated in a Walk This Way mini-grant with 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. An outdoor thermometer display kit has been

developed, with MIEMSS coordinating the use of four kits across the state.

In June 2019, a collaborative Safe Kids/RISK WATCH program was held over four days at the MSFA Annual Convention and Conference. Youth and adult volunteers helped participants complete the “Steps to Safety” and EMS/fire learning stations, which are designed to provide information to the entire family. The EMS for Children/FAN Panda and ATS TraumaRoo mascots were available to lead children through the interactive skills stations and to promote safety at home and in the community.

## **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 participate in many emergency and disaster preparedness efforts, including the following that took place in FY 2019:

- 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
- Participated in planning and operations for Baltimore City Fleet Week (October 2018)
- Complex Coordinated Terror Attacks (CCTA) GAP analysis and planning
- 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 in the State Incident Management Team (IMT)

## Emergency Response

Emergency Operations supports numerous planned mass gatherings and emergency response efforts throughout the state. Department staff participated in a number of notable activities in FY 2019, including:

- Supported Baltimore City during Moonrise Festival (August 2018)
- Supported Baltimore City as part of the state IMT during Fleet Week (October 2018)
- State EOC staffing Presidential Funeral (December 2018)
- State EOC Staffing Governor's Inauguration (January 16, 2019)
- Monitored flu and environmental-related patient EMS contacts and reported this data to the Maryland Department of Health (MDH)
- Provided support to Opioid Operational Command Center (OCCC)

## Emergency Exercises

Emergency Operations and Field Operations Support Team personnel participate in numerous emergency exercises throughout the state. Some of the more notable activities in FY 2019 included:

- M&T Bank Stadium Full Exercise (July 2018)
- HCID regional exercises:
  - Cecil Co. HCID TTX (September 2019)
  - Anne Arundel Co. F.D./ Anne Arundel Medical Center HCID Full Scale Exercise (April 2019)
  - Fredrick Co. RFS/ Frederick Memorial Hospital Full-Scale Exercise (October 2018)
  - Montgomery Co. FRS/ Holy Cross Hospital HCID Full-Scale Exercise (April 2019)
  - D.C.F.D./ D.C. Public Health HCID Full-Scale Exercise (December 2018)
  - Johns Hopkins Hospital's HCID TTX (October 2018)
- Maryland Disaster Recovery Service Center (May 2019)
- Healthcare Coalition Hospital Evacuation Exercises (June 2019)
- NDMS Tabletop Exercise (June 2019)
- Region III Health and Medical Coalition Hospital Evacuation Exercise (June 2019)
- Naval District Washington / Anne Arundel Medical Center Active Assailant / Mass Casualty Full-Scale Drill (February 2019)

## 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 providers and emergency departments, trauma centers, and specialty centers
2. Maintain and share situational awareness of the activities, capabilities, and capacities of the pre-hospital system and hospitals
3. Provide initial alerting and coordination of resources and the distribution of patients during major medical incidents

In FY 2019, the EMRC handled 154,871 telephone and radio calls. Of these calls, 147,355 were communications involving a patient or incidents with multiple patients, while 7,516 of these calls involved online medical direction. SYSCOM handled 22,444 telephone calls and 9,428 radio calls. Of these 31,872 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.*

During the 2019 Session, EMS-related issues that were passed and signed into law by the Governor included the following:

- The recommendations of the Commission to Advance Next Generation 9-1-1 became law. The Emergency Numbers Systems Board is to establish minimum standards for cybersecurity, oversight and accountability and training standards for Public Safety Answering Point (PSAP) personnel based on national best practices. The purpose of the 9-1-1 Trust is broadened to include operation and maintenance of 9-1-1 systems, PSAP facilities costs, training and cybersecurity. The state 9-1-1 fee increased, and counties are authorized to impose additional charges in certain situations. User fees became applicable to each separate outbound call voice channel, instead of by user account.
- MIEMSS will work with the Maryland Health Care Commission to submit a report that outlines the State's plan for reimbursing three new models of EMS care: treatment without EMS transport; transport to an alternative destination other than a hospital ED; and mobile integrated health services. The report is to be submitted by December 1, 2019.
- MIEMSS will work with the Maryland Health Services Cost Review Commission (HSCRC) to submit a report on progress toward addressing hospital emergency department overcrowding. This report will provide an update on previously-identified strategies to help mitigate overcrowding. The study is to be submitted by November 1, 2019.

The Maryland Trauma Physician Fund, which was established in 2003 to reimburse trauma physicians

for uncompensated and undercompensated care at a designated trauma center, was modified to permit reimbursement for documented uncompensated or undercompensated costs incurred by the R Adams Cowley Shock Trauma Center to maintain trauma surgeons, orthopedic surgeons, neurosurgeons, and anesthesiologists.

## **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 are 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 Medical Center, 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
- Trauma surgeon notification to arrival time was within 30 minutes
- Trauma bypass hours per month

Maryland TQIC continues to be active with the annual Distracted Driving Day (in April) and the Falls for Fall Day (in September). Stop the Bleed training continues with the trauma centers within the communities they serve.

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 like burn metrics. A project is in progress that has reviewed 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.

### **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 (3) comprehensive stroke centers. All stroke centers are redesignated every five (5) years, and in FY 2019 six (6) Primary Stroke Centers (PSC) and one (1) Comprehensive Stroke Center (CSC) were redesignated.

In FY 2019, the Stroke Quality Improvement Committee (Stroke QIC), comprising stroke program coordinators and medical directors, focused on two new initiatives for improving stroke care in Maryland. The first initiative was to revise and update the current Primary Stroke Center (PSC) COMAR Regulations. The second initiative was to add a third level of stroke

center designation, the Acute Stroke Ready Hospital Center (ASRHC), to the regional system of care approach. The ASRHC will help to ensure timely and appropriate care of the acute stroke patient. ASRHCs lack the infrastructure for designation as a primary stroke center, but have policies and procedures in place to quickly treat the acute stroke patient in the emergency department and transfer them to a primary stroke center or comprehensive stroke center based on the patient's needs. COMAR regulations for ASRHCs and the revised COMAR regulations for PSC are complete and are expected to be implemented by July 1, 2020.

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 18). 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 2018 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 2019, 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 2018, Maryland's median door-to-t-PA time was 48 minutes. Additionally, 83.7% 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 2 designated Level IV perinatal referral centers. All perinatal referral centers are redesignated every five (5) years. The redesignation process will begin in CY 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

## Stroke Core Measures (5-Year Comparison)

Core Measure	CY 2014	CY 2015	CY 2016	CY 2017	CY 2018
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	90.9%	91.4%	93.1%	90.7%	93.2%
Percent of patients with ischemic stroke or TIA who receive anti-thrombotic therapy by the end of hospital day two	98.5%	98.6%	98.8%	98.8%	98.6%
Percent of patients with an ischemic stroke, or hemorrhagic stroke, who receive VTE prophylaxis the day of or the day after hospital admission	98.1%	98.2%	98.2%	97.9%	98.2%
Percent of patients with an ischemic stroke or TIA prescribed anti-thrombotic therapy at discharge	98.9%	99.3%	99.5%	99.5%	99.5%
Percent of patients with an ischemic stroke or TIA with atrial fibrillation/flutter discharged on anticoagulation therapy	97.2%	96.1%	97.7%	97.3%	98.2%
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	97.7%	98.1%	99.0%	99.4%	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	97.1%	97.9%	98.3%	98.8%	98.5%
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	87.6%	87.7%	90.2%	90.7%	89.1%
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	95.8%	96.9%	97.29%	97.5%	97.5%
Percent of patients with stroke who were assessed for rehabilitation services	98.7%	98.7%	99.1%	99.5%	99.3%

*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

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 use 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 comprising 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/semi-public pools and health clubs per local ordinances. However, the voluntary Maryland Public Access Automated External Defibrillator (AED) Program permits facilities that do not provide health care but meet certain requirements to have an AED onsite for use in the event of a sudden cardiac arrest (SCA) until EMS arrives.

Through the online Maryland AED registry ([www.marylandaedregistry.com](http://www.marylandaedregistry.com)), MIEMSS received and approved 388 public access AED applications in FY 2019. As of June 30, 2019, there were 7,343 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 234 (23.9%) successful AED uses out of 978 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, 541 were witnessed, and 170 of those witnessed arrests regained a pulse at the time of EMS arrival, for a 31.4% save rate for witnessed cardiac arrests.

### **Cardiac Arrest Steering Committee**

The guiding vision of MIEMSS' Cardiac Arrest Steering Committee (CASC) is to enhance the response to and care of patients with sudden out-of-hospital cardiac arrest in a way that will improve outcomes from sudden out-of-hospital cardiac arrest in all communities and populations in Maryland. CASC

carries out this mission through three subcommittees: Public, Emergency Medical Dispatch (EMD), and EMS Clinician.

The Public subcommittee has actively promoted community CPR training and mass CPR training events. It has collaborated with the American Heart Association to see the CPR in Schools bill passed in Maryland, requiring students to demonstrate CPR prior to graduation in all schools across the state.

The EMS subcommittee promotes EMS Clinician best practices, including High-Performance CPR to all EMS Operational programs in Maryland. It has worked collaboratively with PEMAC to bring HP CPR for pediatric cardiac arrests into the Maryland Protocol, available for all EMS programs in the state.

The EMD subcommittee has actively produced continuing education content for 911 Specialists, celebrating their role as Maryland's first First Responders for all emergencies including cardiac arrest. CASC, as a whole, recognizes and advocates that assertive hands-only CPR coached by EMDs is the most efficient way to double bystander-CPR in Maryland and has the potential to double survival from sudden cardiac arrest across the state.

CASC has been working with Dr. Nisha Chandra from Johns Hopkins to explore disparities in cardiac arrest survival across the state, while planning how to best address the disparities in a way that raises survival in communities with opportunities for improvement. CASC has begun undertaking a review of cardiac arrest data from eMEDS® and from hospital outcome data with Dr. Chandra, which will help celebrate the accomplishments while possibly identifying a few opportunities to educate about how to work collaboratively to make the data the most accurate and helpful for decision-makers.

### **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 (4) quarters of CY 2018, FMC-to-device in < 90 minutes was achieved in 71.5% of STEMI patients transported by EMS, with a median time of 83 minutes – slightly below the national percentage of 79.4%, and slightly above the national median of 81 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® software, 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 25, public safety jurisdictions (including Baltimore City and the City of Annapolis) 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. Expected completion time is unknown for these agencies.

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 electronic tablets and laptops, and 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. Aligning these two systems will make 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 medical care they are able to provide at the patient's side and through mobile integrated health (MIH) initiatives. This effort will continue throughout FY 2020.

## National Study Center Collaboration

The IT and data management departments continued to advance MIEMSS' analytical and reporting capabilities of collected data through collaboration with the National Study Center for Trauma and Emergency Medical Systems (NSC). NSC has assisted MIEMSS in designing and developing EMS system performance measures and reports, GIS maps for evaluating transport times, EMS vehicle crash data, reports for producing evidence-based guidelines for EMS care, and other important analytical projects.

## 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 geographically separate from the MIEMSS data center.

■ **Maryland Emergency Medical Resource and Alerting Database.** MIEMSS continues to host and operate the Maryland Emergency Medical Resource and Alerting Database (MEMRAD), which operates on the HC-Standard software system provided by Global Emergency Resources (GER). 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 and for disaster response. CHATS is a public, web-based service that displays the alert status information of hospitals in Maryland and adjacent regions. It is used daily by EMS services throughout Maryland to support life-critical decisions about the delivery of patients to hospitals by monitoring and displaying hospital capacity and status. FRED is utilized to alert healthcare partners of an incident or the need for aid, and allows them to indicate what resources they have to lend to the response. Partners include hospitals, local health departments, long-term care facilities, and EMS medical directors and services.

■ **Trauma and Specialty Care Registries.** MIEMSS hosts and, in conjunction with Digital Innovations (DI), supports the Maryland State Trauma Registry and related specialty registries. The IT Department assisted with a major upgrade to the Maryland State Trauma Registry, including updating the virtual servers to Windows 2016, which was completed in Q1 2019.

■ **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 provides 24/7 technical support to EMRC/SYSCOM in coordination with MIEMSS' Communications Engineering Services.

■ **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<sup>®</sup> and Computer Support. The eMEDS<sup>®</sup> 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<sup>®</sup>-related issues. Computer Support receives requests for password and login issues, VPN, email, and general computer support. The eMEDS<sup>®</sup> queue received nearly 3,000 tickets that were created and worked. Similarly, Computer Support received more than 800 requests that were worked. 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.

■ **Data to the Desktop.** The Data Management Department continues to develop a data analysis system to facilitate direct, expeditious, and flexible data access and analysis for agency departmental and program end-users. A major goal of this effort is to provide real-time access to numerous datasets maintained by MIEMSS.

■ **Opioid Overdose Data Reporting.** MIEMSS, in compliance with state law, provides data from EMS patient care reports into the Washington/Baltimore High Intensity Drug Trafficking Areas Overdose Map (ODMAP) database to assist with statewide monitoring of the opioid overdose problem. Through an interface developed by MIEMSS' Data Management Department and supported by a grant facilitated by the Opioid Operational Command Center, data is submitted directly into the ODMAP database on a near real-time basis; that is, when EMS clinicians submit reports into eMEDS<sup>®</sup>, data pertaining to overdose cases will be sent to ODMAP within a few minutes. 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.** In FY 2019, the Information Security Department continued to develop and update security policies, and it continues to enhance data security at MIEMSS. Work will continue into FY 2020, with a focus on endpoint protection, data leak protection, full disk encryption, and system monitoring throughout the MIEMSS network. Security awareness for agency personnel remains a top priority for the agency, with staff participating in monthly online training that incorporates real-world testing to guard against user-based security threats such as phishing and spoofing.

In CY 2018, MIEMSS contracted with a data destruction company to destroy hard drives, and other digital media including floppy disks, CDs, USB drives, film and tape, etc. Destroying these storage devices and media reduces risk and data exposure through potential data breaches.

■ **Computer Network Improvements.** The IT Department continues to improve computer resources, network reliability, and disaster preparedness by upgrading core server, storage, and VMware systems. In CY 2018, MIEMSS IT worked in conjunction with an outside IT vendor to upgrade network switches to Power-over-Ethernet (PoE) switches, and to complete a wiring upgrade project in the MIEMSS building to CAT 6, which improved endpoint bandwidth from 100 MB to 1 GB. In addition to improving the wired network, MIEMSS also upgraded wireless capabilities with a new system and refreshed all of the access points throughout the building.

MIEMSS IT also added an additional data storage system to our infrastructure which allows us to migrate existing virtual servers and decommission old and end-of-life technology. Completion of these projects ensures the agency continues to have dependable end-user service and to ensure agency resources are available in the event of local, regional, and national disasters or other emergencies.

■ **Strengthen Data Analysis.** Recognizing the importance of accurate, timely, and accessible prehospital patient care data, MIEMSS has expanded 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. New analysis tools continuing to be developed by MIEMSS will be available for data analysis and quality assurance. These will improve the quality of EMS care through statewide initiatives led by MIEMSS and assist jurisdictional and commercial EMSOPs and EMS clinicians to measure and improve the quality of EMS within their respective agencies.

■ **Off-site Data Protection/Disaster Recovery Capabilities.** The IT Department continues to plan and develop off-site storage of backup data, and the capability to provide IT systems and services from another location in the event that MIEMSS' primary facility becomes unavailable. The IT Disaster Recovery Plan will be updated and improved, and integrated with the agency's Continuity of Operations Plan.

In addition, MIEMSS switched to a new product for backups of production systems, and continues to store tapes in an offsite location. The new product added functionality and enhanced support to the backup solution.

## 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

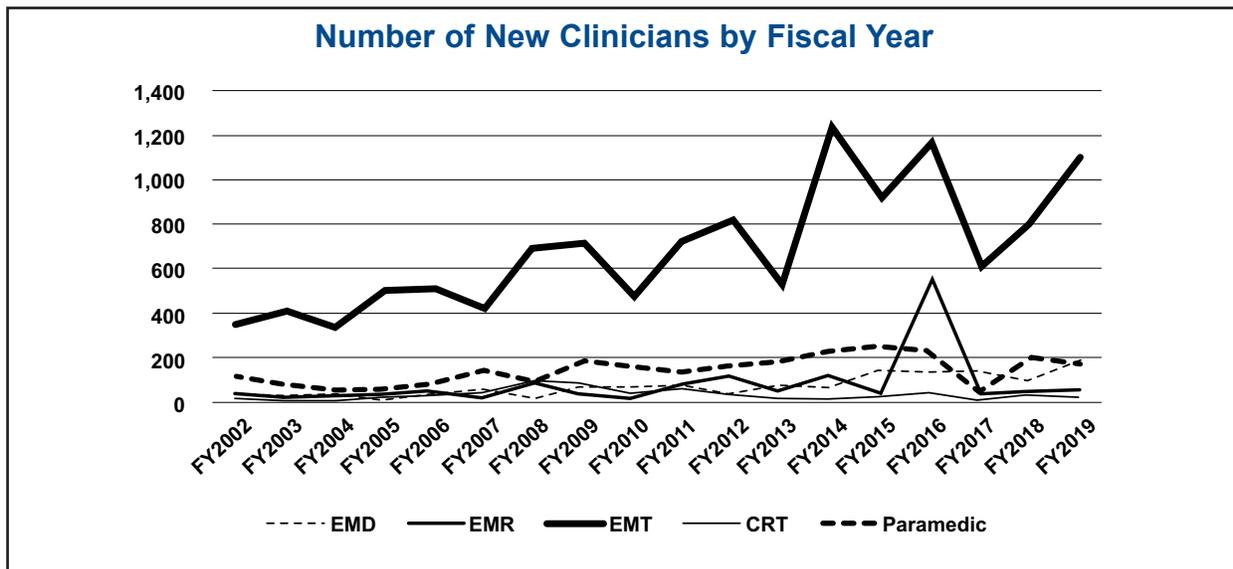
■ **FY 2019 EMS Clinician Data.** Licensure and Certification had a steady workload in FY 2019, issu-

#### Number of EMDs and EMRs (Includes Current, Extended, and Military Status) Excludes Lapsed (Inactive and Expired)

Level	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
EMD	1,079	1,058	1,320	1,377	1,066
EMR	2,044	2,020	1,589	1,136	662

#### Number of EMTs, CRTs, and Paramedics (Includes Current, Extended, and Military Status) Excludes Lapsed (Inactive and Expired)

EMT	16,569	15,839	16,069	15,485	14,853
CRT	658	662	619	587	575
Paramedic	3,166	3,293	3,336	3,278	3,491
<b>TOTAL</b>	<b>20,393</b>	<b>19,794</b>	<b>20,024</b>	<b>19,350</b>	<b>18,919</b>



ing 1,541 initial prehospital clinician certifications and licenses and renewing 4,540 certifications and licenses. The vast majority of new entrants into Maryland EMS are through an initial emergency medical technician (EMT) clinician course. Licensure and Certification tested 1,414 EMT students in 93 courses in FY 2019.

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 22. 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 49,453 registered users in FY 2019. Of those registered users, 13,263 clinicians were

active in the Online Training Center during the same period. The Online Training Center hosted 30 active courses in FY 2019. Several new courses were made available this year, including Maryland ALS Update 2019, Maryland BLS Update 2019, EMD Cardiac Arrest Training, Hostile and Potentially Violent Patients, and an updated Pediatric High Performance CPR course. Projected course topics for FY 2020 include the Maryland EMS Updates for 2019 and additional courses that will help clinicians fulfill 10 hours of the State/Local National Continued Competency Program (NCCP) content for ALS 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 system. Moving into FY 2020, 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 turn-around 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.*

On November 1, 2018, Dr. Timothy Chizmar was appointed State EMS Medical Director following the retirement of Dr. Richard Alcorta, who had served at MIEMSS for 26 years.

### EMS Medical Directors' Symposium

The 24<sup>th</sup> Annual EMS Medical Directors' Symposium was held at the Sykesville-Freedom District Fire Department on April 10, 2019. The Symposium was attended by regional, jurisdictional, and commercial ambulance service medical directors, base station physicians and coordinators, highest jurisdictional officials, quality assurance officers, and MIEMSS personnel. This year's keynote speaker was John W. Lyng, MD, FAEMS, FACEP, NRP, Medical Director for North Memorial Health Ambulance and Air Care in Minneapolis, MN. Dr. Lyng's keynote address was "Takeaways from 35 years of MCIs, and where do we go next?" Other symposium presentations included the following:

- *State of the State:* Theodore Delbridge, MD, MPH
- *Pediatric High Performance CPR: From Protocol to Training to Practice, Practice:* Karen O'Connell, MD and Cyndy Wright-Johnson, MSN, RN
- *West Baltimore Mobile Integrated Health: Community Paramedicine Program:* David Marcozzi, MD and Chief Mark Fletcher
- *EMS Safety Culture – Listen to Your People:* Kevin Seaman, MD; Chief John Filer; and Lee Varner, MSEMS, CPPS, EMT-P
- *EMS Grandfathers: Crunch Time. Either Apply or Say "Bye-Bye!":* Roger Stone, MD
- *Panel Discussion: Active Shooter Events:* Chief Jeffrey Sexton, NRP; Chief Shawn Davidson, NRP; Chief James Craze, NRP; Chief Robert Vaccaro, NRP; and Chief Steven Hinch
- *eMEDS® Update & CQI:* Jason Cantera, EMT-B; Holly Hathaway, FF/PM; Brian Blunt, Lt/PM
- *EMS Performance Measures:* Timothy Chizmar, MD

### Alternative Destination Pilot Protocol

With the guidance of the Protocol Review Committee, Dr. Chizmar developed the Alternative Destination Pilot Protocol for use by jurisdictional EMS operational programs. This protocol was approved by the EMS Board in June 2019 and will enable EMS clinicians to transport select patients to urgent care centers, crisis/stabilization centers, and primary care offices. Additionally, this pilot protocol enables Maryland's jurisdictional EMS operational programs to participate in the CMS Emergency Triage, Treat, and Transport (ET3) Model.

