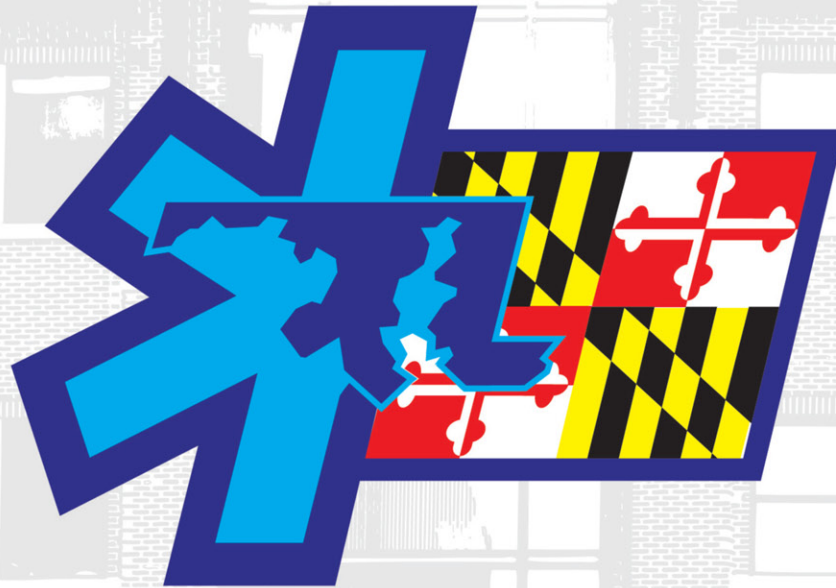


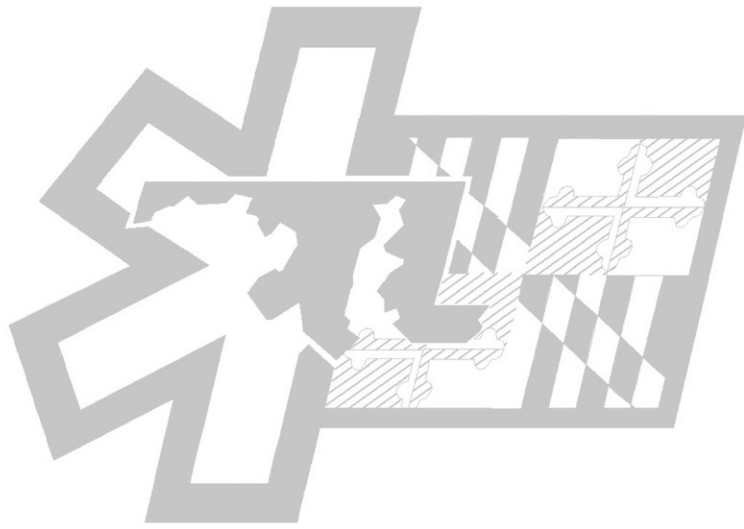
Maryland Institute for
Emergency Medical Services Systems



2017 - 2018
Annual Report

25th Anniversary
1993 - 2018

653



2017–2018 ANNUAL REPORT

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MISSION, VISION, AND KEY GOALS

MISSION

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

VISION

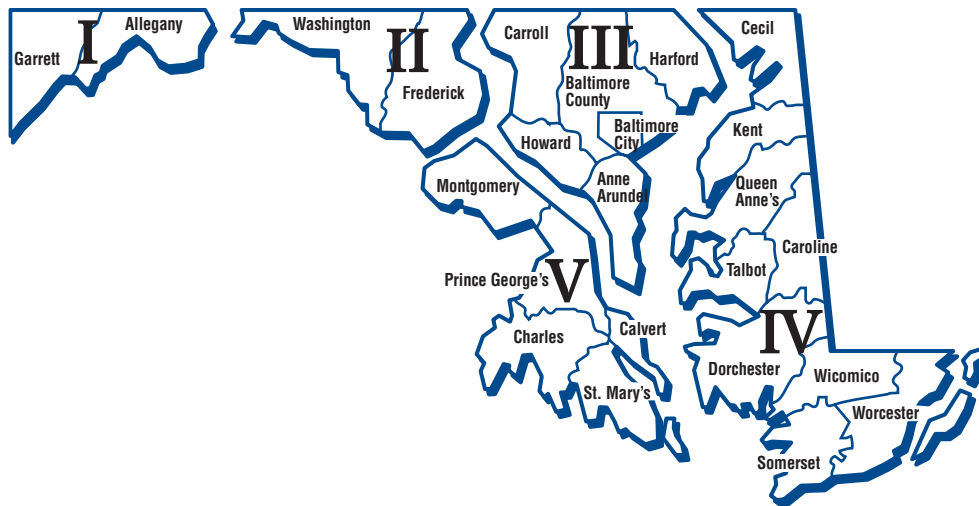
To be a state EMS system acknowledged as a leader for providing the highest quality patient care and that is sought out to help other EMS systems attain the same level of quality care.

KEY GOALS

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

MARYLAND EMS REGIONS

Maryland's EMS system is composed of five regions. Each region has a Regional EMS Advisory Council composed of members who have an interest in EMS. Council responsibilities are defined by regulation, and council meetings typically cover a range of topics, including grants, training, EMS policies and protocols, legislation, and communications. Input from each Regional EMS Advisory Council is provided to the Statewide EMS Advisory Council for recommendation to the EMS Board. MIEMSS' regional administrators support the councils, facilitate communication, and address regional EMS issues.





Donald L. DeVries, Jr., Esq.
Chairman, EMS Board

FROM THE MARYLAND EMS BOARD CHAIR

With this 2017-2018 Annual Report, we celebrate the 25th Anniversary of the statute that formally created Maryland's present statewide EMS system. Passed in 1993, this law recognized the importance of the EMS system in reducing mortality and morbidity, the value of Maryland's highly-trained career and volunteer firefighters, EMS providers, and rescue squad personnel in rendering life-sustaining medical care and emergency services, and the complexity of our EMS system, which involves multiple stakeholders and interests. The law was based on the premise that Maryland's EMS could be further enhanced by establishing a governing body and structure for the statewide system.

The 1993 statute created the State EMS Board and charged it with oversight and responsibility for ensuring the effective and efficient operation of the statewide EMS system. The law also called for the formation of Statewide EMS Advisory Council (SEMSAC) to serve as the principle advisory body to the EMS Board and to be the mechanism by which the myriad of EMS system stakeholder interests would be represented at a statewide level. Finally, the law made MIESS an independent state agency responsible for coordinating the statewide system and implementing the EMS Board-approved EMS Plan.

Although formally created in law in 1993, the foundation of Maryland's EMS system was rooted in local, state, and national initiatives started decades earlier to improve prehospital care and reduce unnecessary deaths. The 1993 legislation was the result of a Governor's Taskforce that, one year earlier, had been charged with examining Maryland's EMS system, identifying needed improvements, and recommending ways to prepare the EMS system for the next century. Since Maryland's comprehensive and coordinated statewide EMS system could not be successful without sustained funding, much of the necessary financial support for the EMS system had been secured by the creation of the EMS Operations Fund in 1992. The final piece of the oversight structure was put into place by 1999 legislation that charged the EMS Board with the responsibility for licensing and certification of all levels of EMS providers.

In the intervening quarter of a century since our inception, the combination of a strong foundation, an effective organizational structure, and a stable funding source has helped Maryland's statewide EMS system to flourish. It has provided the opportunity to pursue initiatives for improving the EMS system and helped Maryland EMS meet the challenges of an ever-changing health care landscape. There have been important achievements too numerous to detail here, but among those are the following:

- Our first Statewide EMS Plan, approved by the EMS Board in 1995, identified 99 objectives, one of which was that Maryland should adopt the national "blueprint" for all levels of prehospital providers. This objective, ranked by EMS providers at that time as one of the most important objectives for Maryland, has been achieved over many years of effort to ensure that EMS educational standards align with national standards and state requirements to confirm provider readiness to treat emergency patients in the field. This has ensured that the highest levels of competence and licensing/certification levels continue to evolve consistent with those used throughout the nation.
- Between 1994 and 2014, Maryland moved from a cumbersome paper-based prehospital care record, to a homegrown electronic form (EMAS), and finally to a sophisticated prehospital care information system (eMEDS) that is now used in every EMS jurisdiction in Maryland. On the horizon, integrating eMEDS with Maryland's Health Information Exchange ("CRISP") will eventually make accessible a patient's prehospital, hospital, and physician records for treatment and quality improvement purposes.
- Maryland's EMS communication system, confined in the early 1990s to operating in certain defined areas of the state, now operates statewide and is the largest medical communication system in Maryland. The system is currently undergoing a major upgrade from analog to digital that will incorporate the use of cutting-edge technology in EMS communications. This upgrade will be completed in the next several years.
- Designation of specialty centers capable of receiving seriously ill or injured ambulance-transported patients began with Maryland's trauma centers, which were first designated in 1997. Since then, hospital designation has grown beyond trauma to encompass 11 specific specialty center designations, with more likely as EMS begins to move into innovative ways of delivering care to patients. The impact of hospital designation has been significant. The designation of Primary Stroke Centers began in 2006, and Comprehensive Stroke Center designation began in 2013. Since then, Maryland has become a national leader in stroke care. Designation of Cardiac Interventional Centers began in 2010, and had been preceded by a multi-year effort to ensure that all advanced life support (ALS) providers were trained in 12-lead electrocardiograph (EKG) administration and interpretation, and that all ALS units in Maryland were equipped with 12-lead EKG.
- Maryland's EMS system remains one of the few in the nation with uniform, statewide protocols for all EMS providers. Our statewide EMS protocols ensure that the care rendered throughout Maryland—from Western Maryland to the Eastern Shore—is consistent with the highest standards. Since the inception of our system, the State EMS Medical Director, Richard Alcorta, MD, has tirelessly championed the development and implementation of our EMS protocols. Dr. Alcorta will retire in 2018, and we thank him for his dedication and service.

Over the past quarter century, we have also endured tragedy. The events of September 11, 2001, unfolded as the EMS Board was holding its monthly meeting. The loss of life from the crash of Maryland State Police Trooper 2 Medevac in 2008 devastated our entire EMS community. And the all-too-frequent loss of public safety personnel who give their lives while responding to emergencies has touched every EMS and fire provider in Maryland. Despite these tragedies, our providers remain courageous and committed, and our EMS system remains strong and ready to meet the emergency needs of our citizens.

We can be very proud of the numerous accomplishments of the past 25 years. The laws that were enacted in the early 1990s have been invaluable in our joint efforts to meet our mission. The key to our success has been the sacrifice of the dedicated people working in our system who have experienced triumph and endured tragedy. I am enormously grateful to the fire and EMS community, both volunteer and career, for its partnership and commitment to the spirit of cooperative excellence and dedicated personnel. Your leadership and support have been critical to our successes. On behalf of the EMS Board, I pledge our continued efforts to strengthen and improve EMS in Maryland and to ensure that we continue as a national model.

MIEMSS OVERVIEW

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 providers, 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.



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 records, processes payroll, 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.

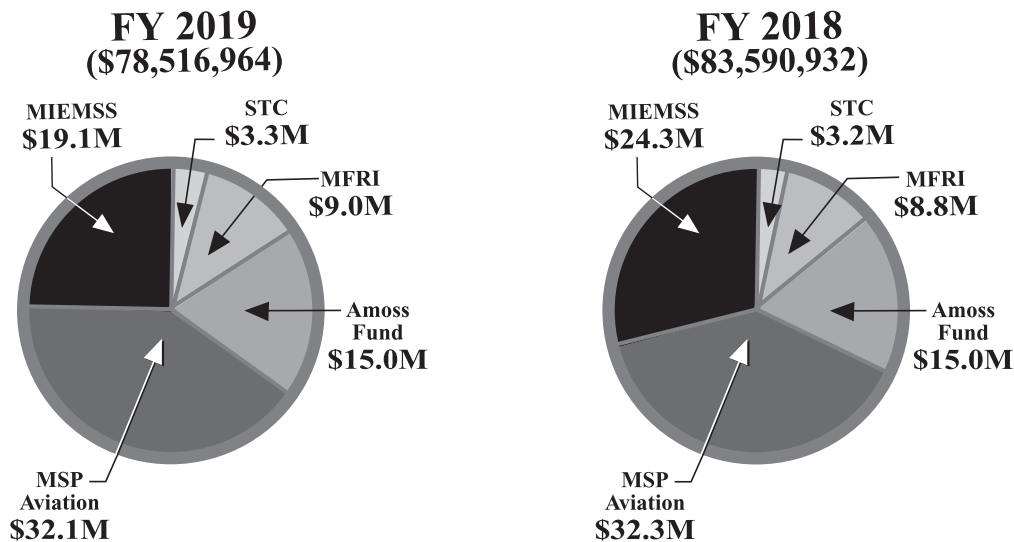
Administration is also responsible for inventory control, fleet management, travel services, and building operations and maintenance.

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 2018 Expenditure by Object Code (Includes All Funds)

| FY 2018 | Actual |
|---|--------------|
| Salaries and Wages..... | \$8,737,327 |
| Technical/Special Fees..... | 1,708,188 |
| Communication..... | 11,807,637 |
| Travel..... | 639,367 |
| Fuel and Utilities..... | 124,432 |
| Motor Vehicle Operations and Maintenance..... | 323,665 |
| Contractual Services..... | 2,423,712 |
| Supplies and Materials..... | 189,632 |
| Equipment—Replacement..... | 171,512 |
| Equipment—Additional..... | 66,278 |
| Fixed Charges..... | 169,761 |
| Grants..... | 1,418,731 |
| Total Expenditure..... | \$27,780,242 |

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 2018 there were 2,015 patients transported by the Maryland State Police Aviation Command (MSPAC). Of these patients, 1,995 (99%) were transported from the scene at the request of the local emergency services and 20 (1%) were transported between hospitals to a higher level of care. Types of calls include the following:

- Motor vehicle crashes812
- Falls533
- Pedestrians.....108
- Assaults57
- Gunshot wounds.....55
- Stabbings36
- Industrial accidents.....35
- Burns24

After the successful transition in 2015 to the AgustaWestland 139 (AW-139) model of aircraft, FY 2018 saw continued growth in the crew resource management approach to care, made possible by the use of a two-person medical crew with dual pilot operation. The AW-139 aircraft utilize the most current safety technology, as recommended by the National Transportation Safety Board, and are powerful enough to carry two patients and two EMS providers despite the challenging heat and humidity of the summer months.

The MSPAC continued its participation 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

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 providers 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 2018 the Attorney General's Office provided the following services to MIEMSS.

- Reviewed and prosecuted 44 cases of alleged prohibited acts by EMS providers and applicants and responded to exceptions filed in 2 cases.
- 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 74 public information act requests, 3 subpoenas, and 10 research requests.

Assistant attorneys general worked with MIEMSS in FY 2018 to amend various regulations, including the standards for designation of trauma centers. They also provided advice on mobile integrated health programs, provided advice and support on a bill concerning reimbursement for mobile integrated health services during the legislative session, and participated in a subsequent study group.

Also in FY 2018, 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, software maintenance agreements, and business associate agreements under the Health Insurance Portability and Accountability Act (HIPAA).

Other tasks completed included providing advice on MIEMSS' social media policy, various intellectual property issues, reviewing interagency memorandums of understanding, and reviewing and providing advice concerning designation of trauma and specialty referral centers and base stations. The assistant attorneys general also provided advice and support by reviewing two applications for conversion of a hospital to a

freestanding emergency medical facility, specifically as to whether the hospitals will maintain adequate and appropriate delivery of emergency care within the statewide EMS system.

The assistant attorneys general made educational presentations at several venues in FY 2018, including the EMS Care Conference and the Chesapeake Region Safety Council Conference, and served on the Maryland Health Information Exchange Policy Board, the Governor's Inter-Agency Heroin and Opioid Coordinating Council, and the Attorney General's Opioid/Heroin Work Group. 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 health care 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 health care 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 end of FY 2018, 37 commercial ambulance services and 467 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 mission, SOCALR remains committed to providing sound leadership and direction, while ensuring patient and provider health, safety, and welfare. In doing so, SOCALR remains continuously committed to MIEMSS' organizational mission and vision. The department continues to evaluate internal business processes and develop strategies that enhance and streamline operations.

As a direct result of this evaluative process, SOCALR is pleased to report a transition to year-round licensure renewal for all commercial services. This modification from the previous May/June renewal period was initiated in March 2018. Since that time, the department has determined that SOCALR personnel resources are being used more efficiently and the inspection process is more consistent among commercial services.

In an effort to maintain the desired level of competency and professionalism, SOCALR is pleased to report that all personnel performing inspections have successfully completed the Council on Licensure, Enforcement and Regulation (CLEAR) National Certified Investigator and Inspector Training (NCIT) basic training program. This three-day certification program provides covers topics such as professional conduct, administrative law principles, investigative processes, and inspection procedures.

SOCALR has continued to work collaboratively with MIEMSS information technology personnel to refine the web-based Commercial Ambulance Licensing System (CALs). SOCALR can now process initial and renewal applications electronically, and expects to incorporate online payment processing using a newly-implemented electronic funds transfer procedure in FY 2019. The use of CALs has streamlined operations and significantly reduced agency costs associated with service management, vehicle management, and the licensing process.

Commercial service base surveys continued throughout FY 2018, with an emphasis on neonatal licensed services. Each of these surveys was conducted by a team of personnel from SOCALR and MIEMSS perinatal and Maryland EMS for Children programs. Survey team members assessed individual services' neonatal operational and administrative practices, including a review of equipment and practices at each of the hospitals for which these services provide neonatal transport. During this process, subject matter experts from statewide hospital neonatal intensive care units provided recommendations with regard to the latest trends in neonatal equipment and transport practices. This data will be compiled and presented to statewide stakeholders as part of the regulatory review process.

Through an ongoing partnership with the Maryland EMS for Children program, SOCALR continues to promote safe ambulance transports by way of MIEMSS' Ambulance Safety Work Group, the statewide forum for ambulance safety issues. The work group is tasked with gathering, analyzing, and disseminating best practices for initial and periodic driver screening and driver training. Through improved monitoring of ambulance safety issues and information sharing, it aims to increase the use of restraints in all seated positions in ambulance and fire vehicles, as well as reduce excessive speed and excessive use of lights and sirens in ambulances.

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. SOCALR personnel also provide support to MIEMSS Regional Programs department by assisting with the Voluntary Ambulance Inspection Program throughout Maryland (see page 28 for more information).

Throughout FY 2018 SOCALR has continued to work closely with MIEMSS' Information Technology and Licensure and Certification offices to support the transition to the licensure system launched in fall 2016. Commercial service personnel affiliations are now processed electronically and managed directly by service operations managers and service medical directors. Additionally, SOCALR is in the process of transitioning all commercial services to the eMEDS ELITE platform (see page 20 for more information). This transition is expected to be completed by early FY 2019.

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.

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).

MIEMSS' microwave assets continue to make it possible to implement MFiRST in Maryland more rapidly than originally anticipated. In support of MFiRST, MIEMSS worked with the MFiRST team to resolve a significant microwave backhaul challenge created by the lack of available microwave channels on the border between Washington and Allegany counties. Through a partnership agreement, MIEMSS modified the existing microwave system to allow MFiRST to move forward with the creation of a new microwave link in support of both MIEMSS and MFiRST, leveraging each agency's resources and taxpayer dollars to the fullest extent possible.

The completion of the Benedict to Leonardtown SHA microwave path makes connectivity into St. Mary's County more reliable and provides the backhaul needed to support the EMS communications system upgrade to an internet protocol (IP) based system. The addition of this licensed link not only provides for reliable base station connectivity in the Leonardtown area, but also allows the Leonardtown SHA tower to be a springboard into MedStar St. Mary's Hospital.

In partnership with Calvert County, MIEMSS installed a link between the new Barstow tower and Prince Frederick MSP. This provides MIEMSS the ability to leverage Calvert County's new towers at Barstow, Lusby, and Mt. Hope. The new link also supplies a secondary connectivity to Calvert County's 9-1-1 center, providing a more robust 9-1-1 radio system.

Maryland FiRST: Statewide 700 MHz Radio System

MIEMSS remains an active partner in the Maryland First responders 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.

Because MIEMSS' Western Emergency Medical Resource Center (EMRC) is located in the program's Phase 4 design area, Communications Engineering Services staff members were key players in the technical design process and deployment of the interface equipment at the shared tower site. Western EMRC's interface with MFiRST should be operational by August 2018 and will be in concert with Allegany County's effort to begin operating on MFiRST. MIEMSS' direct interoperability with MFiRST supports field providers operating on this system and allows all field providers in the Western EMRC serving area to obtain medical direction via the EMRC. MIEMSS has also been involved in designing and planning the program's fifth phase in Southern Maryland, which is expected to be completed in 2019.

MIEMSS has continued to expand its network monitoring and alarm monitoring system to enable staff to be more efficient and to effect 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. Funding sources that have been critical to this project have included Public Safety Interoperable Communications (PSIC) grants, Urban Area Security Initiative (UASI) grants, MIEMSS operating funds, the MFiRST program, the Maryland Department of Health, and local interoperability project funds. Applications that currently operate on PSInet in addition to MFiRST include:

- Digital Emergency Medical Services Telephone (DEMSTEL)
- Central Maryland Area Radio Communications (CMARC)
- Maryland Eastern Shore Interoperability Network (MESIN)
- 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. To manage this increasing risk, a multi-year plan was developed to provide structural upgrades that can support an IP-based, geo-diverse system comprising contemporary standards.

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 the Black & Veatch Company to upgrade the statewide EMS communications systems. 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. As of this report, over 200 of the sites have been surveyed. Once complete, this data will be utilized to develop the final design components for the system. A phased implementation approach will be utilized over the next three years to replace the core radio, telephone, and patching systems used by MIEMSS.

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 providers 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, and Cecil counties have adopted the use of the AVTacs, greatly benefitting the EMS continuum of care. It is expected that other counties will adopt 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 2018.