### Advanced Disaster Life Support Course

MIEMSS and the Maryland Regional National Disaster Life Support (NDLS) Coalition provided an Advanced Disaster Life Support (ADLS) program to the health care community on May 30 and 31, 2019. Dr. Richard Alcorta, retired State EMS Medical Director and retired Maryland Regional NDLS Coalition Medical Director, served as the course director. The Maryland Regional NDLS Coalition comprises MIEMSS, Johns Hopkins Critical Event Preparedness and Response, the Maryland Fire and Rescue Institute, the R Adams Cowley Shock Trauma Center, and the University of Maryland, Baltimore County's Center for Emergency Education and Disaster Research. There were eight participants who successfully completed the two-day ADLS course.

### The Maryland Medical Protocols for Emergency Medical Services Providers

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

- **Adult Tachycardia:** A significant revision to the algorithm has been made. Included in the changes is the removal of the need for medical consultation prior to the administration of diltiazem.
- **DNR/MOLST:** The list of acceptable procedures for DNR and MOLST B patients has been expanded to include the use of Magill forceps for obstructed airways and capnography.
- **Fentanyl:** Fentanyl has moved to the general patient care section, and morphine has moved to an optional supplemental protocol. The preferred route of administration for fentanyl will be intranasal.
- **Needle Decompression:** The flutter valve will be an optional piece of equipment. The preferred location will be moved from the midclavicular line to the anterior axillary line.

- **Medical Consultation Requirement:** Changes have been made to the consult requirement for priority 2 patients. Hospital notification versus medical consultation will be made based on the need for procedures or medication that requires physician approval.
- **Stroke:** The last known well time window has been moved from 3.5 hours to 20 hours, which has also been added to the required information to be relayed with a stroke alert communication to the hospital. This change aligns the Maryland Medical Protocol with the latest science regarding the care for stroke patients. A new exam for the detection of cerebellar stroke has been added (BE-FAST).
- **Tissue Donation:** Contact information for donor services has been added for reference.
- **Trauma Arrest:** The use of epinephrine for ADULT patients in traumatic arrest has been discontinued.

There are 47 base stations designated by the EMS Board. All physicians and nurses who will be answering a base station radio are required to successfully complete the MIEMSS-approved *Base Station Communications Course for Emergency Department Personnel and the 2019 Maryland EMS Updates for Hospital Base Station Personnel* training video, so that they can communicate with EMS providers and provide appropriate online medical consultation and direction. *MIEMSS' Base Station Communications Course for Emergency Department Personnel* was offered at multiple hospitals in FY 2019, resulting in 530 base station certificates issued to emergency department (ED) physicians and nurses. Additionally, five emergency department 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.

All of Maryland's jurisdictional EMS operational programs, the sub-divisions within jurisdictions, and Maryland hospitals and Freestanding Emergency Medical Facilities submit their cardiac arrest information to CARES. Statewide data for calendar year 2018 is now included on CARES National Report (see data on page 70).

A poster entitled "Statewide Survival in Maryland Following Pediatric Out-of-Hospital Cardiac Arrest," Seaman, Kevin, MD, McNally, Bryan, MD, et al., was presented at the National Association of EMS Physicians Conference in January 2019 in Austin, TX, by Kevin Seaman, MD. The data illustrated in the poster used the 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.

### Heroin and Opioid Crisis in Maryland

State EMS Medical Director Dr. Timothy 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 heroin, opioid, and fentanyl crisis in Maryland. Governor Hogan subsequently extended this declared State of Emergency by Executive Order. For its part, MIEMSS has implemented multiple strategies in effort to reduce morbidity and mortality related to opioid overdoses.

- Authorized EMR (basic life support) 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 "Building Resilience in the First Responder Community" as an OOC-sponsored webinar (Dr. Chizmar, November 2018)
- Ten 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 substance dependency.
- Encouraged EMSOPs to share identified opioid overdose information with local health officers so they can provide peer support and rehabilitation opportunities.
- Reporting limited 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 recent legislation.

## 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, help improve the availability of this vital service systemwide. 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 provider confidentiality at all times. Since January 2000, MIEMSS has tracked and responded to over 2,000 data requests.

## REGIONAL PROGRAMS

### Mission

*To provide leadership and support through cultivating strong relationships with EMS system stakeholders, ensuring that the Maryland EMS system is effectively prepared and responding to the emergency medical needs of the citizens of Maryland and surrounding areas.*

Regional Programs consists of five offices throughout the state that are responsible for monitoring the operation of the regional EMS system, acting as advocates for services through state policy development, and representing MIEMSS in the implementation and maintenance of these policies. Regional administrators are expected to be available to local resources to assist in large-scale responses, and, in many cases, are the first state representative on the scene. Additionally, Regional Programs supports the Emergency Operations office by participating in exercises, assisting in planned mass gatherings, and supporting emergency response efforts (see page 14 for the Emergency Operations report).

Regional Program’s priorities are to ensure the following goals are met:

- All emergency medical patients receive quality prehospital emergency medical care and are safely transported to the most appropriate facility;
- Maryland EMS professionals have the tools, resources, and training required to effectively manage an incident requiring the delivery of emergency medical services; and
- Maryland EMS operational programs (EMSOP) have the tools, resources, and training required to effectively manage the jurisdictional EMS systems.

### Regional EMS Advisory Councils

Each region has an EMS advisory council that facilitates coordination of EMS planning and activities among the regional jurisdictions. The councils provide a means for neighboring jurisdictions to collaborate on issues such as conferences, training, quality improvement processes, emergency response exercises, and mutual aid activities. On behalf of the advisory councils, regional office staff schedule meetings, manage records, research information, facilitate discussions, and represent MIEMSS at meetings.

### 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 page 26.

■ **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 2019, Regional Programs continued to support the HPP by representing 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 2019, 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

### MIEMSS Grant Disbursements (FY 2019) by Region

	50/50 Matching Fund Grant for AEDs, Monitor Defibrillators, and Upgrades	ALS Training Funds	Emergency Dispatch Programs	SHSGP	Totals By Region
Region I	\$46,790	\$28,000	\$0	\$30,145	\$104,935
Region II	\$50,772	\$28,000	\$8,762	\$29,548	\$117,082
Region III	\$130,966	\$98,000	\$8,500	\$96,266	\$333,732
Region IV	\$91,200	\$67,998	\$24,203	\$54,041	\$237,442
Region V	\$99,000	\$78,000	\$9,697	\$40,000	\$226,697
Total	\$418,728	\$299,998	\$51,162	\$250,000	\$1,019,888

with the Statewide EMS Services Advisory Council (SEMSAC). Projects concerning active assailant preparedness and incident management team development and training received top consideration for 2019 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 2019, 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.

Naloxone Grant	FY 2019 Grant Funding Distribution by Region
Region I	\$6,314.00
Region II	\$31,320.00
Region III	\$288,894.00
Region V	\$47,823.00
Total	\$374,351.00

■ **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.

### Medical Direction

■ **STEMI Designation and Planning.** All regional offices continue to work toward the rapid treatment and transportation of ST-elevation myocardial infar-

tion (STEMI) patients. Each region is collecting data on STEMI patients for quality assurance (QA) and quality improvement (QI) and to improve EMS-to-balloon times. As more patients are transported directly to a Cardiac Interventional Center (CIC), and transfer times from non-CIC hospitals improve, patient outcomes also improve.

■ **Base Stations.** Regional Programs serves as the lead on the management and oversight of the statewide EMS Base Station program, as required by COMAR Title 30. Each regional administrator is responsible for life-cycle management of the regional EMS base station programs.

■ **Regional Medical Directors.** Regional Programs staff members work with the MIEMSS regional medical directors to further develop regional EMS system performance and oversee the regional base station designation program.

### Communications Systems

Regional offices continue monthly testing of the digital emergency medical services telephones, including those in hospital emergency rooms and hospital command centers. Monthly testing identifies technical failures, which are then able to be repaired, and makes operational personnel more aware of their existence and purpose. Additionally, the regional offices coordinated hospital site surveys in support of a statewide EMS communications upgrade project.

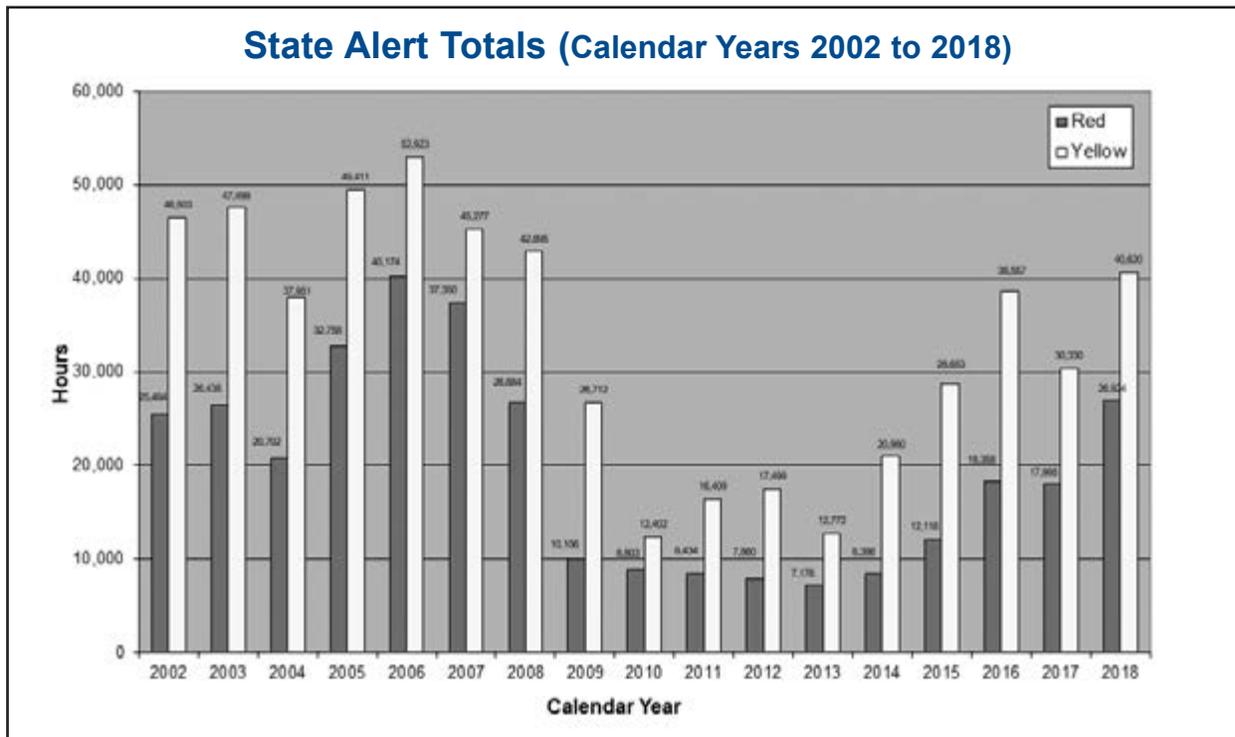
### Voluntary Ambulance Inspection Program

The regional offices continue to perform ambulance inspections under the Voluntary Ambulance Inspection Program (VAIP). These inspections are valid for two years and ensure that each unit is stocked with specific equipment and meets standards developed by the VAIP Committee. MIEMSS has standardized the process of inspection and interpretation of the standards. All regional offices cooperate to inspect units across the state to ensure consistent assessment. The statewide aggregate number of VAIP program certified units is annotated below:

- BLS Transport.....123
- BLS Non-Transport.....228
- ALS Transport .....211
- ALS Non-Transport .....80

### Conferences and Training

Regional Programs provides support to a number of statewide and regional EMS conferences and training opportunities. In FY 2019, these included Winterfest Conference, Miltenberger Emergency Services Seminar, EMS Care Conference 2019, and the ongoing EMS Clinician Ultrasound Training Program. Regional



Programs assisted in coordinating continuing education training for jurisdictions participating in the Prehospital Ultrasound pilot protocol.

In addition to conferences, the regional offices support many other innovative educational opportunities and provide resources and training for local educational programs and institutions. They often coordinate courses with community colleges, fire academies, and local hospital and association programs. Education committees and councils staffed by the regional offices facilitate networking among program coordinators and identify priorities for training.

#### Health and Medical Emergency Preparedness

The regional offices are the first line of response by MIEMSS to support local jurisdictions during significant emergency incidents and pre-planned mass gatherings. Internal policies and procedures were recently revised to improve incident notification to regional offices, the Field Operations Support Team, Emergency Operations, MIEMSS leadership, and other key support agencies.

#### ■ Health and Medical Preparedness Coalitions.

Each regional office is actively involved in Health and Medical Preparedness Coalitions in its respective region. During FY 2019, regional administrators assisted the coalitions and the Maryland Department of Health’s Office of Preparedness and Response with coordination of regional no-notice hospital evacuation and high-consequence infectious disease exercises.

#### ■ Hospital Availability and Alert Utilization.

MIEMSS monitors statewide alert activity via the County Hospital Alert Tracking System (CHATS) and generates quarterly reports comparing current alert utilization volumes with the past year’s. The alert categories available in CHATS are used to indicate whether a hospital emergency department is temporarily unable to accept certain ambulance-transported patients. Yellow alert, indicating emergency department overload, is the most frequently utilized alert category and has the most significant impact on EMS clinicians transporting patients. Hospitals and 9-1-1 centers use CHATS to post current status information and obtain alerts about other status changes. Alert activity for individual hospitals and across all MIEMSS regions are publicly available on MIEMSS’ website.

#### Annual Resources Survey

The regional programs division coordinates the Annual Jurisdictional EMSOP Resources Survey. In FY 2019, Maryland’s jurisdictional EMSOPs delivered emergency medical care with the below resources:

- BLS Transport Units .....248
- BLS Non-Transport Units .....142
- BLS Equipped Fire Apparatus.....650
- ALS Transport Units.....365
- ALS Supervisor Units.....37
- ALS Non-Transport Units.....29
- ALS Equipped Fire Apparatus .....140

# MARYLAND TRAUMA AND SPECIALTY REFERRAL CENTERS

<b>MARYLAND DESIGNATED ADULT TRAUMA CENTERS</b> (For explanation of differences in levels, see Trauma Center Categorization chart on page 31)		
<u>Primary Adult Resource Center</u> <ul style="list-style-type: none"> <li>R Adams Cowley Shock Trauma Center/ University of Maryland Medical Center, Baltimore City (MIEMSS Region III)</li> </ul>	<u>Level II Adult Trauma Centers</u> <ul style="list-style-type: none"> <li>Johns Hopkins Bayview Medical Center, Baltimore City (MIEMSS Region III)</li> <li>Prince George’s Hospital Center, Cheverly (MIEMSS Region V)</li> <li>Sinai Hospital, Baltimore City (MIEMSS Region III)</li> <li>Suburban Hospital–Johns Hopkins Medicine (JHM), Bethesda (MIEMSS Region V)</li> </ul>	<u>Level III Adult Trauma Centers</u> <ul style="list-style-type: none"> <li>Meritus Medical Center, Hagerstown (MIEMSS Region II)</li> <li>Peninsula Regional Medical Center, Salisbury (MIEMSS Region IV)</li> <li>Western Maryland Regional Medical Center, Cumberland (MIEMSS Region I)</li> </ul>
<u>Level I Adult Trauma Center</u> <ul style="list-style-type: none"> <li>The Johns Hopkins Hospital Adult Trauma Center, Baltimore City (MIEMSS Region III)</li> </ul>		
<b>OUT-OF-STATE HOSPITALS (with MOUs)</b>		
<ul style="list-style-type: none"> <li>Adult Trauma Center/Christiana Care Health System, Newark, DE</li> <li>Adult Trauma Center/MedStar Washington Hospital Center, Washington, DC</li> </ul>	<ul style="list-style-type: none"> <li>Adult Burn Center/MedStar Washington Hospital Center, Washington, DC</li> <li>Pediatric Trauma Center/Children’s National Medical Center, Washington, DC</li> </ul>	<ul style="list-style-type: none"> <li>Pediatric Burn Center/Children’s National Medical Center, Washington, DC</li> </ul>
<b>MARYLAND DESIGNATED SPECIALTY REFERRAL CENTERS</b>		
<u>Burn Centers</u> <ul style="list-style-type: none"> <li>Adult Burn Center/Johns Hopkins Bayview Medical Center, Baltimore City</li> <li>Pediatric Burn Center/Johns Hopkins Children’s Center, Baltimore City</li> </ul>	<ul style="list-style-type: none"> <li>Out-of-State Cardiac Interventional Centers                             <ul style="list-style-type: none"> <li>Bayhealth Kent General, Dover, DE</li> <li>Christiana Hospital, Newark, DE</li> <li>MedStar Washington Hospital Center, Washington, DC</li> <li>Nanticoke Memorial Hospital, Seaford, DE</li> </ul> </li> </ul>	<u>Comprehensive Stroke Centers</u> <ul style="list-style-type: none"> <li>The Johns Hopkins Hospital</li> <li>University of Maryland Medical Center</li> <li>Johns Hopkins Bayview Medical Center</li> </ul>
<u>Cardiac Interventional Centers</u> <ul style="list-style-type: none"> <li>Region I                             <ul style="list-style-type: none"> <li>Western Maryland Regional Medical Center</li> </ul> </li> <li>Region II                             <ul style="list-style-type: none"> <li>Frederick Memorial Hospital</li> <li>Meritus Medical Center</li> </ul> </li> <li>Region III                             <ul style="list-style-type: none"> <li>Anne Arundel Medical Center</li> <li>Carroll Hospital Center</li> <li>Howard County General Hospital, JHM</li> <li>Johns Hopkins Bayview Medical Center</li> <li>The Johns Hopkins Hospital</li> <li>MedStar Franklin Square Medical Center</li> <li>MedStar Union Memorial Hospital</li> <li>Sinai Hospital</li> <li>St. Agnes Hospital</li> <li>University of Maryland Medical Center</li> <li>University of Maryland (UM) Baltimore Washington Medical Center</li> <li>UM St. Joseph Medical Center</li> <li>UM Upper Chesapeake Medical Center</li> </ul> </li> <li>Region IV                             <ul style="list-style-type: none"> <li>Peninsula Regional Medical Center</li> <li>UM Shore Medical Center at Easton</li> </ul> </li> <li>Region V                             <ul style="list-style-type: none"> <li>Adventist HealthCare White Oak Medical Center</li> <li>Holy Cross Hospital</li> <li>MedStar Southern Maryland Hospital Center</li> <li>Prince George’s Hospital Center</li> <li>Shady Grove Adventist Hospital</li> <li>Suburban Hospital–JHM</li> </ul> </li> </ul>	<u>Eye Trauma</u> <ul style="list-style-type: none"> <li>The Wilmer Eye Institute/The Johns Hopkins Hospital, Baltimore City</li> </ul>	<u>Primary Stroke Centers</u> <ul style="list-style-type: none"> <li>Adventist HealthCare White Oak Medical Center</li> <li>Anne Arundel Medical Center</li> <li>Atlantic General Hospital</li> <li>Calvert Memorial Hospital</li> <li>Carroll Hospital Center</li> <li>Doctors Community Hospital</li> <li>Frederick Memorial Hospital</li> <li>Greater Baltimore Medical Center</li> <li>Holy Cross Germantown Hospital</li> <li>Holy Cross Hospital</li> <li>Howard County General Hospital–JHM</li> <li>Mercy Hospital Center</li> <li>Meritus Medical Center</li> <li>MedStar Franklin Square Medical Center</li> <li>MedStar Good Samaritan Hospital</li> <li>MedStar Harbor Hospital</li> <li>MedStar Montgomery Medical Center</li> <li>MedStar Southern Maryland Hospital Center</li> <li>MedStar St. Mary’s Hospital</li> <li>MedStar Union Memorial Hospital</li> <li>Northwest Hospital</li> <li>Peninsula Regional Medical Center</li> <li>Prince George’s Hospital Center</li> <li>Shady Grove Adventist Hospital</li> <li>Sinai Hospital</li> <li>St. Agnes Hospital</li> <li>Suburban Hospital–JHM</li> <li>University of Maryland Medical Center Midtown Campus</li> <li>UM Baltimore Washington Medical Center</li> <li>UM Charles Regional Medical Center</li> <li>UM Harford Memorial Hospital</li> <li>UM Shore Medical Center at Easton</li> <li>UM St. Joseph Medical Center</li> <li>UM Upper Chesapeake Medical Center</li> <li>Union Hospital of Cecil County</li> <li>Western Maryland Regional Medical Center</li> </ul>
<u>Hand/Upper Extremity Trauma</u> <ul style="list-style-type: none"> <li>The Curtis National Hand Center/MedStar Union Memorial Hospital, Baltimore City</li> </ul>		
<u>Neurotrauma</u> <ul style="list-style-type: none"> <li>Neurotrauma Center/R Adams Cowley Shock Trauma Center/University of Maryland Medical Center, Baltimore City</li> </ul>		
<u>Pediatric Trauma</u> <ul style="list-style-type: none"> <li>Pediatric Trauma Center/The Johns Hopkins Children’s Center, Baltimore City</li> </ul>		
<u>Perinatal Referral Centers</u> <ul style="list-style-type: none"> <li>Anne Arundel Medical Center</li> <li>Frederick Memorial Hospital</li> <li>Greater Baltimore Medical Center</li> <li>Holy Cross Hospital</li> <li>Howard County General Hospital–JHM</li> <li>Johns Hopkins Bayview Medical Center</li> <li>The Johns Hopkins Hospital</li> <li>MedStar Franklin Square Medical Center</li> <li>Mercy Medical Center</li> <li>Prince George’s Hospital Center</li> <li>St. Agnes Hospital</li> <li>Shady Grove Adventist Hospital</li> <li>Sinai Hospital</li> <li>University of Maryland Medical Center</li> <li>UM St. Joseph Medical Center</li> </ul>		
<b>POISON CONSULTATION CENTER</b>		
<ul style="list-style-type: none"> <li>Maryland Poison Center/University of Maryland School of Pharmacy, Baltimore City</li> </ul>		

# DESIGNATED TRAUMA CENTER CATEGORIZATION

Differences in Standards Based on Physician Availability and Dedicated Resources	PARC	Level I	Level II	Level III
Attending 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	
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	
On-call Anesthesiologist with CRNA who is in the hospital				X
Orthopaedic Surgeon in the hospital at all times and dedicated to trauma care	X			
Orthopaedic Surgeon in the hospital at all times but shared with other services		X		
On-call Orthopaedic 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		
Outreach Professional Education	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 6,210 primary trauma patients from June 1, 2018, through May 31, 2019, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Over this 12-month period, 89% of patients admitted to the Shock Trauma Center arrived by ground transportation and 11% arrived by air. Demographic data obtained indicate that the majority of admissions were male (66%) and aged 15-35 years (40%), followed by patients aged 56 or older (29%) and 36-55 (28%).