- Expanded MIEMSS’ radio programming template to incorporate county radio system upgrades.
- Provided conventional communication circuits on MIEMSS infrastructure to help MSP’s Washington County barracks transition to 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.
- Relocated the Sideling Hill microwave traffic to Townhill to allow MFiRST to construct a new tower.
- Continued to work with Wicomico, Calvert, and Worcester counties on public safety radio system upgrades at tower sites shared with MIEMSS.
- Continued support for local 9-1-1 centers through active participation on the Emergency Number Systems Board.
- Replaced old communications consoles in the EMRC/SYSCOM backup center in the R Adams Cowley Shock Trauma in Baltimore to improve operations and in preparation for the EMS communications system upgrade.
- Developed interim connectivity to these hospitals in preparation for Verizon’s planned copper retirement:
 - Washington Adventist Hospital
 - Shady Grove Adventist Hospital
 - MedStar Montgomery Medical Center
 - UM Bowie Health Center
 - Holy Cross Silver Spring
 - Germantown Emergency Center

Despite the loss of one of the department’s key technicians and other staffing challenges in FY 2018, Communications Engineering Services was successful in completing many important projects while managing constantly changing priorities at the local and state level. 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 EMS by EMS providers throughout Maryland. To that end, the Compliance Office is responsible for ensuring quality of 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 comprising physicians representing the Maryland Board of Physicians, Maryland Medical Chirurgical Society, and EMSOP medical directors. All levels of EMS providers are also 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 2018 Compliance Office Activity

| | |
|--|--------|
| • EMSOP reverification applications reviewed..... | 1 |
| • Criminal background investigations completed | 10,377 |
| • Incidents reported to IRC | 250 |
| • IRC investigations initiated | 250 |
| • IRC investigations conducted | 241 |
| • IRC investigations (FY 2017) continued..... | 9 |
| • IRC complaints forwarded to PRP | 45 |
| • Complaints dismissed by PRP | 1 |
| • Complaints forwarded to EMS Board | 44 |
| • Complaints requiring service | 3 |
| • Quality assurance officer courses conducted..... | 2 |
| • Quality assurance officers trained..... | 66 |

EMS Board Actions

| | |
|------------------------------------|----|
| • Reprimands..... | 3 |
| • Probation | 19 |
| • Suspensions | 5 |
| • Revocations | 12 |
| • Remedial training | 4 |
| • Surrenders..... | 0 |
| • Evaluations | 0 |
| • Applications denied..... | 1 |
| • Case resolution conferences..... | 9 |
| • Dismissed | 1 |
| • Counseling..... | 5 |
| • Rehab | 7 |
| • Random testing..... | 10 |
| • OAH hearings requested | 10 |
| • OAH hearings conducted | 2 |
| • OAH hearings defaulted | 1 |
| • Settlement agreements | 7 |

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 providers, 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 and 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 2018 MIEMSS continued to focus on promoting and enhancing CISM capabilities through symposiums and training. The March 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 providers needing this service following traumatic events. In FY 2018 these ongoing collaborative efforts proved critical in supporting two out-of-state CISM missions. Both of these deployments were requested and coordinated through the Emergency Management Assistance Compact (EMAC).

Florida

The first of these missions took place in September 2017. In the aftermath of Hurricane Irma, the State of Florida requested CISM support for shelter workers and first responders. MIEMSS and the Maryland Emergency Management Agency (MEMA) coordinated the response to this EMAC request; the personnel that deployed were provided by Montgomery County Fire and Rescue Service, Howard County Department of Fire and Rescue Services, and a private-sector mental health provider.

The CISM team traveled to multiple Florida counties to support personnel working in difficult conditions since the hurricane, performing one-on-one and group meetings at public shelters and fire/EMS stations, and distributing information and resource packets to personnel working in these locations. The team remained in Florida for 10 days.

US Virgin Islands

In January 2018 the US Virgin Islands requested critical incident and mental health support for first responders, emergency personnel, and other government workers who had been working long hours in the months since Hurricane Irma.

MIEMSS and MEMA worked together to coordinate the response to this EMAC request. MIEMSS organized a 17-person team comprising personnel from MIEMSS, Montgomery County Fire and Rescue Service, and private-sector mental health providers.

The mental health providers and emergency services peers were paired together and traveled throughout the islands of St. Croix, St. John, and St. Thomas providing educational sessions for stress management and other aid to those who had been coping with demanding situations. Over 900 individuals were supported in formal sessions and countless others in one-on-one encounters. The team remained active for 21 days and returned in mid-February.

CISM Training

In partnership with local jurisdictions, MIEMSS offered three 3-day initial CISM courses:

- November 2017; partnering with Salisbury Fire Department and the Wicomico County Health Department
- June 2018; partnering with Washington County Division of Emergency Services and Meritus Health System
- June 2018; partnering with Cecil County Department of Emergency Services

In April 2018 MIEMSS sponsored two 1-day courses 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 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 providers 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 and Social Networking

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, special issues of the newsletter devoted to the statewide opioid crisis and Maryland's Mobile Integrated Health programs were produced, and another issue included special articles about mentoring and recruitment and retention of volunteer EMS providers. In FY 2018 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).

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, 2018, over 9,800 users were following MIEMSS' Facebook page and over 1,300 users were following its Twitter feed. Posts on Facebook during this period had a total reach of nearly 700,000, 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 providers, including important messages specifically for Maryland providers as well as illness and injury prevention messages intended for the public. Information about EMS conferences and EMS Week celebrations for providers, 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.

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 2018-2019 protocol manual was made available on MIEMSS' website in early 2018. 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 provider statewide.

Training Support

In FY 2018 the department produced the *EMS Update 2018* training video, required viewing for Maryland EMS providers, which included educational content as well as changes and additions to the 2018-2019 EMS protocols. The production was made available to providers through MIEMSS' Online Training Center or on CD 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 1) an EMS Week "thank you" message to providers in May 2018, 2) the Mid-Atlantic Life Safety Conference opening video, 3) the Maryland Fire-Rescue Memorial Foundation annual ceremony, and 4) the annual memorial service program and video eulogies for the MSFA convention.

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 providers. Staff also provides assistance and support with in-house web conferencing, video conferencing, and teleconferencing.

Maryland EMS Awards

During EMS Week in May 2018, 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 Acting Co-Executive Directors Richard L. Alcorta, MD, FACEP, and Patricia Gainer, JD, MPA, 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 2018 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 the dangers of drowsy driving for emergency services field and hospital personnel 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 2018 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 providers 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 throughout the state:

- 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 grants related to pediatric emergency care, injury prevention, and EMS for Children research
- 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. In FY 2018 the FAN provided training for the public and for EMS providers on the educational program “Emergency Ready Families,” and is developing a train-the-trainer package.

Allen Walker, MD, MBA, FAAP, retired as the Associate State EMS Medical Director for Pediatrics after over eighteen years of working at MIEMSS and serving as the medical advisor for EMS for Children State Partnership Grants. Jennifer F. Anders, MD, FAAP, transitioned into this position having worked beside Dr. Walker for the past two years. She serves on MIEMSS’ Protocol Review Committee (PRC) revising current medical protocols for EMS providers, 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. The Pediatric QIC is also 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 QIC and DART meet bimonthly and have three 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) a second year of data collected on the pediatric sepsis protocol for EMS providers and 3) cardiac arrest occurrence and Cardiac Arrest Registry to Enhance Survival (CARES) outcome reports. 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 Johns Hopkins University.

Cynthia Wright-Johnson, EMS for Children’s director, is designated by the National Association of State

EMS Officials’ (NASEMSO) Pediatric Emergency Care Council to serve as liaison to the American Academy of Pediatrics (AAP) Committee on Pediatric Emergency Medicine. She also serves on the Institute for Quality Safety and Injury Prevention at the Emergency Nurses Association (ENA) national level, chairs the ENA’s Maryland committee, and is appointed to the Maryland State Child Fatality Review Committee. In 2018 Wright-Johnson was appointed as the NASEMSO representative to the advisory board of the EMSC Innovation and Improvement Center Pediatric Recognition Collaborative.

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, regional educational councils, and attendees of the Lifesavers National Conference.

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 and three local ENA chapters by providing meeting logistics for the Pediatric Committee of Maryland ENA and the Emergency Nurse Pediatric Course (ENPC). In August 2017 MIEMSS hosted the annual ENA delegate preparation meeting prior to their national General Assembly.

Maryland EMS for Children State Partnership Grant

MIEMSS completed the 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. This 12 years of consecutive grant funding 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 health care providers (see Pediatric and EMS Hospital Education, below). April 1, 2018, was the start of a new four-year EMS for Children State Partnership Grant from the same funding agency that will continue to support integration of pediatric EMS into the Maryland EMS system and work toward meeting the newly-revised federal EMS for Children Performance Measures. The three new measures are: 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 the FAN Council activities and pilot QI projects through the DART.

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 17th 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 practice, including training for Maryland healthcare providers or CPS technicians, social media on MIEMSS' Facebook and Twitter accounts, educational materials development and distribution, 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 use of car seats and boosters has slowly increased, and proper use is taught, we hope that this grant has contributed to safer children.

Some highlights of this project include:

- Conducted 11 CPS exhibits, reaching approximately 1,275 EMS providers, emergency nurses, occupational therapists, elementary school families, and others. Approximately 19,000 pieces of educational material were distributed through exhibits, mailings, and trainings, including seven car seats or training dolls. More than 158 agencies received materials from this project.
- Taught eight training sessions reaching 97 providers at five different agencies.
- Assisted with teaching five national CPS certification courses and one special needs CPS class, reaching more than 60 health care providers and law enforcement professionals.
- Assisted at 21 car seat safety checks, including four as part of a Graco grant to Safe Kids-Baltimore.
- Awarded five scholarships to cover the cost of a certified child passenger safety technician course.
- Planned and conducted two webinars, reaching 105 people.
- Assisted at five neonatal intensive care unit (NICU) site visits in Maryland hospitals.
- Used three outdoor temperature displays 19 times to educate families about heatstroke in children left alone in cars, and posted 10 social media messages and an article in Maryland EMS News on this topic. These displays were funded by the Maryland State Firemen's Association (MSFA) Fire and Injury Prevention Committee in 2017, and are maintained by Maryland Safe Kids Buckle Up funding.

- Sponsored the Pediatric Grand Rounds at Peninsula Regional Medical Center, with car expert and pediatrician Dr. Alisa Baer educating 20 providers.
- Documented ongoing views of archived CPS/OP webinars and public service announcements (PSA) on EMS for Children's website, with an average of 28 new views for each of the ten webinars and average of 129 new views for the five PSAs.

Drowsy Driving Awareness and Prevention for Health Care Provider Grant

In 2017 the HSO received a grant from the Governor's Highway Safety Association and the National Road Safety Foundation to create a drowsy driving prevention campaign for Maryland health care providers, which was subcontracted to MIEMSS for implementation. Through a review of literature and focus group meetings, it was decided that a "Drowsy Driving Awareness and Prevention Campaign" kit would be created for hospital and EMS agencies to implement at their respective organizations. These campaign materials were created to increase awareness: a website on drowsy driving prevention (www.miemss.org/home/drowsy-driving-awareness), stand-up banners and table-top retractable posters with key messages and graphics, six different colorful table tents, a hot cup holder with the campaign logo and website, a small magnet with the logo, at least 12 social media-ready messages, a press release, two 30-second public service announcements, newsletter-ready articles, online training for EMS, and handouts.

The key messages used to increase awareness about drowsy driving were:

- Health care providers are usually a high risk group.
- It can have similar risks and consequences to driving with an elevated blood-alcohol concentration.
- There are warning indicators of being too tired to drive safely (including tips and resources for minimizing risk).

Twenty-five agencies, including most of the state's trauma centers, participated in the campaign. Most conducted their activities in April in association with Distracted Driving Awareness Month. MIEMSS and many other agencies used the fourteen different social media messages to educate their readers, or they adapted the press release or two news articles for their own campaign. MIEMSS featured drowsy driving prevention in its April issue of Maryland EMS News. MIEMSS arranged or hosted five talks on drowsy driving prevention during the 12-month grant, and has created online

training for EMS and hospital providers based on a February 2018 EMS lecture at University of Maryland Medical Center with Dr. Jeffrey Ellenbogen. Additional presentations of drowsy driving prevention took place at Maryland ENA, the MSFA's annual convention, and the EMS Medical Directors' Symposium. Additionally, drowsy driving prevention was the focus of an exhibit at nine different conferences or events across the state.

Many health care providers encountered through the campaign acknowledged being in a high-risk category for a drowsy driving crash and that they have had near-misses. Many health care providers expressed surprise that the impact of drowsiness on driving is comparable to an elevated blood alcohol concentration. They were very interested in learning specific strategies for managing their own drowsiness risk, and also in sharing fatigue mitigation recommendations from NASEMSO with their workplaces.

Injury Prevention and Life Safety

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 Maryland Chapter of the ATS.

MIEMSS, and EMS for Children in particular, is the lead agency for the Safe Kids Maryland state coalition. In FY 2018 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. This year, Safe Kids Maryland participated in a Walk This Way mini-grant with Cecil County Department of Emergency Services taking the lead, a Safe Kids Day mini-grant, a Medication Safety: Over-the-Counter mini-grant, and a Water Safety mini-grant with Cecil County and Peninsula Regional Medical Center taking the leads.

In June 2018 a collaborative Safe Kids/RISK WATCH program was held over four days at the MSFA annual convention. 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.

In recognition of the specialized care required for pediatric emergencies, EMS for Children Day was celebrated on May 23, 2018. Also on this day, six 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 year-round as one of the FAN Council projects. This year, Dr. Allen Walker received the EMS for Children Award not only for his work with MIEMSS, but for a lifetime of dedication to pediatric emergency medicine, caring for children, and educating EMS, nurses, and physicians.

Pediatric EMS and Hospital Education

EMS for Children participated in a number of EMS and emergency nursing educational seminars and conferences in FY 2018, highlighting pediatric high-performance CPR protocol implementation, pediatric sepsis protocol and quality assurance review, and pediatric trauma care. Preconference sessions were delivered on obstetrical and newly born EMS care and pediatric medical resuscitation. EMS for Children continues to offer the Advanced Pediatric Life Support (APLS) course to physicians, nurse practitioners, and physician assistants in collaboration with faculty from Johns Hopkins Children's Center, Children's National Medical Center, and University of Maryland Hospital for Children. The hybrid-format course includes pre-course work completed online and in-person training that consists of lectures, high-fidelity cases, low-volume/high-risk case scenarios, and mock codes.

The first Pediatric EMS Champion workshop was held at EMS Care 2018 in April, and featured the pediatric high-performance CPR protocol rollout and feedback, infant manikins, and updated pediatric tracheostomy care training. Throughout the year a dedicated work group met to develop the protocol, algorithm, teaching kit, and demonstration video for pediatric high-performance CPR. EMS providers and EMS instructors uniformly demonstrated improved quality of CPR with the high fidelity manikins used for the educational sessions. Specific offerings are listed in an annual continuing education chart, available on MIEMSS' website.

EMERGENCY OPERATIONS

Preparedness Planning

Emergency operations personnel participate in many emergency and disaster preparedness efforts, including the following that took place in FY 2018.

- Participated and co-chaired the Maryland Active Assailant Interagency Workgroup
- Emergency repatriation planning
- National Disaster Medical System patient reception preparedness
- Critical incident stress management team development and coordination
- High consequence infectious disease (HCID) transport preparedness
- Mass casualty incident preparedness
- Health care facility evacuation preparedness
- CHEMPACK program awareness and operations
- Complex coordinated attack preparedness
- Participated in statewide school safety summit (April 2018)
- Preparation for Baltimore City Fleet Week (planned for October 2018)

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 2018.

- Supported Baltimore City during Moonrise Festival (August 2017)
- Deployed as members of the state incident management team (IMT) to support Washington County following heavy flooding (May 2018)
- Deployed as members of IMT to Howard County following Ellicott City flooding (May/June 2018)
- Coordinated critical incident stress management (CISM) team support to Florida (September 2017) and the US Virgin Islands (January/February 2018)
- Assisted with coordination of CISM/mental health support for Great Mills High School personnel following on-campus shooting (March 2018)
- Responded to support Anne Arundel County in the aftermath of Annapolis Capital Gazette shooting (June 2018)
- Monitored flu and environmental-related patient contacts among Maryland EMS providers, reporting this data to Maryland Department of Health (MDH)
- Provided support to Opioid Operational Command Center

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 2018 are listed below.

- M&T Bank Stadium tabletop exercise (September 2017)
- Vigilant Guard full-scale exercise (May 2018)
- Pimlico Race Course full-scale mass casualty incident exercise (June 2018)
- Holly Center active assailant exercise (June 2018)
- HCID regional exercises (winter/spring 2018)
- US Department of Health and Human Services Region III HCID tabletop exercise (June 2018)
- Healthcare Coalition hospital evacuation exercises (spring 2018)
- Calvert Cliffs Nuclear Power Plant State Emergency Operations Center exercise (September 2017)

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 prehospital system and hospitals
3. Provide initial alerting and coordination of resources and the distribution of patients during major medical incidents

In FY 2018 the EMRC handled 158,342 telephone and radio calls. Of these calls, 145,878 were communications involving a patient or incidents with multiple patients, while 9,924 of these calls involved on-line medical direction. SYSCOM handled 27,954

telephone calls and 9,318 radio calls. Of these 37,272 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 health care issues. MIEMSS works on proposed legislation that affects all the various components of the statewide EMS system, the emergency care system, and Maryland's health care system as a whole. MIEMSS partners with EMS providers, physicians, nurses, hospitals and other health care providers to ensure that EMS system issues are accounted for in legislation considered by the Maryland General Assembly.

MIEMSS and the Maryland Health Care Commission are jointly to (1) develop a statewide plan for the reimbursement of services provided by EMS providers to Medicaid recipients, (2) identify a process for obtaining Medicare reimbursement for such services, and (3) study and make recommendations regarding the desirability and feasibility of reimbursement for such services provided to privately insured individuals. The plan, process, and study results are to be submitted to the Governor and General Assembly by January 1, 2019.

Governor appointments to the State EMS Board may not result in more than two persons total on the Board from the same health system, a health system and medical school that are affiliated, or medical schools under the same governing board. Previous restrictions on appointments from the Board of Regents of the University System of Maryland, or of an officer or full-time employee of the Medical System Corporation or the University of Maryland, Baltimore Campus, are no longer effective.

EMS providers and law enforcement officers are now permitted, and MIEMSS is now required, to report location information when EMS /law enforcement encounter individuals suffering from an overdose. This reporting is to help identify geographic areas where higher incidences of overdose are occurring and to submitted this data to the Washington/ Baltimore High Intensity Drug Trafficking Areas Overdose Map (ODMAP), or similar programs operated by federal, state, or local governments. The location information to be provided is: 1) date and

time of overdose, 2) approximate address where overdose occurred or where victim was encountered, 3) whether an opioid reversal drug was administered, and 4) whether the overdose was fatal or nonfatal.

Organ delivery vehicles are now considered "emergency vehicles" under Maryland law; however, operators of organ delivery vehicles may not exercise the privileges associated with such emergency vehicles unless they complete an emergency vehicle operator course approved by the Maryland Fire and Rescue Institute. This emergency vehicle designation applies only to those organ delivery vehicles registered to a federally-designated organ procurement organization or a professional organ transport organization.

The Commission to Advance Next Generation (NG) 9-1-1 Across Maryland was established to study and make recommendations regarding the implementation, management, operation, and ongoing development of the NG 9-1-1 emergency communications system and other factors.

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

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

Trauma Centers

Under Code of Maryland Regulations (COMAR) 30.08, 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 center regulation revisions were completed in FY 2017 and implemented on July 1, 2018.

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.

All nine adult trauma centers, the neurotrauma center, and the hand and upper extremity trauma center submitted applications for reverification in FY 2018. Out-of-state site surveys were completed for continued designation. Since 2015 all Maryland adult and pediatric trauma centers submit data to the National Trauma Data Bank, which assists the centers in benchmarking their trauma center with other centers around the country.

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). Training citizens across the state in the national Stop the Bleed initiative is important to the TQIC. With the support of the American College of Surgeons and Maryland Committee on Trauma, each trauma center has participated in Stop the Bleed training 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. Adult and pediatric burn center regulations were recently revised and are being readied for state review and promulgation.

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 3 comprehensive stroke centers. In FY 2018 the Stroke Quality Improvement Committee (Stroke QIC), comprising stroke program coordinators and medical directors, focused on adding 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 are complete and are expected to be implemented on July 1, 2019.

All stroke centers are redesignated every five years; in FY 2018 four primary stroke centers and one comprehensive stroke center were redesignated. Additionally, one hospital received initial designation as a primary stroke center. The Stroke QIC continues its efforts to improve stroke care throughout the state. Following the release of two significant stroke trials in January 2018, which showed benefit to treating stroke patients presenting with a large vessel occlusion (LVO) up to 24 hours after stroke symptom onset, the Stroke QIC focused their attention on early identification and treatment of patients presenting with an LVO. Additionally, focused attention was placed on improving the interfacility transfer times for stroke patients with an LVO requiring endovascular treatment. Based on the most current literature available, stroke interfacility transfer guidelines were revised, updated, and implemented in June 2018.

Each primary and comprehensive 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 2017 revealed Maryland had a compliance rate of 90% or greater for each of the core performance measures, significantly higher than the AHA/ASA minimal compliance rate of 80%.

Stroke Core Measures (5-Year Comparison)

| Core Measure | CY 2013 | CY 2014 | CY 2015 | CY 2016 | CY 2017 |
|---|---------|---------|---------|---------|---------|
| 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 | 86.9% | 90.9% | 91.4% | 93.1% | 90.7% |
| Percent of patients with ischemic stroke or TIA who receive anti-thrombotic therapy by the end of hospital day two | 98.0% | 98.5% | 98.6% | 98.8% | 98.8% |
| Percent of patients with an ischemic stroke, or hemorrhagic stroke, who receive VTE prophylaxis the day of or the day after hospital admission | 96.2% | 98.1% | 98.2% | 98.2% | 97.9% |
| Percent of patients with an ischemic stroke or TIA prescribed anti-thrombotic therapy at discharge | 98.7% | 98.9% | 99.3% | 99.3% | 99.5% |
| Percent of patients with an ischemic stroke or TIA with atrial fibrillation/flutter discharged on anticoagulation therapy | 95.6% | 97.2% | 96.1% | 97.7% | 97.3% |
| Percent of patients with ischemic or hemorrhagic stroke, or TIA with a history of smoking cigarettes, who are, or whose caregivers are, given smoking cessation advice or counseling during hospital stay | 98.8% | 97.7% | 98.1% | 99.0% | 99.4% |
| 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 | 96.0% | 97.1% | 97.9% | 98.3% | 98.8% |
| Percent of stroke patients who undergo screening for dysphagia (difficulty swallowing) with an evidence-based bedside testing protocol approved by the hospital before being given any food, fluids, or medication by mouth | 89.5% | 87.6% | 87.7% | 90.2% | 90.7% |
| 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 | 93.6% | 95.8% | 96.9% | 97.2% | 97.5% |
| Percent of patients with stroke who were assessed for rehabilitation services | 98.5% | 98.7% | 98.7% | 99.1% | 99.5% |
| <i>Source: Get With the Guidelines-Stroke Registry</i> | | | | | |
| IV t-PA = Intravenous Tissue Plasminogen Activator VTE = Venous Thromboembolism LDL = Low Density Lipoprotein (bad cholesterol) TIA = Transient Ischemic Attack | | | | | |

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 2018 stroke centers also 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 established a minimal compliance rate of 50% of stroke patients who are eligible for t-PA to receive the drug within 60 minutes from time of hospital arrival (“door”). For CY 2017 Maryland’s mean door-to-t-PA time was 51.9 minutes,

while the national mean was 53.1 minutes. Additionally, 80.2% 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 years.

Hospitals participating in the Maryland perinatal system submit patient care data to the Maryland Department of Health (MDH) and MIEMSS, as appropriate, for system and quality management. All Level III and Level IV perinatal referral centers submit

an annual perinatal indicator report that provides statistics beyond mortality data and focuses on striving for clinical excellence, patient safety, and reliability with zero preventable adverse outcomes. Database elements and indicators include variables related to maternal and infant health. The MIEMSS Perinatal Advisory Committee 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 will allow Level III and Level IV perinatal referral centers in Maryland to combine data for collaborative learning and improvement. A combined report will be generated that compares individual center data among all the Level III and Level IV perinatal centers. The report will also include 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 the 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), MIEMSS received and approved 230 public access AED applications in FY 2018. As of June 30, 2018, there are 6,247 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 213 (23.7%) successful AED uses out of 899 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, 499 were witnessed, and 154 of those witnessed arrests regained a pulse at the time of EMS arrival, for a 30.9% save rate for witnessed cardiac arrests.

Cardiac Arrest Steering Committee

MIEMSS' Cardiac Arrest Steering Committee focuses on 9-1-1 dispatch, prehospital provider treatment, community response, and data collection and reporting to improve cardiac arrest survival rates. Through the committee, the Maryland Resuscitation Academy holds two training sessions annually. Using a multi-focused approach to address out-of-hospital cardiac arrest, the committee has established three subcommittees. The EMD subcommittee focuses on providing early dispatch of EMS to cardiac arrest calls and providing dispatch-assisted CPR instructions to the caller until EMS arrives. The EMS subcommittee promotes high-performance CPR to all EMS operational programs in Maryland. The public subcommittee educates and encourages laypersons to learn CPR and how to use an AED. Communities that have incorporated all of these elements have improved rates of survival from SCA.

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 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 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. However, this requires a high degree of coordination and integration of care between EMS providers in the field and medical staff in the hospital.

The Maryland Medical Protocols for Emergency Medical Services Providers allows providers who have identified a STEMI patient to bypass non-designated hospitals and transport the patient to the closest designated cardiac interventional center. In certain circumstances patients may be transported to the closest emergency department for rapid assessment and treatment, and then transferred to a cardiac interventional center.

All cardiac interventional centers submit data quarterly to the American Heart Association Get With the Guidelines Coronary Artery Disease registry, Registry–GWTG, enabling MIEMSS 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. The most recently available data indicate that median FMC-to-device time for Maryland’s cardiac interventional centers was 85 minutes for STEMI patients transported by EMS, slightly above the national median of 79 minutes.

Regional STEMI plans, available under the Hospitals tab on MIEMSS’ website, reflect an evidence-based approach to planning and collaboration among prehospital and hospital providers for optimal patient care.

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 providers

2. Supporting the advancement of the practice of EMS medicine, which includes the modification of scope of practice, roles of EMS providers, and destination capacity
3. Providing the foundation for applying performance measures to patient care and provider 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 hospitals use the eMEDS Hospital Hub website to access 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 is currently upgrading all jurisdictional EMS services to the new Elite version of eMEDS. This provides better data collection and software tools to EMS systems in Maryland. The Information Technology (IT) Department, in coordination with the Office of the State Medical Director, is leading this project, which will be completed by the end of CY 2018. Upgrading eMEDS to ImageTrend’s Elite software program will make 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 will also improve its compatibility with the Health Level Seven International (HL7) data framework, enabling better exchange of data with health information exchanges systems. eMEDS will be able to function on smartphones, electronic tablets, and laptops and with a variety of operating systems, so that EMS providers will have more flexibility on the equipment they use. The Elite system also adds many new and enhanced features requested by Maryland’s EMS providers.

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). The 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.

Licensure System Support

This department continues to collaborate with MIEMSS' Licensure and Certification and ImageTrend to support the new provider registry implemented in FY 2017, which replaced the Maryland Prehospital Provider Registry (MPPR) system. The new system uses ImageTrend's License Management software, a hosted web-based product. The new software provides self-service automation for EMS providers to apply for certification, track education requirements, and maintain compliance with Maryland regulations.

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 hosts and operates the Maryland Emergency Medical Resource and Alerting Database (MEMRAD), which operates on the HC-Standard software system provided by Global Emergency Resources. 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 health care 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 supports the Maryland State Trauma Registry and related specialty registries (see

the Health Care Facilities and Special Programs report on page 16). The IT Department assisted with a major upgrade to the Maryland State Trauma Registry, which is expected to be completed by the end of CY 2018.

EMRC/SYSCOM Support

EMRC/SYSCOM, located in Baltimore City, is operational 24/7 and is staffed by MIEMSS and 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 Systems Communications (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 providers statewide. Dedicated, skilled staff respond to requests ranging from assisting agency staff with their PC equipment and applications to handling inquiries from EMS providers, hospitals, and EMSOP leadership pertaining to critical statewide applications, such as eMEDS. 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.

Project Management

The IT Department provides project management services for various initiatives at MIEMSS. One important 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 authorized physicians and hospitals throughout the state. IT will also facilitate the tracking, location, and family reunification of patients during major incidents or disasters. A future goal of the project is to make select patient medical data, such as medical history and medications, available to EMS providers 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 2019.

Data to 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.

Initiatives for FY 2019

Security Improvements: In FY 2018 the Information Security Department continued to develop and update security policies, and deployed several systems to enhance data security at MIEMSS. Work will continue into FY 2019 to implement endpoint protection, data leak protection, full disk encryption, and monitoring systems 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.

Computer Network Improvements: The IT Department will continue to improve computer resources, network reliability, and disaster preparedness by upgrading core server, storage, and VMware systems. Near term plans include upgrading network switching, wiring, and Wi-Fi services at MIEMSS' headquarters to ensure 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 will expand data analysis capability through use of local copies of hosted eMEDS and the Licensure System. The emphasis will continue on statistical reporting, key metrics for systemwide quality improvement and assurance, and practical applications of EMS and hospital data. New analysis tools developed by MIEMSS will be available for data analysis and quality assurance. These will improve the quality of EMS care through statewide initiatives lead by MIEMSS and assist jurisdictional and commercial EMSOPs and providers to measure and improve the quality of EMS within their respective agencies.

Opioid Overdose Data Reporting: MIEMSS, in compliance with state law, is providing 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 providers submit reports into eMEDS, 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.

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.

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 Providers and Education Programs

FY 2018 EMS Provider Data

Licensure and Certification had a steady workload in FY 2018 issuing 1,861 initial prehospital provider certifications and licenses and renewing 5,463 certifications and licenses. The vast majority of new entrants into Maryland EMS are through an initial emergency medical technician (EMT) provider course. Licensure and Certification tested 1,217 EMT students in 109 courses in FY 2018.

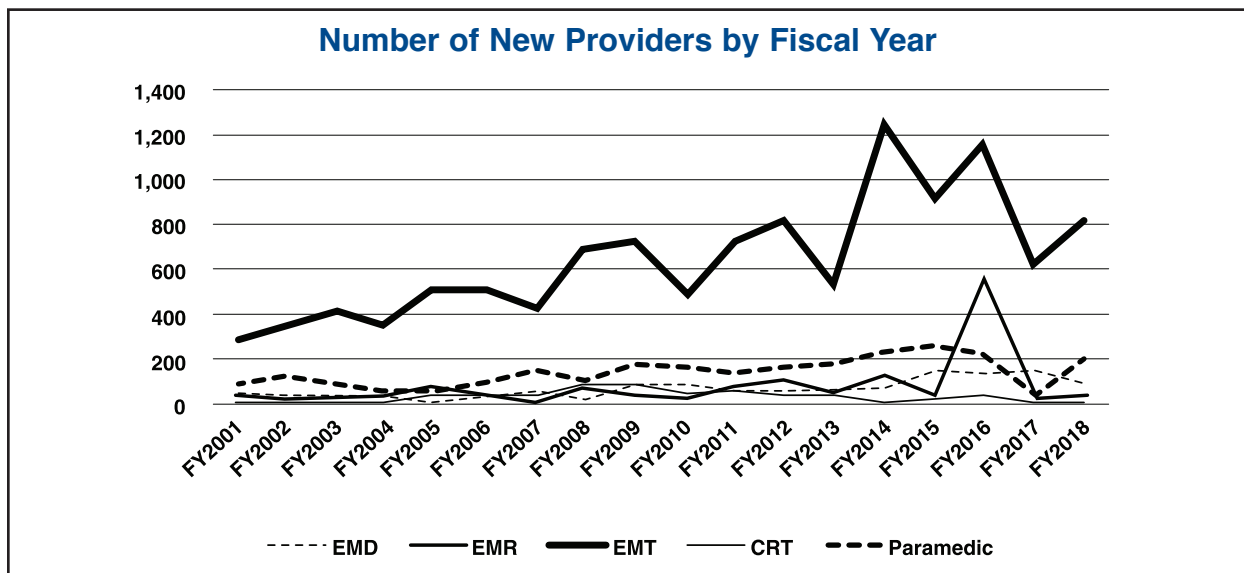
There was a slight uptick in the number of emergency medical dispatchers (EMD). This is primarily

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

| Level | FY 2014 | FY 2015 | FY 2016 | FY 2017 | FY 2018 |
|-------|---------|---------|---------|---------|---------|
| EMD | 1,052 | 1,079 | 1,058 | 1,320 | 1,377 |
| EMR | 2,631 | 2,044 | 2,020 | 1,589 | 1,136 |

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

| | | | | | |
|--------------|---------------|---------------|---------------|---------------|---------------|
| EMT | 16,644 | 16,569 | 15,839 | 16,069 | 15,485 |
| CRT | 721 | 658 | 662 | 619 | 587 |
| Paramedic | 3,045 | 3,166 | 3,293 | 3,336 | 3,278 |
| TOTAL | 20,410 | 20,393 | 19,794 | 20,024 | 19,350 |



due to the implementation of the web-based Maryland Licensure System, as it has increased efficiency with submissions and processing. 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 health care professions.

The number of cardiac rescue technicians (CRT) declined slightly this year, as the National Registry of EMTs (NREMT) no longer certifies providers at the Intermediate/99 (I/99) level. Some providers have upgraded to the paramedic level, while others have downgraded to basic life support (BLS) certifications. Maryland, however, will continue to license CRTs.

The number of paramedics continues to increase, as many CRT providers transitioned to this level as the NREMT phased out the I/99 certification.

The number of Maryland providers is shown on page 22. Licensure and Certification worked with other MIEMSS departments to supply provider data and trends (e.g., provider 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 47,461 registered users in FY 2018. Of these registered users, 13,222 providers were active in the Online Training Center during the same period. The Online Training

Center hosted 26 active courses in FY 2018. Several new courses were made available this year, including Maryland ALS Update 2018, Maryland BLS Update 2018, EMD cardiac arrest training, Elite field and general user courses, EMR naloxone training, R Adams Cowley Shock Trauma Center (RACSTC) lecture series courses, and a five-hour course on emerging infectious diseases. Projected course topics for FY 2019 include the Maryland EMS Updates for 2019, additional RACSTC lecture series courses, and courses that will fulfill 10 hours of the State/Local National Continued Competency Program (NCCP) content for ALS recertification. In FY 2018 Licensure and Certification, in conjunction with ImageTrend and MIEMSS' Information Technology Department, was able to install new functionality in the Online Training Center that provides daily automated transfer of course completions directly into each provider's continuing education record in the Licensure System. Moving into FY 2019, Licensure and Certification will continue review possible upgrades to the Online Training Center to keep the system in line with the ever-changing educational technologies available to providers.

Transition to National EMS Education Standards

The National EMS Education Standards were implemented for courses taken by new providers on July 1, 2012, and influenced the revision of continuing education and renewal courses. Providers who hold a CRT license who were previously certified by NREMT at the I/99 level, but failed to transition to paramedic, were issued NREMT certification at the national level of Advanced EMT (AEMT). However, many of these individuals have maintained a Maryland-only CRT license. All Maryland EMS providers continue to meet the objectives of the national EMS education standards by participating in Maryland continuing education and certification renewal courses.

Maryland Provider 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.

All provider applications that were previously completed by paper are now available electronically for submission through the Licensure System. In addition, when necessary, configuration allows for jurisdictional approval directly within the Licensure System. This has resulted in greater efficiency and faster turnaround times for processing.

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.

The 23rd Annual EMS Medical Directors' Symposium was held at the Sykesville-Freedom District Fire Department on April 11, 2018. It 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 Joseph P. Ornato, MD, professor and chairman of the Department of Emergency Medicine and professor of internal medicine (cardiology) at Virginia Commonwealth University Health System and operational medical director of Henrico County Division of Fire, Richmond Ambulance Authority, Richmond Fire and EMS in Virginia. Dr. Ornato's keynote address was "Emergency ECMO Regionalization." Other symposium presentations included the following.

- State of the State and eMEDS Elite Update; Richard Alcorta, MD
- Your EMS Grandfather Status and the Fountain of Youth: ABEM Made It Easier to Sit for the Exam; Roger Stone, MD
- Improving Patient Care Through Data Surveillance; Alan Butsch, NRP, and Brian Frankel, NRP

- Updates from the State Tactical EMS Committee; Matthew Levy, DO
- Clot Retrieval for Acute Stroke > 6 Hours from Last Known Well Time; Michael Phipps, MD, and Carolyn Cronin, MD
- Panda Express: Short Topic Updates from EMS for Children; Jennifer Anders, MD, and Cyndy Wright-Johnson, RN
- My Airvo Transport; Clemmis Futrell, MS, RRT
- Maximizing Cardiac Arrest Survival in Maryland: Current Status and Future Directions; Kevin Seaman, MD

MIEMSS and the Maryland Regional National Disaster Life Support (NDLS) Coalition provided a Basic Disaster Life Support (BDLS) program to the health care community on December 14, 2017. Dr. Alcorta serves as the coalition's medical director and 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 59 participants who successfully completed the one-day BDLS 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 providers.

- Use of dextrose 10% was expanded to include all pediatric patients.
- Ketamine was added to the advanced life support formulary, with the primary indication for use being patients experiencing excited delirium syndrome and secondary indication for pain management.
- Spinal Protection Protocol was enhanced to include an algorithm and refined definitions for indications.
- Consult requirement for calcium chloride was removed for all indications.
- EasyTube was removed from the airway procedure section and replaced by the King LTS-D airway. The King LTS-D has been moved from an Optional Supplemental Protocol to general procedures.
- Multiple changes were made for cardiac arrest patients, including increase of time from 15 minutes to 30 minutes before consideration of implementing the Termination of Resuscitation Protocol for medical patients.

- Use of naloxone as a standing order was expanded to include the Emergency Medical Responder (EMR) level of certification. This was approved for emergency implementation on October 1, 2017, to meet the opioid overdose crisis.
- Pelvic Stabilization Binder Device Pilot Protocol was changed to an Optional Supplemental Protocol, removing the reporting requirement for local jurisdictions.
- Freestanding Emergency Medical Facility Acute Stroke Ready Harford pilot protocol for future implementation.

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 2018 Maryland EMS Updates for Hospital Base Station Personnel training video, so that they can communicate with EMS providers and provide appropriate on-line medical consultation and direction. MIEMSS' Base Station Communications Course for Emergency Department Personnel was taught at multiple hospitals in FY 2018, resulting in 610 base station certificates issued to emergency department (ED) physicians and nurses along with the approval of five new physician 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 providers 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 providers 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.

As of January 2017, all 24 EMSOP jurisdictions, the sub-divisions within jurisdictions, and Maryland

hospitals and Freestanding Emergency Medical Facilities submit their cardiac arrest information to CARES. Statewide data for calendar year 2017 is now included on CARES National Report (see data on page 70).

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. Richard Alcorta is a member of the Governor's 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) providers to administer naloxone.
- Enhanced EMS provider education and community awareness on opioids.
- Produced an opioid overdose information and crisis hotline card that EMS providers can distribute to patients and their family members.
- Added the Naloxone Leave Behind Pilot Protocol to Maryland EMS protocols, with EMS Board approval, 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.

Legislation was recently passed that requires MIEMSS to provide limited opioid overdose data to the Washington/Baltimore High Intensity Drug Trafficking Areas Overdose Map (ODMAP), which provides real-time overdose surveillance data across jurisdictions. The law went into effect on July 1, 2018.

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 1,800 data requests.

MIEMSS Grant Disbursements (FY 2018) 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 | \$51,363 | \$28,000 | \$0 | \$30,145 | \$109,508 |
| Region II | \$17,865 | \$28,000 | \$9,635 | \$29,548 | \$85,048 |
| Region III | \$113,390 | \$98,000 | \$10,435 | \$96,266 | \$318,091 |
| Region IV | \$120,380 | \$67,998 | \$21,630 | \$54,041 | \$264,049 |
| Region V | \$99,000 | \$78,000 | \$8,300 | \$40,000 | \$225,300 |
| Total | \$401,998 | \$299,998 | \$50,000 | \$250,000 | \$1,001,996 |

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 15 for the Emergency Operations report).

Regional Program's priorities are to ensure these 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.
- Maryland EMS operational programs (EMSOP) have the tools, resources, and training required to effectively manage their 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 facilitate the distribution of funds to support local programs and are responsible for tracking the activity and progress of all grants that they receive. This includes 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 health care coalitions, hospitals, and EMS agencies to enhance emergency preparedness and coordination of operations. In FY 2018 Regional Programs continued to support the HPP by representing local EMS jurisdictions on regional health care 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. In FY 2018 Regions I and II assisted local jurisdictions in the planning and development of a deployment program for a newly acquired ambulance bus.

State Homeland Security Grant Program

A percentage of the State Homeland Security Grant Program (SHSGP) funding from the US Department of Homeland Security must be allocated to EMS agencies. The Maryland Emergency Management Agency (MEMA) and MIEMSS continued their partnership in meeting this federal requirement. Funding priorities are established by MEMA in consultation with the Statewide EMS Services Advisory Council (SEMSAC). Projects concerning active assailant preparedness and incident management team development and training received top consideration for 2018 grant funds. \$250,000 was disbursed to 14 EMSOPs. 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 2018 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 2018 Grant Funding Distribution by Region |
|-----------------------|---|
| Region I | \$1,521.00 |
| Region II | \$5,094.00 |
| Region III | \$158,531.00 |
| Region V | \$18,719.00 |
| Total | \$183,865.00 |

MIEMSS-Funded Grants

MIEMSS provides funding from its budget for several programs. Funds for EMS provider 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 infarction (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.

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. Now all regional offices cooperate to inspect units across the state to ensure consistent assessment. Jurisdictional VAIP inspections conducted in 2018 are indicated below.

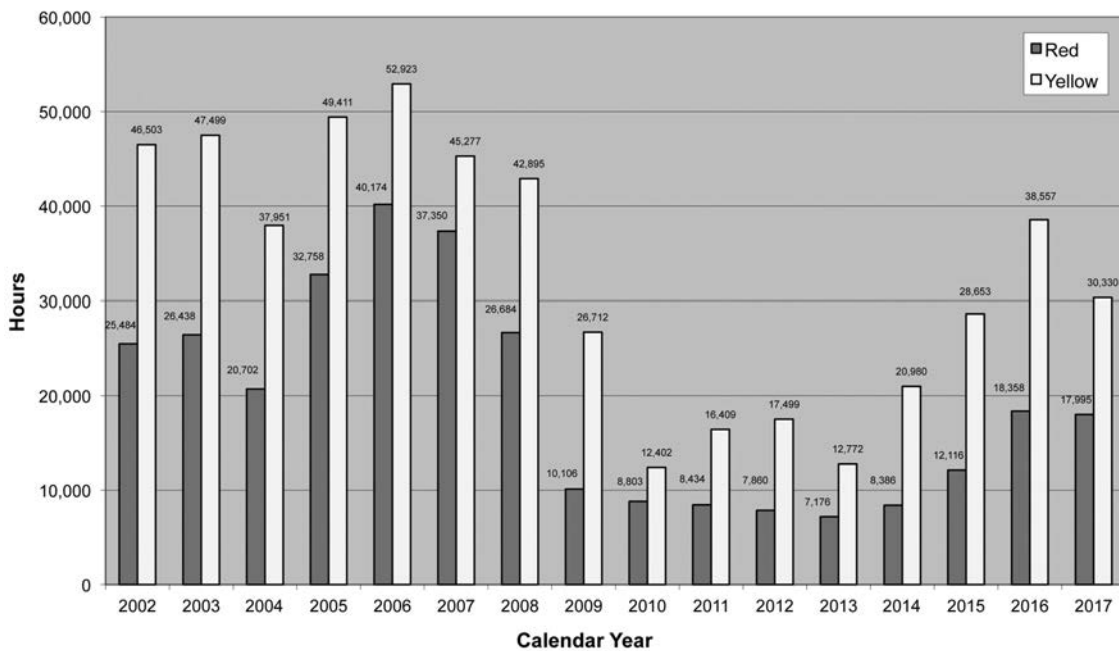
Conferences and Training

Regional Programs provides support to a number of statewide and regional EMS conferences and training opportunities. In FY 2018 these included Winterfest Conference, Miltenberger Emergency Services Seminar, EMS Care Conference 2018, and the ongoing EMS Provider Ultrasound Training Program. Regional Programs assisted the Frederick County Division of Fire and Rescue Services and the R Adams Cowley Shock Trauma Center with coordinating a prehospital ultrasound training program as part of the Paramedic Ultrasound Pilot Protocol.

2018 VAIP Inspections

| Region | BLS Transport | BLS Non-Transport | ALS Transport | ALS Non-Transport |
|---------------|----------------------|--------------------------|----------------------|--------------------------|
| I | 1 | 18 | 30 | 7 |
| II | 0 | 32 | 24 | 7 |
| III | 5 | 18 | 34 | 5 |
| IV | 2 | 24 | 74 | 6 |
| V | 3 | 1 | 0 | 0 |

State Diversion Alert Totals (Calendar Years 2002 to 2017)



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 their respective regions. During FY 2018 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 providers 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.

Through CHATS, MIEMSS is also able to monitor EMS "release-of-patient-care" times (from EMS arrival at the emergency department until the patient is moved to a hospital stretcher) and "return-to-service" times (length provider is at an emergency department with a patient before returning to service) that are recorded in the EMS patient care record. These times are helpful indicators of the impact of emergency department crowding on the EMS system.

The Facility Resource Emergency Database (FRED) function of the CHATS system alerts health and medical response partners of incidents and exercises, and is used to assess resource availability for beds, medications, and other supplies needed for the response.

MARYLAND TRAUMA AND SPECIALTY REFERRAL CENTERS

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

DESIGNATED TRAUMA CENTER CATEGORIZATION

| Differences in Standards Based on Physician Availability and Dedicated Resources | PARC | Level I | Level II | Level III |
|---|------|---------|----------|-----------|
| Attending 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, located within the University of Maryland Medical Center, serves as the state's Primary Adult Resource Center. The R Adams Shock Trauma Center treated 6,142 trauma patients from June 1, 2017, through May 31, 2018, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Over this 12-month period, 83% of patients admitted to the R Adams Shock Trauma Center arrived by ground transportation and 17% arrived by air. Demographic data indicate that the majority of admissions were male (68%) and aged 15-35 years (43%), followed by patients aged 56 or older (28%) 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 2018 therapeutic hyperbaric oxygen treatment was provided during 5,198 dive hours, of which 35 dive hours were an emergency (0.7%), 1,823 were inpatients (35.1%), and 3,341 were outpatients (64.3%).