#### Mission

*The 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, MBA, MS, RN, NEA-BC, FAAN

#### Center for Hyperbaric Medicine

The Center for Hyperbaric Medicine is the state-wide referral center for individuals who experience decompression sickness, carbon monoxide poisoning, smoke inhalation, delayed effects of radiation treatment, non-healing wounds, and/or gas gangrene. It is internationally recognized for its leadership and expertise in the clinical application of hyperbaric therapy. In FY 2019, therapeutic hyperbaric oxygen treatment was provided during dive hours, of which 33 dive hours were an emergency (0.7%), 1,663 were inpatients (35.7%), and 2,969 were outpatients (63.7%).

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.

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.

### The GO-TEAM

RACSTC maintains an advanced resuscitative team, the GO-TEAM, that 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 prehospital emergency care clinicians. Each dispatched GO-TEAM includes an attending physician and a certified nurse anesthetist. In FY 2019, there were 16 requests for the GO-TEAM, with five deployments.

### Center for the Sustainment of Trauma and Readiness Skills

Since 2001, U.S. Air Force Medical Service personnel have traveled to Baltimore for training at the U.S. 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.

### FY 2019 Annual Report

■ **Notable Accomplishments.** Through a collaboration with University of Maryland Medical Center's (UMMC) infection control, an initiative to reduce particular infections was recently undertaken by RACSTC. A multifaceted approach for every central line associated blood stream infection incident was developed, in addition to a root cause analysis performed by staff, the medical director, nurse manager, and clinical nurse specialist. Additionally, an eradication protocol has been implemented to reduce methicillin-resistant staphylococcus aureus (MRSA) bacteremia in the hospital setting.

Three members of RACSTC contributed to the *Society of Trauma Nurses' Trauma Certified Registered Nurse (TCRN) Study Guide*. In addition, staff members of the Trauma Resuscitation Unit

created a TCRN review course, on which they regularly present. Fifty nurses on RACSTC staff hold TCRN certification.

Reporting from the Maryland State Trauma Registry has been increased to more clearly identify preventability of complications, and the death review database has been incorporated into the Trauma Registry. RACSTC now submits Registry data to the National Trauma Databank and the American College of Surgeons Trauma Quality Improvement Program.

■ **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 continuously 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 2019, CIPP presented 447 events reaching 32,168 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 abuse; 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 to stop life-threatening bleeding with tourniquet application and wound packing.

The Stop the Bleed program has completed over 160 events, training more than 4,920 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 2019, evening educational programs open to EMS clinicians and nurses were held three times and linked via live broadcast to 24 remote sites across the state. Many EMS clinicians participated in an ALS airway course, offered 10 times in FY 2019, that includes 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 developed a robust educational schedule and has built environments to mimic every phase of patient care within the primary adult resource center. Certification courses and advanced trauma courses are open to providers outside of RACSTC.

Over 800 classes a year with more than 10,000 contact hours are conducted at RACSTC. 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.

■ **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 multiply 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 2019, 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".

■ **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. JHH treated 1,702 trauma patients from June 1, 2018, through May 31, 2019, according to the Maryland State Trauma Registry. (See pages 75 to 80 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, RN, TCRN

## FY 2019 Annual Report

■ **Notable Accomplishments.** The Johns Hopkins Hospital is ranked #3 among top hospitals in the nation for patients of all ages, based on U.S. News and World Report's 2019-2020 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.

Kent Stevens, MD, MPH, FACS, was appointed as the Director of Adult Trauma Services, effective February 1, 2019. Dr. Stevens joined the Department of Surgery at Johns Hopkins in 2008 following completion of a Trauma / Surgical Critical Care Fellowship at the R Adams Cowley Shock Trauma Center at the University of Maryland in Baltimore.

David Efron, MD, FACS, was appointed as the Vice Chair for Acute Care surgery and Clinical Care Integration effective December 1, 2018. Dr. Efron serves as 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 oversees integration of clinical services in acute care surgery and trauma at Howard County General Hospital, Suburban Hospital (Level II Trauma Center), East Baltimore, and Bayview.

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 has been selected to be a 2019–2020 National Academy of Medicine and Robert Wood Johnson Foundation Health Policy Fellow. In this capacity, Dr. Sakran will focus on developing health-related legislative and regulatory issues with members of Congress and the executive branch. Dr. Sakran is also an elected member of the Board of the Brady Campaign to Prevent Gun Violence, and recently completed the Presidential Leadership Scholars program.

Elliott R. Haut, MD, PhD, FACS, Vice Chair of Quality, Safety, and Service for the Department of Surgery, is the President of the Eastern Association for the Surgery of Trauma (EAST) and serves as Chair of Maryland TraumaNet. He was a member of the recently completed National Quality Forum (NQF) panel on Trauma Outcomes.

Christian Jones, MD, is the Assistant Program Director, and the Acute Care Surgery Fellowship Director.

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 redesignation in 2008, 2013, and 2018.

■ **Quality Management and Improvement.** Johns Hopkins Hospital continues to be a leader in the field of quality and safety. Dr. Elliott Haut, as 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 AHRQ has used Dr. Haut's 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 continues to gain momentum with JHH professionals having taught well over 1,000 individuals in Baltimore and the surrounding communities. Dr. Matthew Levy, Senior Medical Officer for the Hopkins Center for Law Enforcement Medicine and an Emergency Medicine Attending, has worked on designing the Stop the Bleed 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). Johns Hopkins Adult Trauma Center, in partnership with the Maryland Committee on Trauma, filmed a Stop the Bleed public service announcement that aired during National Stop the Bleed Month in May 2019.

JHH held its second annual Trauma Survivors Day Celebration on May 10, 2019. Three former trauma patients were celebrated for their remarkable recoveries from severe injuries. Maryland State Police paramedics and members of the care team provided professional and personal accounts of their roles in each patient's journey to recovery.

JHH held its annual Falls Prevention Awareness Fair on September 10, 2018. This year's fair combined the efforts of JHH Central Nursing, JHH Adult and Peds Trauma, and the Johns Hopkins Wilmer Eye Institute to prevent falls within the community as well as for hospitalized patients. This year's event focused on falls prevention education, safe patient handling and mobility, and risk reduction strategies

As part of a statewide injury prevention initiative, JHH held a Road Safety Fair on April 10, 2019. Collaborating with JH Peds Trauma and the Maryland State Police, the event focused on prevention of distracted, impaired, and drowsy driving, and featured distracted driving crash data, evidence-based prevention programs, and information on state driving laws.

Prevention of gun violence at the local, state, and national level 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. He has testified before Congress at the House Judiciary Committee hearing on HR8, the bipartisan legislation to enact universal background checks. 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 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, has been named the Region III medical director of 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, M.D., M.P.H., 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.

Kathy Noll, MSN, TCRN, continues to serve as the Treasurer for Trauma Net, and the Maryland State Chair for the Society of Trauma Nurses.

Trauma Education continues as a priority for the trauma center. Trauma attending physicians at JHH teach Advanced Trauma Operative Management, Advanced Trauma Life Support, Advanced Surgical Skills for Exposure in Trauma, and Rural Trauma Team Development courses. Many of the trauma physicians were also invited speakers at over 40 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, providers 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 – Dr. Peter Pak and Dr. Robby Syed. Dr. Jana Hambley who will also be returning to finish her trauma fellowship after completing a year of surgical critical care. Trauma fellows provide trauma, emergency general surgery, and critical care coverage at both JHH and JHBMC. Dr. Pamela Lipsett directs the Surgical Critical Care fellowship with assistance from Dr. Christian Jones, the Associate 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, pre-hospital trauma care, and gun violence prevention. Trauma research resulted in over 75 peer-reviewed publications this past academic year.

This past year Dr. Sakran had a dedicated full-time Research Fellow, Dr. Hiba Ezzeddine. Dr. Ezzeddine was extremely productive and published numerous original scientific research. In addition she helped Dr. Sakran to spearhead the Patient Reported Outcome Measure – Consensus Conference for the American College of Surgeons. This two day conference in Washington D.C. was the first of its kind bringing together a multi-disciplinary team in order to develop some guidelines as to how best to approach long-term outcomes in injured patients. The proceedings will be published in the next few months, which will then be followed up by an implementation phase across the country. Dr. Haut was senior author of “Prehospital Mode of Transport and Mortality in Penetrating Trauma” which was cited as the “article of the year” for 2018 in *JAMA-Surgery*.

JHH maintains a unique collegial relationship with the 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.

Hypothermia in trauma patients is associated with an increase in inpatient mortality. Nurses Kathy Noll, Judy Schroeder, and Zakk Arciaga sought to identify patients with missing or delayed temperature readings on arrival to the ED. Their work, focused on improving temperature capture as part of a performance improvement initiative, was presented at a poster session at the Society of Trauma Nurses 2019 annual conference.

■ **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 2,499 trauma patients from June 1, 2018, through May 31, 2019, according to the Maryland State Trauma Registry. (See pages 75 to 80 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:*

Marie Dieter, MSN, MBA, RN, CEN, TCRN

#### **FY 2019 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.

Expanding the knowledge of front-line nurses at JHBMC is crucial to improving patient outcomes. JHBMC continues 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). Dr. Fang continues to be an Advanced Trauma Life Support Course Director and Instructor for courses offered through the Maryland COT.

Involvement with state trauma committees continues to be a priority for the JHBMC Trauma Program. In December 2018, Ms. Dieter was elected to the Vice-Chair position of TraumaNet, the States' Trauma Advocacy group.

#### ■ **Quality Management and Improvement.**

JHBMC's quality management evaluation process continuously reviews patient care and outcomes at the individual and system level. Participation from multidisciplinary trauma care departments (emergency, trauma surgery, orthopaedic surgery, and neurosurgery) is essential for an effective quality management program. The trauma center at JHBMC formally identified departmental liaisons from specialties defined by COMAR, both surgical and non-surgical, to enhance and strengthen the program.

During the past year, JHBMC noted an increase in penetrating trauma cases. Accordingly, it reviewed the utilization of its massive transfusion protocol (MTP) and the volume of blood components transfused in the care of these patients. JHBMC will be implementing thromboelastography as part of our management of the trauma patient. This diagnostic laboratory study will allow us to provide goal-directed blood product replacement therapy to the trauma patient.

#### ■ **Injury Prevention Programs and Initiatives.**

In FY 2019, JHBMC focused on injury prevention initiatives for the two most common injury mechanisms presenting at the trauma center: falls and motor vehicle crashes. The September 2018 Fall Prevention Awareness event provided information to community members focusing on the risks related to falls and prevention strategies in the home.

JHBMC Trauma Center staff hosted an information fair on Distracted Driving Prevention Awareness Day, April 3, 2019, an initiative of the TQIC. JHBMC partnered with Johns Hopkins Wilmer Eye Trauma Center and Union Memorial Hand Trauma Center for this event.

As part of the nationwide Stop the Bleed campaign, JHBMC has delivered hemorrhage control training to hospital staff, local EMS, and the public. The educational goals of this campaign are to train laypersons to recognize the presence of potential life-threatening hemorrhage and to know the basic interventions to control the bleeding, including the use of tourniquets.

■ **Emergency Medical Services and Nursing Continuing Education.** JHBMC supported semiannual education for EMS clinicians with presentations

at two full-day, on-site educational seminars in FY 2019. JHBMC offers nursing trauma care education at unit level in-services and during an annual fall seminar, and physician education is facilitated through support of multiple conferences. JHBMC also supports MCOT's educational programs by providing instructors and course directors for ATCN and Advanced Trauma Life Support.

■ **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 Prince George's Hospital Center**

3001 Hospital Drive, Cheverly, Maryland  
MIEMSS Region V

University of Maryland 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 3,367 trauma patients from June 1, 2018, through May 31, 2019, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) The adult trauma center at UMPGHC is the second busiest trauma center in Maryland.

#### **Mission**

*The University of Maryland 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, providing highly specialized services to a broad community, and building a work 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 (interim):*

Gabriel Ryb, MD, MPH, FACS

*Adult Trauma Program Manager:*

Dawn Moreland, BSN, RN, TCRN

### **FY 2019 Annual Report**

■ **Notable Accomplishments.** In FY 2019, UMPGHC welcomed an additional trauma/acute care surgeon; held its second annual 5K/10K Trauma Trek fundraiser during Trauma Awareness Month in May; and continued to partner with community leaders and residents of Prince George's County and Washington, DC, to support the Capital Region Violence Intervention Program (CAP-VIP), the area's leading hospital-based violence intervention program to reduce trauma recidivism. Trauma Services also hosted its second annual college summer internship for students interested in the Health Sciences, which exposed them to various opportunities within the hospital setting and validated their interest in medicine.

■ **Quality Management and Improvement.** UMPGHC Trauma Services continues to improve its performance and quality management processes by incorporating best practices, practice management guidelines, and clinical expertise through a multidisciplinary approach. Educational sessions, comprehensive case reviews, and strong collaborative efforts with Emergency, Anesthesia, Orthopaedic, Vascular, Intensive Care, and other departments support our dedication to improving the quality, timeliness, and outcomes of patient care.

Partnering with the UMPGHC Quality Performance Improvement Committee, Medical Staff Quality Oversight Committee, and Annual Operating Plan Committee enables Trauma Services to have an overall institutional commitment to the future of trauma care and ensures access to necessary resources to provide quality care to the injured patient.

■ **Injury Prevention Programs and Initiatives.** Initiatives in FY 2019 were primarily related to providing awareness and education on safety and preventing injuries from falls to community recreation centers and senior living facilities through multidisciplinary partnerships with Physical Medicine and Rehabilitation.

Multiple education and awareness activities for violent crimes and motor vehicle crashes from distracted, drowsy, and under the influence driving were also conducted throughout the year to the community as well as hospital staff and visitors.

UMPGHC participated in the 26<sup>th</sup> Annual NBC4 Health and Fitness Expo by conducting prevention and awareness activities and demonstrating hemorrhage control techniques supporting the nationwide Stop the Bleed campaign. UMPGHC continues to provide bleeding control education throughout the area to public and private institutions.

■ **Emergency Medical Services and Nursing Continuing Education.** UMPGHC offers on-going education to nursing staff for the care of the injured patient to include an orientation to the care of the injured patient, Trauma Nursing Core Course (TNCC), Trauma Care After Resuscitation (TCAR), and multiple unit-specific, online and in-house extended-learning opportunities. UMPGHC also continues to expand its program with medical students, residents, and fellows from local, regional, and international institutions.

Emergency Medical Services education is constant with all providers during patient hand-off, patient follow-up, and during Trauma Collaborative Committee meetings, and is supported by leaders of the Trauma Center and EMS to ensure and enhanced partnerships.

■ **Research.** UMPGHC supports internal multidisciplinary research by providing data from the trauma registry and will be initiating new projects and collaborative research in the near future.

■ **Rehabilitation.** The Laurel Regional Hospital Physical Rehabilitation Center relocated to UMPGHC, enhancing the in-hospital program that offers physical, occupational, and speech-language therapy. The Acute Care Rehab and Gladys Spellman Chronic Care Vent units also relocated, creating additional opportunities for internal long-term care.

## ***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 1,951 trauma patients from June 1, 2018, through May 31, 2019, according to the Maryland State Trauma Registry. (See pages 75 to 80 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 continued leadership of President/Chief Operating Officer Jonathan Ringo, MD, 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.ch 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 2019 Annual Report

■ **Notable Accomplishments.** In July 2019, the Trauma Center at Sinai successfully completed the recertification process and was reissued full designation as a Level II trauma center. Sinai's trauma services closely collaborated with other hospital departments to build relationships and created expectations for accountability to best serve our trauma patients.

Sinai's trauma program went through several leadership changes over FY 2019. James Gannon, MS, RN, CEN, has assumed the position of Trauma Program Manager. He has spent numerous years as a member of the Sinai ER-7 team, most recently serving in an Assistant Nurse Manager role. James also spent time working as a Charge Nurse at Carroll Hospital Center and as a staff nurse with the Maryland-1 team for the National Disaster Medical Assistance Team (DMAT). He has spent time working in Level I trauma centers across the country and has a passion for trauma, disaster response and emergency preparedness; he was also a member of Sinai's Multi-Disciplinary Trauma Committee.

■ **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 begun working closely with the Kujichagulia Center to identify trauma patients who are victims of street violence. Through this partnership, trauma patients with violent or criminal lifestyles are identified and the SVIP team intervenes to offer them safety, positive and productive growth opportunities, and any support the individual may need.

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 system and branched out into the community, training Baltimore County Public School faculty and other public and private institutions in the Baltimore metropolitan area.

As a member of TraumaNet, Sinai is actively involved in state legislation that affects trauma patients and trauma care providers.

■ **Quality Measures and Improvement.** Sinai trauma services continue to be active in quality improvement initiatives. Partnering with a hospital-based quality team and various 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 FY 2019, the division of trauma at Sinai worked closely with the neurosurgery and orthopedic departments to improve communication and timely response, optimizing the care provided to patients in need of trauma care. Trauma activation terminology was modified to ensure the right patient is receiving the right care at the right time. Sinai also updated the Massive Transfusion Protocol to provide best evidence-based practice to our patients needing emergent blood product administration. Through the Maryland Trauma Physician Services Fund Equipment Grant, Sinai was able to purchase a TEG 6s Thrombelastograph® system. A point of care blood analyzer which provides comprehensive and accurate identification of an individual's hemostasis condition. This allows for real-time, personalized, clinically and economically sound treatment for patients requiring blood products during their treatment.

■ **Emergency Medical Services and Nursing Continuing Education.** In FY 2019, Sinai worked on expanding 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 has expanded to include hands-on training exercises such as Stop the Bleed and a mass casualty exercise. The conference is scheduled for early November 2019.

In collaboration with Sinai's Emergency Preparedness Coordinator, Sinai's Division of Trauma actively participates in ongoing emergency preparedness and disaster response training. In FY 2019, this included advanced National Incident Management System (NIMS) - FEMA training and Medical First

Receiver Operations Training in Hazardous Waste Operations and Emergency Response (HAZWOPER).

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 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 receive 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.** LifeBridge Health 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 are 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 1,439 trauma patients from June 1, 2018, through May 31, 2019, according to the Maryland State Trauma Registry. (See pages 75 to 80 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

### **Fiscal Year 2019 Report**

■ **Notable Accomplishments.** Suburban Hospital is currently undergoing a campus-wide transformation, including a 300,000 sq. ft. addition, a parking garage and dedicated ambulance driveway with direct access to the Emergency Department (ED) entrance, and the relocation 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 suite, 108 new private patient rooms with enhanced infection control and patient privacy are under construction. The transformation plan project is on target to be completed by the beginning of 2020.

Suburban joined the national Stop the Bleed campaign in September 2016, made possible through donations from the Wolpoff Family Foundation. These funds enabled purchasing of training mannequins and tourniquets. Also, wall-mounted Stop the Bleed kits were purchased and placed strategically throughout the hospital. Suburban trauma staff have trained over 400 community residents, hospital employees, physicians, staff members of the Department of Surgery, and the Nursing Professional Development Council.

■ **Quality Management and Improvement.** In an effort to identify opportunities for improvement at all levels, a comprehensive review process at Suburban includes a review of each 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 are presented at the monthly multidisciplinary trauma Morbidity and Mortality Conference.

■ **Injury Prevention Programs and Initiatives.** In addition to a Fall Prevention Fair held in September 2018 and a Distracted Driving Awareness campaign held in April 2019, Suburban participated in multiple statewide injury-prevention activities in FY 2019.

Of note, Suburban participated in a drug and alcohol education series for high-risk youth. In addition to discussing the effects of alcohol and drugs with the young participants, Suburban's trauma nurses highlight the consequences of poor decisions and dangerous behaviors, which often land them in the trauma bay.

■ **Emergency Medical Services and Nursing Continuing Education.** Suburban's Emergency Department continues to be a training site for pre-hospital care clinicians through an agreement with the Montgomery County Training Academy and Montgomery County Community College.

In June 2019, Suburban's annual four-hour seminar "Critical Issues in Trauma" was offered at Johns Hopkins University's Montgomery County Campus. This program, which included speakers from other academic medical centers, was presented free of charge to the region's trauma community. Approximately 200 trauma care professionals, including physicians, registered nurses, physician assistants, and EMS clinicians, were in attendance.