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

The R Adams Cowley Shock Trauma Center (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 providers. Each dispatched GO-TEAM includes an attending physician and a certified nurse anesthetist. In FY 2018 there were 16 requests for the GO-TEAM with three deployments.

Center for the Sustainment of Trauma and Readiness Skills

Since 2001, US Air Force Medical Service personnel have traveled to Baltimore for training at the US Air Force Center for the Sustainment of Trauma and Readiness Skills (C-STARS), embedded within RACSTC. These civilian-military partnerships are crucial in keeping military medics continuously ready for wartime casualty care.

FY 2018 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

The 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 2018 the CIPP presented 41 programs reaching 9,155 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.

Emergency Medical Services and Nursing Continuing Education

The 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 2018 evening educational programs open to EMS providers and nurses were held seven times and linked via live broadcast to 24 remote sites across the state. Many EMS providers participated in an ALS airway course, offered 12 times in FY 2018, that includes didactic and simulation learning. In addition, a virtual tour video was created to allow more EMS students, providers, and first responders to better understand the process of transporting a patient to RACSTC. EMS providers are permitted to observe

procedures in the Trauma Resuscitation Unit or in the Critical Care Unit.

The Trauma Observation Program provides health care 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 700 classes a year, with more than 8,000 learners coming through annually, 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.

Fellowship 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 2018 over 400 classes were provided to health care workers, including medical students, EMS providers, 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 15 ongoing clinical studies at RACSTC covering a wide array of trauma-related issues, including blood product usage in the field, improved perfusion of the spinal cord after injury, and more cost efficient and beneficial venous thromboembolism therapies.

All RACSTC research projects are designed to enhance the trauma system's ability to resuscitate, stabilize, and treat the needs of trauma patients. Current projects that seek to advance the system's capabilities include Emergency Preservation and Resuscitation for Cardiac Arrest from Trauma, the Prehospital Resuscitation On Helicopter Study, and Maryland Blended Reality Center development.

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, 2017, through May 31, 2018, 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:

David T. Efron, MD, FACS

Adult Trauma Program Manager: Kathy Noll, MSN, RN

FY 2018 Annual Report

Notable Accomplishments

The Johns Hopkins Hospital was ranked #1 in Maryland and #3 in the nation in *U.S. News & World Report's* 2017-2018 Best Hospitals list. 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. Dr. Efron is the chief of the Division of Acute Care Surgery in addition to the trauma center medical director.

For the fourth consecutive time, JHH has achieved Magnet designation from the American Nurses Credentialing Center. JHH was the first hospital in Maryland to achieve Magnet designation. This designation represents the gold standard for nursing excellence, innovation, and high-quality patient care that is exemplified by its nurses.

Joseph V. Sakran, MD, MPH, MPA, FACS, associate chief of the Division of Acute Care Surgery and director of Emergency General Surgery, was recently appointed as vice chair of the Maryland Committee on Trauma and elected to the Board of the Brady Campaign to Prevent Gun Violence. Elliott R. Haut, MD, PhD, FACS, vice chair of Quality, Safety, and Service for the Department of Surgery, was recently

elected president of the Eastern Association for the Surgery of Trauma and currently serves as vice chair of Maryland TraumaNet.

In FY 2018 Dr. Efron was selected as JHH's Physician of the Year for his commitment and dedication to providing excellent trauma care. Dr. Haut received the William Baumgartner Mentorship Award, and Christian Jones, MD, MS, FACS, received the William Stewart Halsted Teaching Award from the Department of Surgery.

The Johns Hopkins Hospital held its first annual Trauma Survivor's Day Celebration on May 16, 2018. Two former patients were celebrated for their remarkable recoveries from severe injuries. Prehospital providers, physicians, and other members of the care team gave professional and personal accounts of the courage and determination that each patient displayed in the face of significant odds.

Quality Management and Improvement

The Johns Hopkins Hospital was ranked a Top Performer on Key Quality Measures by The Joint Commission. The "Top Performer" designation is reserved for accredited hospitals that consistently and profoundly follow best practices for treating people with serious conditions. Consistent with that, JHH's Armstrong Institute for Patient Safety and Quality continues to focus on eliminating preventable harm to patients and to achieving the best patient outcomes at the lowest cost. The institute provides the structure to coordinate and support patient safety and quality efforts.

Injury Prevention Programs and Initiatives

Physicians and nurses at JHH have taught over 100 courses as part of the nationwide Stop the Bleed campaign. Hospital personnel, school staff, and the public have learned how to control life-threatening bleeding through the use of tourniquets and other bleeding control techniques. Bleeding control kits have been placed in strategic locations throughout the institution, and training in their use is underway for all security personnel.

The adult and pediatric trauma centers at JHH hosted a Falls Prevention Awareness Fair on September 18, 2017. Working with the Department of Physical Medicine and Rehabilitation, adult trauma and rehabilitation staff conducted fall risk assessments and provided educational information on health conditions that predispose individuals to falls.

As part of a statewide injury prevention initiative, JHH held a Road Safety Fair on April 4, 2018. The event focused on prevention of distracted and drowsy driving, and featured distracted driving crash

data, evidence-based prevention programs, and policy implementation.

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.

Many trauma survivors experience long-term consequences, ranging from physical disability to chronic pain, depression, and post-traumatic stress. The JHBSPH Center for Injury Research and Policy has collaborated extensively over the years with major patient advocacy organizations for trauma survivors, amputees, and burn patients in order to develop, disseminate, and implement a wide range of interventions.

Emergency Medical Services and Nursing Continuing Education

Trauma attending physicians at JHH also 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.

The Johns Hopkins Medicine Simulation Center is 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 Surgical Critical Care fellowship is directed by Dr. Pamela Lipsett with assistance from Dr. Christian Jones, the associate director. The program graduates two critical care fellows each year. The Acute Care Surgery fellowship is directed by Dr. Jones and includes three faculty-level fellows who provide trauma, emergency general surgery, and critical care coverage at both JHH and JHBMC.

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. Dr. Sakran's published manuscript "Firearm-Related Injuries in the United States," in the journal *Health Affairs*, was recognized by the Healthcare Cost and Utilization Project and the Agency for Healthcare Research and Quality with its 2017 Outstanding Article of The Year award.

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, and the effects of frailty on injury outcome. Trauma research resulted in 91 peer-reviewed publications this past academic year.

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

Rehabilitation Services

On January 11, 2017, the Comprehensive Integrated Inpatient Rehabilitation Program opened at JHH. The new state-of-the-art, 18-bed inpatient rehabilitation unit offers 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.

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. Johns Hopkins Bayview Medical Center treated 2,657 trauma patients from

June 1, 2017, through May 31, 2018, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Adult trauma care services at Johns Hopkins Bayview Medical Center 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 health care 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 2018 Annual Report

Notable Accomplishments

Johns Hopkins Bayview Medical Center 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. With the support of the Maryland Committee on Trauma, the JHBMC coordinated and conducted Society of Trauma Nurses' Advanced Trauma Care for Nurses (ATCN) courses on-site in FY 2018.

Since 2014 Marie Dieter, the adult trauma program manager at JHBMC, served as the co-chair, and then chair, of the Maryland Trauma Quality Improvement Committee (TQIC), completing her term in December 2017. During her tenure TQIC adopted two annual injury prevention events that occur simultaneously across the state. These initiatives bring an increased awareness to the dangers of distracted driving and promote proactive measures for fall prevention. To support TQIC's data collection quality initiatives for the Maryland State Trauma Registry, Dieter also advocated for the use of algorithms for specific data point completion to support inter-rater reliability among all Maryland trauma centers.

Quality Management and Improvement

Johns Hopkins Bayview Medical Center'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. It was determined that an increase in the baseline blood bank inventory for specific blood products was warranted. Tranexamic acid was also added to the MTP as a potential therapeutic adjunct.

Injury Prevention Programs and Initiatives

In FY 2018 JHBMC focused on injury prevention initiatives for the two most common injury mechanisms presenting at the trauma center: falls and motor vehicle crashes. With the support of a community partner, Dundalk Invest Health, the third annual Fall Prevention Awareness Fair was held in September 2017. At this event, several hospital departments provided fall prevention education to attendees.

Johns Hopkins Bayview Medical Center trauma center staff hosted an information fair on Distracted Driving Prevention Awareness Day, April 4, 2018, an initiative of the TQIC. JHBMC partnered with AT&T, which provided a distracted driving simulator for the 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 lay persons to recognize the presence of potential life-threatening hemorrhage and to know the basic interventions to control the bleeding, including the use of tourniquets. In March 2018 JHBMC participated with the Maryland Committee on Trauma's (MCOT) Stop the Bleed training for Maryland state legislators and their staff in Annapolis.

Emergency Medical Services and Nursing Continuing Education

Johns Hopkins Bayview Medical Center supported semiannual education for EMS providers with presentations at two full-day, on-site educational seminars in FY 2018. Nursing trauma care education at unit

level in-services and during an annual fall seminar are offered by JHBMC, 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.

In FY 2018 Dr. Fang presented two webinars through the American Association for the Surgery of Trauma, reaching national and international health care providers, entitled "What About Platelets? Military and Civilian Efforts to Increase Platelet Storage Time and Availability for Massive Transfusion" and "Combat Trauma M&M: Lessons Learned from Combat Casualty Care."

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 3,664 trauma patients from June 1, 2017, through May 31, 2018, 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:
R. Sean Benoit, MD, MBA, FACS
Adult Trauma Program Manager:
Dawn Moreland, BSN, RN, TCRN

FY 2018 Annual Report

Notable Accomplishments

In FY 2018 UMPGHC added two trauma/acute care surgeons to its staff, held its first annual Trauma Survivors Celebration event recognizing survivors and their caregivers, and held the first annual 5k/10k *Trauma Trek* fundraiser during Trauma Awareness Month in May. Over 100 individuals from the hospital and community participated in the trek. UMPGHC continued to partner with the University of Maryland and residents of Prince George's County and Washington, DC, to operate the Capital Region Violence Intervention Program (CAP-VIP), the area's leading hospital-based violence intervention program to reduce trauma recidivism. To date, with over 70 clients served, the recidivism rate is 0.

Quality Management and Improvement

University of Maryland Prince George's Hospital Center recently hired a trauma performance improvement coordinator and partnered with the Department of Surgery in an effort to streamline its quality initiatives and improve the peer review process. Through this partnership, all surgical and trauma patients are evaluated utilizing a multidisciplinary approach through joint educational sessions with intensive care, anesthesiology, emergency, and other departments. This process is designed to improve the quality and timeliness of patient care.

Injury Prevention Programs and Initiatives

Initiatives undertaken by UMPGHC in FY 2018 were primarily related to preventing injuries resulting from falls, motor vehicle crashes, and violent crimes. UMPGHC partnered with local churches and the Prince George's County Police Department in a gun buy-back program, partnered with AT&T to reduce distracted driving, marketed a violence intervention program, reached out to local schools to educate youth, worked with local nursing homes to reduce falls by elderly residents, and provided in-house education to the community through Stepping ON! falls awareness and prevention classes.

University of Maryland Prince George's Hospital Center participated in the 25th Annual NBC4 Health and Fitness Expo conducting drunk, drowsy, and distracted driving prevention awareness and demonstrating hemorrhage control techniques as part of the nationwide Stop the Bleed campaign. UMPGHC continues to partner with local businesses, schools, agencies, and legislatures to conduct Stop the Bleed awareness and education. In addition, several members of the UMPGHC trauma team participate in the US Department of Homeland Security's disaster and emergency preparedness programs.

Emergency Medical Services and Nursing Continuing Education

University of Maryland Prince George's Hospital Center offers continuing education that reinforces care of injured patients, including positioning, spine immobilization, and hand-off communication, to EMS cadets. UMPGHC also collaborates with EMS to practice mock trauma codes to assess and improve the trauma transfer process.

Research

University of Maryland Prince George's Hospital Center recently hired a new institutional review board director, and will be initiating new projects, such as collaborative research with the Intensive Care Unit on sedation in the trauma patient, in the near future.

Rehabilitation

At UMPGHC, there is a robust in-hospital rehabilitation program that offers physical, occupational, and speech-language therapy. The hospital also works collaboratively with the Laurel Regional Hospital Physical Rehabilitation Center to offer rehabilitation services.

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 1,953 trauma patients from June 1, 2017, through May 31, 2018, 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.

Adult Trauma Center Staff

Trauma Medical Director:
Hashim Hesham, MD, FACS
Trauma Program Manager:
Lauren Smith, MSN, ACNP-BC

FY 2018 Annual Report

Notable Accomplishments

In July 2017 Sinai partnered with the US Acute Care Solutions emergency physician provider group. Under the leadership of its chief, Dr. Neil Roy, the Department of Emergency Medicine is dedicated to delivering quality care and patient experience. Sinai has taken a multidisciplinary approach utilizing new systems and technology to focus on improving patient care, communication, and documentation.

Some of the recent accomplishments directly affecting trauma care include the creation of a unique trauma registration system, allowing for better preparedness and patient safety, and an integrated electronic handoff tool improving communication among trauma providers.

The trauma center at Sinai has also worked with Sinai's Lifelink Coordination Center in an effort to make transferring patients in and out of the hospital more efficient, improving provider-to-provider

communication between hospitals and with primary care providers. Providers can now be immediately connected to a trauma surgeon, allowing for a rapid, well-documented, and seamless approach from sending facility to receiving facility, including review of all transfers times and notifications.

With the goal of ensuring the right patient is getting the right care, Sinai is currently working on revising its trauma activation criteria, including adding a third-tier activation that creates protocols for the most challenging populations. Through the work of an engaged multidisciplinary provider group, Sinai has revised its admission criteria and processes to ensure the appropriate providers are involved in the patient's care as soon as possible.

Quality Management 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 an individual and system level. Sinai staff routinely reviews and implements best practices to improve the care and experience for its trauma population.

In June 2018 Sinai held a large-scale mass casualty drill coordinated by the hospital's emergency preparedness team. Sinai partnered with various city and county emergency services, private groups, and social services to stress and assess the system's ability to respond to a no-notice event that could result in multiple traumatic injuries.

Other ongoing quality improvement efforts include resident-led multidisciplinary projects that focus on blood utilization, venous thromboembolism, and opioid use.

Sinai is continually working to improve how data is submitted to the Maryland State Trauma Registry. There are three trauma registrars dedicated to accurate and timely chart abstraction. In an effort to assure quality data, the registrars have implemented a monthly review for inter-rater reliability that is measured against state and national requirements and definitions.

Injury Prevention Programs and Initiatives

Sinai is active in community injury prevention initiatives. The Violence Intervention Program continues to expand in the Park Heights community, and Sinai provides community education on fall prevention and distracted driving.

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 is currently training first-line responders within the LifeBridge Health system and have recently obtained grant support to move its efforts into the community.

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

Emergency Medical Services and Nursing Continuing Education

In FY 2018 Sinai held its first annual Treating Trauma: Care Across the Continuum Conference. In this course, local experts deliver innovative and evidence-based presentations on current topics in trauma care, including prehospital, inpatient, and post-discharge phases. Many trauma staff members at Sinai teach Trauma Nurse Core Course, Advanced Trauma Life Support (ATLS), Advanced Cardiac Life Support (ACLS), 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 continues 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 providers, 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 an eight-week rotation at the R Adams Cowley Shock Trauma Center during their post-graduate III-V years.

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. Most recently, Mark R. Katlic, MD, MMM, FACS, chair of the Department of Surgery, developed a screening tool to rapidly and practically assess cognition, frailty, and function in the older

surgical patient in an effort to predict treatment risk. The Sinai Abbreviated Geriatric Evaluation tool has been shown to be a statistically significant predictor of postoperative outcomes.

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 also easily accessible from Frederick and Prince George's counties. Suburban treated 1,678 trauma patients from June 1, 2017, through May 31, 2018, 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 Westerland, MD, FACS
Trauma Program Director:
Melissa E. Meyers, RN, BSN, MBA, TCRN

Fiscal Year 2018 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 expected 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 has trained over 400 community residents, hospital employees, physicians, staff members of the Department of Surgery, and the Nursing Professional Development Council. Several Stop the Bleed classes have been held for the Oasis Center, the Montgomery County Citizen Emergency Response Team, the National Cancer Institute, and the Whelan Security Group.

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 2017 and a Distracted Driving Awareness campaign held in April 2018, Suburban participated in multiple statewide injury prevention activities in FY 2018.

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 prehospital care providers through an agreement with the Montgomery County Training Academy and Montgomery County Community College.

In June 2018 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 providers, 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 1,288 trauma patients from June 1, 2017, through May 31, 2018, 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 2018 Annual Report

Notable Accomplishments

In FY 2018 MMC provided continuing education through its biannual trauma conferences to more than 230 providers, including EMS, hospital staff, and other local health care providers outside the organization.

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.

Injury Prevention Programs and Initiatives

In FY 2018 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 and conducted a Stepping ON! program for class instructors in Allegany County.

Meritus Medical Center 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 students in grades pre-K to 5 in Washington County.

In May 2018 MMC became part of a nationwide campaign to provide education in hemorrhage control by teaching 10 Stop the Bleed classes in the community and train-the-trainer courses for instructors.

In addition to car seat checks and loaner programs (see Notable Accomplishments, above), 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

Meritus Medical Center organized free trauma conferences in FY 2018 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

Meritus Medical Center 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 1,372 trauma patients from June 1, 2017, to May 31, 2018, 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

Through our mission to improve the health of the communities we serve and our values—respect for every individual, delivery of exceptional service, continuous improvement, safety and effectiveness, trust and compassion, transparency, and stewardship—our staff believe in a “culture of always,” where we work to ensure that we are performing at our best for every patient, every person, every time. As the Delmarva Peninsula’s referral medical center, we will be the leader in providing a system of regional access to comprehensive care that is interconnected, coordinated, safe, and the most clinically advanced. We will deliver an exceptional patient and family experience, while fostering a rewarding environment for physicians and employees. Together, Peninsula Regional Medical Center and its physicians will be a trusted partner in improving the health of the region.

Adult Trauma Center Staff

Trauma Medical Director:

Brion McCutcheon, MD

Trauma Program Manager:

Kari Cheezum, MSN, RN, CEN, TCRN

FY 2018 Annual Report

Notable Accomplishments

Dedicated to improving the quality of care of its patients, the trauma center at PRMC became an American College of Surgeons Trauma Quality Improvement Program (ACS TQIP) participating center in November 2017. It also received the American Trauma Society (ATS) Maryland Division's Distinguished Service Award, given for outstanding efforts to reduce the burden of injury in Maryland, for its utilization of the injury prevention mascot "TraumaRoo" and for staffing several events for the ATS Maryland Division. In addition, trauma staff and the manager of the Pediatric Emergency Department (ED) have been working closely with Maryland EMS for Children, Safe Kids Maryland, and Risk Watch Maryland to implement a Safe Kids Partnership at PRMC.

Quality Management and Improvement

Peninsula Regional Medical Center has been working on several quality improvement initiatives this past year. In October 2017 all ED nurses attended trauma documentation training following the implementation of a new electronic medical records system. Based on input from the ED nursing staff, trauma and ED leadership continues to work with the EPIC healthcare software team to improve Trauma Narrator, an EPIC proprietary application, making it more user-friendly

for clinicians. The audit tool utilized for nursing chart review was revised, becoming a more robust communication tool that allows staff feedback and improved loop closure. To improve quality indicators, ED physicians are given a report after each monthly performance improvement (PI) meeting regarding PI indicator fallouts.

Injury Prevention Programs and Initiatives

Peninsula Regional Medical Center continues to coordinate and participate in community-based injury prevention initiatives. In fall 2017 PRMC participated in a statewide fall injury prevention initiative, and in April 2018 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 and to highlight the consequences of poor decisions such as drinking and driving by participating in the first annual Prevent Event at Washington Academy and High School.

Working with the ATS Maryland Division and local communities, PRMC continues to hold wellness events for the public. For the past six 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. In FY 2018 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

Peninsula Regional Medical Center 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 28th 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 providers from Maryland, Delaware, Pennsylvania, and Virginia.

As in previous years, in FY 2018 PRMC continued to provide educational classes, such as Prehospital Basic Trauma Life Support, Advanced Life Support

(ALS), ALS Skills, and paramedic recertifications/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

Peninsula Regional Medical Center 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 568 trauma patients from June 1, 2017, to May 31, 2018, 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: Birat Dhungel, MD

Trauma Program Manager: Elizabeth Wooster, RN

FY 2018 Annual Report

Quality Management and Improvement

In FY 2018 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.

Western Maryland Regional Medical Center'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 and specialty care transport coordinators, 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).

Injury Prevention Programs and Initiatives

In support of a nationwide campaign to provide education in hemorrhage control, WMRMC received multiple grants to teach Stop the Bleed courses this past year. 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 over 25 current instructors serving the requests for the Stop the Bleed program.

Western Maryland Regional Medical Center also participated in Distracted Driving Prevention Awareness Day in April 2018, an initiative of the Maryland Trauma Quality Improvement Committee.

Emergency Medical Services and Nursing Continuing Education

Western Maryland Regional Medical Center 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, Trauma Nursing Core Course, and Specialty Care Transport Medicine. 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 providers; a multidisciplinary journal club; 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.

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 11th 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 2,552 trauma patients.

Adult Burn Center

Johns Hopkins Bayview Medical Center

4940 Eastern Avenue, Baltimore, Maryland

Johns Hopkins Bayview Medical Center (JHBMC) is a designated Adult Burn Center serving Maryland and adjacent regions. It provides a comprehensive, nationally recognized program of care for patients with burn injuries. JHBMC treated 934 burn patients (317 inpatients, 514 emergency department (ED) patients, and 91 observation patients) from June 1, 2017, through May 31, 2018, according to the Maryland State Trauma Registry. (See pages 81 to 83 for additional patient data.) JHBMC is verified by the American Burn Association (ABA).

Mission

Johns Hopkins Bayview Medical Center, a member of Johns Hopkins Medicine, provides compassionate health care that is 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 Program Manager:

Emily Werthman, BSN, BA, RN

FY 2018 Annual Report

Notable Accomplishments

In FY 2018 JHBMC installed Dr. Hultman as its new burn medical director. Board-certified by the American Board of Plastic Surgery and the American Board of Surgery with added qualifications in surgical critical care, Dr. Hultman has specialties in burn treatment and reconstruction, microsurgical reconstruction, aesthetic surgery, and surgery of the hand. JHBMC also reinvigorated its multidisciplinary, comprehensive unit-based safety program committee, which works to improve patient safety and outcomes.

Quality Management and Improvement

Johns Hopkins Bayview Medical Center recently implemented a new system for tracking and responding to pressure injuries in burn patients. The results of this practice are used in a weekly loop-closure discussion of pressure injury prevention and treatment. JHBMC also



continues its quality improvement work through analysis of metrics tracked in the burn quality dashboard. Trends in care and quality are examined by the Burn Joint Practice Committee.

Injury Prevention Programs and Initiatives

In FY 2018 JHBMC participated in various fire safety programs for adults, the Kiwanis Community Burn Prevention Program for school-aged 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. Carrie Cox, MS, RN, is the community outreach and education coordinator for JHBMC burn services, and Thomas McLhinney is the community program manager.

Emergency Medical Services and Nursing Continuing Education

For prehospital providers throughout the region, an Advanced Burn Life Support (ABLS) course, held biannually at JHBMC, and an EMS/firefighter burn course are offered. Burn center staff members frequently lecture at EMS regional conferences and offer other continuing education opportunities through JHBMC and participate in ALS updates for Baltimore City and many other Maryland counties annually. For EMS students, rotation time within JHBMC is available.

Clinical education for health care professionals who may come into contact with burn patients throughout the region is vitally important to JHBMC. Examples of the clinical education programs currently provided by JHBMC include ABLS provider certification courses; the ED Burn Poster Program; the Military Burn Education Program, held in conjunction with Center for the Sustainment of Trauma and Readiness Skills; and on-site clinical training for medical, nursing, rehabilitation, psychology, and dietitian students. JHBMC burn staff also present at colleges and universities throughout the region for physician assistants, nurses, physical and occupational therapists, and other prehospital providers.

Fellowships and Residencies

For over 20 years, JHBMC has provided annual fellowship training for physicians in both general and plastic surgery tracks, a program currently directed by Julie Caffrey, DO, MS. Also provided is residency training in partnership with local hospitals and universities, including Johns Hopkins University, Christiana Care Health System, MedStar Union Memorial Hospital, St. Agnes Hospital, Hershey Medical Center, and Sinai Hospital.

Research

Research collaborations with disciplines such as critical care, nursing, nutrition, rehabilitation, and psychology are currently underway. The Michael D. Hendrix Burn Research Laboratory actively studies the non-healing wound environment in animal models, and is looking at ways to improve or speed burn wound healing. Clinical studies conducted this past year include evaluating the efficacy and safety of NexoBrid compared to Gel Vehicle, e-cigarette battery explosion, pressure ulcers in burn patients, UV light technology for methicillin-resistant staphylococcus aureus (MRSA) decolonization of the burn unit, reciprocal relationship of pain and PTSD, and fluconazole for fungal prophylaxis in the Burn Intensive Care Unit.

Johns Hopkins Bayview Medical Center publishes and presents its findings at various local, regional, and national conferences. In FY 2018 JHBMC burn staff members were invited to present at the American Burn Association Conference, the Mid-Atlantic Region Burn Conference, the Eastern Great Lakes Burn Conference, the Armstrong Institute Symposium, and the American Association of Critical Care Nurses Chesapeake Chapter Conference. Staff members 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 staff includes occupational and physical therapists. Each patient admitted to JHBMC is seen by these specialists within the first 24 hours. This year 317 inpatients were evaluated by rehabilitation specialists.

The rehabilitation staff work with case management and social work staff to discharge patients to appropriate levels of care. There is a close working relationship with the Johns Hopkins Specialty Hospital for inpatient rehabilitation. Burn rehabilitation staff also provide in-service and consultation assistance to independent therapy facilities that receive JHBMC patients.

In FY 2018, 59 patients were referred for outpatient therapy. On average, a burn outpatient participates in therapy 1- 1.5 hours a day for four days a week.

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 and 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 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 20-bed facility features an intensive care unit with its own operating room and an intermediate care/rehabilitation unit, both of which provide wound care and progressive rehabilitation. With 649 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 950 patients annually.

Pediatric Trauma Center

Johns Hopkins Children's Center

1800 Orleans Street, Baltimore, Maryland

Johns Hopkins Children's Center (JHCC) is a designated Pediatric Trauma Center serving Maryland and adjacent regions. JHCC treated 775 trauma-injured children from June 1, 2017, through May 31, 2018, according to the Maryland State Trauma Registry. (See pages 84 to 87 for additional patient data.) Pediatric trauma services at JHCC are provided by the Pediatric Trauma and Burn Program.

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:

F. Dylan Stewart MD, FACS

Pediatric Trauma Program Manager:

Susan Ziegfeld, MSN, PNP-BC

FY 2018 Annual Report

Quality Management and Improvement

The pediatric trauma performance improvement (PI) program at JHCC had another productive year. Lisa Puett, BSN, is the dedicated, full-time PI coordinator and is involved with all PI initiatives. Through high-fidelity simulation, JHCC continued to improve trauma team configurations, assess trauma team readiness for low frequency–high risk injuries and procedures, and optimize its overall teamwork and communication. For the upcoming year, JHCC will utilize its upgraded video review system to identify educational needs and opportunities for improvement. Another focus was on the quality and reliability of clinical data submitted to the Maryland State Trauma Registry and National Trauma Data Bank. A comprehensive inter-rater reliability tool was developed to help identify and correct inconsistencies in data abstraction. A multidisciplinary morbidity and mortality team committed to meet monthly to review all complications and deaths, and trends are referred to the PI committee for further review.

Injury Prevention Programs and Initiatives

Johns Hopkins Children's Center has a robust injury prevention program, offering services to its patients, families, and the community. A multidisciplinary team of child passenger safety technicians

(CPSTs) are available to provide car seat fittings and assist with on-site installations. A hospital-wide car seat policy has been developed to ensure all JHCC patients are discharged safely. Thanks to financial support from the Maryland Trauma Network, Morgan Stanley, and other small grants and donations, the injury prevention team is able to provide free conventional car seats to families in need. In 2017 the injury prevention program received 100 car seats from Toyota and Cincinnati Children's Buckle Up for Life program in an effort to reduce motor vehicle–related injuries and deaths. This grant enabled the injury prevention program to double the number of community car seat events from previous years. Hospital-donated seats were distributed to families in need. All of the donated child restraint devices were checked for damage and recall issues, adjusted for each child's individual age, weight, and height, and properly installed in family vehicles.

The injury prevention staff also manages the special needs loaner program providing alternative child restraint devices when conventional devices are not an option due to injury or its treatment. JHCC loans these seats free of charge. Once the child is recovered and able to safely fit in a conventional car seat, the devices are returned.

Other injury prevention initiatives include bike safety and helmet distribution, fall prevention, and road safety awareness. The bike safety and helmet distribution program focuses on proper helmet wear, safe bike riding behaviors, and traumatic brain injury prevention. In FY 2017, 245 helmets were provided to patients. The second annual Fall Prevention Awareness event was held in collaboration with the adult trauma center at The Johns Hopkins Hospital. Pediatric injury prevention topics highlighted during this event included window falls, furniture tip overs, and bathroom-related slips and falls. Products such as furniture straps and non-slip bath pads were provided to attendees.

In addition, as part of the Maryland Trauma Quality Improvement Committee's initiative to recognize National Distracted Driving Awareness Month, Johns Hopkins pediatric and adult trauma centers collaborated for the fourth annual Road Safety Health Fair. Partners included the Maryland State Police Impaired Driving Effort (SPIDRE) team, Maryland Highway Safety Office, AT&T, University of Maryland's Legal Resource Center, MIEMSS, and the American Pediatric Surgical Nurses Association. The event featured information on distracted driving, drowsy driving, impaired driving, child passenger safety, evidence-based prevention programs, and policy implementation and successes.

Johns Hopkins Children's Center participates in the nationwide Stop the Bleed campaign educating

the public in hemorrhage control techniques. Stop the Bleed courses are being taught in schools, communities, and in hospitals.

Emergency Medical Services and Nursing Continuing Education

Johns Hopkins Children's Center continues to offer monthly training to prehospital providers and students that includes lectures, case reviews, and simulation. Maryland State Police paramedics rotate through the operating room weekly to maintain competency in comprehensive pediatric airway management.

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. The International Pediatric Surgery Fellowship program is a two-year program that was launched in July 2017. The international fellows focus on the management of complex surgical patients using minimally invasive surgical techniques.

Research

Johns Hopkins Children's Center remains active in research, and faculty and staff have presented and published work nationally and internationally. Research is supported through grants from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, a division of the National Institutes of Health, for a multicenter randomized trial on youth violence prevention. A grant from the Thomas Wilson Foundation was received for a pilot study on bicycle safety in the urban setting, tailored to cultural diversity. JHCC continues to participate in multisite projects, including studies on care transitions and teamwork in pediatric trauma, youth violence prevention, open fractures in children, alcohol screening, brief intervention for harmful behaviors, and gun safety in the home.

Rehabilitation

Johns Hopkins Children's Center has a state-of-the-art pediatric rehabilitation program that offers inpatient rehabilitation and comprehensive outpatient services. Therapists are certified CPSTs 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 1,034 trauma-injured children, including 711 of whom 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 344 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 health care experience for our patients and families, improving health care 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 2018 Annual Report

Notable Accomplishments

In FY 2018 CNMC continued a four-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 FY 2019 as the first Cerner-based trauma center to go live with electronic documentation.

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 2018, including improved emergency department readiness to care for children with penetrating injuries and improvements in the decision time for emergency surgery to the operating room, now with an average time of 20 minutes.

Injury Prevention Programs and Initiatives

In FY 2018 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 2018 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, but expanded in FY 2017 to include birthing centers, prenatal clinics, and parenting groups. In FY 2018 the program expanded further to include the school systems in Washington, DC, furthering increasing outreach to the public. Additionally, CNMC maintains a two-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 2018. 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. The second annual Child Abuse Prevention Symposium was held in April 2018, including a new half-day preconference on sex



trafficking. In FY 2018 CNMC launched the inaugural EMS Symposium, which included didactic education and hands-on skills training in traumatic injury. More than 60 prehospital professionals attended this conference.

Children's National Medical Center has been active in the Stop the Bleed campaign to teach traumatic hemorrhagic control, providing training to health care professionals monthly and to staff members at Smithsonian Institution.

Research

The trauma center maintains an active research program with multi-year studies in place. In FY 2018 the program received grants from the National Institutes of Health and the Agency for Healthcare Research and Quality to continue research in automatic workflow capture and analysis using real-time data driven feedback to improve trauma resuscitation outcomes and trauma patient safety. In addition, Dr. Burd serves as a co-principal investigator for the collaborative Pediatric Critical Care Research Network at CNMC.

In FY 2018 clinical staff authored or co-authored nine 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 subacute 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. JHCC treated 391 burn-injured children, plus an additional 896 outpatient burn clinic visits from June 1, 2017, through May 31, 2018, according to the Maryland State Trauma Registry. (See pages 88 to 91 for additional patient data.) JHCC also treated 78 patients with laser therapy for late effects of burn scars. Pediatric burn services at JHCC are provided by the Pediatric Trauma and Burn Program.

Mission

The mission of the pediatric burn center at the Johns Hopkins Children's 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:

F. Dylan Stewart MD, FACS

Pediatric Burn Program Manager:

Susan Ziegfeld, MSN, PNP-BC

FY 2018 Annual Report

Notable Accomplishments

Johns Hopkins Children's Center is proud to report that its pediatric burn program obtained verification from the American Burn Association (ABA) after an intensive application and review by leading burn surgeons. As noted by the ABA surveyors, the rigorous multidisciplinary performance improvement process exemplifies a high-functioning program, and JHCC demonstrates quality of care and forward-thinking overall. This verification is in addition to the pediatric burn center designation by MIEMSS.

Quality Management and Improvement

Johns Hopkins Children's Center has a vigorous performance improvement (PI) program. Through data collection, trending, and benchmarking, several clinical processes have shown improvement, including decreasing time to patients' first pain medication and time to burn wound care. Since implementation of the nurse-driven fluid resuscitation protocol, fluid resuscitation has been streamlined and patient length of stay in the Pediatric Intensive Care Unit has decreased.

The Pediatric Burn Late Effects Clinic continues to treat patients with difficult long-term burn problems. This multidisciplinary clinic follows children to provide care for the late effects of burn injuries, including physical issues such as contractures and burn scars, and emotional scars such as post-traumatic stress. The Sunshine Laser Program, designed to treat burn scars, is held monthly. Despite aggressive scar prevention, some children develop burn scars that cause pain, significant itching, and movement restrictions. While JHCC is currently analyzing its data, patients and families verbally report significant improvements in post-treatment quality of life. Clinician and patient-reported standardized assessments are measured to determine if quality of life and scar-related functioning (e.g., pliability and pruritus) are improving.

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. During its verification survey, the ABA noted that this program could serve as a model for other multi-center benchmarking and quality improvement initiatives.

Pediatric psychology has become 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 led efforts to collaborate with other pediatric burn centers, through PIQIC, to establish a focused psychology screening process across sites, including establishment of PI measures. Data from this program has been presented at national and international conferences, including an invited talk at the 2018 ABA Annual Meeting. Grant applications have been submitted to further support innovative psychosocial interventions.

Injury Prevention Programs and Initiatives

Johns Hopkins Children's Center 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

Johns Hopkins Children's Center 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.

The injury prevention team offers ongoing education to burn nurses at JHCC. Topics include burn prevention, epidemiologic framework, childhood development and its relationship to injury risk, childhood burn mechanisms and prevention strategies, statistics in Baltimore compared to the national data, and the hospital's burn prevention services.

Johns Hopkins Children's Center continues to practice team building, communication, and clinical skills through interdisciplinary simulation and in situ events in collaboration with the Johns Hopkins Medicine Simulation Center.

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. The International Pediatric Surgery Fellowship program is a two-year program that was launched in July 2017. The international fellows focus on the management of complex surgical patients using minimally invasive surgical techniques.

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.

Johns Hopkins Children's Center has several ongoing research projects, including effect of laser treatment on burn scars, functional outcomes of hand burns, child quality of life and parent post-traumatic stress reactions, and initial treatment of scald burn injuries.

Rehabilitation Services

A state-of-the-art pediatric rehabilitation program that offers inpatient rehabilitation and comprehensive outpatient services is available at JHCC. The hospital partners 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 376 burn-injured children who reside in Maryland from June 1, 2017, through May 31, 2018, according to the Maryland State Trauma Registry. (See pages 88 to 91 for additional patient data.). Of the 376 burn injured children, 34 were admitted as inpatients and 250 were emergency department (ED) visits. There were an additional 683 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 health care experience for our patients and families, improving health care 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 2018 Annual Report

Notable Accomplishments

Children’s National Medical Center welcomed a child psychologist, Carrie Tully, PhD, to the burn center team in FY 2018. The addition of a child psychologist allows the team to provide focus on the mental health of a patient and their family members after a burn injury. Dr. Tully has implemented post-traumatic stress disorder and quality of life screening tools in the burn clinic to assess patient and family coping. She is available for counseling or counseling referral for patients and families requiring assistance. Dr. Tully is an active researcher and will expand the breadth of the burn research at CNMC.

Quality Management and Improvement

The pediatric burn center has a robust quality improvement program. Several projects in FY 2018 focused on the enhancement of burn care, such as improvement in the assessment of burn injuries. Total body surface area (TBSA) agreement is crucial in planning care for burn-injured children. TBSA dictates level of care and the need for fluid resuscitation, and plays a role in assessing the need for supplemental nutrition. In FY 2018 the Division of Emergency Trauma and Burn Surgery and the ED adopted a phone application to assess TBSA in burn patients, with the rule of palm serving as a backup assessment method. Since implementation, burn TBSA agreement is in the ninety-th percentile. To further expand its abilities, CNMC has received funding to create an application-based TBSA calculator that will be available to all burn care providers.

Children’s National Medical Center is one of five charter members of the Pediatric Injury Quality Improvement Consortium, which will be implementing benchmark metrics in the care of burn patients, developing best practice protocol in burn care, and contributing to multicenter research in burn management.

Injury Prevention Programs and Initiatives

In FY 2018 the burn center partnered 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.

In summer 2018 CNMC completed demographic mapping of all burn injured patients (FY 2016–2017) to determine the type, extent, and location of burn injuries. This information is providing guidance for FY 2019 burn injury prevention strategies.

Emergency Medical Services and Nursing Continuing Education

Several burn educational programs were offered at CNMC in FY 2018. 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. The burn center launched a “Major Burn 5-minute Fire Drill” geared to maintaining competency of the ED nursing staff in the care and flow of low-volume, high-risk major burn patients.

Children’s National Medical Center sponsored over 15 nurses, therapists, and physicians to attend the Northeast Regional Burn Conference and 8 nurses and therapists to attend the American Burn Association National Conference.

In addition, an occupational therapist and a physical therapist at CNMC were awarded a grant to fund burn-focused training at the Shriners’s Hospital in Galveston, Texas.

Research

The burn center maintains an active research program with multi-year studies in place. In FY 2018 the program received grants from the National Institutes of Health and the Agency for Healthcare Research and Quality to continue research in automatic workflow capture and analysis, using real-time data driven feedback, to improve trauma resuscitation outcomes and trauma patient safety. Recent burn center research in the care of facial burn and treadmill injuries has been highlighted at national and regional meetings, with publications pending.

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 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 based at The Johns Hopkins Hospital 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 remain 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 2018 Annual Report

Notable Accomplishments

On July 29, 2017, the Wilmer Eye Institute's Trauma Center (Wilmer), represented by Dr. Woreta and Dr. Shameema Sikder, hosted a celebrated guest speaker, Ferenc Kuhn, MD, PhD, for Ocular Trauma: The Basics, a full-day program that included a keynote lecture followed by a wet lab course in Wilmer's Center of Excellence for Ophthalmic Surgical Education and Training. Wilmer residents as well as residents from Sinai Hospital and university ophthalmology programs, including George Washington, Georgetown, University of Maryland, and Howard, were invited to attend this special event.

Research and program development efforts continue in the domain of telemedicine. Wilmer's Dr. Ingrid Zimmer-Galler, executive medical director of the Johns Hopkins Office of Telemedicine, actively collaborated with Dr. Woreta in piloting a model of remote eye consultation in the emergency department (ED) at Howard County General Hospital. This work was published in an article "The (Remote) Eye Doctor Will See You Now," by Karen Nitkin.

Dr. Woreta's vision and work as director of the eye trauma center were highlighted as the feature story of the 2017 edition of Wilmer Magazine. Dr. Woreta was also invited to present on sports-related anterior segment injuries at the most recent Asia-Pacific Academy of Ophthalmology meeting in Hong Kong.

In May 2018 Mark D'Souza, a physician assistant at Wilmer, was awarded Off-Service Educator of the Year for 2017-2018 by the Johns Hopkins Emergency Medicine Residency Program.

Quality Management and Improvement

A workgroup including the eye trauma center director, associate directors, trauma coordinator, and assistant administrator continues to meet on a quarterly basis. 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 The Johns Hopkins Hospital (JHH). A Wilmer project that was successfully undertaken in FY 2018 was implementation of dedicated emergency surgery slots on a daily basis for further-improved access for leveled add-on cases.

Members of the eye trauma center team also meet with JHH adult ED leadership 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.

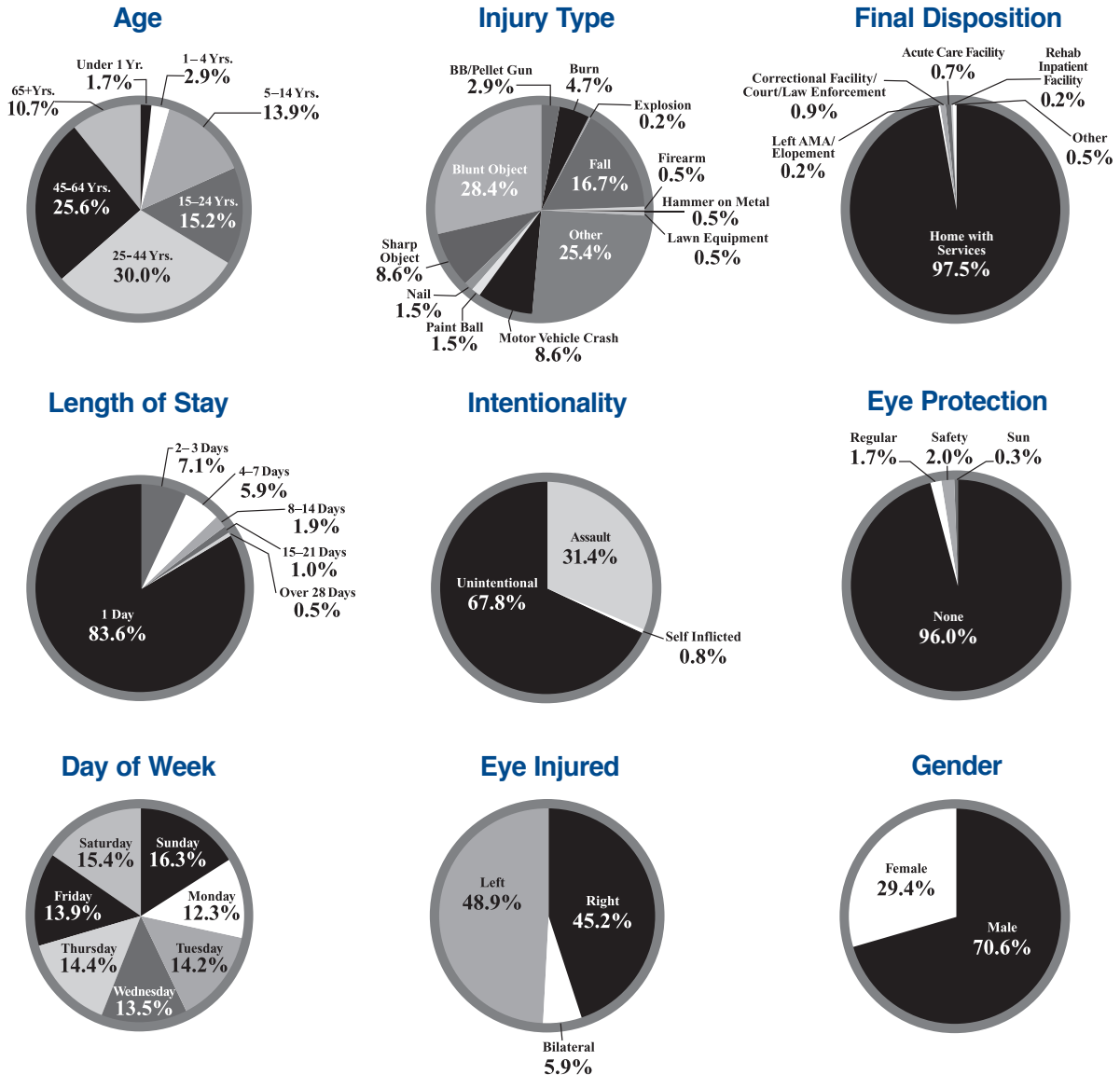
Injury Prevention Programs and Initiatives

In September 2017 Shailaja Chopde and Ann Roberts from the Wilmer nursing team attended the Johns Hopkins Fall Prevention Awareness Fair and distributed patient literature about eye trauma associated with mechanical falls. In fall 2017, Wilmer nurses

Wilmer Eye Institute at The Johns Hopkins Hospital Demographics

(June 2017 to May 2018)

Source: Maryland Eye Trauma Registry



Liang Peng, Ning Kardmai, and Shailaja Chopde assisted with vision and health screenings for over 150 adults and children as part the Burnt Mills Seventh Day Adventist Church’s annual Health Fair.