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

■ **Research.** Suburban continues to participate in the National Institutes of Health's 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 on-site 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 1,734 trauma patients from June 1, 2018, through May 31, 2019, according to the Maryland State Trauma Registry. (See pages 75 to 80 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 2019 Annual Report**

■ **Notable Accomplishments.** In FY 2019, Meritus Medical Center (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 April, MMC trauma center staff participated in Distracted Driving Prevention Awareness Day, an initiative of the Maryland Trauma Quality Improvement Committee. Staff members reached out to more than 100 people about the dangers of this risky behavior. 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 2018. Notably, MMC's car seat program assisted with 89 car seat checks throughout the year, and its loaner program provided 42 car seats to families in need of a passenger safety seat. Stop the Bleed classes were held throughout the region, reaching approximately 760 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.

■ **Injury Prevention Programs and Initiatives.**

In FY 2019, 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. Again this year, MMC organized an annual kids' safety art contest for Washington County students in grades pre-K to 5.

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.

■ **Emergency Medical Services and Nursing Continuing Education.** In FY 2019, 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 their 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 1,361 trauma patients from June 1, 2018, to May 31, 2019, according to the Maryland State Trauma Registry. (See pages 75 to 80 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 2019 Annual Report**

■ **Notable Accomplishments.** In July 2018, Kari Cheezum was elected as co-chair of the MD Trauma Quality Improvement Committee. In May 2019, she became the chair of the committee. PRMC was awarded two grants, \$2000 from Pediatric Childress Institute and \$1000 from Maryland Trauma Net which was used to purchase Stop the Bleed kits and provide training for public and private schools in Wicomico, Worcester, and Somerset Counties. Each of the schools that completed the training, received one Stop the Bleed kit for the school.

In May 2019, PRMC held the first annual Trauma Survivor's Dinner. The event was well received by staff and past survivors in attendance and we look forward to future celebrations. In January of 2019, the one-call transfer center opened and is staffed 24 hours a day. The staff works closely with referring healthcare providers to provide high quality, collaborative care when transferring trauma patients to our institution.

■ **Quality Management and Improvement.** PRMC has been working on several quality improvement initiatives this past year. A trauma scorecard metric was developed based on the quality indicators tracked through trauma PI. This scorecard is posted on the KPI board within the Emergency Department, as well as sent out in the weekly Emergency Department newsletter, reviewed at the monthly trauma PIPS meeting and quarterly committee meetings. Based on over tri-

age data, an algorithm was developed to help triage guidelines for the anticoagulated head trauma patient. 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.

#### ■ **Injury Prevention Programs and Initiatives.**

PRMC continues to coordinate and participate in community-based injury prevention initiatives. In fall 2018 PRMC partnered with the MAC center and participated in a statewide fall injury prevention initiative, and in April 2019 trauma center staff participated in the third statewide injury prevention initiative focused on distracted driving awareness and prevention, an initiative of the Maryland Trauma Quality Improvement Committee. 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 Health Care Conferences over the past year.

Working with the ATS Maryland Division and local communities, PRMC continues to hold wellness events for the public. For the past seven years, staff have utilized TraumaRoo to deliver injury prevention education to children at the Maryland State Firemen's Association's Annual Convention and Conference in Ocean City. 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 Crown Sports Summer Camp, and several other community events. Trauma staff also received bike helmets and provided helmets and safety education to children and families. In FY 2019, staff members also attended the Critical Care Symposium and American Association of Critical Care Nurses Conference to highlight local hospitals and EMS companies located in MIEMSS Region IV. They also continue to be active members of the Ocean City Pedestrian Safety Task Force, which focuses on improving pedestrian safety throughout Worcester County.

#### ■ **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, which is in its 29<sup>th</sup> 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 2019, PRMC continued to provide educational classes, such as Advanced Life ALS Skills and paramedic recertification's/ refreshers, to EMS providers 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***

#### **Western Maryland Regional Medical Center**

12500 Willowbrook Road, Cumberland, Maryland  
MIEMSS Region I

Western Maryland Regional Medical Center (WMRMC), part of Western Maryland Health System, is a designated Level III Adult Trauma Center serving Allegany and Garrett Counties. WMRMC treated 498 trauma patients from June 1, 2018, to May 31, 2019, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Adult trauma services at WMRMC are provided by the Emergency Department.

#### **Mission**

*Western Maryland Health System is dedicated to providing patient-centered care and improving the health and well-being of people in the communities it serves, with the visionary goal of shaping dynamic partnerships in advancing health and well-being. The hospital mission and vision are carried out through its 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 2019 Annual Report

■ **Quality Management and Improvement.** In FY 2019, trauma services at WMRMC implemented several new pathways of care and policies to standardize patient care and improve patient outcomes based on evidence-based best practices. WMRMC recently enrolled in the American College of Surgeons Trauma Quality Improvement Program in an effort to streamline and benchmark quality.

WMRMC'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, WMRMC 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, Maryland Region I & II Healthcare Council, and the MIEMSS Region I Prehospital Care and Quality Improvement Committee.

■ **Injury Prevention Programs and Initiatives.** In support of a nationwide campaign to provide education in hemorrhage control, WMRMC partnered with 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 51 current instructors serving the requests for the Stop the Bleed program.

WMRMC also participated in Distracted Driving Prevention Awareness Day in April 2019, an initiative of the Maryland Trauma Quality Improvement Committee.

WMRMC 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.** WMRMC 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. Also offered are R Adams Cowley Shock Trauma Center telelink classes, cadaver lab clinical competency for physicians, and an annual trauma seminar at Miltenberger Emergency Services Seminar. WMRMC educational offerings also include skills training for nurses, emergency department technicians, and EMS clinicians, as well as multidisciplinary case reviews and weekly instruction by a visiting professor.

■ **Rehabilitation.** The 13-bed Comprehensive Inpatient Rehabilitation Unit, located within Western Maryland Health System, 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.

Western Maryland Health System 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 2,345 trauma patients in FY 2019.

### **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 2019, JHBMC treated 851 patients – 300 inpatients and 550 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, BSN, RN

### **FY 2019 Annual Report**

■ **Notable Accomplishments.** In FY 2019, 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 improving sleep hygiene, decreasing pain, and improving functional outcomes of burn patients. In addition, the research program of the Johns Hopkins Burn Center is robust, with multiple peer-reviewed publications each year. The Burn Center also serves a vital role in educating about burn care through educational offerings for prehospital and hospital-based clinicians.

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 2019, the Burn Center reinigorated its comprehensive unit-based safety program (CUSP) committee. This nurse-led multidisciplinary committee works to improve patient safety and outcomes in the Burn Center.

■ **Quality Management and Improvement.** The Burn Center implemented a new system for tracking and responding to a variety of quality improvement metrics including time to the operating room, hospital-acquired 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. Thomas McLhinney plays a vital role in burn prevention programs in his position as a Community Program Manager.

In FY 2019, 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 state-wide health and safety fairs.

■ **Prehospital/EMS/Nursing Continuing Education.** Prehospital clinician education includes Advanced Burn Life Support Courses coordinated at our institution biannually. Our instructors also teach courses throughout the region and country. The Burn Center offers an EMS/Firefighter Burn Course throughout the region for prehospital providers. 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.

Finally, the Burn Center offers rotation time within the Burn Center for EMS students.

Clinical education for health care 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 dietitian 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 include:

- Reduction in bioburden in the Burn Center
- Classification and Prognostic Factors in Inhalation Injury
- Validation of the Defense and Veteran Pain Rating Scale (DVPRS)
- A Quality Improvement Project: UV Light Technology for MRSA Decolonization of the Burn Unit
- Evaluating Pressure Redistributing Surfaces for Prevention of Sacral Pressure Injuries
- Fluconazole for Fungal Prophylaxis in the Burn Intensive Care Unit: A Medication Use Evaluation
- Use of telemedicine in the Burn Center
- Impact of spirituality in the burn patient
- Impact of homelessness on outcomes of the burn patient

The Burn Center publishes its findings and presents at various local, regional, and national conferences. In 2018, Burn Center staff were invited to present at the ABA Conference, the Mid-Atlantic Region Burn Conference, the Eastern Great Lakes Burn Conference,

the Armstrong Institute Symposium, and the AACN Chesapeake Chapter Conference. Staff also wrote textbook chapters and published in various peer-reviewed journals, including *The Journal of Burn Care and Research*, *BURNS*, *Eplasty*, and *Plastic and Reconstructive 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 300 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.

In FY 2019, 59 patients were referred for outpatient therapy. On average, a burn outpatient participates in therapy four days a week, for 1-1.5 hours of therapy each time.

## *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:*

Katie Hollowed, BSN, MSN

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 926 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 1,020 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 adjacent regions. JHCC treated 753 trauma-injured children from June 1, 2018, through May 31, 2019, according to the Maryland State Trauma Registry. (See pages 81 to 83 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 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 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

*Pediatric Injury Prevention Coordinator:*

Beatrice Braithwaite, MPH

#### **FY 2019 Annual Report**

■ **Notable Accomplishments.** *U.S. News & World Report* ranked JHCC #9 in the nation on its 2019–20 Best Children's Hospitals Honor Roll. As in previous years, the Children's Center ranked among the top children's hospitals in all 10 specialties surveyed by *U.S. News & World Report*. Eight specialties ranked among the top 20 nationally, with four in the top 10 and one in the top five.

Hopkins maintains its Magnet designation from the American Nurses Credentialing Center. This designation represents the gold standard for nursing excellence, innovation and high quality patient care shown by its nurses.

The Johns Hopkins Pediatric Trauma Program held its 1st annual trauma survivors day on May 10, 2019, along with the adult trauma program. A former pediatric patient was honored for his courage and strength as he recovered from severe injuries. Many providers, including doctors, nurses and child life therapists, shared their accounts of how patients actually are their inspiration.

■ **Quality Management and Improvement.** The pediatric trauma performance improvement (PI) program at JHCC had another productive year.

■ **Injury Prevention Programs and Initiatives.** JHCC has a robust injury prevention program, offering services to its patients, families, and the community. Multidisciplinary teams of child passenger safety technicians (CPSTs) are available to provide car seat fittings and assist with on-site installations.

New this year, the pediatric trauma program held a Gun Safe Storage event on June 21, 2019. Working with the Johns Hopkins Center for Gun Policy and Research, a division of the Johns Hopkins Bloomberg School of Public Health, an event was held and covered by the media. Maryland State Police provided education on storing guns safely. Locks and lock boxes were made available through a grant from the Maryland Trauma Network. Local high school students participated in a poster competition.

Again, this year the pediatric trauma center co-hosted two events with the adult trauma center. Road Safety Day, held on April 19, 2019, focused on distracted driving prevention and education. The annual Falls Prevention Awareness Day, held on September 20,

2018, provided educational information on preventing injuries from pediatric falls and distributed tools to help keep children safe from falls.

The pediatric trauma center also has a strong bike safety and helmet distribution program. The team focuses on proper helmet wear, safe bike riding behaviors, and traumatic brain injury prevention. A study was just concluded evaluating the efficiency of the program.

■ **Emergency Medical Services and Nursing Continuation Education.** 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. Trauma staff provide ongoing education and case reviews to referring facilities.

Senior paramedic students at UMBC are provided with three pediatric rotations in the pediatric emergency department learning pediatric trauma and emergency care of children. 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 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.** 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. The Children's Center 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 team maintains an active role in national and international trauma meetings, and several members present their research projects in these meetings ultimately leading to manuscript submission and publication. Basic science trauma research is also an important tenet of the program, whereby 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 outcomes of injury prevention efforts, in addition to evaluating care transitions and teamwork in pediatric trauma activations. More importantly, we encourage multi-disciplinary collaborations amongst different specialties with the ultimate goal of improving the overall care of our pediatric trauma patients.

■ **Rehabilitation.** JHCC has a state-of-the-art pediatric rehabilitation program that offers inpatient rehabilitation and comprehensive outpatient services. In addition to our injury prevention coordinator, therapists are also certified child passenger safety technicians and support the injury prevention program. JHCC collaborates with the Kennedy Krieger Institute and Mount Washington Pediatric Hospital for children needing inpatient rehabilitation.

## *Pediatric Trauma Center*

### **Children's National Medical Center**

111 Michigan Avenue, NW, Washington, DC

Children's National Medical Center (CNMC) 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. CNMC treated 950 trauma-injured children, including 637 of who reside in Maryland, from June 1, 2017, through May 31, 2018, according to the Maryland State Trauma Registry. (See pages 84 to 87 for additional patient data.) There were 285 children from Maryland treated in the Trauma Code Room. ) Pediatric trauma services at CNMC are provided by the Division of Emergency Trauma and Burn Surgery.

#### **Mission**

*At Children's National Medical Center, 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 Medical Center.*

## Pediatric Trauma Center Staff

*Pediatric Trauma Medical Director:*

Randall S. Burd, MD, PhD

*Pediatric Trauma Program Manager:*

Jennifer Fritzeen, MSN, RN

## FY 2019 Annual Report

■ **Notable Accomplishments.** In FY 2019, CNMC continued a five-year partnership with the Cerner Corporation as the lead hospital in the development of Cerner's electronic trauma flowsheet. An 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. CNMC and Cerner plan to launch the trauma flowsheet in early FY 2020 as the first Cerner-based trauma center to go live with electronic documentation.

Randall Burd MD, PhD, is serving a one-year term as the President of the Pediatric Trauma Society. The Pediatric Trauma Society is a professional organization for all healthcare clinicians interested in improving outcomes for injured children through development of optimal care guidelines, education, research, and advocacy.

■ **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, CNMC is able to benchmark nationally and evaluate its patient care.

There were several quality initiatives undertaken by the Trauma Center in FY 2019. A high-impact example is the Code Room Efficiency quality project. 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 include decreasing time in CT and decision to intubate to successful intubation. Currently, the trauma team is in the intervention phase of decreasing post-secondary survey time in the code room.

CNMC has improved the ability to provide outreach to outside hospitals and EMS agencies. In January 2018, we launched a program that allows us to template individualized feedback that are sent through a protected server. The program allows the recipient of the email to respond and have online dialog with our trauma team. The program allows tracking of responses.

■ **Injury Prevention Programs and Initiatives.** In FY 2019, 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 2019, 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 CNMC, birthing centers, prenatal clinics, parenting groups, and school systems in Washington, DC, furthering increasing outreach to the public. Additionally, CNMC maintains a three-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 CNMC in FY 2019. Trauma Update, a half-day trauma and burn conference, was offered in the spring and fall. Over 100 nurses, respiratory therapists, EMTs, and paramedics attended each event. The third annual Child Abuse Prevention Symposium was held in April 2019, including a new half-day preconference on sex trafficking. In FY 2019, CNMC launched the second annual EMS Symposium, which included didactic education and hands-on skills training in traumatic injury. More than 110 prehospital professionals attended this conference either in person or through Webex.

CNMC has increased activity in the in the Stop the Bleed campaign to teach traumatic hemorrhagic control. The trauma department provides training to healthcare professionals monthly on-site. This year, we have advertised these classes to the public, which has increased our visibility and invitation to provide off-site courses. In FY 2019, approximately 250 people were trained though a combination of the monthly courses and invited events.

■ **Research.** The Trauma Center maintains an active research program with multiyear studies in place. In FY 2019, Dr. Burd and the trauma program received a \$3 million, multiyear grant to build an Intention-aware Recommender System for Improving Trauma Resuscitation Outcomes.

In FY 2019, clinical staff authored or co-authored eleven trauma-related publications in peer-reviewed journals, including the *Journal of Pediatric Surgery* and the *American Journal of Surgery*.

■ **Rehabilitation.** The Department of Physical Medicine and Rehabilitation at CNMC 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 CNMC, including regional outpatient centers (outpatient medical care). Physicians and APNs also provide consultation services in integrated equipment at a bracing clinic and a sub-acute rehabilitation facility.

## *Pediatric Burn Center*

### **Johns Hopkins Children’s Center**

1800 Orleans Street, Baltimore, Maryland

Johns Hopkins Children’s Center (JHCC) is a designated Pediatric Burn Center serving Maryland and adjacent regions. According to the Maryland State Trauma Registry, JHCC treated over 300 burn-injured children, including 123 admissions, from June 1, 2018, through May 31, 2019. (See pages 88 to 91 for additional patient data.) These patients are followed in our burn outpatient clinic weekly. Burn late effects clinic is offered for those children that develop burn-related scarring. Laser scar treatment is now offered, and 88 patients were treated this past year.

### **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 Coordinator:*

Rebecca Gardner, BSN

*Pediatric Injury Prevention Coordinator:*

Beatrice Brathwaite

### **FY 2019 Annual Report**

■ **Notable Accomplishments.** This year, the pediatric burn team nominated a pediatric burn patient for the Right Care When It Counts Award. This yearly award is presented during the annual Stars of Life and Right Care When It Counts awards ceremony in Annapolis. Children who have learned prevention and how to act when they see someone in need of help are recognized. Our pediatric burn patient was one of six children who received this annual award.

■ **Quality Management and Improvement.** JHCC has a vigorous performance improvement program. Through data collection, trending, and benchmarking, several clinical processes have shown improvement, including improved management of fluid resuscitation in pediatric large-burn injury as well as increased accuracy of determining total body surface area by referring providers.

The pediatric burn team continues to lead the Pediatric Injury Quality Improvement Consortium (PIQIC), a network of four pediatric burn centers from around the country that meet monthly. The collaborative goal of the PIQIC is to improve burn patient outcomes through utilization of outcomes-data, research, and standardized evidence-based care guidelines, while establishing national performance standards. Data-sharing and multisite research among PIQIC members are under development. PIQIC has completed a year of data collection and has presented regionally and nationally, publications or in process.

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 lead 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.

### ■ **Emergency Medical Services and Nursing**

**Continuing Education.** JHCC provides education and case reviews to referring hospitals and trains prehospital providers on initial burn management. In collaboration with the adult burn center at the Johns Hopkins Hospital, the Advanced Burn Life Support class is offered to deliver education on initial management of burn injuries to both prehospital providers and burn staff.

JHCC continues to offer monthly training to prehospital providers 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.

Senior paramedic students at UMBC are provided rotations in the pediatric burn clinic, learning pediatric burn initial management and treatment of pediatric burn injuries. 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 a competitive two-year fellowship program, which has been approved by the Residency Review Committee of the Accreditation Council for Graduate Medical Education. One fellow per year is accepted, allowing a junior and senior fellow to train concurrently. Under the direction of the general pediatric surgery (GPS) attending, the GPS 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.

■ **Research.** The pediatric burn staff at JHCC had a successful year of podium and poster presentations at academic conferences across the country,

including annual meetings for the ABA, Pediatric Trauma Society, and the American Pediatric Surgical Association.

JHCC has several ongoing research projects, including evaluating child quality of life and parent PTSD symptoms following pediatric burn injury, virtual reality during procedures in pediatric patients, parent perceptions of pediatric burn healing process and need for support, burn scars treated with carbon dioxide laser and epidemiology of children transferred to burn center and comparison of initial and final provider assessment.

■ **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 for burn patients needing continual inpatient rehabilitation.

## ***Pediatric Burn Center***

### **Children's National Medical Center**

111 Michigan Avenue, NW, Washington, DC

Children's National Medical Center (CNMC) 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. CNMC treated 342 burn-injured children who reside in Maryland from June 1, 2018, through May 31, 2019, according to the Maryland State Trauma Registry. (See pages 88 to 91 for additional patient data.) Of the 342 burn-injured children, 26 were admitted as inpatients and 189 were emergency department (ED) visits. There were an additional 629 burn clinic visits. Pediatric burn services at CNMC are provided by the Division of Emergency Trauma and Burn Surgery.

### **Mission**

*At Children's National Medical Center, 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 Medical Center.*

## Pediatric Burn Center Staff

*Pediatric Burn Medical Director:*

Randall S. Burd, MD, PhD

*Pediatric Burn Program Manager:*

Jennifer Fritzeen, MSN, RN

## FY 2019 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 time of injury. To meet this need, CNMC 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 has 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 CNMC's YouTube channel at <https://bit.ly/2IX7HvH>.

■ **Quality Management and Improvement.** The pediatric burn center has a robust quality improvement program. Several projects in FY 2019 focused on the enhancement of burn care, most notably the prevention of late rescue project. A 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 is currently in testing phase, with the hope of a beta test in mid-FY 2020, and public dissemination in late-FY 2020.

CNMC 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 2019, the Burn Center collaborated with the DC Firefighters Burn Foundation to offer educational opportunities in the community. CNMC partnered with

the Foundation to sponsor a burn prevention fair that was attended by over 200 children and their families.

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 approximately 2,000 views. To increase viewership, the Burn Service has partnered with a marketing company to assist in geomapping and targeting an appropriate local audience.

■ **Emergency Medical Services and Nursing Continuing Education.** CNMC offered several burn educational programs in FY 2019. Trauma Update, a half-day trauma and burn conference, was offered in the spring and fall. Over 100 nurses, respiratory therapist, EMTs, and paramedics attended each event.

CNMC 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 inaugural EMS Pediatric Symposium was launched in FY 2019. 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.

■ **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 was initiated in May 2018.

Through the Pediatric Injury Quality Improvement Consortium, CNMC had a poster presentation at the National American Burn Association Conference, "Variation in Acute Fluid Resuscitation in Pediatric Burn Centers". The paper is currently in production.

■ **Rehabilitation.** The Department of Physical Medicine and Rehabilitation at CNMC 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 CNMC, as well as regional outpatient centers (outpa-

tient medical care). Physicians and APNs also provide consultation services in integrated equipment at a bracing clinic and a subacute rehabilitation facility.

## *Eye Trauma Center*

### **Wilmer Eye Institute at The Johns Hopkins Hospital**

1800 Orleans Street, Baltimore, Maryland

The Wilmer Eye Institute's 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 800 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 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 2019 Annual Report**

■ **Notable Accomplishments.** Wilmer ETC is continuing to build partnerships with primary care and emergency medicine teams, with the goal of enhancing pathways for point-of-care diagnosis and triage. Dr. Woreta previously collaborated with the Johns Hopkins Office of Telemedicine to pilot models of remote eye screening, and Wilmer's initiatives in the domain of artificial intelligence may yield further solutions benefitting quality and timeliness of access to care.