Emergency Medical Services and Nursing Continuing Education

Each year, eye trauma center physicians and nurses provide education on eye trauma identification and management to multidisciplinary care teams within JHH adult and pediatric EDs, which serve as the point of entry for all 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 nursing leadership at the R Adams Cowley Shock Trauma Center to update the “Ocular Injuries” chapter of the Trauma Nursing: From Resuscitation Through Rehabilitation, 5th edition textbook.

On May 18, 2018, the Wilmer Eye Institute hosted its annual Wilmer Nursing Conference, featuring Wilmer and Johns Hopkins faculty presentations on a wide range of trauma topics. This conference was attended by over 150 Wilmer ophthalmic technicians and nurses, as well as several nurses, technicians, and paraprofessionals visiting from other institutions and community-based practices.

Fellowships and Residencies

The Wilmer Eye Institute supports a three-year ophthalmology residency program, which accepts five residents per program year. Eye trauma center residents, alongside assistant chiefs of service, faculty attendings, and staff, are highly-active participants in the assessment and management of eye trauma center 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 eye trauma center faculty in FY 2018 covered a variety of topics, including epidemiology of primary ophthalmic inpatient admissions in the United States, computed tomography (CT) in the evaluation of acute injuries of the anterior eye segment, safely viewing solar eclipses, Google cardboard indirect ophthalmoscopy, and benign reactive lymphoid hyperplasia of conjunctiva in childhood.

Wilmer's Dana Center for Preventive Ophthalmology continues to study visual field loss as a risk factor for falls through the Falls in Glaucoma study, launched in 2014. Principal investigator Pradeep Ramulu, MD, PhD, and his research team used accelerometer and GPS devices to help track movements of 250 people over a three-year period, and identified higher incidence of falls within the home. The next goal of the study is to identify interventions that might occur in terms of layout and design of the physical environment in the homes of persons with visual disabilities.

Rehabilitation Services

The Wilmer Eye Institute Trauma Center offers eye trauma center 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. Eye trauma center 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

The Curtis National Hand Center (CNHC) at MedStar Union Memorial Hospital serves as the state's referral center for the specialized care of injuries to the hand and upper extremities. The unique nature of CNHC's services also draws patients from a broad geographic region, including Pennsylvania, Delaware, Virginia, West Virginia, and Washington, DC. In FY 2018 CNHC treated 1,636 patients with traumatic hand and upper extremity injuries.

Curtis National Hand Center's expertise in challenging bone and soft tissue trauma is supplemented by advanced microsurgery skills. The handling of fractures, complex soft tissue coverage problems, and amputations requiring replantation attempts continues to be the hand center's primary focus. Over 26 percent of traumatic hand cases are transported by public safety ambulance or medevac helicopter. The onsite heliport reduces travel time and improves the speed of intervention for the most critically wounded.

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 to respond to a variety of injuries ranging from severing or crush injuries to infections and animal bites. Most hand injuries treated at the center are the result of incidents with power saws, lawn mowers, snow blowers, or other machines that can cut, crush, or break hands, and most injuries occur outside of the work place.

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.

Hand/Upper Extremity Trauma Center Staff

Trauma Medical Director: James P. Higgins, MD

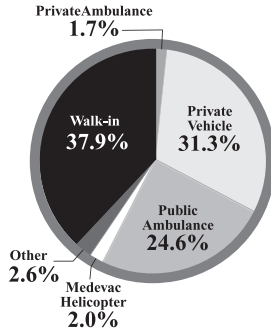
Trauma Program Manager: Cynthia Johnson

The Curtis National Hand Center at MedStar Union Memorial Hospital

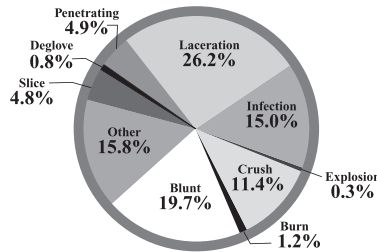
(July 2017 to June 2018)

Source: The Curtis National Hand Center
n = 1, 636

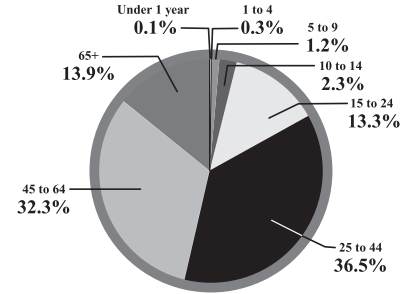
Transport Mode



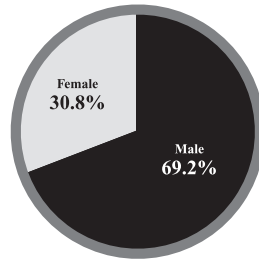
Injury Type



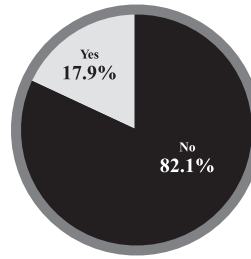
Age



Gender



Work Related



FY 2018 Annual Report

Notable Accomplishments

In FY 2018 CNHC expanded its academic offerings, increased collaboration with affiliated institutions, and increased participation by friends and alumni around the region and country.

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

Quality Management and Improvement

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 (MUMH). At monthly mortality and morbidity conferences, challenging and readmitted cases are presented for evaluation and to learn outcome status.

Injury Prevention Programs and Initiatives

In FY 2018 CNHC initiated community and hospital visitor outreach via social media and hospital digital wall screens that provided injury prevention information about lawnmower, fireworks, and snow blower safety.

Emergency Medical Services and Nursing Continuing Education

Education at CNHC is built upon the multifactorial system of communication, cooperation, and professional execution necessary to treat hand and upper extremity trauma. The basic elements of the system include: 1) prehospital communication and determination for transfer suitability, 2) specialty center presentation and intake, 3) progress through a clinical system designed to handle traumatic injuries of the hand and upper extremity, and 4) collection and analysis of data related to the care of traumatic injuries of the hand and upper extremity.

The Continuing Medical Education Committee of MUMH oversees the continuing medical education (CME) program at the hospital. The principal goal of the CME program is to offer diverse educational programs to the attending staff at MUMH and other

MedStar Health institutions, physicians in the community, residents, fellows, nurses, and other allied health professionals. Hand trauma labs are scheduled on a regular basis, giving staff the opportunity to learn, practice, and update their skills.

Fellowships and Residencies

Curtis National Hand Center is one of the largest training centers for hand surgery in the United States. Established in 1977, the one-year fellowship training offers a diverse approach to the assessment and treatment of common and complex hand, wrist, arm, elbow, and shoulder problems. Fellows have the opportunity to work with all of the attending staff at CNHC, and are required to complete a project in clinical or laboratory research. Nearly 200 doctors have graduated from the CNHC's fellowship program.

Research

Curtis National Hand Center's clinical research director is instrumental in ongoing research and educational studies, labs, and publications. Research projects, funded by both internal and external sources, look at a wide range of pertinent questions, including those in microsurgery, surgery of the peripheral nerve, bone and soft tissue problems, and reconstruction after significant trauma. Collaborations with the region's scientists and other investigators promote thinking and new developments in these critical areas of trauma care.

The surgeons of CNHC have contributed important publications about care of injured hands and upper extremities, and continue to lecture worldwide on hand trauma. In particular, Dr. Higgins, CNHC's medical director, is engaged several times each year to lecture on hand trauma across Maryland and its surrounding regions.

Rehabilitation

The hand specialists at CNHC work with each patient to establish a treatment plan, including the techniques used in supervised and independent therapy sessions, based on their individual situation and needs.

Therapists teach and guide each patient to maximize the use of the dysfunctional extremity while preventing re-injury or worsening of condition. Therapists may educate patients on the disease process, the healing process, and the rationale for the prescribed therapy techniques.

An assortment of rehabilitation services are offered, including management of acute or chronic pain, protective splinting for immobilization and controlled motion, inpatient and home exercise programs, sensory re-education programs after nerve injury, thermal and electrical modalities to minimize pain and swelling and

facilitate restoration of joint motion and tendon gliding, whirlpools to assist with wound healing, and 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 provides comprehensive management for patients with injuries of the brain, spinal cord, and spinal column. The Neurotrauma Center treated 2,310 patients with traumatic brain injury, 524 patients with spinal column or spinal cord injuries, and 525 patients who suffered from both traumatic brain and spinal column or spinal cord injuries from June 1, 2017, to May 31, 2018, according to the Maryland State Trauma Registry.

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:

Deborah Stein, MD, MPH, FACS, FCCM

FY 2018 Annual Report

Notable Accomplishments

In FY 2018, the Neurotrauma Center (NTC) developed a multifaceted approach and respiratory driven protocol aimed at liberating patients from mechanical ventilation. The protocol involved the initiation of therapy within 24 hours of intubations. Patients receive prophylactic treatment with intrapulmonary percussive ventilation, cough assist, and bronchodilators every four hours. In addition to be liberated from mechanical ventilation, patients successfully treated on the protocol did not need nitric oxide or proning.

Dr. Stein is the only physician in Maryland certified to implant the NeuRx Diaphragm Pacing System. The device is the only one of its kind and is FDA approved for use in cervical spinal cord injury and amyotrophic lateral sclerosis. STC is now designated as the regional referral center for this system as a result of work performed with the device.

Decompressive Craniectomy, a comprehensive evidence based text used as a resource throughout the world, was published in 2018. The textbook was edited by Dr. Aarabi and J. Marc Simard, MD, PhD, professor of Neurosurgery, with contributions from additional STC and University of Maryland Medical Center staff.

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 NTC avails its clinical and research expertise globally to health care providers. Trauma-related publications by neurotrauma faculty in FY 2018 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, 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 NTC, 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 treat 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.

The role of rehabilitation in the acute hospital care setting may differ from an inpatient rehabilitation facility care setting. Hospital rehabilitation may consist of an initial evaluation of the patient's injuries, and then deciding what therapy can be instituted based on the patient's status. 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.

After an injured patient is stable and is healing, rehabilitation focuses on restoring their ability to complete daily activities, speak, and move. Therapists strive to improve quality of life, decrease pain, and increase function. Advanced techniques and evidence-based best practices help patients return to normal activities as quickly as possible. Rehabilitation care generally comprises physical, occupational, and speech therapy, which are discussed in further detail on page 60.

Top Ten Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Aged 15 and Over) (June 2017 to May 2018)

Source: Maryland State Trauma Registry

| Rehabilitation Center | Number |
|---|--------|
| Adventist Health Care | 82 |
| Future Care | 26 |
| Genesis Health Care | 93 |
| Johns Hopkins Bayview Specialty Hospital Inpatient Rehabilitation | 26 |
| Johns Hopkins Hospital Inpatient Rehabilitation Center | 28 |
| HCR Manor Care | 31 |
| Health South Chesapeake Rehabilitation Center | 51 |
| MedStar Good Samaritan Hospital | 35 |
| Sava Senior Care | 35 |
| Sinai Rehabilitation Center | 79 |
| University of Maryland Rehabilitation & Orthopaedic Institute | 460 |

Note: Total patients aged 15 and over that went to rehabilitation centers = 1,487

Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Aged 14 and Under) (June 2017 to May 2018)

Source: Maryland State Trauma Registry

| Rehabilitation Center | Number |
|--|--------|
| HSC Pediatric Center, DC | 6 |
| Kennedy Krieger Institute | 7 |
| Mt. Washington Pediatric Hospital | 7 |
| MedStar National Rehabilitation Network | 5 |
| Johns Hopkins Hospital Inpatient Rehabilitation Center | 1 |
| Nemours/Alfred I. Dupont Hospital for Children | 1 |

Note: Total patients aged 14 and under that went to rehabilitation centers = 27



Physical Therapy: During a patient's stay at the hospital, physical therapists visit the patient's bedside in both critical care and acute care sections of the hospital. Physical therapists have special training to increase mobility, strength, balance, and flexibility after an injury by using stretches, exercise, and massage. 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. Long-term occupational therapy may be required following traumatic brain or spinal cord injuries.

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.

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.

Emergency Response System of the National Capital Region of Maryland

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.

The 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 an adjunct office is located in the Montgomery County Public Safety Headquarters in Gaithersburg.

In FY 2018 MDERS continued to apply its methodology 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.

Project Methodology

Throughout FY 2018 MDERS continued to revise its project and initiative methodology by examining response capabilities and contrasting against target outcomes. Using this model, a target outcome is defined, and then reverse-engineered to determine which initiatives or changes need to take place to achieve the goal. Using a cycle of planning, organization, equipping, training, exercising, and evaluating (POETEE), all facets of the capability are thoroughly considered and planned in advance. By applying this method, normal risks to each project's success are mitigated. It also allows the staff to perform strategic planning and budgeting for future years.

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. 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 into Washington, DC, and the Arlington, Alexandria, and Loudoun areas of Virginia. Plans and funding exist to expand this capability to the entire NCR, thereby providing a common situational awareness and system status management tool to all fire/rescue/EMS departments in the region.

Incident Command System Software (Rhodium)

MDERS continues to build out incident command capability with a computer-based platform for managing critical incidents. Rhodium Incident Management software was selected to interact with computer-aided dispatch systems.

Hospital Cache

This project addresses three gaps observed at local hospitals from terror attacks across the nation: massive bleeding, rapid bed deployment, and efficient storage. Bleeding control supplies were distributed to the 12 hospitals in Montgomery and Prince George's counties. This equipment cache of tourniquets, hemostatic bandages, wound packing materials, and additional patient care cots provided the capability for hospital personnel in the Maryland-NCR, including those at non-specialty facilities, to reduce the loss of life from a terrorist attack.

Medical Cache

A cache of nerve agent antidote kits were purchased for Prince George's and Montgomery counties, for use in the treatment of patients exposed to chemical nerve agents.

SWAT Vehicles and Equipment

Emergency response vehicles, necessary equipment, and supplies were provided to law enforcement officers in Montgomery and Prince George's counties to deploy during or following a terrorism attack. The vehicles are equipped with heavy-duty, secure storage boxes that can house all the equipment that SWAT officers need for a response. The project also funded approximately 200 breaching kits to allow patrol officers to access high-threat situations without waiting for specialty teams.

Tactical Emergency Casualty Care Training Kits

Through this project 47 tactical emergency casualty care (TECC) training kits, each of which are capable of training 25 students, were procured to build and sustain TECC skills for law enforcement officers and fire/rescue personnel in Montgomery and Prince George's counties.

Tactical Medical Equipment and Ballistic Protection

Level IIIA ballistic protection vests were purchased for fire/rescue personnel in Montgomery and Prince George's counties. Additional items include ballistic helmets, patient litters, and components to support the protective ensemble. This equipment provides limited protection that allow fire/rescue personnel to enter warm zones to initiate patient care in high-threat situations.

Training and Exercise Cache

An equipment cache, and trailer with which to deploy those materials, was purchased to support MDERS training and exercise initiatives conducted with its stakeholders. Exercises focus on developing and testing response capabilities to critical incidents, including a wide range of terrorist incidents.

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 2018:

- 7th Annual Breaching Circle
- Adobe InDesign training (AGi Mission Support Services, Inc.)
- Advanced Law Enforcement Rapid Response Training (ALERRT) (Texas State University)
- Advanced operational breaching training (Direct Action Resource Center)
- Field-based live tissue training (Assessment and Training Solutions Consulting Corporation)
- Counter Narcotics and Terrorism Operational Medical Support (CONTOMS)
- Continuity of Operations (COOP) for public entities
- Committee on Tactical Emergency Casualty Care
- Complex coordinated attack exercises for regional stakeholders (eight held)
- Domestic Terrorism and Mass Casualty Incidents Insight Exchange Network
- Emergency Medical Services World Conference
- Federal Aviation Administration Unmanned Aerial Surveillance UAS Conference Symposium
- International Association of Fire Chiefs (IAFC) HazMat Conference
- Incident Command System (ICS) train-the-trainer tool box
- Inlets Elements of an Active Shooter Conference
- International Association of Chiefs of Police (IACP) Annual Conference
- International Breacher's Group Symposium
- High angle sniper training (International Mountain Survival)
- International Public Safety Association Conference
- Journal of Emergency Medical Services Conference
- Level 1 and 2 counterterrorism training (Direct Action Resource Center)
- MedStar Emergency Management Summit
- National Healthcare Coalition Preparedness Conference
- National Urban Area Security Initiative Conference
- Naval weapons sniper course
- National Fire Protection Association (NFPA) Conference
- New York Tactical Emergency Medical Services Expo
- Pinnacle Conference

- Progressive phase mastery of explosive entry training
- Rappel Master Instructor course (Group H3)
- Special Operations Medical Association (SOMA) Conference
- Tabletop-in-a-box exercises (eight held)
- Urban Rappel and Climbing course (Group H3)
- Urban sniper operations training
- Woodland-rural tactical operations

2018 Maryland-National Capital Region Emergency Response Symposium

On May 2, 2018, MDERS sponsored its fourth 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 participants attended the event; 318 stakeholders attended the event in person and 102 participated via webcast.

This year's symposium highlighted the response to the Las Vegas mass casualty shooting incident that occurred on October 1, 2017. Four presentations took place, each focusing on a different sphere of response, including law enforcement, fire/rescue/EMS, emergency management, and hospitals.

MDERS also hosted a pre-symposium seminar, during which Dr. David McIntyre, trauma surgeon at Sunrise Medical Center in Las Vegas, presented to and met with hospital personnel from throughout the NCR to discuss his experiences, lessons learned, and efforts to increase preparedness. Several post-symposium roundtables held to discuss discipline-specific strategies and tactics for handling these high-impact events provided fire/rescue/EMS and law enforcement leadership with direct access to the Las Vegas MCI emergency responders.

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.

- **Hospital mass casualty workshop:** MDERS hosted a hospital mass casualty incident workshop to identify gaps, gather information, and identify the next steps for generating a capability development plan (CDP). This was the beginning of a lengthy endeavor to prepare hospitals for surge events, especially those brought about by terrorism and violence.
- **Support to regional workgroups:** MDERS staff support or lead workgroups and initiatives and serve on various committees. In particular, MDERS leads a medical cache working group that assesses regional needs.
- **Participation in high-threat workgroups:** Staff participate on a regular schedule with the Maryland Emergency Management Agency Complex Coordinated Attack Workgroup, Maryland State Police–lead Active Assailant Workgroup, and annual NCR Threat Hazard Identification and Risk Analysis (THIRA) initiative.

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 providers. 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 2017-2018 academic year was an exciting time for EHS, with many noteworthy accomplishments.

Lucy Wilson, MD, MPH, FACEP, an epidemiologist from the Maryland Department of Health (MDH) and expert in emerging infectious diseases in disasters, has been hired to become the department's new graduate program director. Dr. Wilson succeeds Richard Bissell, PhD, who served as the graduate program director for over two decades prior to his retirement.

The department completed a contract for over \$700,000 to create an EMS training series addressing provider preparedness for responding to calls involving highly infectious disease patients. The project was funded by the Centers for Disease Control and Prevention on behalf of MDH. These training videos are now available for continuing education credit to all Maryland providers through MIEMSS' Online Training Center.

Dr. J Lee Jenkins, the department's chair, is the co-principal investigator 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 use this data to ultimately develop innovative teaching models to improve provider stress response.

The first PhD program in Emergency Services at UMBC is now available through EHS in conjunction with the Department of Public Policy. Students may concentrate in either emergency health or emergency management.

Dwight Polk has retired from his role as EHS's paramedic program director. Gary Williams will be acting as the interim paramedic program director for this academic year as a national search is conducted to hire a permanent replacement.

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. The MPC provides 24/7 emergency poison information to the public and health professionals across the state. The MPC is accessed by calling the nationwide poison help telephone number, 800-222-1222, or via the Emergency Medical Resource Center (EMRC).

The 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 Elizabeth Quaal Hines, MD, is the interim medical director. The poison specialists who work at MPC are pharmacists and nurses who are certified as specialists in poison information (CSPI) by the AAPCC. The 15 specialists at the MPC have over 250 years of combined poison center experience, ensuring that callers have access to experienced, qualified, and well-trained staff.

In CY 2017 the MPC received 42,604 calls. While 32,164 of these calls involved a human exposure, the



remaining 10,440 were requests for information or involved animal exposures. Children under the age of six accounted for 40% of poison exposures. The top five causes of poisoning were analgesics, sedatives/antipsychotics/hypnotics, household cleaners, cosmetics/personal care products, and antidepressants. Sixty-two percent of the cases reported to the MPC were managed at a site not providing health care, such as the home, school, or workplace. Maryland EMS providers consulted with the MPC on 1,805 cases in 2017. In 15% 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.

The 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. An automated symptom and substance outlier detection strategy is used to 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. The number of calls to the MPC that reportedly involved heroin increased by 40% from 2016 to 2017, and increased 938% from 2010 to 2017. MPC data is provided to state and local health departments to help them respond to the opioid epidemic. The MPC provides a vital service to the state's Overdose Response Program by monitoring naloxone administration by the lay public and law enforcement officers. In

2017 the MPC received 734 calls regarding bystander naloxone administration, a 64% increase over 2016. Law enforcement officers constituted 87% of the callers reporting naloxone administration. Of the total number of patients reported to MPC for naloxone administration, 77% were transported to a health care facility and the MPC monitored and participated in the care of 85% of these patients.

Research is conducted by MPC staff to advance the prevention, diagnosis, and treatment of poisonings. Research published or presented at scientific meetings in 2017 included

- Characterizing the toxicity and dose-effect of tramadol ingestions in children
- Comparison of pediatric atypical antipsychotic exposures reported to US poison centers
- Asenapine, iloperidone, and lurasidone exposures in young children reported to US poison centers
- Abuse and misuse of selected dietary supplements among adolescents
- Trends in types of calls managed by US poison centers, 2000-2015
- Pediatric methadone exposure: poison center time documentation of dose and clinical effects
- Poison education outreach methods for older adults

The 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 the MPC's assistant director of operations and public education. In 2017 the MPC attended 50 programs throughout Maryland, reaching approximately 2,648 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 the MPC in their classrooms. More than 175,000 pieces of educational material (brochures, magnets, telephone stickers, Mr. Yuk stickers, teacher's kits, and more) were distributed at programs, schools, health fairs, and by direct mailings.

National Poison Prevention Week (March 18-24, 2018) activities included mailings to emergency departments throughout the state. To provide Poison Prevention Week kits to elementary schools, MPC partnered with Safe Kids Baltimore City, Safe Kids

Carroll County, Safe Kids Frederick County, Safe Kids Washington County, Cecil County Department of Emergency Services, Wicomico County Health Department, and school nurses in Anne Arundel and Baltimore counties. Schools could choose from a list of activities to increase awareness of poison safety to students and their families. In all, 151 schools participated, reaching over 45,600 students.