Wilmer's same-day appointment access program in its clinics has helped to accommodate patients with non-acute issues outside of the emergency department (ED) setting itself.

Wilmer ETC has also been working on a customized electronic health record-based system for flagging of ocular traumas upon presentation to JHH, and is ready to launch that surveillance workflow in early FY 2020. Dr. Woreta has also organized a consortium of leaders across several U.S. institutions focused specifically on eye trauma. Generous support facilitated purchase of a nonmydriatic fundus camera with added optical coherence tomography capability for the JHH ED, which serves to improve residents' access to technology and quality of care within that setting.

Dr. Woreta continues to give a number of lectures on ocular trauma each year. In FY 2019, these included a March 5 nursing education session for the Johns Hopkins Children Center Pediatric Trauma and Burn Center, a May 7 pediatric eye trauma presentation at Meritus Medical Center's Spring Trauma Update meeting in Hagerstown, and plans to present at Peninsula Regional Medical Center's September 2019 conference.

■ **Quality Management and Improvement.** The Wilmer ETC workgroup includes the eye trauma center director, associate directors, trauma coordinator, and assistant administrator. Its activities include 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 also meet with JHH Adult and now Pediatric ED leaders on 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. Current efforts focus on refinement of eye trauma triage protocols.

■ **Injury Prevention Programs and Initiatives.** Wilmer nurses participate annually in Fall Prevention Awareness Fairs coordinated by JHH and Johns Hopkins Bayview Medical Center, and several volunteer at a local community health fair and provide free vision and health screenings. Based on analysis of

eye trauma trends, Dr. Woreta and a team of students are exploring opportunities to design education and interventions targeted to higher-risk populations. One such group of interest for this year is industrial and mechanical trade workers of Hispanic/Latinx origin, who appear to be more susceptible than average to on-the-job, accidental eye trauma.

■ **Emergency Medical Services and Nursing 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 eye trauma patients. Dr. Woreta is contributing to eye trauma literature by authoring book chapters, and Martha Conlon, RN, BSN, is working in collaboration with nurses at the R Adams Cowley Shock Trauma Center to update the “Ocular Injuries” chapter of the *Trauma Nursing: From Resuscitation Through Rehabilitation, 5<sup>th</sup> Edition* textbook.

On May 31, 2019, the Wilmer Eye Institute hosted its 36<sup>th</sup> annual full-day Wilmer Nursing Conference, featuring expert presentations on a diverse range of topics, including trauma. This conference was attended by over 150 Wilmer ophthalmic technicians and nurses, including several guests from outside of the institution, and offered 4.6 IJHN and 5.0 JCAHPO CEUs.

The Wilmer Eye Institute also hosts an ocular trauma course featuring lectures and a ruptured globe repair practicum for residents and fellows within a wet lab setting (Wilmer’s Center of Excellence in Ophthalmology Surgical Education & Training, OphSET).

■ **Fellowships and Residencies.** The Wilmer Eye Institute supports a three-year ophthalmology residency program, which accepts five residents per program year. ETC residents, alongside assistant chiefs of service, faculty attendings, 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 2019 covered a variety of topics, including tissue engineered solutions to healing corneal wounds, fall risk factors for patients with glaucoma, best practices for management of penetrating injuries, traumatic eye injury and brain injury with ophthalmic impacts in military service members, and the epidemiology of hyphema-related emergency department visits

in the U.S. over a nine-year period (the latter which Dr. Woreta co-authored).

■ **Rehabilitation Services.** The Wilmer Eye Institute Trauma Center offers ETC 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. The Low Vision and Vision Rehabilitation Division matches patients with assistive technologies that can enable their independence and participation in activities of daily living.

The 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 2019, the Hand Center’s emergency department cared for 1,947 patients with acute hand injuries, nearly 20% 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.

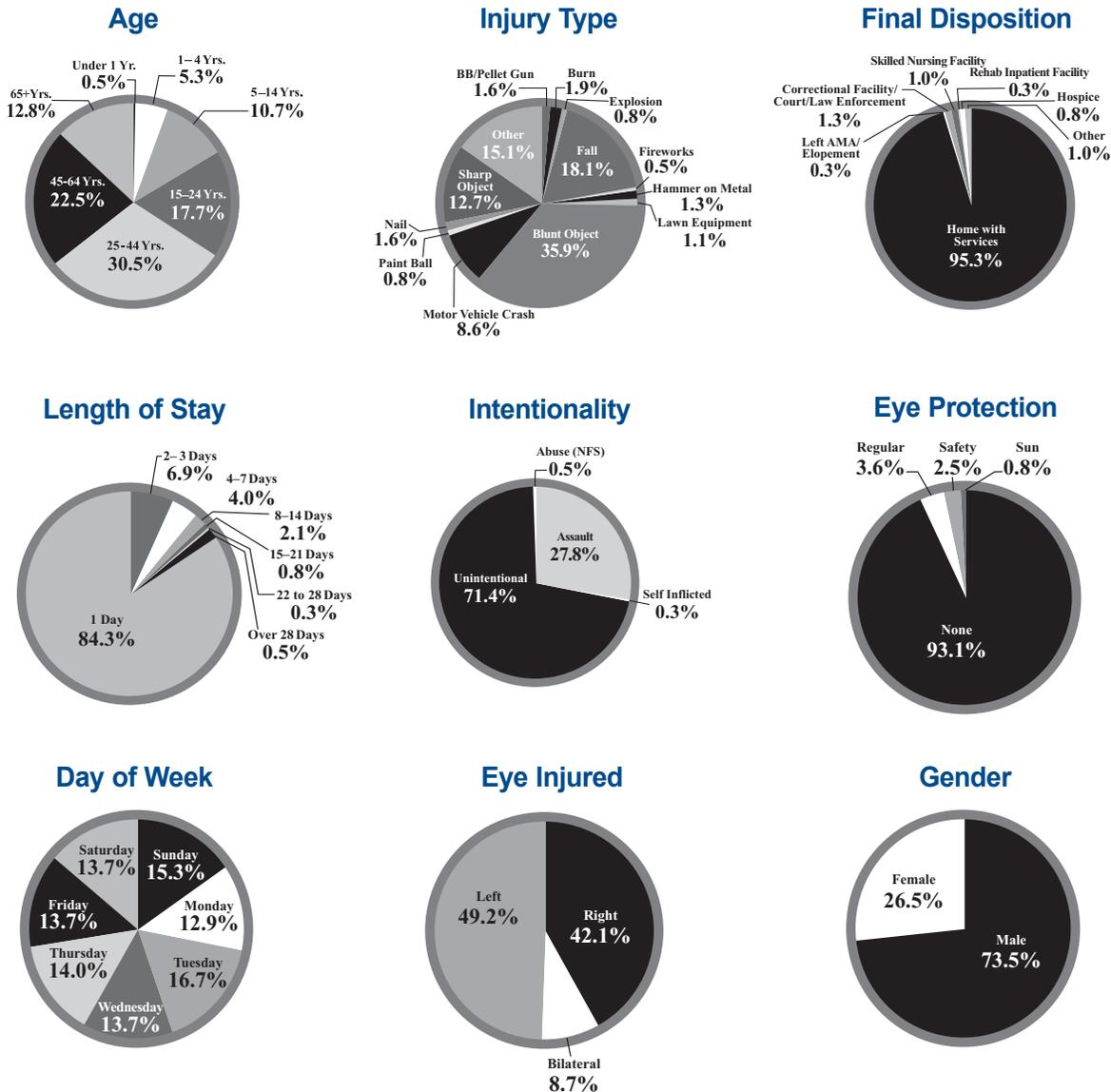
The Hand Center’s expertise in management of challenging bone and soft tissue trauma is supplemented by advanced microsurgery skill. The handling of fractures, complex soft tissue coverage problems, and amputations requiring replantation continues to be the Curtis National Hand Center’s major focus.

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 840 calls/year for transfer or consultation. These are rapidly and efficiently routed to

# Wilmer Eye Institute at The Johns Hopkins Hospital Demographics

(June 2018 to May 2019)

Source: Maryland Eye Trauma Registry



the hand surgeons on call. Call logs of these transfer requests demonstrate an acceptance rate of >95% of these patients to the Curtis National Hand Center. The remaining (<5%) cases 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 2019 Annual Report

■ **Notable Accomplishments.** In FY 2019, the Hand Center expanded its academic offerings, increased col-

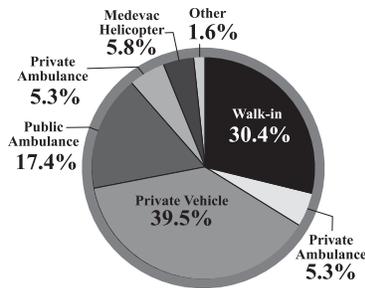
## The Curtis National Hand Center at MedStar Union Memorial Hospital

(July 2018 to June 2019)

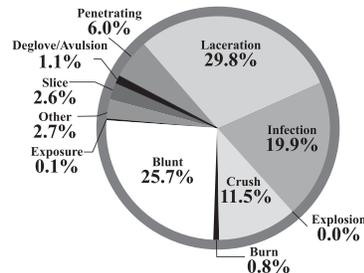
Source: The Curtis National Hand Center

n = 1, 947

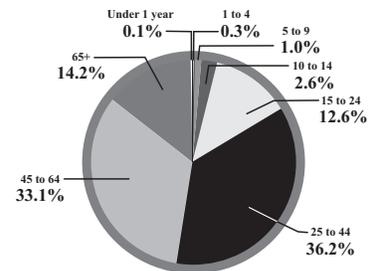
### Transport Mode



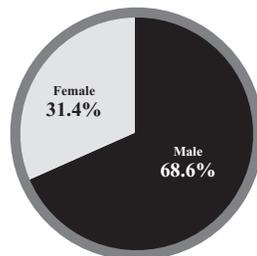
### Injury Type



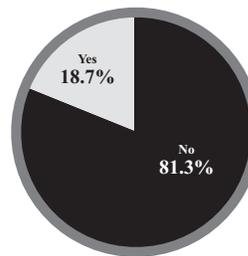
### Age



### Gender



### Work Related



laboration with affiliated institutions, and increased participation by friends and alumni around the region and country.

The 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.

■ **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 2019, 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. In addition, the trauma coordinator participates each year in a statewide distracted driving injury prevention initiative, and the Trauma Medical Director, Dr. James P. Higgins, has been active with speaking engagements throughout the state and surrounding areas. Additionally, hand trauma labs are scheduled on a regular basis, giving staff the opportunity to learn, practice, and update their skills.

■ **Prehospital/EMS/Nursing Continuing Education.** Managing Hand & Upper Extremity Trauma requires a multi-faceted system of communication, cooperation, and professional execution. The basic elements of the system include: 1) pre-hospital 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 Continuing Medical Education Committee of MedStar Union Memorial 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.

■ **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.** One of the surgeons at the Curtis National Hand Center with additional training in statistics and research methodology works as the research director. With 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. Collaborations with other experts, in our region and across the world, promotes expanded thinking and new developments across all of our research efforts.

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

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, 2018, to May 31, 2019, the Neurotrauma Center provided care to 2,034 patients with traumatic brain injuries, 409 patients with spinal column or spinal cord injuries, and 454 patients who suffered from both traumatic brain and spinal column or spinal cord injuries. (See pages 75 to 80 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 and, when appropriate, implantation of a diaphragmatic pacer that enables successful weaning from mechanical ventilation for most patients.

The 13-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 23-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 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 2019 Annual Report

■ **Notable Accomplishments.** The Neurotrauma Center achieved 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 agitation Behavioral Scale by staff as a regularly used tool to assess and communicate agitation severity.

Study enrollment was begun for a multicenter, randomized prospective phase II trial that will evaluate the

most effective hyperbaric oxygen treatment for patients with severe traumatic brain injury.

■ **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 continuously engages in community activities to honor organ donors. NTCC Donation Committee has been nominated by the Living Legacy Foundation for Innovation and Improvement for the November 2019 Biennial Hospital Partners Conference.

■ **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, NTCC's SIR rate for CLABSI was 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.** The STC Nursing Clinical Practice and Quality Council, comprising staff nurses from each patient care area, focuses on nursing-sensitive indicators as well as hospital-wide indicators. This council meets monthly and is an integral component of the Quality Management Program. The chair of this council is a standing member of the STC Quality Improvement Committee and reports to that committee quarterly.

■ **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 2019 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, treatment changes for traumatic brain injury among older adults in a trauma center, and the use of acupuncture for spinal cord injury patients.

Previous research provides a view of the diversity of the STC’s research efforts in areas such as traumatic brain injury, extra corporeal lung support, acute respiratory distress syndrome, hyperbaric therapy and soft-tissue infections, extremity and pelvic trauma, advanced diagnostic, and surgical and nonsurgical techniques for traumatic injury. These research efforts provide an expanding knowledge base for all providers and strengthen the infrastructure of the state’s trauma system.

A nursing research project is currently under development that aims to quantify reporting of patient agitation, so it can be better communicated to providers. Following a research study measuring agitation among trauma patients admitted to the Neurotrauma Center, an evidence-based, multi-interventional/disciplinary agitation protocol for traumatic brain injury patients will be piloted in the NTIMC.

■ **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 suffered serious trauma.

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 goal is to enable the patients to resume the greatest level of functioning.

The initial rehabilitation team focuses on 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.

### Top Ten Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Aged 15 and Over) (June 2018 to May 2019)

Source: Maryland State Trauma Registry

Rehabilitation Center	Number
Adventist Health Care	79
Future Care	8
Genesis Health Care	26
HCR Manor Care	10
Johns Hopkins Bayview Specialty Hospital Inpatient Rehabilitation	32
Johns Hopkins Hospital Inpatient Rehabilitation Center	24
Health South Chesapeake Rehabilitation Center	63
MedStar Good Samaritan Hospital	63
Sinai Rehabilitation Center	56
University of Maryland Rehabilitation & Orthopaedic Institute	343

Note: Total patients aged 15 and over that went to rehabilitation centers = 1,111

**Destinations of Patients Who Went to  
Inpatient Rehabilitation Facilities  
(Aged 14 and Under)  
(June 2018 to May 2019)**

*Source: Maryland State Trauma Registry*

Rehabilitation Center	Number
HSC Pediatric Center, DC	6
Kennedy Krieger Institute	17
Mt. Washington Pediatric Hospital	16
MedStar National Rehabilitation Network	7

*Note: Total patients aged 14 and under that went to rehabilitation centers = 46*

**Physical Therapy**

During a patient’s stay at the hospital, physical therapists visit the patient’s bedside. 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 after injuries to bones, muscles, nerves, the spinal cord, and the brain. Patients may continue to see a physical therapist at home or at an outpatient center after leaving the hospital.

**Occupational Therapy**

Occupational therapists focus on restoring a patient’s ability to perform 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 extremely important 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 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. This 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. A steering committee 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. MDERS’ main office is co-located with MIEMSS Region V in College Park, and a supplementary office is located in the Montgomery County Public Safety Headquarters in Gaithersburg.

In FY 2019, MDERS continued to apply its approach for enhancing response capabilities, provided staffing to accommodate this approach, built a number of capabilities, provided training and exercise opportunities, and acquired 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 in program staff and regional projects.

■ **FirstWatch System Monitoring.** 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 project continues funding for the FirstWatch situational awareness software currently used in Montgomery and Prince George’s Counties. This year also brought about the expansion of this application and additional features into Washington, DC; Loudoun County, Virginia; Prince William County, Virginia;

Arlington County, Virginia, and Alexandria, Virginia. This is continuing to build a standardized situational awareness tool across the entire NCR to better manage routine and large-scale emergency events.

■ **Public Access Bleeding Control.** 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 pushed 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 and training in all 207 schools within the county. Prince George's County officials have chosen to first implement this program in government buildings. Both will be multi-year efforts as the program continues to be expanded. MDERS has also invested in approximately 50 training caches to allow community agencies and groups to deliver this training.

■ **SWAT/Bomb Squad Equipment.** MDERS invested in local bomb squads and specialized teams to address the threats of improvised explosives, incendiary devices, and other explosive acts of violence. This project refreshed outdated equipment, expanding capacity to include more deployable assets and emerging tools to address the evolving threat profile. Enhancements procured this year included night vision goggles, X-ray systems, laptops for assessing X-rays, bomb suits, tactical robots, scene lighting, throw robots, breaching equipment, breathing apparatus, and long-range voice broadcasts systems. Across both counties, this provides a significant increase in capability and capacity for response to bomb-related threats and emergencies.

■ **Unmanned Aerial Systems.** MDERS is supporting technological innovation to enhance public safety in the region by developing an unmanned aerial systems (UAS) capability for fire/rescue/EMS, law enforcement, and emergency management agencies. These devices provide real-time situational awareness during complex and hazardous situations, during which access is limited or direct observation by a provider is dangerous. Examples of this include assessment of possible explosive devices, air monitoring during hazardous materials operations, overwatch during active assailant incidents, scene surveys, and damage assessments following disasters. MDERS has worked with the Department of Homeland Security, Federal

Emergency Management Agency (FEMA), the State Administrative Agency, and the individual departments to develop policies and procedures that adhere to all national, state, and local guidelines and requirements. Following approval of the policies by FEMA, the UAS vehicles will be procured.

■ **Mass Casualty Incident Support.** Since its inception, MDERS has supported EMS surge capability and capacity in the National Capital Region. As an area with a high threat profile and significant mass gatherings, it is critical that the EMS agencies have a means to immediately increase capacity in the event of a mass casualty incident. This year, MDERS purchased several pieces of equipment for both counties, including the Handtevy Medication System software application to aid in dosages for chemical and biological events, medical kits for all staff vehicles, Binder Lifts to assist with patient movement, casualty collection point kits, wireless vital sign monitors for Medical Ambulance Buses, and advanced patient care manikins for training.

■ **Incident Command Competency.** Based on the successful program built by Montgomery County Fire and Rescue, MDERS teamed with Prince George's County Fire and EMS to create several Command Competency Labs for use by current and potential incident commanders in the public safety community. These labs are used to develop and enhance incident commander competency in a controlled environment that simulates an emergency scene. The labs feature simulations of the emergency incident, communications, personnel interactions, changing conditions, and responses to incident commander actions. This past year, eight Command Competency Labs were built throughout Prince George's County. Funding provided simulation software, monitors, projectors, audio visual equipment, computers, radios, and mobile data terminals.

■ **Healthcare Information Exchange.** This project developed a real-time data exchange between the State of Maryland's EMS Electronic Patient Care Reporting System, eMEDS, and the State-recognized Health Information Exchange (HIE), CRISP. This year, MDERS supported the first phase of this program, execution and implementation of a unidirectional exchange of patient care information from eMEDS to a Health Information Exchange. This has allowed all Maryland EMS patient encounter data to be available to all CRISP participating partners for use in the continuation of efficient care of the patient. Future iterations will include patient tracking/family reunification capabilities, bidirectional information exchange to seek out patient medical history during field encounters, and integration with the Department of Health's Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) to further

contribute to early detection, surveillance, and situational awareness to mitigate the threat of both naturally occurring and human-caused biological hazards.

■ **Law Enforcement Special Operations Tactical Equipment.** MDERS continues to support enhancing law enforcement special operations tactical capabilities in order to optimize response to active violence and complex coordinated attacks. This year, MDERS provided urban night vision kits for SWAT operators, night vision scopes, full night vision kits, dual communications headsets for tactical medical operators, tactical medical bags, and bounce imaging cameras.

■ **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 (HSEEP) 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 a number of specialized trainings and conferences, including these events conducted in FY 2019:

- 18<sup>th</sup> Annual Breachers Symposium
- 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 Counterterrorism Training
- 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 8<sup>th</sup> Annual Breachers Circle
- Forced Entry Tactical Training Explosive Breaching Course
- FireStats Public Safety Data Analysis Training
- HSEEP Training
- International Association of Fire Chiefs Hazardous Materials Conference
- INLETS Active Shooter Training
- *Journal of Emergency Medical Services* Conference
- Joint Commission Emergency Preparedness Conference

- K-9 Tactical Emergency Casualty Care Training
- Maryland Emergency Management Association Conference
- National Healthcare Coalition Conference
- National Homeland Security Conference
- National Hurricane Conference
- National Tactical Officers Association Command Class
- Ohio Active Assailant Initiative
- Pinnacle EMS Conference
- Special Operations Medical Association (SOMA) Conference
- Tactical Energetic Entry Systems Explosive Breaching Training
- Tomahawk Rural-Woodlands Tactical Operations Training
- Tomahawk Tactical Entry Course

■ **2019 Maryland-National Capital Region**

**Emergency Response Symposium.** On April 18, 2018, MDERS sponsored its fifth annual symposium, which highlighted interdisciplinary response to terrorism and mass casualty incidents (MCI). Individuals within and around the NCR, representing 180 federal, state, and local government agencies and private organizations, registered for the event. This year, stakeholders had the option of attending the event in person or via webcast, leading to increased participation. A total of 420 stakeholders participated in the event – 318 attended in person, and 102 via webcast.

This year's symposium highlighted the multiple terrorist attacks that took place in the United Kingdom in 2017. Four presentations took place, each focusing on a different sphere of response, including law enforcement, fire/rescue/EMS, emergency management, and hospitals. The keynote was delivered by Jim Schwartz, a National Capital Region leader driving interoperability and coordination throughout the area.

**Additional Activities**

■ **Tabletop-in-a-box exercises.** MDERS Staff completed a gap analysis and procured supplies for its training and exercise cache. These kits allow for spontaneous training at the station level for fire/rescue/EMS and law enforcement personnel. The target is tactical management of incidents that contribute to overall superior incident command and control.

■ **Support to regional workgroups:** MDERS staff support or lead workgroups and initiatives and serve on various committees. In particular, MDERS leads a Law Enforcement-EMS working group that assesses regional needs and builds target capabilities.

■ **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 demonstrates value in 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.

### **Emergency Health Services Department, University of Maryland Baltimore County**

The Department of Emergency Health Services (EHS) at the University of Maryland Baltimore County (UMBC) provides undergraduate and graduate level education to future and existing prehospital and emergency public health clinicians. 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 state and local EMS leaders, medical directors, researchers, and administrators. The 2018-19 academic year was again a year of change, recruitment, and research for EHS.

Kyle Bates, MS, NREMT-P, an experienced paramedic program director in Maine, educational developer at MFRI, and national speaker has been recruited by the department as our new Paramedic Program Director. Mr. Bates succeeds Dwight Polk, MS, who served as the paramedic program director for over two decades prior to his retirement.

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 use this data to ultimately develop innovative teaching models to improve clinician stress response.

The first PhD program in Emergency Services at UMBC has now available for two 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 Josh King, MD, is the medical director. The poison specialists who work at the MPC are pharmacists and nurses who are certified as specialists in poison information (CSPI) by the AAPCC. The 15 specialists at MPC have over 166 years of combined poison center experience, ensuring that callers have access to experienced, qualified, and well-trained staff.

In CY 2018, MPC received 39,360 calls. While 30,709 of these calls involved a human exposure, the remaining 8,651 were requests for information or involved animal exposures. Children under the age of 6 accounted for 39% of poison exposures. The top five causes of poisoning were analgesics, sedatives/antipsychotics/hypnotics, cosmetics/personal care products, household cleaners, and antidepressants. Sixty percent of the cases reported to MPC were managed at a site not providing health care, such as the home, school, or workplace. Maryland EMS providers consulted with MPC on 1,704 cases in 2018. In 9% of those cases, transportation by EMS to a health care 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 health care 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 2018, MPC was involved in over a 1,000 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 2018 included:

- Characterizing other therapeutic errors reported to a poison center
- Comparison of second substances used in patients abusing LSD and hallucinogenic mushrooms
- Asenapine, iloperidone, and lurasidone exposures in young children reported to US poison centers
- Analysis of iatrogenic and in-hospital medication errors submitted to US poison centers

- Trends in types of calls managed by US poison centers, 2000-2015
- Acute hemolysis following acetaminophen overdose in a patient with undiagnosed G6PD deficiency
- Bystander naloxone administration for undifferentiated opioid overdose in the era of non-pharmaceutical fentanyl: a retrospective study of a regional poison center

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. In 2018, MPC attended 66 programs throughout Maryland, reaching approximately 2,093 people. Organizations that partnered with MPC to provide education included fire and police departments, hospitals, health departments, pharmacies, hospital perinatal education programs, CPR instructors, parish nurses, the American Red Cross, and Head Start and Healthy Start programs. Seventeen county school systems and daycare centers used educational materials from MPC in their classrooms. More than 162,000 pieces of educational material (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 Anne Arundel County School Nurses, Safe Kids Baltimore City, Baltimore County School Nurses, Safe Kids Carroll County, Safe Kids Frederick County, Safe Kids Washington County, Cecil County Department of Emergency Services, St. Mary's County School Nurses, and Wicomico County Health Department to offer Poison Prevention Week Kits to elementary schools in their respected counties. Schools could choose from a list of activities to increase awareness of poison safety to the students and their families. In all, 151 schools participated, reaching over 69,500 students.

MPC publishes *Poison Prevention Press*, a bimonthly e-newsletter for the public that highlights poison safety topics. Articles published in 2018 included "Aroma Therapy and Essential Oils"; "A Day in the Life of the Poison Center"; "E-Cigarettes and Nicotine"; "Making the Right Call"; "OTC Medicine Safety for Tweens and Teens"; and "Holiday Food Safety". MPC's Facebook page shares content with the public on topics related to poison prevention and safety. In 2018, MPC generated 174 posts and saw an

increase of 1,354 followers. MPC’s Twitter account (@MDPoisonCtr) also shares content for the public. In 2018, MPC shared 193 tweets and saw an increase of 117 followers. In 2018, MPC’s blog, e-Antidote, had 24 new posts and 2,200 visitors.

MPC’s Twitter account for health care providers, @MPCToxTidbits, posts clinical and medical toxicology content. The account tweeted 223 times in 2018, garnering more than 165,000 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 2018, 36 programs were presented by MPC staff at hospitals, EMS/fire departments, colleges, professional conferences (state, regional, and national), and through online webinars. More than 25,000 physicians, nurses, EMS providers, pharmacists, physician assistants, and other health professionals attended these programs and webinars. MPC also provides on-site training for physicians, pharmacists, and EMS providers. Toxicology segments were recorded for MedicCast.com and NursingShow.com podcasts. MPC’s Twitter account for health care providers, @MPCToxTidbits, posts clinical and medical toxicology content. MPC tweeted 346 times in 2018, garnering more than 129,000 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 2018 were “Atypical Antidepressants”; “Tianeptine”; “Antiarrhythmics”; “Synthetic Cannabinoids”; “Essential Oils”; and “Cannabinoid Hyperemesis Syndrome”. *ToxTidbits* is emailed to subscribers and faxed to every emergency department in MPC’s service area.

### Reason for Poisoning (CY 2018)

Circumstance	Number of Patients	Percentage
Unintentional	21,730	70.8
Intentional	7,638	24.9
Adverse Reaction	887	2.9
Other and Unknown	454	1.4
TOTAL	30,709	100.0

### Medical Outcome of Poisoning (CY 2018)

Medical Outcome	Number of Patients	Percentage
No Effect/Minor Effect	25,313	82.4
Moderate Effect	2,512	8.2
Major Effect	728	2.4
Death	80	0.2
Other and Unknown	2,076	6.8
TOTAL	30,709	100.0

NOTE: The medical outcome is assessed based on the severity of the clinical manifestations.

### Location of Poisoning Exposure by MIEMSS Region (CY 2018)

Region	Number of Exposures	Percentage
Region I	726	2.4
Region II	2,721	8.9
Region III	17,062	55.6
Region IV	3,318	10.7
Region V*	2,974	9.7
Unknown County/		
Other state	3,908	12.7
TOTAL	30,709	100.0

\* Routing for the nationwide telephone number automatically connects most callers from Montgomery and Prince George’s Counties to the National Capital Poison Center in Washington, 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 U.S. 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.

Alan I. Faden, MD, leads the STAR-ORC, and 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, serve as its associate directors. Dr. Kozar is also the interim director of the NSC. Dr. Faden, 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 2019. Long-time staff members Timothy J. Kerns, PhD, and Cynthia Burch, MS, left NSC for other careers in traffic safety. The NSC staff continue their collaborations with them and the institutions they represent. In addition, NSC hired three research analysts – Alicia Chavez, Erica Zimmerman and Alexis Aviles (recent Towson University Graduates) – who are being trained in Injury Research and Epidemiology. Dr. Roumen Vesselinov, a research associate who specializes in statistical analysis, has been

named as the PI on several NSC projects, along with Dr. Margaret Lauerman from the STC. Cinzia Cirillo, 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). Mark Scarboro, STAR-ORC Senior Director of Research Operations, has taken a leadership role within NSC.

## Research Activities

NSC 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 2018-2019 contract year, 26 cases were enrolled into CIREN and a comprehensive investigation was conducted for each. Multiple 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 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 their research at the Maryland Crash Reconstruction Committee Symposium in March 2019 and the American Association of Motor Vehicle Administrators Region 1 Conference in May 2019.

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 data to examine the types and severity of injuries sustained by older occupants in motor vehicle crashes. This CDC grant was awarded for three years (9/1/2017 - 8/31/2020). NSC staff have completed linking the databases for 2008-2014 and are working on linking data for 2015 and 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 will be presented at the 2019 Traffic Records Forum. NSC will continue with the analysis during the third year of the project, and plans to submit at least one paper for publication in a peer-reviewed journal and present those findings at a future traffic safety-related conference.

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 Maryland's Partnership for a Safer Maryland, and participate as data coordinators on SHSP Implementation and Emphasis Area Teams. Last year, NSC produced 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, motorcycle safety, older drivers, distracted driving, bicycle crashes, and pedestrians. NSC was involved in the Buckle Up Phone Down Campaign being conducted in Southern and Western Maryland. For the seventh consecutive year, NSC supervised and reported findings of the Maryland Front Seat Belt Use Project. A similar study and report was conducted for the Maryland Back Seat Belt Use Project for the third consecutive year. As part of another project with MHSO, NSC is working with OCME to conduct toxicology tests on fatally-injured motor vehicle drivers. The testing identifies the use of marijuana as well as a battery of other licit and illicit drugs.

In FY 2019, 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. Once complete, these models will provide a better understanding of factors playing a role in crash trends in Maryland. The findings will allow decision makers and other stakeholders to estimate the expected change in injury-involved crashes expected for a given change in each risk factor.

NSC has established a Pedestrian Fatality Review Team to support the Pedestrian and Bicycle Emphasis Area Team (PBEAT) at MHSO as part of the State's Strategic Highway Safety Plan in 2019. 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.

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 has submitted an ICD-10-CM Proposal to add Micro-Mobility Codes 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), CHART-related data available under the 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.

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 attended and presented at 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 2019 Crash Reconstruction Symposium, and the Maryland Highway Safety Summit. Presentation topics included pedestrian fatality review, data quality improvement, and GIS methodologies.

### **Training Activities**

NSC actively trains epidemiologists and other health professionals on research topics related to injuries and EMS. Three students from the Towson University Health Education and Promotion program

interned with the NSC during the past year. These students worked with NSC faculty and staff on a variety of research efforts. In addition, members of the faculty teach courses on injury epidemiology and prevention and sit on dissertation committees for doctoral students who study injury-related matters in the Department of Epidemiology and Public Health.

### **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. NSC staff members were instrumental in the publication of at least 20 manuscripts by University of Maryland, Baltimore researchers between June 2018 and May 2019. At least three additional papers have been accepted for publication and three are still in various stages of critical review. A total of 20 abstracts supported by NSC staff members were submitted to various injury-related conferences.

NSC continues to maintain its existing website, making many data products available to the public. 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.

### **MIEMSS-NSC Memorandum of Understanding**

Through a cooperative memorandum of understanding agreement, NSC serves as a data liaison to MIEMSS and continues to support data management and data analysis requests from the agency. The focus of the past year has been on developing benchmark reports generated from MIEMSS data sources, including eMEDS and Flight Vector, that allow jurisdictions to compare their performance on specific metrics to other local jurisdictions and to state data. These benchmark reports are important to quality improvement efforts throughout the state.

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, including a recent manuscript regarding the correlation between the revised trauma score and Injury Severity Score.

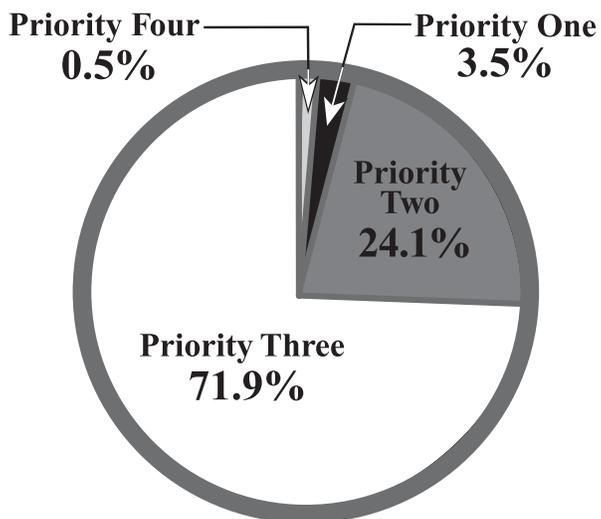
NSC members continue to serve on several MIEMSS committees and provide assistance to advance the agency's mission.

# MARYLAND EMS STATISTICS

## Types of EMS Calls

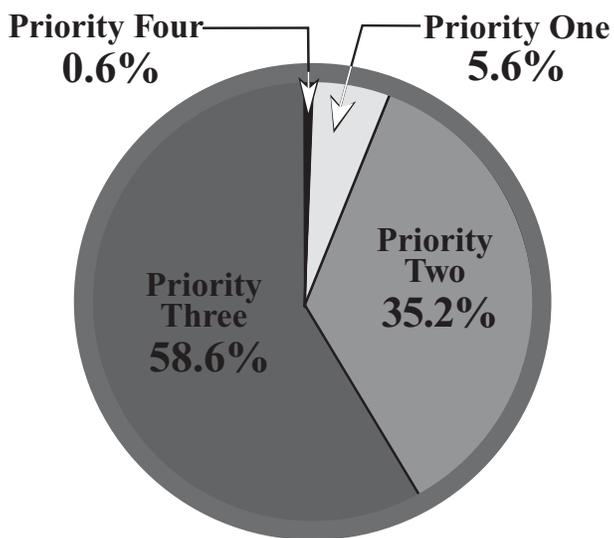
### Patient Priority For Injury Transports

Fiscal Year 2019



### Patient Priority For Medical Transports

Fiscal Year 2019



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 2019.

<b>eMEDS Records Submitted to MIEMSS per Fiscal Year 2019 Quarter<sup>1</sup></b>						
Reporting Between: 7/1/2018 - 06/30/2019						
Jurisdiction	Elite Implementation <sup>2</sup>	1st Qtr. FY 2019	2nd Qtr. FY 2019	3rd Qtr. FY 2019	4th Qtr. FY 2019	Total
Allegany County	5/7/2018	3,747	3,618	3,662	3,712	14,739
Anne Arundel County*	5/29/2018	20,489	20,638	19,714	21,045	81,886
Baltimore City	12/3/2018	71,402	67,804	59,411	59,098	257,715
Baltimore County*	7/24/2018	33,887	35,210	33,514	33,042	135,653
Calvert County	8/28/2018	1,528	4,507	4,763	4,709	15,507
Caroline County	6/11/2018	1,619	1,495	1,486	1,535	6,135
Carroll County	1/2/2019	5,233	5,272	5,140	5,197	20,842
Cecil County	8/1/2018	7,262	6,842	6,713	7,116	27,933
Charles County	6/1/2018	7,309	7,029	6,870	7,337	28,545
Dorchester County	5/21/2018	1,669	1,587	1,482	1,634	6,372
Frederick County	10/1/2018	12,219	11,891	11,683	12,247	48,040
Garrett County	5/7/2018	1,246	1,115	1,121	1,081	4,563
Harford County*	3/30/2018	8,622	8,339	8,160	8,808	33,929
Howard County	12/11/2018	7,566	7,663	6,573	6,552	28,354
Kent County	6/11/2018	1,378	1,347	1,175	1,296	5,196
Montgomery County	9/4/2018	21,584	21,276	21,273	22,187	86,320
Prince George's County	10/1/2018	55,977	56,925	52,554	54,429	219,885
Queen Anne's County	12/18/2017	1,928	1,861	1,722	1,992	7,503
Somerset County	7/16/2018	786	718	632	701	2,837
St. Mary's County	7/16/2018	5,378	5,090	4,893	5,334	20,695
Talbot County	12/18/2017	2,041	1,810	1,846	1,861	7,558
Washington County	6/25/2018	7,587	7,568	7,282	8,137	30,574
Wicomico County	5/14/2018	3,904	3,895	3,751	4,048	15,598
Worcester County*	5/14/2018	3,790	2,288	2,146	3,147	11,371
<b>Jurisdictional Total</b>		288,151	285,788	267,566	276,245	1,117,750

\*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.

<sup>1</sup>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.

<sup>2</sup>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 2018 Registry Data

Non-Traumatic Etiology Survival Rates*	Maryland	National
Overall	7.9%	10.4%
Bystander Witnessed	13.1%	15.8%
Unwitnessed	2.9%	4.4%
Utstein	29.9%	33.3%
Utstein Bystander	33.7%	37.3%

Bystander Intervention Rates**	Maryland	National
CPR	35.5%	39.2%
Public AED Use	12.5%	11.9%

Demographic Information	Maryland	National
Mean Age (years)	62.0	62.2
% Males	39.8%	37.9%
% Females	60.2%	62.1%

Location of Arrest	Maryland	National
Home/Residence	71.5%	70.2%
Nursing Home	12.4%	11.1%
Public Setting	16.0%	18.7%

Arrest Witnessed?	Maryland	National
Witnessed by Bystander	30.5%	37.3%
Witnessed by 9-1-1 Provider	12.6%	12.5%
Unwitnessed	56.9%	50.1%

Who Initiated CPR?	Maryland	National
Not Applicable	0.0%	0.1%
Bystander	38.5%	40.0%
First Responder	24.8%	29.0%
Emergency Medical Services (EMS)	36.7%	30.9%

Who First Defibrillated the Patient?	Maryland	National
Not Applicable	74.3%	69.6%
Bystander	1.8%	1.7%
First Responder	3.5%	5.8%
Emergency Medical Services (EMS)	20.4%	22.8%

\* See page 71 for survival rate formulas.

\*\* See page 71 for intervention rate formulas.

## **Cardiac Arrest Registry to Enhance Survival (CARES) CY 2018 Registry Data Rate Calculations**

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

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

**Bystander Witnessed:** Number of survivors with bystander-witnessed arrests out of total arrests witnessed by bystanders

**Unwitnessed:** Number of survivors with unwitnessed arrests out of total number of unwitnessed arrests

**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

## 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	55	10	149	112	0	2	3
Region IV	29	3	125	46	0	1	4
Region V	134	76	39	38	3	0	0
STATEWIDE TOTAL	248	115	365	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	19	53	10	4	0	0	1	2
Region III	53	273	2	20	97	2	5	4
Region IV	17	67	8	5	0	0	1	5
Region V	42	223	4	7	43	3	2	4
STATEWIDE TOTAL	137	652	29	37	140	5	11	16

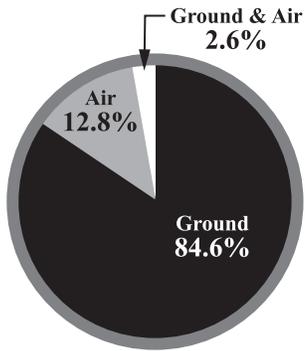
Source: Vehicle data reported by the EMS Operational Programs

\*\*MCSU = Mass Casualty Support Unit

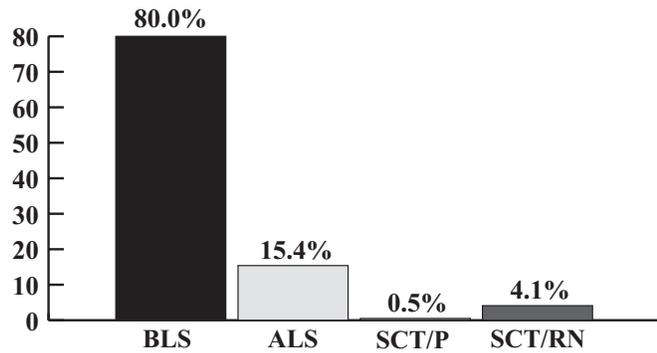
# Maryland-Licensed Commercial Ambulance FY 2019 Statistics

Source: MIEMSS Commercial Ambulance Licensing System

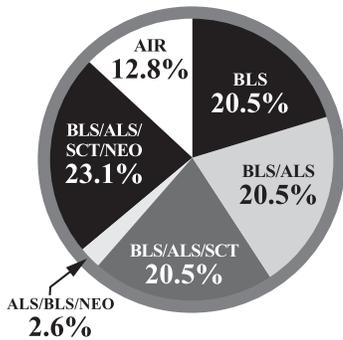
**Total Number of Services**  
n = 39



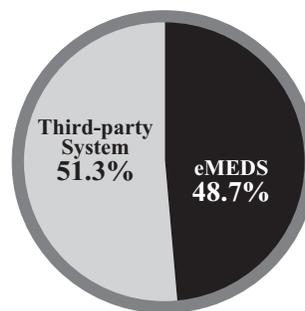
**Transports by Type**  
n = 273,078



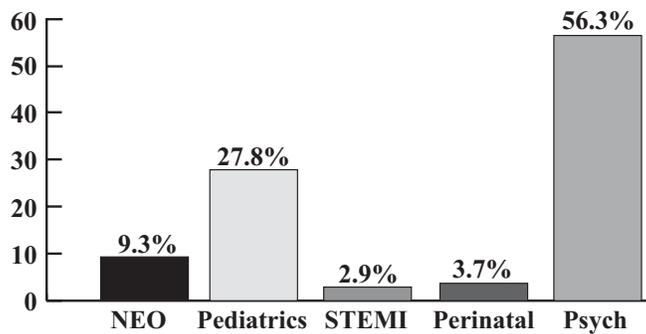
**Services by Type**  
n = 39



**ePCR Reporting Software Platform**  
n = 39



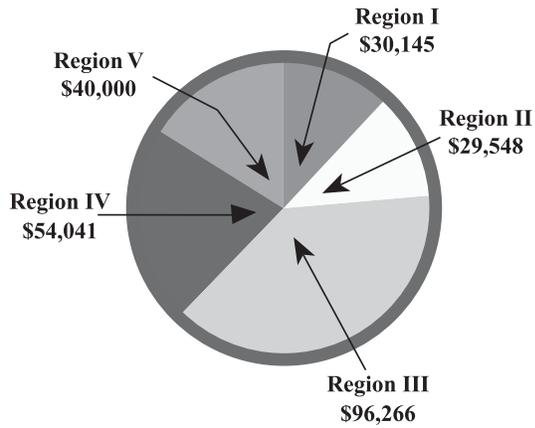
**Transports of Special Populations**  
n = 12,675