The MPC publishes *Poison Prevention Press*, a bimonthly e-newsletter for the public that highlights poison safety topics. Articles published in 2017 included “Carbon Monoxide,” “Bites and Stings,” “Household Objects and Substances,” “Poison Myths,” “Pre-teen and Teen Substance Abuse,” and “Holiday Poison Hazards.” The MPC’s Facebook page shares content with the public on topics related to poison prevention and safety. In 2017 MPC staff generated 195 posts and saw an increase of 184 followers. The MPC launched a Twitter account for the public (@MDPoisonCtr), sharing 476 Tweets in 2017. Also new in 2017 was e-Antidote, a blog that had 264 visitors since it was launched.

Health professional education is coordinated by Eric Schuetz, BS Pharm, CSPI, who took over the duties performed by Lisa Booze, PharmD, CSPI, upon her retirement in fall 2017. Programs and materials are designed to help health professionals better assess and manage poisoning and overdose cases. In 2017, 36 programs were presented by MPC staff at hospitals, EMS/fire departments, colleges, professional conferences (state, regional, and national), and through online webinars. These programs and webinars were attended by more than 10,000 physicians, nurses, EMS providers, pharmacists, physician assistants, and other health professionals. The MPC also provides on-site training for physicians, pharmacists, and EMS providers. Toxicology segments were recorded for MedicCast.com and NursingShow.com podcasts. The MPC’s Twitter account for health care providers, @MPCToxTidbits, posts clinical and medical toxicology content. MPC tweeted 346 times in 2017, 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 2017 were “Pediatric Buprenorphine Ingestion,” “Promethazine Abuse: A Growing Problem?,” “Abrin,” “Black Widow Spider Bites,” “Salicylate Poisoning,” and “Hydrofluoric Acid.” *ToxTidbits* is emailed to subscribers and faxed to every emergency department in MPC’s service area.

Reason for Poisoning (CY 2017)

| Circumstance | Number of Patients | Percentage |
|-------------------|--------------------|------------|
| Unintentional | 22,886 | 71.2 |
| Intentional | 7,693 | 23.9 |
| Adverse Reaction | 1,030 | 3.2 |
| Other and Unknown | 555 | 1.7 |
| TOTAL | 32,164 | 100.0 |

Medical Outcome of Poisoning (CY 2017)

| Medical Outcome | Number of Patients | Percentage |
|------------------------|--------------------|------------|
| No Effect/Minor Effect | 26,952 | 83.9 |
| Moderate Effect | 2,587 | 8.0 |
| Major Effect | 710 | 2.2 |
| Death | 78 | 0.2 |
| Other and Unknown | 1,837 | 5.7 |
| TOTAL | 32,164 | 100.0 |

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

Location of Poisoning Exposure by MIEMSS Region (CY 2017)

| Region | Number of Exposures | Percentage |
|--------------------------------|---------------------|------------|
| Region I | 816 | 2.5 |
| Region II | 2,679 | 8.3 |
| Region III | 19,063 | 59.3 |
| Region IV | 3,286 | 10.2 |
| Region V* | 3,022 | 9.4 |
| Unknown County/ Other state | 3,298 | 10.3 |
| TOTAL | 32,164 | 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 US Congress in 1986. In 2007, in an effort to further basic, translational, and clinical studies in injury research, the University of Maryland School of Medicine (UMSOM) designated the 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 the 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 Executive Committee of the STAR-ORC.

In FY 2018 Timothy J. Kerns, PhD, who has spent his career at the NSC working on injury epidemiology, and Roumen Vesselinov, PhD, were granted faculty positions at the UMSOM. Dr. Kerns is the program director for many of the NSC projects focusing on motor vehicle-related injuries. Dr. Vesselinov is a research associate who specializes in statistical analysis.

Research Activities

Motor Vehicle–Related Injuries

The 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 Highway Safety Office (HSO). The NSC is one of the centers awarded the CIREN project on an annually renewable basis; funding for the 2018-2019 year has already been awarded.

During the 2017-2018 contract year, 19 cases were enrolled into CIREN and a comprehensive investigation was conducted for each. Multiple case reviews were held and the NSC hosted NHTSA administrators on several occasions. In addition to the HSO, the CIREN center has developed partnerships with the Maryland State Police, Baltimore 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, Maryland Crash Reconstruction Committee, and other local injury prevention programs across the state.

In September 2017 the NSC was awarded a grant from the Centers for Disease Control and Prevention (CDC) to use linked traffic records data to examine the types and severity of injuries sustained by older occupants in motor vehicle crashes. The University of Maryland partnered with the University of Utah, the University of Kentucky, and Nationwide Children’s Hospital (Ohio) to conduct this three-year research effort.

The NSC has compiled information from a variety of statewide databases to enable in-depth analysis of highway safety programs. Data provided through the Maryland CODES program are used for portions of the Maryland Strategic Highway Safety Plan (SHSP), Highway Safety Plan, HSO Annual Report, and to support a variety of problem identification and program evaluation activities across the state. NSC staff members facilitate the Traffic Records Coordinating Committee and serve on the National Traffic Records Advisory Committee, the Association of Transportation Safety Information Professionals Executive Board, the ANSI D.16 Update Panel, Maryland’s Partnership for a Safer Maryland, and as data coordinators on SHSP Implementation and Emphasis Area Teams. The compiled CODES data sets are a valuable resource to Maryland’s highway safety and injury prevention community.

Under a grant from the HSO, the NSC serves as a key data analysis resource and partner for the HSO and MVA. During the past year, NSC staff conducted analyses related to nighttime seat belt use, motorcycle safety, older drivers, distracted driving, bicycle crashes, and pedestrians. In one set of studies, NSC staff conducted a comprehensive analysis of pedestrian, bicycle, and motorcycle crashes in Maryland and presented the findings to the HSO. NSC staff members have also collaborated with researchers at the University of Maryland’s College Park campus and the National

Opinion Research Center to evaluate the State Police Impaired Driving Effort project. As part of another project with the HSO, the NSC is working with the 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.

The NSC partners with the CDC to measure the degradation of blood alcohol levels among fatally-injured persons from the time of initial testing at the STC to the testing conducted by the OCME, with a finding that blood alcohol concentration decreases with resuscitation. A second partnership with the Maryland Department of Health focuses on ICD-10 coding for persons treated at the STC as the result of an intentional injury, finding that injury coding is frequently different between observers.

NSC staff attended and presented at the International Traffic Records Forum, SHSP Implementation Team meetings, Lifesavers Conference, and the Safe States Conference. Presentation topics included pedestrian safety, traffic records, and state-of-the-state data.

Alcohol-Related Injuries

Analysis continues on Alcohol Involvement in a Cohort of Trauma Patients: Trends and Future Mortality, an innovative project that links unique longitudinal data on alcohol consumption by STC patients with National Death Index data to identify patients who die after discharge. In September 2017 a presentation was made at the Society for the Advancement of Violence and Injury Research entitled “Association of smoking with narcotic overdose death following trauma injury admission.” Death certificate data from the National Death Index has been linked to all cases discharged from the STC and is now incorporated into its trauma registry. This information is available for use in other studies and will provide valuable long-term outcome data on mortality for discharged patients.

Training Activities

The NSC actively trains epidemiologists and other health professionals on research topics related to injuries and EMS. There were three students from Towson’s Health Policy program who 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 other doctoral students who study injury-related matters in the Department of Epidemiology and Public Health. During the past year, staff members specializing in statistics have taught sessions on data analysis at the Shock Trauma Fellows Research Conference and School of Pharmacy, and in support

of the Injury Prevention Research Training in Egypt and the Middle East project, funded by the Fogarty International Center of Advanced Study in the Health Sciences.

Technical Support

In addition to in-house preparation of peer-reviewed research papers, NSC staff offers 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 12 manuscripts by University of Maryland, Baltimore researchers between June 2017 and May 2018. At least three additional papers have been accepted for publication and seven are still in various stages of critical review. A total of 16 abstracts supported by NSC staff members were submitted to various injury-related conferences.

The 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, the 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 the 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 key article in the *Annals of Emergency Medicine* entitled “Maryland’s Helicopter Emergency Medical Services Experience from 2001 to 2011: System Improvements and Patients’ Outcomes.” This article concluded that “modifications to state protocols were associated with decreased helicopter EMS use and overall improved trauma patient outcomes.”

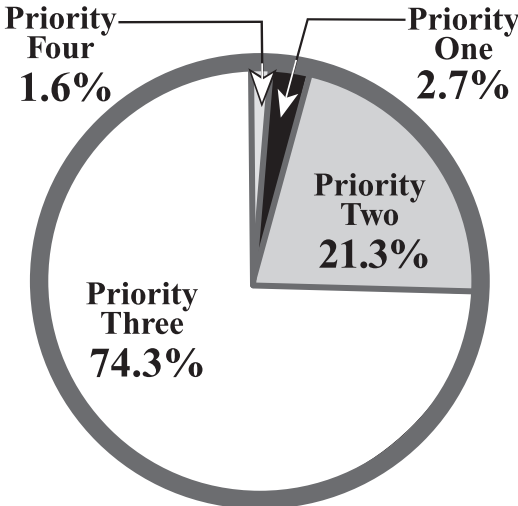
National Study Center members continue to serve on several MIEMSS committees and provide assistance to meet the agency’s mission.

MARYLAND EMS STATISTICS

Types of EMS Calls

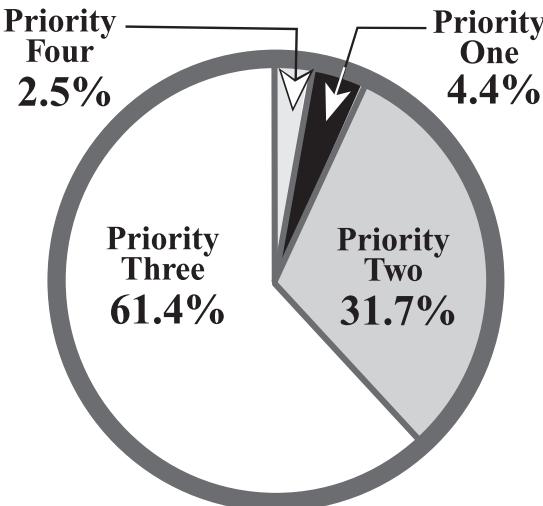
Patient Priority For Injury Transports

Fiscal Year 2018



Patient Priority For Medical Transports

Fiscal Year 2018



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 2018.

| eMEDS Records Submitted to MIEMSS per Fiscal Year 2018 Quarter¹ | | | | | | |
|---|---|-------------------------|-------------------------|-------------------------|-------------------------|------------------|
| Reporting Between: 7/1/2017 - 06/30/2018 | | | | | | |
| Jurisdiction | Elite Implementation² | 1st Qtr. FY 2018 | 2nd Qtr. FY 2018 | 3rd Qtr. FY 2018 | 4th Qtr. FY 2018 | Total |
| Allegany County | 5/7/2018 | 3,827 | 3,506 | 3,802 | 3,816 | 14,951 |
| Anne Arundel County* | 5/29/2018 | 20,949 | 20,951 | 20,631 | 20,836 | 83,367 |
| Baltimore City | | 72,357 | 66,317 | 68,514 | 70,976 | 278,164 |
| Baltimore County* | | 34,053 | 34,851 | 36,002 | 34,892 | 139,798 |
| Calvert County | | 4,424 | 4,343 | 4,681 | 4,606 | 18,054 |
| Caroline County | 6/11/2018 | 1,829 | 1,784 | 1,841 | 1,679 | 7,133 |
| Carroll County | | 5,120 | 5,079 | 5,675 | 5,345 | 21,219 |
| Cecil County | | 7,186 | 6,605 | 6,823 | 7,223 | 27,837 |
| Charles County | 6/1/2018 | 6,929 | 6,993 | 6,989 | 7,040 | 27,951 |
| Dorchester County | 5/21/2018 | 1,640 | 1,590 | 1,605 | 1,570 | 6,405 |
| Frederick County | | 12,055 | 12,156 | 12,056 | 12,320 | 48,587 |
| Garrett County | 5/7/2018 | 1,256 | 1,163 | 1,003 | 1,064 | 4,486 |
| Harford County* | | 8,474 | 8,231 | 8,581 | 8,765 | 34,051 |
| Howard County | | 7,458 | 7,820 | 7,763 | 7,835 | 30,876 |
| Kent County | 6/11/2018 | 1,406 | 1,247 | 1,376 | 1,302 | 5,331 |
| Montgomery County | | 21,309 | 21,630 | 21,584 | 21,413 | 85,936 |
| Prince George's County | | 60,104 | 60,477 | 57,088 | 56,214 | 233,883 |
| Queen Anne's County | 12/18/2017 | 2,028 | 1,905 | 1,819 | 1,771 | 7,523 |
| Somerset County | | 790 | 788 | 768 | 744 | 3,090 |
| St. Mary's County | | 5,808 | 5,429 | 5,616 | 5,661 | 22,514 |
| Talbot County | 12/18/2017 | 1,850 | 1,859 | 1,806 | 1,996 | 7,511 |
| Washington County | 6/25/2018 | 8,656 | 7,996 | 7,933 | 7,868 | 32,453 |
| Wicomico County | 5/14/2018 | 4,134 | 3,921 | 3,983 | 3,897 | 15,935 |
| Worcester County* | 5/14/2018 | 3,972 | 2,403 | 2,218 | 2,833 | 11,426 |
| Jurisdictional Total | | 297,614 | 289,044 | 290,157 | 291,666 | 1,168,481 |

*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.

¹The 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.

²MIEMSS has upgraded to ImageTrend's Elite Platform to support the eMEDS patient care reporting system. The upgrade moves MIEMSS from the NEMESIS 2.2.1 data standard to the NEMESIS 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 2017 Registry Data

| Non-Traumatic Etiology Survival Rates* | Maryland | National |
|--|----------|----------|
| Overall | 8.8% | 10.4% |
| Bystander Witnessed | 15.7% | 16.1% |
| Unwitnessed | 3.7% | 4.6% |
| Utstein | 32.0% | 32.6% |
| Utstein Bystander | 33.7% | 36.5% |

| Bystander Intervention Rates** | Maryland | National |
|--------------------------------|----------|----------|
| CPR | 34.0% | 38.2% |
| Public AED Use | 10.6% | 11.4% |

| Demographic Information | Maryland | National |
|-------------------------|----------|----------|
| Mean Age (years) | 62.3 | 62.0 |
| % Males | 59.1% | 62.0% |
| % Females | 40.9% | 38.0% |

| Location of Arrest | Maryland | National |
|--------------------|----------|----------|
| Home/Residence | 71.4% | 69.9% |
| Nursing Home | 13.6% | 11.4% |
| Public Setting | 15.0% | 18.8% |

| Arrest Witnessed? | Maryland | National |
|-----------------------------|----------|----------|
| Witnessed by Bystander | 29.7% | 36.6% |
| Witnessed by 9-1-1 Provider | 12.0% | 12.3% |
| Unwitnessed | 58.3% | 51.1% |

| Who Initiated CPR? | Maryland | National |
|----------------------------------|----------|----------|
| Not Applicable | 0.0% | 0.1% |
| Bystander | 38.2% | 39.4% |
| First Responder | 26.0% | 29.3% |
| Emergency Medical Services (EMS) | 35.8% | 31.2% |

| Who First Defibrillated the Patient? | Maryland | National |
|--------------------------------------|----------|----------|
| Not Applicable | 76.6% | 69.7% |
| Bystander | 1.5% | 1.6% |
| First Responder | 3.2% | 5.7% |
| Emergency Medical Services (EMS) | 18.7% | 23.1% |

* See page 71 for survival rate formulas.

** See page 71 for intervention rate formulas.

Cardiac Arrest Registry to Enhance Survival (CARES) CY 2017 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 |

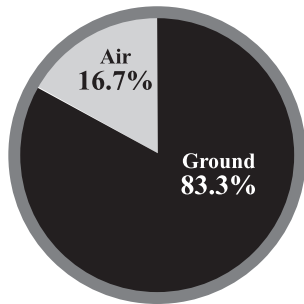
Source: Vehicle data reported by the EMS Operational Programs

**MCSU = Mass Casualty Support Unit

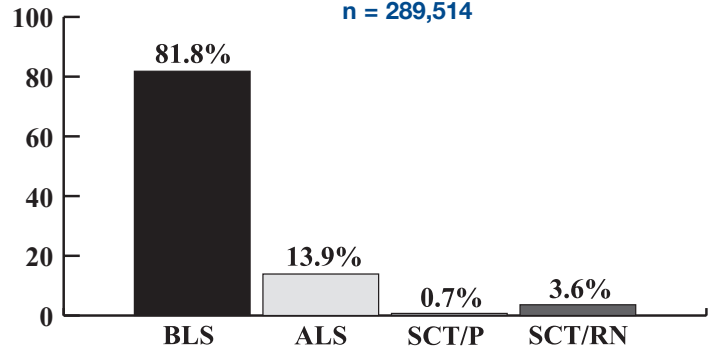
Maryland-Licensed Commercial Ambulance FY 2018 Statistics

Source: MIEMSS Commercial Ambulance Licensing System

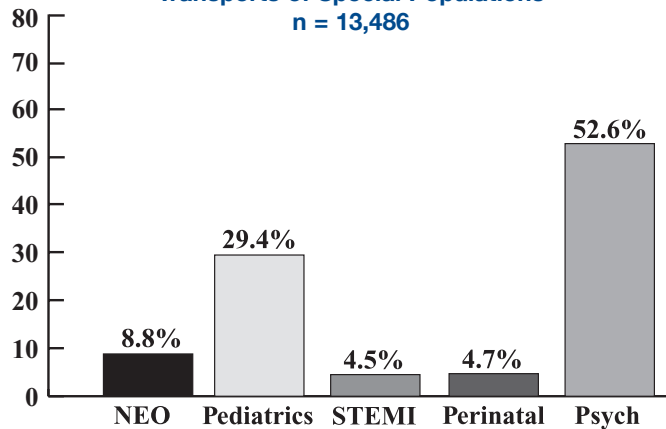
Total Number of Services
n = 36



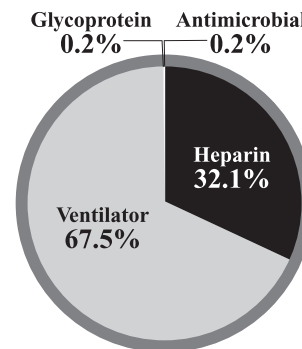
Transports by Type
n = 289,514



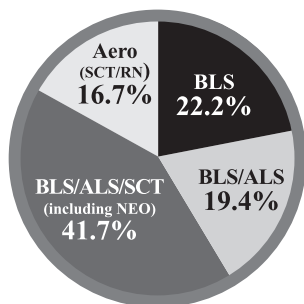
Transports of Special Populations
n = 13,486



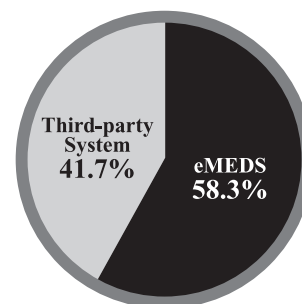
Optional Protocol Transports
n = 3,543



Services by Type
n = 36



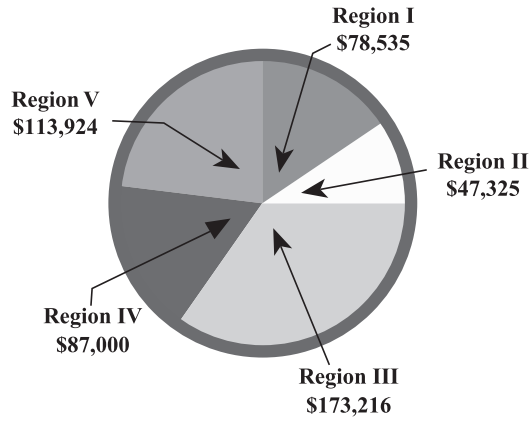
ePCR Reporting Software Platform
n = 36



State Homeland Security Grant Funding for Maryland EMS

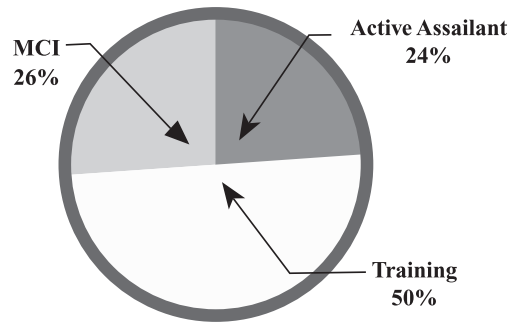
Grant Funding Distribution by Region

(FY 2015 and FY 2016)



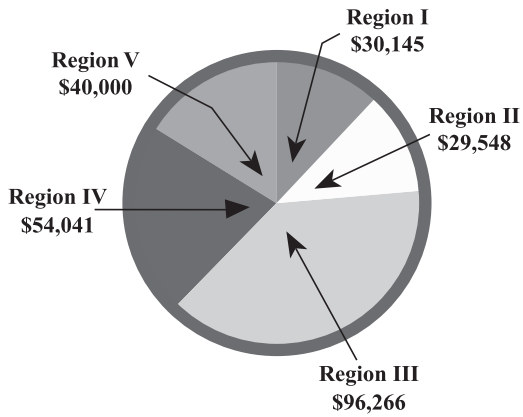
Grant Funding by Project Activity

(FY 2015 and FY 2016)



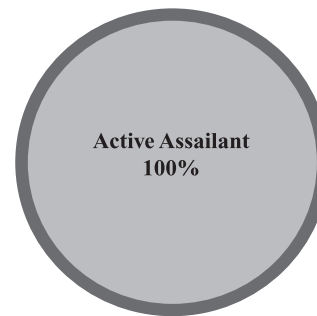
Grant Funding Distribution by Region

(FY 2017)



Grant Funding by Project Activity

(FY 2017)



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 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|----------------|--------------------------|--------------------------|--------------------------|
| Under 1 year | 276 | 287 | 222 |
| 1 to 4 years | 522 | 510 | 490 |
| 5 to 9 years | 645 | 602 | 510 |
| 10 to 14 years | 620 | 547 | 537 |
| 15 to 24 years | 4,016 | 4,102 | 3,753 |
| 25 to 44 years | 6,818 | 7,040 | 6,648 |
| 45 to 64 years | 5,168 | 5,372 | 5,243 |
| 65+ years | 4,157 | 4,972 | 5,092 |
| Unknown | 5 | 12 | 16 |
| TOTAL | 22,227 | 23,444 | 22,511 |

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 Medical Center | WMRMC |
| Prince George's Hospital Center | PGH | | |

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

Source: Maryland State Trauma Registry

| Trauma Center | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|---|--------------------------|--------------------------|--------------------------|
| Johns Hopkins Bayview Medical Center | 2,449 | 2,838 | 2,657 |
| The Johns Hopkins Medical System | 2,052 | 1,863 | 1,702 |
| Meritus Medical Center | 1,245 | 1,363 | 1,288 |
| Peninsula Regional Medical Center | 1,219 | 1,398 | 1,372 |
| University of Maryland Prince George's Hospital Center | 3,401 | 3,793 | 3,664 |
| R Adams Cowley Shock Trauma Center | 6,089 | 6,156 | 6,142 |
| Sinai Hospital of Baltimore | 2,038 | 2,113 | 1,953 |
| Suburban Hospital – Johns Hopkins Medicine | 1,314 | 1,633 | 1,678 |
| Western Maryland Regional Medical Center | 590 | 665 | 568 |
| TOTAL | 20,397 | 21,822 | 21,024 |

* Maryland Trauma Statistics are based on patient discharge data from June 2017 to May 2018.