# State Homeland Security Grant Funding for Maryland EMS

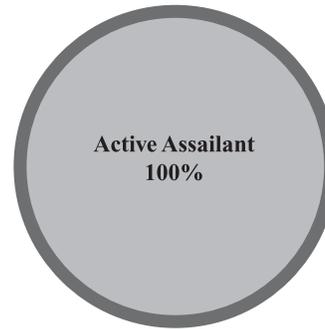
**Grant Funding Distribution by Region**

(FY 2017)



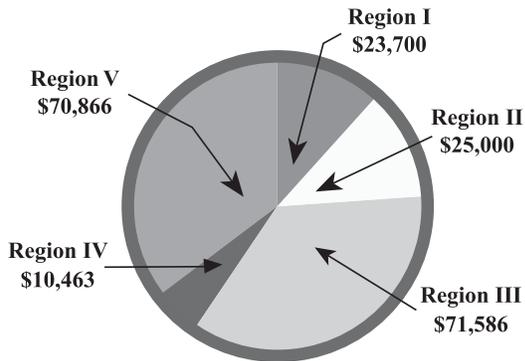
**Grant Funding by Project Activity**

(FY 2017)



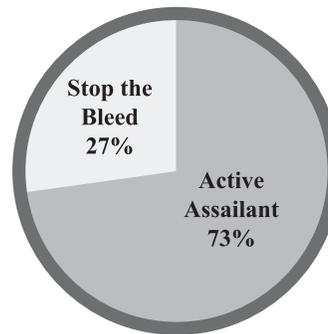
**Grant Funding Distribution by Region**

(FY 2018)



**Grant Funding by Project Activity**

(FY 2018)



## 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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Under 1 year	287	220	247
1 to 4 years	510	490	440
5 to 9 years	602	510	474
10 to 14 years	547	536	509
15 to 24 years	4,103	3,761	3,277
25 to 44 years	7,047	6,661	6,846
45 to 64 years	5,377	5,254	5,114
65+ years	4,973	5,086	5,194
Unknown	12	16	23
<b>TOTAL</b>	<b>23,458</b>	<b>22,534</b>	<b>22,124</b>

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

## MARYLAND ADULT TRAUMA STATISTICS

### Legend Code

Johns Hopkins Bayview Medical Center	BVMC	R Adams Cowley Shock Trauma Center	STC
The Johns Hopkins Hospital	JHH	Sinai Hospital	SH
Meritus Medical Center	MMC	Suburban Hospital – Johns Hopkins Medicine	SUB
Peninsula Regional Medical Center	PEN	Western Maryland Regional	
Prince George's Hospital Center	PGH	Medical Center	WMRMC

### Total Cases Reported by Trauma Centers (3-Year Comparison)

Source: Maryland State Trauma Registry

Trauma Center	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Johns Hopkins Bayview Medical Center	2,838	2,652	2,499
The Johns Hopkins Medical System	1,863	1,702	1,703
Meritus Medical Center	1,363	1,288	1,729
Peninsula Regional Medical Center	1,398	1,372	1,360
University of Maryland Prince George's Hospital Center	3,807	3,696	3,378
R Adams Cowley Shock Trauma Center	6,156	6,142	6,186
Sinai Hospital of Baltimore	2,113	1,952	1,942
Suburban Hospital – Johns Hopkins Medicine	1,633	1,680	1,436
Western Maryland Regional Medical Center	665	563	498
<b>TOTAL</b>	<b>21,836</b>	<b>21,047</b>	<b>20,731</b>

\* Maryland Trauma Statistics are based on patient discharge data from June 2018 to May 2019.

**Occurrence of Injury by County:  
Scene Origin Cases Only**

(June 2018 to May 2019)

Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	308
Anne Arundel County	780
Baltimore County	2,725
Calvert County	136
Caroline County	40
Carroll County	262
Cecil County	64
Charles County	241
Dorchester County	66
Frederick County	379
Garrett County	24
Harford County	535
Howard County	349
Kent County	39
Montgomery County	1,336
Prince George's County	2,287
Queen Anne's County	62
St. Mary's County	194
Somerset County	84
Talbot County	54
Washington County	1,104
Wicomico County	424
Worcester County	219
Baltimore City	4,300
Virginia	54
West Virginia	122
Pennsylvania	217
Washington, DC	209
Delaware	81
Other	6
Not Indicated	656
<b>TOTAL</b>	<b>17,357</b>

Note: Scene origin cases represent 83.7% of the total trauma cases treated statewide.

**Residence of Patients by County:  
Scene Origin Cases Only**

(June 2018 to May 2019)

Source: Maryland State Trauma Registry

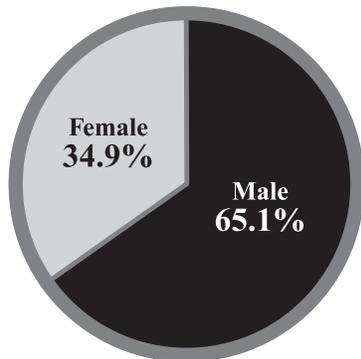
County of Residence	Number
Allegany County	277
Anne Arundel County	802
Baltimore County	2,862
Calvert County	157
Caroline County	47
Carroll County	275
Cecil County	79
Charles County	283
Dorchester County	71
Frederick County	354
Garrett County	16
Harford County	561
Howard County	343
Kent County	44
Montgomery County	1,269
Prince George's County	2,019
Queen Anne's County	54
St. Mary's County	151
Somerset County	92
Talbot County	39
Washington County	1,041
Wicomico County	374
Worcester County	160
Baltimore City	4,016
Virginia	259
West Virginia	193
Pennsylvania	418
Washington, DC	472
Delaware	151
Other	329
Not Indicated	149
<b>TOTAL</b>	<b>17,357</b>

Note: Scene origin cases represent 83.7% of the total trauma cases treated statewide.

**Gender Profile:  
Primary Admissions Only**

(June 2018 to May 2019)

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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
None	22.0%	21.5%	25.9%
Seatbelt	16.0%	15.0%	13.6%
Airbag and Seatbelt	35.0%	35.5%	36.8%
Airbag Only	11.1%	12.0%	10.2%
Infant/Child Seat	0.0%	0.2%	0.2%
Protective Helmet	15.1%	14.5%	12.7%
Padding/Protective Clothing	0.1%	0.1%	0.1%
Other Protective Device	0.4%	1.0%	0.1%
Unknown	0.3%	0.2%	0.4%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

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 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

Modality Type	BVMC	JHH	MMC	PEN	PGH	SH	STC	SUB	WMRMC	TOTAL
Ground Ambulance	93.7%	80.9%	79.1%	92.8%	87.6%	84.3%	82.8%	96.1%	80.7%	86.3%
Helicopter	0.2%	0.9%	0.4%	4.0%	10.6%	0.1%	15.3%	0.3%	2.9%	6.1%
Other	6.1%	18.2%	20.5%	3.2%	1.8%	15.6%	1.9%	3.6%	16.4%	7.6%
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 2018 to May 2019)*

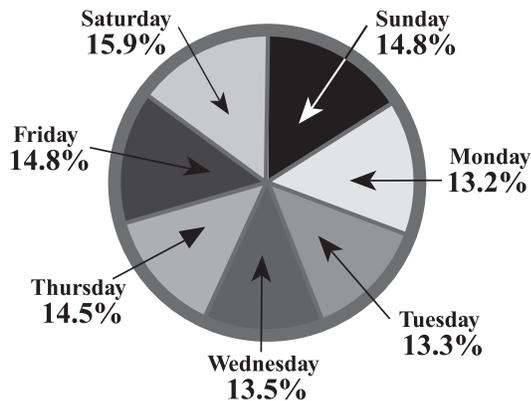
*Source: Maryland State Trauma Registry*

Origin Type	BVMC	JHH	MMC	PEN	PGH	SH	STC	SUB	WMRMC	TOTAL
Scene of Injury	95.8%	81.0%	97.5%	67.4%	91.8%	95.8%	67.9%	95.2%	96.0%	83.8%
Hospital Transfer	0.2%	6.9%	0.3%	2.9%	2.0%	4.0%	32.1%	4.3%	0.8%	11.4%
Other	4.0%	12.1%	2.2%	29.7%	6.2%	0.2%	0.0%	0.5%	3.2%	4.8%
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 2018 to May 2019)*

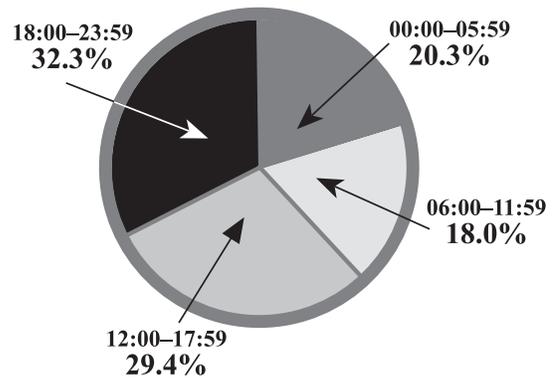
*Source: Maryland State Trauma Registry*



**Emergency Department Arrivals by Time of Day: Primary Admissions Only**

*(June 2018 to May 2019)*

*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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Under 1 year	0	3	1
1 to 4 years	1	0	1
5 to 14 years	3	2	3
15 to 24 years	148	121	107
25 to 44 years	254	246	255
45 to 64 years	155	157	176
65+ years	266	271	260
Unknown	9	6	12
<b>TOTAL</b>	<b>836</b>	<b>806</b>	<b>815</b>
Deaths Overall as a Percentage of the Total Injuries Treated	3.8%	3.8%	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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Under 1 year	63	48	60
1 to 4 years	106	127	118
5 to 14 years	240	205	216
15 to 24 years	4,018	3,650	3,160
25 to 44 years	7,047	6,661	6,846
45 to 64 years	5,377	5,254	5,114
65+ years	4,973	5,086	5,194
Unknown	12	16	23
<b>TOTAL</b>	<b>21,836</b>	<b>21,047</b>	<b>20,731</b>

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 2018 to May 2019)  
Source: Maryland State Trauma Registry

Age	Number of Injured Patients		Number of Deaths	
	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	60	55	1	1
1 to 4 years	118	105	1	1
5 to 14 years	216	175	3	3
15 to 24 years	3,160	2,792	107	91
25 to 44 years	6,846	6,033	255	227
45 to 64 years	5,114	4,512	176	147
65+ years	5,194	4,770	260	235
Unknown	23	17	12	12
<b>TOTAL</b>	<b>20,731</b>	<b>18,459</b>	<b>815</b>	<b>717</b>

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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Cut or Pierce	6.2%	5.8%	5.7%
Drowning/Submersion	0.0%	0.1%	0.0%
Fall	35.9%	37.4%	38.4%
Fire or Flame	0.3%	0.4%	0.4%
Hot Object or Substance	0.1%	0.1%	0.2%
Firearm	7.7%	7.6%	7.6%
Machinery/Mechanical	0.7%	0.6%	0.5%
Motor Vehicle Crash	27.4%	27.0%	26.1%
Motorcycle Crash	3.8%	3.8%	3.8%
Pedal Cycle Crash	2.0%	1.8%	2.0%
Pedestrian Incident	5.8%	5.4%	5.5%
Other Transport	0.2%	0.2%	0.1%
Natural or Environmental	0.4%	0.4%	0.3%
Poisoning	0.4%	0.3%	0.5%
Struck by or Against	7.9%	7.7%	7.6%
Other	1.2%	1.4%	1.3%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Negative	23.7%	24.5%	22.7%
Positive	16.7%	16.3%	15.6%
Undetermined	59.6%	59.2%	61.7%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

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

### Etiology of Injuries by Age: Primary Admissions Only

(June 2018 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	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%	0.0%	1.0%	0.1%
1 to 4 years	0.2%	0.0%	0.1%	0.6%	0.0%	0.0%	0.4%	0.0%	2.6%	0.4%
5 to 14 years	0.6%	0.0%	0.9%	0.5%	0.5%	0.5%	0.9%	2.4%	4.0%	0.8%
15 to 24 years	18.9%	19.3%	15.7%	3.7%	32.3%	18.2%	15.2%	13.4%	10.5%	13.2%
25 to 44 years	38.2%	38.9%	33.7%	13.3%	55.2%	54.8%	49.4%	29.1%	39.8%	31.3%
45 to 64 years	26.9%	34.0%	34.7%	24.8%	9.9%	23.8%	28.6%	41.1%	30.4%	25.9%
65+ years	15.1%	7.8%	14.9%	56.9%	2.1%	2.7%	5.4%	14.0%	11.7%	28.3%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

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 2018 to May 2019)

Source: Maryland State Trauma Registry

Etiology	Percentage
Cut or Pierce	0.2%
Fall	44.7%
Machinery/Mechanical	0.5%
Motor Vehicle Crash	30.5%
Motorcycle Crash	4.4%
Pedalcyclist Crash	2.3%
Pedestrian Incident	6.4%
Other Transport	0.1%
Natural or Environmental	0.2%
Struck by or Against	8.8%
Other	1.1%
Not Valued	0.8%
<b>TOTAL</b>	<b>100.0%</b>

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 2018 to May 2019)

Source: Maryland State Trauma Registry

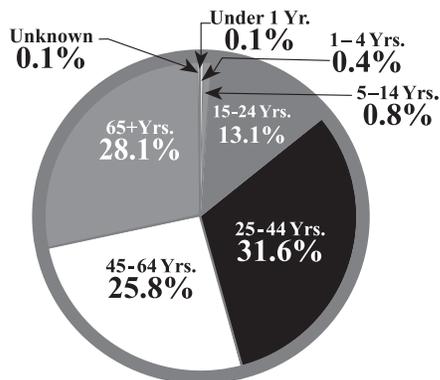
Etiology	Percentage
Cut or Pierce	40.8%
Fall	1.0%
Firearm	54.9%
Machinery/Mechanical	0.4%
Motor Vehicle Crash	0.5%
Motorcycle Crash	0.1%
Other Transport	0.1%
Struck by or Against	0.7%
Other	0.3%
Not Valued	1.2%
<b>TOTAL</b>	<b>100.0%</b>

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 2018 to May 2019)

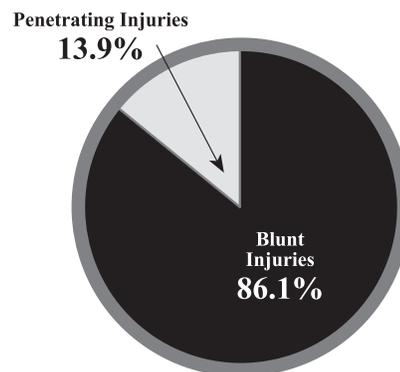
Source: Maryland State Trauma Registry



### Injury Type Distribution of Patients: Primary Admissions Only

(June 2018 to May 2019)

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.

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

**Final Disposition of Patients:  
Primary Admissions Only  
(3-Year Comparison)**  
*Source: Maryland State Trauma Registry*

Final Disposition	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Inpatient Rehab Facility	11.3%	9.9%	7.4%
Skilled Nursing Facility	6.3%	8.4%	9.7%
Residential Facility	1.4%	0.8%	0.9%
Specialty Referral Center	4.1%	4.4%	4.2%
Home with Services	4.1%	4.6%	5.4%
Home	57.9%	56.9%	57.5%
Acute Care Hospital	3.4%	2.9%	3.2%
Against Medical Advice	2.7%	2.6%	2.3%
Morgue/Died	5.4%	5.3%	5.5%
Left without Treatment	0.1%	0.0%	0.1%
Hospice Care	0.5%	0.5%	0.5%
Jail	1.5%	1.8%	1.5%
Psychiatric Hospital	0.9%	1.3%	1.3%
Elopement	0.0%	0.3%	0.4%
Other	0.4%	0.3%	0.1%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
1 to 12	72.6%	72.2%	72.3%
13 to 19	10.7%	11.2%	11.6%
20 to 35	12.4%	12.9%	11.9%
36 to 75	4.3%	3.7%	4.2%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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 2018 to May 2019)**  
*Source: Maryland State Trauma Registry*

ISS	Blunt	Penetrating	Total
1 to 12	76.9%	72.3%	76.3%
13 to 19	13.3%	11.6%	13.0%
20 to 35	8.5%	11.9%	9.0%
36 to 75	1.3%	4.2%	1.7%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
1 to 12	79.1%	77.7%	76.9%
13 to 19	12.8%	12.8%	13.3%
20 to 35	6.9%	8.1%	8.5%
36 to 75	1.2%	1.4%	1.3%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
1 to 12	78.2%	76.8%	76.3%
13 to 19	12.5%	12.6%	13.0%
20 to 35	7.7%	8.8%	9.0%
36 to 75	1.6%	1.8%	1.7%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

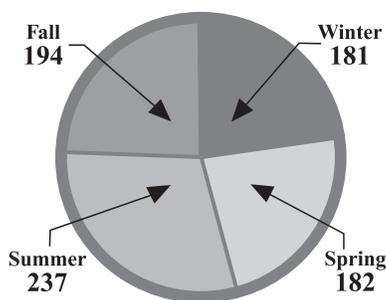
*Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival.*

# MARYLAND ADULT BURN STATISTICS

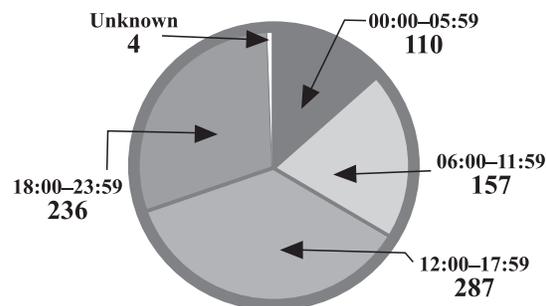
**Total Number of Adult Burn Cases**  
*Patients Aged 15 and Older Treated at  
 Johns Hopkins Burn Center at Bayview  
 (3-Year Comparison)*  
 Source: Maryland State Trauma Registry

Institution	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Johns Hopkins Burn Center at Bayview	743	883	794

**Season of Year Distribution**  
*Patients Aged 15 and Older Treated at  
 Johns Hopkins Burn Center at Bayview  
 (June 2018 to May 2019)*  
 Source: Maryland State Trauma Registry



**Time of Arrival Distribution**  
*Patients Aged 15 and Older Treated at  
 Johns Hopkins Burn Center at Bayview  
 (June 2018 to May 2019)*  
 Source: Maryland State Trauma Registry



**Place of Injury**  
*Patients Aged 15 and Older Treated at  
 Johns Hopkins Burn Center at Bayview  
 (June 2018 to May 2019)*  
 Source: Maryland State Trauma Registry

Place of Injury	Number
Non-Institutional Private Residence	461
Institutional Private Residence	20
Other Institution and Public Administrative Area	11
Sports and Athletic Area	2
Street/Highway	29
Trade and Service Area	54
Industrial and Construction Area	44
Other Places	47
Unspecified Places	126
<b>TOTAL</b>	<b>794</b>

**Occurrence of Injury by County**

*Patients Aged 15 and Older Treated at  
Johns Hopkins Burn Center at Bayview  
(June 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

County of Injury	Number
Allegany County	6
Anne Arundel County	48
Baltimore County	130
Calvert County	3
Caroline County	3
Carroll County	13
Cecil County	16
Dorchester County	5
Frederick County	14
Harford County	32
Howard County	23
Kent County	1
Montgomery County	4
Prince George's County	9
Queen Anne's County	4
Somerset County	3
Talbot County	1
Washington County	21
Wicomico County	5
Worcester County	4
Baltimore City	202
Virginia	2
West Virginia	24
Pennsylvania	25
Delaware	1
Other	5
Not Valued	190
<b>TOTAL</b>	<b>794</b>

**Residence of Patients by County**

*Patients Aged 15 and Older Treated at  
Johns Hopkins Burn Center at Bayview  
(June 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

County of Residence	Number
Allegany County	7
Anne Arundel County	58
Baltimore County	184
Calvert County	3
Caroline County	4
Carroll County	18
Cecil County	20
Charles County	1
Dorchester County	7
Frederick County	23
Harford County	48
Howard County	37
Kent County	2
Montgomery County	10
Prince George's County	14
Queen Anne's County	5
St. Mary's County	1
Somerset County	4
Talbot County	1
Washington County	23
Wicomico County	9
Worcester County	3
Baltimore City	232
Virginia	4
West Virginia	21
Pennsylvania	38
Washington, DC	5
Delaware	1
Other	5
Not Valued	6
<b>TOTAL</b>	<b>794</b>

**Mode of Patient Transport**

*Patients Aged 15 and Older Treated at  
Johns Hopkins Burn Center at Bayview  
(June 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

Modality Type	Number
Ground Ambulance	403
Helicopter	35
Other*	339
Not Valued	17
<b>TOTAL</b>	<b>794</b>

*\*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 2018 to May 2019)

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	3	2	33	13	56	1	3	2	6	119
25 to 44 years	9	9	73	57	132	3	3	2	32	320
45 to 64 years	9	6	78	36	90	2	2	3	24	250
65 years and over	2	2	50	17	25	0	1	0	8	105
Total	23	19	234	123	303	6	9	7	70	794

### Final Disposition of Patients

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview  
(3-Year Comparison)

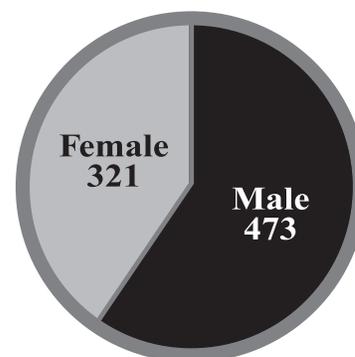
Source: Maryland State Trauma Registry

Final Disposition	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Home	655	715	626
Home with Services	14	68	73
Transfer to Another Acute Care Facility	1	0	2
Transfer to Another Service	0	0	1
Discharge to Extended Care Facility	0	0	2
Discharge to Alternate Caregiver	0	2	3
Rehabilitation Facility	5	9	7
Skilled Nursing Facility	29	33	27
Psychiatric Hospital	8	7	3
Morgue/Died	14	18	12
Left Against Medical Advice or Discontinued Care	13	16	19
Jail	1	8	4
Hospice	1	2	1
Other	1	2	2
Not Valued	1	3	12
TOTAL	743	883	794

### Gender Profile

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview  
(June 2018 to May 2019)

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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
15 to 24 years	114	151	119
25 to 44 years	301	327	320
45 to 64 years	236	295	250
65 years and over	92	110	105
TOTAL	743	883	794

# MARYLAND PEDIATRIC TRAUMA STATISTICS

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

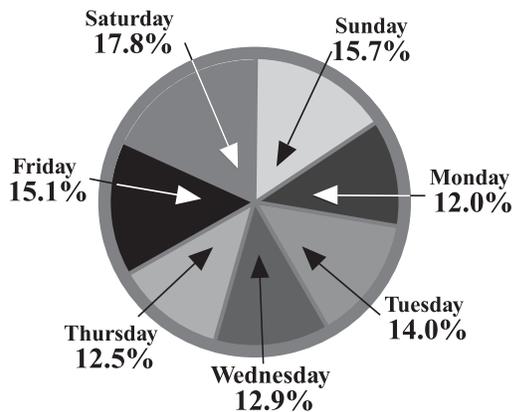
Total Cases Treated at Pediatric Trauma Centers (3-Year Comparison)			
Source: Maryland State Trauma Registry			
Trauma Center	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
CNHS	710	712	637
JHP	912	775	756
<b>TOTAL</b>	<b>1,622</b>	<b>1,487</b>	<b>1,393</b>

*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 2018 to May 2019)

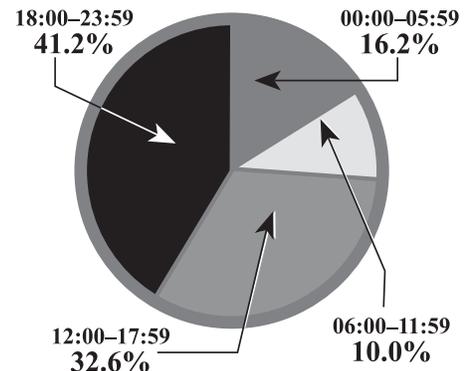
Source: Maryland State Trauma Registry



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

(June 2018 to May 2019)

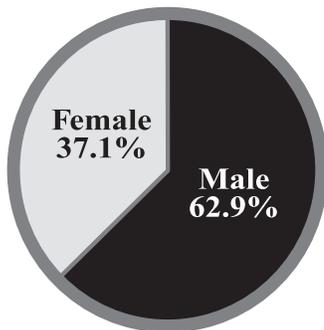
Source: Maryland State Trauma Registry



## Gender Profile: Children Treated at Pediatric Trauma Centers

(June 2018 to May 2019)

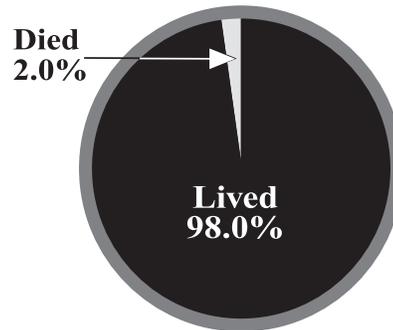
Source: Maryland State Trauma Registry



## Outcome Profile: Children Treated at Pediatric Trauma Centers

(June 2018 to May 2019)

Source: Maryland State Trauma Registry



*Note: For children who were treated at adult trauma centers, see Maryland Adult Trauma Report. Children's National Medical Center 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 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

Modality Type	CNHS	JHP	Total
Ground Ambulance	60.6%	79.1%	72.3%
Helicopter	23.9%	14.6%	18.0%
Other	15.5%	6.3%	9.7%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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 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.*

**Origin of Patient Transport by Center**

*Children Treated at Pediatric Trauma Centers*

*(June 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

Origin	CNHS	JHP	Total
Scene of Injury	41.8%	60.7%	52.1%
Hospital Transfer	43.1%	33.9%	38.1%
Other	15.1%	5.4%	9.8%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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.*

**Injury Type**

*Children Treated at Pediatric Trauma Centers  
(3-Year Comparison)*

*Source: Maryland State Trauma Registry*

Injury Type	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Blunt	93.3%	93.6%	94.6%
Penetrating	4.3%	4.3%	3.8%
Burn	0.0%	0.1%	0.0%
Near Drowning	1.3%	1.4%	1.2%
Hanging	0.1%	0.1%	0.1%
Ingestion	0.0%	0.1%	0.0%
Crush	0.0%	0.0%	0.1%
Animal Bite/Human Bite	0.6%	0.3%	0.1%
Other	0.4%	0.1%	0.1%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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.*

**Mechanism of Injury**

*Children Treated at Pediatric Trauma Centers  
(3-Year Comparison)*

*Source: Maryland State Trauma Registry*

Mechanism of Injury	June 2016 to May 2017	June 2017 to May 2018	June 2017 to May 2018
Cut/Pierce	1.4%	1.7%	1.9%
Drowning/Submersion	1.4%	1.4%	1.2%
Falls	44.6%	39.8%	40.8%
Fire/Flame	0.1%	0.1%	0.0%
Firearm	1.7%	1.4%	1.4%
Machinery/Mechanical	0.2%	0.2%	0.4%
Motor Vehicle Crash	19.2%	19.3%	22.7%
Motorcycle Crash	0.5%	0.1%	0.6%
Pedal Cycle Crash	4.7%	6.1%	3.9%
Pedestrian Incident	8.0%	9.8%	8.7%
Other Transport	0.3%	0.1%	0.4%
Natural/Environmental	2.3%	2.5%	1.7%
Struck by/Against	8.3%	9.8%	7.0%
Abuse	5.7%	4.6%	5.1%
Other	1.4%	1.7%	2.2%
Not Valued	0.2%	1.4%	2.0%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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.*

**Etiology of Injuries by Age**

*Children Treated at Pediatric Trauma Centers (June 2018 to May 2019)*

*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	5.7%	0.0%	0.8%	16.5%	0.0%	0.0%	3.1%	0.0%	42.7%	13.3%
1 to 4 years	24.4%	12.5%	14.0%	31.1%	26.3%	3.7%	10.2%	7.3%	17.1%	23.3%
5 to 9 years	31.9%	37.5%	29.0%	30.6%	15.8%	14.8%	12.2%	40.0%	13.2%	27.4%
10 to 14 years	27.2%	50.0%	53.7%	17.9%	47.4%	59.3%	40.8%	49.1%	21.1%	27.9%
15+ years	10.8%	0.0%	2.5%	3.9%	10.5%	22.2%	33.7%	3.6%	5.9%	8.1%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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 Statistics.*

### Number of Injuries and Deaths by Age

Children Treated at Pediatric Trauma Centers  
(June 2018 to May 2019)

Source: Maryland State Trauma Registry

Age	Number of Injured Patients		Number of Deaths	
	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	187	176	3	3
1 to 4 years	322	302	4	2
5 to 9 years	376	356	5	5
10 to 14 years	391	373	12	12
15+ years	117	115	4	4
<b>TOTAL</b>	<b>1,393</b>	<b>1,322</b>	<b>28</b>	<b>26</b>

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.

### Number of Injuries by Age

Children Treated at Pediatric Trauma Centers  
(3-Year Comparison)

Source: Maryland State Trauma Registry

Age	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Under 1 year	224	172	187
1 to 4 years	404	363	322
5 to 9 years	494	412	376
10 to 14 years	415	429	391
15+ years	85	111	117
<b>TOTAL</b>	<b>1,622</b>	<b>1,487</b>	<b>1,393</b>

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.

### Number of Deaths by Age

Children Treated at Pediatric Trauma Centers  
(3-Year Comparison)

Source: Maryland State Trauma Registry

Age	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Under 1 year	13	4	3
1 to 4 years	8	7	4
5 to 9 years	6	0	5
10 to 14 years	8	2	12
15+ years	1	3	4
<b>TOTAL</b>	<b>36</b>	<b>16</b>	<b>28</b>

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.

### Final Disposition of Patients

Children Treated at Pediatric Trauma Centers  
(3-Year Comparison)

Source: Maryland State Trauma Registry

Final Disposition	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Inpatient Rehab Facility	2.8%	1.9%	3.3%
Skilled Nursing Facility	0.0%	0.1%	0.1%
Specialty Referral Center	0.2%	0.2%	0.2%
Home with Services	0.6%	0.4%	0.4%
Home	92.4%	93.9%	92.7%
Acute Care Hospital	0.1%	0.6%	0.1%
Morgue/Died	2.2%	1.1%	2.0%
Foster Care	1.4%	1.1%	0.8%
Hospice Care	0.0%	0.1%	0.0%
Jail	0.1%	0.1%	0.2%
Psychiatric Hospital	0.1%	0.5%	0.1%
Elopement	0.0%	0.0%	0.1%
Other	0.1%	0.0%	0.0%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

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.

### Etiology of Injuries by Age

Children Treated at Pediatric Trauma Centers or Adult Trauma Centers (June 2018 to May 2019)

Source: Maryland State Trauma Registry

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Cut/Pierce	Struck by/ Against	Pedestrian Cyclist	Other	Total
Under 1 year	7.6%	0.0%	0.7%	18.7%	0.0%	0.0%	5.3%	0.0%	36.8%	14.7%
1 to 4 years	24.9%	12.5%	13.7%	35.0%	25.0%	4.0%	17.0%	6.0%	22.3%	26.5%
5 to 9 years	35.0%	37.5%	33.1%	28.1%	25.0%	20.0%	23.4%	41.8%	15.0%	28.7%
10 to 14 years	32.5%	50.0%	52.5%	18.2%	50.0%	76.0%	54.3%	52.2%	25.9%	30.1%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Note: 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.

**Occurrence of Injury by County:  
Scene Origin Cases Only**

*Children Treated at Pediatric Trauma Centers  
(June 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

County of Injury	Number
Allegany County	1
Anne Arundel County	40
Baltimore County	107
Calvert County	14
Caroline County	6
Carroll County	17
Cecil County	4
Charles County	19
Dorchester County	5
Frederick County	21
Harford County	30
Howard County	16
Kent County	2
Montgomery County	46
Prince George's County	121
Queen Anne's County	2
St. Mary's County	28
Somerset County	2
Talbot County	6
Washington County	10
Wicomico County	1
Worcester County	2
Baltimore City	200
Virginia	1
Washington, DC	12
Not Indicated	12
<b>TOTAL</b>	<b>725</b>

*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. 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.*

**Residence of Patients by County:  
Scene Origin Cases Only**

*Children Treated at Pediatric Trauma Centers  
(June 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

County of Residence	Number
Allegany County	1
Anne Arundel County	38
Baltimore County	96
Calvert County	15
Caroline County	7
Carroll County	10
Cecil County	6
Charles County	18
Dorchester County	4
Frederick County	16
Harford County	32
Howard County	15
Kent County	2
Montgomery County	53
Prince George's County	116
Queen Anne's County	2
St. Mary's County	27
Somerset County	3
Talbot County	2
Washington County	11
Wicomico County	1
Baltimore City	197
Virginia	10
Pennsylvania	8
Washington, DC	15
Other	18
Not Valued	2
<b>TOTAL</b>	<b>725</b>

*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. 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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
None	48.4%	49.6%	45.0%
Seatbelt	8.3%	6.7%	6.6%
Airbag & Seatbelt	13.8%	15.2%	16.3%
Airbag Only	4.0%	6.5%	8.0%
Infant/Child Seat	14.3%	11.4%	16.7%
Protective Helmet	10.2%	10.2%	7.4%
Other Protective Device	0.2%	0.0%	0.0%
Padding/Protective Clothing	0.2%	0.2%	0.0%
Unknown	0.6%	0.2%	0.0%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*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 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.*

# MARYLAND PEDIATRIC BURN STATISTICS

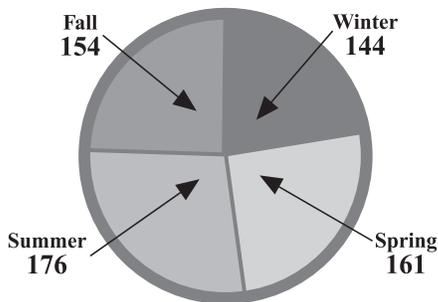
**Total Number of Pediatric Burn Cases**  
*Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (3-Year Comparison)*  
 Source: Maryland State Trauma Registry

Institution	Legend Code	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Children's National Health System Pediatric Burn Center	CNHSPBC	247	287	235
Johns Hopkins Pediatric Burn Center	JHPBC	373	393	345
Johns Hopkins Burn Center at Bayview	JHBC	28	51	55
<b>TOTAL</b>		<b>648</b>	<b>731</b>	<b>635</b>

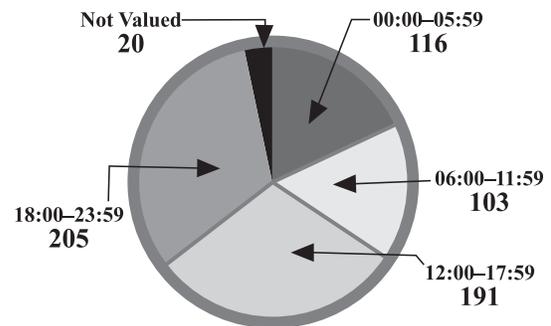
**Place of Injury**  
*Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2018 to May 2019)*  
 Source: Maryland State Trauma Registry

Place of Injury	Number
Non-Institutional Private Residence	517
Institutional Private Residence	1
School, Other Institution and Public Administrative Area	13
Sports and Athletic Area	5
Street/Highway	4
Trade and Service Area	11
Industrial and Construction Area	1
Other Places	38
Unspecified Places	45
<b>TOTAL</b>	<b>635</b>

**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 2018 to May 2019)*  
 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 2018 to May 2019)*  
 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 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

County of Injury	Number
Allegany County	1
Anne Arundel County	25
Baltimore County	72
Calvert County	6
Carroll County	6
Cecil County	7
Charles County	13
Dorchester County	1
Frederick County	10
Harford County	12
Howard County	23
Kent County	1
Montgomery County	70
Prince George's County	114
Queen Anne's County	3
Somerset County	1
St. Mary's County	5
Talbot County	2
Washington County	11
Wicomico County	5
Worcester County	1
Baltimore City	143
Virginia	2
West Virginia	4
Pennsylvania	6
Washington, DC	1
Delaware	3
Other	2
Not Valued	85
<b>TOTAL</b>	<b>635</b>

### 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 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

County of Residence	Number
Allegany County	1
Anne Arundel County	29
Baltimore County	98
Calvert County	10
Carroll County	11
Cecil County	7
Charles County	17
Dorchester County	3
Frederick County	13
Harford County	18
Howard County	26
Kent County	1
Montgomery County	80
Prince George's County	108
Queen Anne's County	5
St. Mary's County	5
Somerset County	1
Talbot County	2
Washington County	10
Wicomico County	5
Worcester County	1
Baltimore City	158
Virginia	4
West Virginia	5
Pennsylvania	3
Washington, DC	7
Delaware	1
Other	6
<b>TOTAL</b>	<b>635</b>

### 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 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

Modality Type	CNHSPBC	JHPBC	JHBC	Total
Ground Ambulance	82	172	4	258
Helicopter	6	7	0	13
Other*	147	162	51	360
Not Valued	0	4	0	4
<b>TOTAL</b>	<b>235</b>	<b>345</b>	<b>55</b>	<b>635</b>

\*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 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

Origin Type	CNHSPBC	JHPBC	JHBC	Total
Scene of Injury	77	117	34	228
Hospital Transfer	70	127	2	199
Other	82	69	19	170
Not Valued	6	32	0	38
<b>TOTAL</b>	<b>235</b>	<b>345</b>	<b>55</b>	<b>635</b>

### Etiology of Injuries by Age

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15  
Treated at Johns Hopkins Burn Center at Bayview  
(June 2018 to May 2018)

Source: Maryland State Trauma Registry

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Unknown	Total
			Flame	Contact	Scald				
Under 1 year	0	0	1	29	39	0	0	2	71
1 to 4 years	5	5	6	132	166	1	0	14	329
5 to 9 years	4	0	12	40	48	2	3	5	114
10 to 14 years	2	1	13	25	51	3	4	2	101
15 years and over	1	0	3	5	8	0	1	2	20
Total	12	6	35	231	312	6	8	25	635

### 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 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Home	607	645	572
Home with Services	19	42	35
Transfer to an Acute Care Facility	7	17	13
Rehabilitation Facility	10	6	10
Morgue/Died	0	3	0
Alternate Caregiver	2	8	3
Foster Care	2	6	1
Transfer to Inpatient Psychiatric Facility	0	1	0
Jail or Prison	0	1	0
Other	1	0	0
Not Valued	0	2	1
TOTAL	648	731	635

### 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 2018 to May 2019)

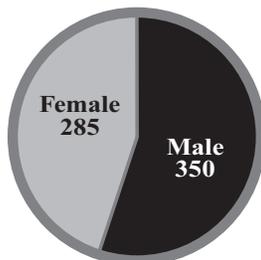
Source: Maryland State Trauma Registry

Length of Stay	Less Than 10% TBSA	10 - 19% TBSA	20% or Greater TBSA	Not Valued	Total
1 Day	451	3	0	68	522
2 - 3 Days	21	4	0	8	33
4 - 7 Days	19	2	0	2	23
8 - 14 Days	6	5	0	1	12
15 - 21 Days	0	1	0	2	3
22 - 28 Days	0	1	2	0	3
Over 28 Days	1	0	2	1	4
Not Valued	33	0	0	2	35
TOTAL	531	16	4	84	635

### Gender Profile

Patients Treated at Pediatric Burn Centers and  
Patients Less Than Age 15 Treated at  
Johns Hopkins Burn Center at Bayview  
(June 2018 to May 2019)

Source: Maryland State Trauma Registry



### Number of Injuries by Age

Patients Treated at Pediatric Burn Centers and  
Patients Less Than Age 15 Treated at  
Johns Hopkins Burn Center at Bayview  
(3-Year Comparison)

Source: Maryland State Trauma Registry

Age Range	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Under 1 year	96	85	71
1 to 4 years	328	375	329
5 to 9 years	124	135	114
10 to 14 years	72	104	101
15 years and over	28	32	20
TOTAL	648	731	635

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

*(3-Year Comparison)*

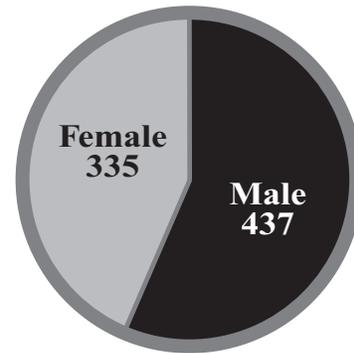
*Source: Maryland State Trauma Registry*

	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Unique Patients	720	793	772
Total Pediatric Burn Clinic Visits	1,572	1,673	1,623

**Gender Profile**

*Patients Treated at the Pediatric Burn Clinics at Johns Hopkins Pediatric Center and Children's National Health System (June 2018 to May 2019)*

*Source: Maryland State Trauma Registry*



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

*(3-Year Comparison)*

*Source: Maryland State Trauma Registry*

Age Range	June 2016 to May 2017	June 2017 to May 2018	June 2018 to May 2019
Under 1 year	90	91	85
1 to 4 years	378	429	386
5 to 9 years	132	139	161
10 to 14 years	83	109	114
15 years and over	37	25	26
<b>TOTAL</b>	<b>720</b>	<b>793</b>	<b>772</b>

**Etiology of Injuries by Age**

*Patients Treated at the Pediatric Burn Clinics*

*At Johns Hopkins Pediatric Center and Children's National Health (June 2018 to May 2019)*

*Source: Maryland State Trauma Registry*

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Other Non-Burn	Unknown	Total
			Flame	Contact	Scald					
Under 1 year	0	0	1	40	43	0	0	0	1	85
1 to 4 years	1	2	10	168	192	0	2	0	11	386
5 to 9 years	4	1	14	77	60	1	1	0	3	161
10 to 14 years	2	1	11	30	62	0	1	1	6	114
15 years and over	1	0	7	9	8	0	0	0	1	26
<b>Total</b>	<b>8</b>	<b>4</b>	<b>43</b>	<b>324</b>	<b>365</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>22</b>	<b>772</b>

## GOVERNOR OF MARYLAND

Larry Hogan

## LIEUTENANT GOVERNOR

Boyd K. Rutherford

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Career Firefighter

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Dany Westerband, MD, FACS

Trauma Physician

Murray A. Kalish, MD, MBA

Chairperson, Statewide EMS Advisory Council

Public at Large – Vacant

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Rosemary Kozar, MD, PhD

Representing National Study Center for  
Trauma and Emergency Medical Systems

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Representing the EMS Regional Medical  
Directors

James S. Fowler, III / M. Justin Kinsey

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

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

Jennifer Anders, MD, FAAP

Representing American Academy of  
Pediatrics, Maryland Chapter

Michael G. Millin, MD, MPH,

FACEP, FAEMS  
Representing American College of  
Emergency Physicians, Maryland Chapter

Habeba Park, MD

American College of Surgeons,  
Maryland Chapter

Robert Pattison

Volunteer Field Providers

American Association of Critical Care  
Nurses, Maryland Chapter – Vacant

Maryland Board of Physicians – Vacant

State Emergency Number Systems  
Board – Vacant

Maryland Hospital Association – Vacant

### Maryland Institute for Emergency Medical Services Systems (MIEMSS)

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

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