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

(June 2017 to May 2018)

Source: Maryland State Trauma Registry

| County of Injury | Number |
|------------------------|---------------|
| Allegany County | 376 |
| Anne Arundel County | 768 |
| Baltimore County | 2,923 |
| Calvert County | 141 |
| Caroline County | 59 |
| Carroll County | 277 |
| Cecil County | 62 |
| Charles County | 206 |
| Dorchester County | 72 |
| Frederick County | 363 |
| Garrett County | 37 |
| Harford County | 563 |
| Howard County | 301 |
| Kent County | 31 |
| Montgomery County | 1,528 |
| Prince George's County | 2,454 |
| Queen Anne's County | 86 |
| St. Mary's County | 202 |
| Somerset County | 87 |
| Talbot County | 67 |
| Washington County | 912 |
| Wicomico County | 432 |
| Worcester County | 254 |
| Baltimore City | 4,122 |
| Virginia | 45 |
| West Virginia | 90 |
| Pennsylvania | 194 |
| Washington, DC | 273 |
| Delaware | 88 |
| Other | 2 |
| Not Indicated | 604 |
| TOTAL | 17,619 |

Note: Scene origin cases represent 83.8% of the total trauma cases treated statewide.

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

(June 2017 to May 2018)

Source: Maryland State Trauma Registry

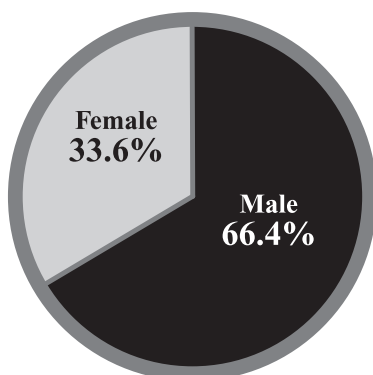
| County of Residence | Number |
|------------------------|---------------|
| Allegany County | 335 |
| Anne Arundel County | 802 |
| Baltimore County | 2,837 |
| Calvert County | 152 |
| Caroline County | 57 |
| Carroll County | 296 |
| Cecil County | 65 |
| Charles County | 281 |
| Dorchester County | 70 |
| Frederick County | 370 |
| Garrett County | 22 |
| Harford County | 615 |
| Howard County | 319 |
| Kent County | 40 |
| Montgomery County | 1,486 |
| Prince George's County | 2,206 |
| Queen Anne's County | 62 |
| St. Mary's County | 147 |
| Somerset County | 83 |
| Talbot County | 65 |
| Washington County | 761 |
| Wicomico County | 394 |
| Worcester County | 165 |
| Baltimore City | 3,909 |
| Virginia | 332 |
| West Virginia | 172 |
| Pennsylvania | 434 |
| Washington, DC | 561 |
| Delaware | 144 |
| Other | 351 |
| Not Indicated | 86 |
| TOTAL | 17,619 |

Note: Scene origin cases represent 83.8% of the total trauma cases treated statewide.

**Gender Profile:
Primary Admissions Only**

(June 2017 to May 2018)

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 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|-----------------------------|--------------------------|--------------------------|--------------------------|
| None | 21.3% | 22.0% | 21.3% |
| Seatbelt | 19.2% | 16.0% | 15.1% |
| Airbag and Seatbelt | 36.3% | 35.0% | 35.7% |
| Airbag Only | 8.2% | 11.1% | 12.0% |
| Infant/Child Seat | 0.2% | 0.0% | 0.2% |
| Protective Helmet | 13.8% | 15.1% | 14.4% |
| Padding/Protective Clothing | 0.1% | 0.1% | 0.1% |
| Other Protective Device | 0.5% | 0.4% | 1.0% |
| Unknown | 0.4% | 0.3% | 0.2% |
| TOTAL | 100.0% | 100.0% | 100.0% |

Note: Table reflects patients 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 2017 to May 2018)

Source: Maryland State Trauma Registry

| Modality Type | BVMC | JHH | MMC | PEN | PGH | SH | STC | SUB | WMRMC | TOTAL |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Ground Ambulance | 96.3% | 82.8% | 80.7% | 94.6% | 87.5% | 86.8% | 79.7% | 94.8% | 79.7% | 86.8% |
| Helicopter | 0.1% | 0.8% | 1.1% | 4.2% | 8.7% | 0.1% | 19.2% | 0.2% | 2.7% | 6.7% |
| Other | 3.6% | 16.4% | 18.2% | 1.2% | 3.8% | 13.1% | 1.1% | 5.0% | 17.6% | 6.5% |
| TOTAL | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

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

Origin of Patient Transport to Trauma Centers

(June 2017 to May 2018)

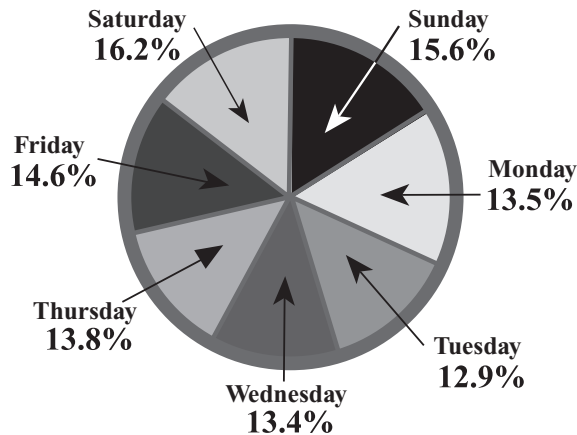
Source: Maryland State Trauma Registry

| Origin Type | BVMC | JHH | MMC | PEN | PGH | SH | STC | SUB | WMRMC | TOTAL |
|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Scene of Injury | 92.9% | 78.4% | 99.0% | 68.9% | 95.0% | 94.9% | 67.5% | 95.1% | 94.7% | 83.9% |
| Hospital Transfer | 0.5% | 10.1% | 0.8% | 1.7% | 2.9% | 4.4% | 32.5% | 4.1% | 0.5% | 11.8% |
| Other | 6.6% | 11.5% | 0.2% | 29.4% | 2.1% | 0.7% | 0.0% | 0.8% | 4.8% | 4.3% |
| TOTAL | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Emergency Department Arrivals by Day of Week: Primary Admissions Only

(June 2017 to May 2018)

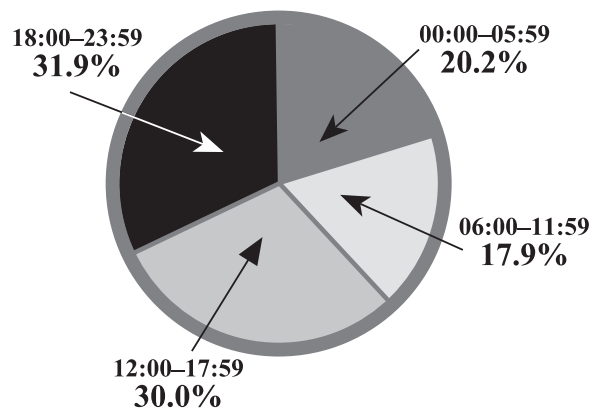
Source: Maryland State Trauma Registry



Emergency Department Arrivals by Time of Day: Primary Admissions Only

(June 2017 to May 2018)

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 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|--|--------------------------|--------------------------|--------------------------|
| Under 1 year | 2 | 0 | 3 |
| 1 to 4 years | 2 | 1 | 0 |
| 5 to 14 years | 2 | 3 | 2 |
| 15 to 24 years | 162 | 148 | 120 |
| 25 to 44 years | 244 | 254 | 245 |
| 45 to 64 years | 157 | 155 | 158 |
| 65+ years | 194 | 265 | 267 |
| Unknown | 0 | 9 | 6 |
| TOTAL | 763 | 835 | 801 |
| Deaths Overall as a Percentage of the Total Injuries Treated | 3.7% | 3.8% | 3.8% |

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 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|----------------|--------------------------|--------------------------|--------------------------|
| Under 1 year | 60 | 63 | 50 |
| 1 to 4 years | 93 | 106 | 127 |
| 5 to 14 years | 191 | 240 | 206 |
| 15 to 24 years | 3,905 | 4,017 | 3,642 |
| 25 to 44 years | 6,818 | 7,040 | 6,648 |
| 45 to 64 years | 5,168 | 5,372 | 5,243 |
| 65+ years | 4,157 | 4,972 | 5,092 |
| Unknown | 5 | 12 | 16 |
| TOTAL | 20,397 | 21,822 | 21,024 |

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 2017 to May 2018)
Source: Maryland State Trauma Registry

| Age | Number of Injured Patients | | Number of Deaths | |
|----------------|----------------------------|-----------------------|------------------|-----------------------|
| | Total | Maryland Residents | Total | Maryland Residents |
| Under 1 year | 50 | 42 | 3 | 2 |
| 1 to 4 years | 127 | 104 | 0 | 0 |
| 5 to 14 years | 206 | 169 | 2 | 1 |
| 15 to 24 years | 3,642 | 3,183 | 120 | 106 |
| 25 to 44 years | 6,648 | 5,828 | 245 | 207 |
| 45 to 64 years | 5,243 | 4,625 | 158 | 143 |
| 65+ years | 5,092 | 4,622 | 267 | 245 |
| Unknown | 16 | 10 | 6 | 6 |
| TOTAL | 21,024 | 18,583 | 801 | 710 |

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 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|--------------------------|--------------------------|--------------------------|--------------------------|
| Cut or Pierce | * | 6.2% | 5.8% |
| Drowning/Submersion | * | 0.0% | 0.1% |
| Fall | * | 35.9% | 37.4% |
| Fire or Flame | * | 0.3% | 0.4% |
| Hot Object or Substance | * | 0.1% | 0.1% |
| Firearm | * | 7.7% | 7.6% |
| Machinery/Mechanical | * | 0.7% | 0.7% |
| Motor Vehicle Crash | * | 27.4% | 26.9% |
| Motorcycle Crash | * | 3.8% | 3.8% |
| Pedal Cycle Crash | * | 2.0% | 1.8% |
| Pedestrian Incident | * | 5.8% | 5.4% |
| Other Transport | * | 0.2% | 0.2% |
| Natural or Environmental | * | 0.4% | 0.4% |
| Poisoning | * | 0.4% | 0.3% |
| Struck by or Against | * | 7.9% | 7.7% |
| Abuse | * | 0.0% | 0.0% |
| Other | * | 1.2% | 1.4% |
| TOTAL | * | 100.0% | 100.0% |

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

* Due to the differences in ICD9 and ICD10 coding, new categories were developed for the mechanisms of injury. The Maryland Trauma Registry began using ICD-10 coding in January 2016. Therefore, there will not be mechanisms of injury for June, 2015 to May, 2016 included in this table.

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

| Blood Alcohol Content | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|-----------------------|--------------------------|--------------------------|--------------------------|
| Negative | 22.1% | 23.7% | 24.5% |
| Positive | 17.3% | 16.7% | 16.2% |
| Undetermined | 60.6% | 59.6% | 59.3% |
| TOTAL | 100.0% | 100.0% | 100.0% |

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

Etiology of Injuries by Age: Primary Admissions Only

(June 2017 to May 2018)

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% | 0.1% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 1.1% | 0.2% |
| 1 to 4 years | 0.1% | 0.0% | 0.4% | 0.5% | 0.0% | 0.0% | 0.1% | 0.0% | 2.0% | 0.3% |
| 5 to 14 years | 0.6% | 0.0% | 0.5% | 0.6% | 0.3% | 0.6% | 0.4% | 2.9% | 2.6% | 0.6% |
| 15 to 24 years | 19.7% | 19.9% | 14.8% | 5.0% | 37.6% | 23.4% | 17.2% | 16.2% | 13.9% | 15.1% |
| 25 to 44 years | 36.6% | 39.5% | 35.1% | 13.0% | 50.0% | 52.4% | 48.8% | 26.6% | 35.3% | 30.4% |
| 45 to 64 years | 25.9% | 35.0% | 35.7% | 25.7% | 10.8% | 20.4% | 26.2% | 43.2% | 35.6% | 25.9% |
| 65+ years | 17.0% | 5.6% | 13.4% | 55.0% | 1.3% | 3.2% | 7.3% | 11.1% | 9.5% | 27.5% |
| TOTAL | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival. Only pediatric patients who were treated at Adult Trauma Centers are included in this table. For patients treated at Pediatric Trauma Centers, see Maryland Pediatric Trauma Statistics.

Etiology Distribution for Patients with Blunt Injuries: Primary Admissions Only

(June 2017 to May 2018)

Source: Maryland State Trauma Registry

| Etiology | Percentage |
|--------------------------|------------|
| Cut or Pierce | 0.2% |
| Fall | 43.5% |
| Machinery/Mechanical | 0.7% |
| Motor Vehicle Crash | 31.4% |
| Motorcycle Crash | 4.5% |
| Pedalcyclist Crash | 2.1% |
| Pedestrian Incident | 6.3% |
| Other Transport | 0.2% |
| Natural or Environmental | 0.3% |
| Struck by or Against | 8.9% |
| Other | 1.2% |
| Not Valued | 0.7% |
| TOTAL | 100.0% |

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

Etiology Distribution for Patients with Penetrating Injuries: Primary Admissions Only

(June 2017 to May 2018)

Source: Maryland State Trauma Registry

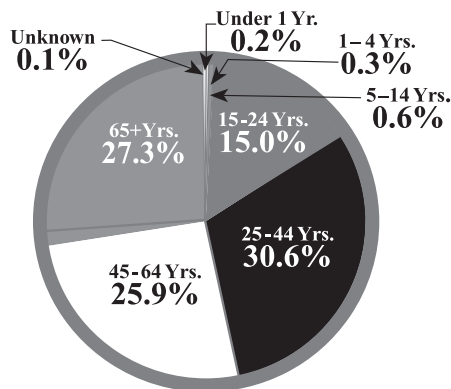
| Etiology | Percentage |
|----------------------|------------|
| Cut or Pierce | 40.5% |
| Fall | 1.5% |
| Firearm | 54.8% |
| Machinery/Mechanical | 0.5% |
| Motor Vehicle Crash | 0.4% |
| Pedestrian Incident | 0.1% |
| Other Transport | 0.2% |
| Struck by or Against | 0.9% |
| Other | 0.2% |
| Not Valued | 0.9% |
| TOTAL | 100.0% |

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

Age Distribution of Patients: Primary Admissions Only

(June 2017 to May 2018)

Source: Maryland State Trauma Registry

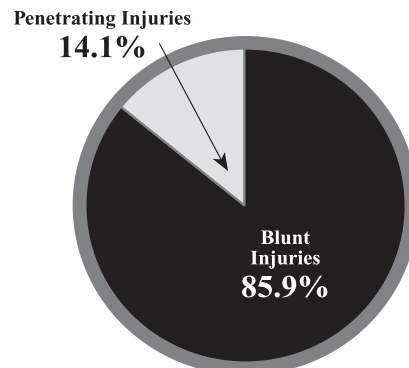


Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival. Only pediatric patients who were treated at Adult Trauma Centers are included in this table. For patients treated at Pediatric Trauma Centers, see Maryland Pediatric Trauma Statistics.

Injury Type Distribution of Patients: Primary Admissions Only

(June 2017 to May 2018)

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.

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

| Final Disposition | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|---------------------------|--------------------------|--------------------------|--------------------------|
| Inpatient Rehab Facility | 13.5% | 11.3% | 9.9% |
| Skilled Nursing Facility | 4.5% | 6.3% | 8.4% |
| Residential Facility | 1.2% | 1.4% | 0.8% |
| Specialty Referral Center | 4.2% | 4.1% | 4.4% |
| Home with Services | 3.9% | 4.1% | 4.4% |
| Home | 59.1% | 57.9% | 57.3% |
| Acute Care Hospital | 2.5% | 3.4% | 2.8% |
| Against Medical Advice | 2.3% | 2.7% | 2.6% |
| Morgue/Died | 5.2% | 5.4% | 5.3% |
| Left without Treatment | 0.1% | 0.1% | 0.0% |
| Hospice Care | 0.3% | 0.5% | 0.5% |
| Jail | 1.7% | 1.5% | 1.8% |
| Psychiatric Hospital | 0.9% | 0.9% | 1.3% |
| Elopement | 0.0% | 0.0% | 0.3% |
| Other | 0.6% | 0.4% | 0.2% |
| TOTAL | 100.0% | 100.0% | 100.0% |

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

**Injury Severity Scores (ISS) by Injury Type:
Primary Admissions Only
(June 2017 to May 2018)**
Source: Maryland State Trauma Registry

| ISS | Blunt | Penetrating | Total |
|--------------|---------------|---------------|---------------|
| 1 to 12 | 78.2% | 73.3% | 77.5% |
| 13 to 19 | 12.5% | 10.7% | 12.3% |
| 20 to 35 | 7.9% | 12.5% | 8.5% |
| 36 to 75 | 1.4% | 3.5% | 1.7% |
| TOTAL | 100.0% | 100.0% | 100.0% |

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

**Injury Severity Scores of Patients with
Penetrating Injuries: Primary Admissions Only
(3-Year Comparison)**
Source: Maryland State Trauma Registry

| ISS | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|--------------|--------------------------|--------------------------|--------------------------|
| 1 to 12 | 74.4% | 72.6% | 73.3% |
| 13 to 19 | 11.1% | 10.7% | 10.7% |
| 20 to 35 | 9.1% | 12.4% | 12.5% |
| 36 to 75 | 5.4% | 4.3% | 3.5% |
| TOTAL | 100.0% | 100.0% | 100.0% |

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

**Injury Severity Scores of Patients with
Blunt Injuries: Primary Admissions Only
(3-Year Comparison)**
Source: Maryland State Trauma Registry

| ISS | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|--------------|--------------------------|--------------------------|--------------------------|
| 1 to 12 | 79.1% | 79.1% | 78.2% |
| 13 to 19 | 13.1% | 12.8% | 12.5% |
| 20 to 35 | 6.7% | 6.9% | 7.9% |
| 36 to 75 | 1.1% | 1.2% | 1.4% |
| TOTAL | 100.0% | 100.0% | 100.0% |

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

**Injury Severity Scores of Patients with Either Blunt or
Penetrating Injuries: Primary Admissions Only
(3-Year Comparison)**
Source: Maryland State Trauma Registry

| ISS | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|--------------|--------------------------|--------------------------|--------------------------|
| 1 to 12 | 78.4% | 78.2% | 77.5% |
| 13 to 19 | 12.8% | 12.5% | 12.3% |
| 20 to 35 | 7.1% | 7.7% | 8.5% |
| 36 to 75 | 1.7% | 1.6% | 1.7% |
| TOTAL | 100.0% | 100.0% | 100.0% |

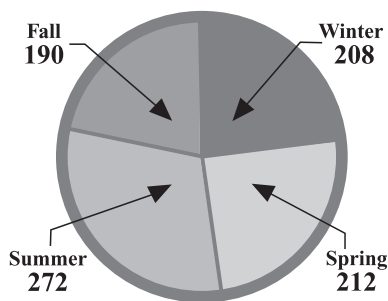
Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival.

MARYLAND ADULT BURN STATISTICS

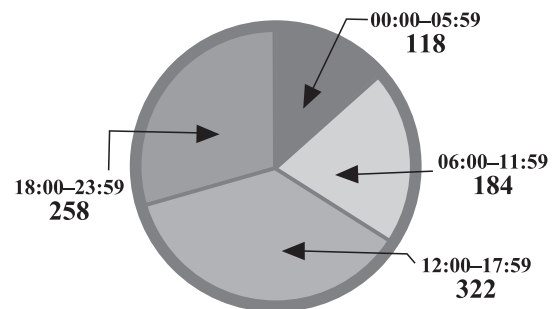
Total Number of Adult Burn Cases
*Patients Aged 15 and Older Treated at
 Johns Hopkins Burn Center at Bayview
 (3-Year Comparison)*
 Source: Maryland State Trauma Registry

| Institution | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|---|--------------------------|--------------------------|--------------------------|
| Johns Hopkins Burn Center at Bayview | 735 | 743 | 882 |

Season of Year Distribution
*Patients Aged 15 and Older Treated at
 Johns Hopkins Burn Center at Bayview
 (June 2017 to May 2018)*
 Source: Maryland State Trauma Registry



Time of Arrival Distribution
*Patients Aged 15 and Older Treated at
 Johns Hopkins Burn Center at Bayview
 (June 2017 to May 2018)*
 Source: Maryland State Trauma Registry



Place of Injury
*Patients Aged 15 and Older Treated at
 Johns Hopkins Burn Center at Bayview
 (June 2017 to May 2018)*
 Source: Maryland State Trauma Registry

| Place of Injury | Number |
|-------------------------------------|------------|
| Non-Institutional Private Residence | 283 |
| Institutional Private Residence | 8 |
| School | 1 |
| Sports and Athletic Area | 2 |
| Street/Highway | 21 |
| Trade and Service Area | 27 |
| Industrial and Construction Area | 34 |
| Farm | 2 |
| Other Places | 29 |
| Unspecified Place | 475 |
| TOTAL | 882 |

Occurrence of Injury by County*Patients Aged 15 and Older Treated at
Johns Hopkins Burn Center at Bayview
(June 2017 to May 2018)**Source: Maryland State Trauma Registry*

| County of Injury | Number |
|------------------------|------------|
| Allegany County | 8 |
| Anne Arundel County | 56 |
| Baltimore County | 133 |
| Caroline County | 7 |
| Carroll County | 15 |
| Cecil County | 16 |
| Charles County | 2 |
| Dorchester County | 8 |
| Frederick County | 8 |
| Harford County | 27 |
| Howard County | 21 |
| Kent County | 1 |
| Montgomery County | 9 |
| Prince George's County | 5 |
| Queen Anne's County | 6 |
| Talbot County | 5 |
| Washington County | 15 |
| Wicomico County | 8 |
| Worcester County | 4 |
| Baltimore City | 237 |
| Virginia | 4 |
| West Virginia | 15 |
| Pennsylvania | 15 |
| Washington, DC | 3 |
| Delaware | 3 |
| Other | 3 |
| Not Valued | 248 |
| TOTAL | 882 |

Residence of Patients by County*Patients Aged 15 and Older Treated at
Johns Hopkins Burn Center at Bayview
(June 2017 to May 2018)**Source: Maryland State Trauma Registry*

| County of Residence | Number |
|------------------------|------------|
| Allegany County | 8 |
| Anne Arundel County | 72 |
| Baltimore County | 219 |
| Calvert County | 2 |
| Caroline County | 6 |
| Carroll County | 24 |
| Cecil County | 27 |
| Charles County | 2 |
| Dorchester County | 8 |
| Frederick County | 14 |
| Harford County | 51 |
| Howard County | 27 |
| Kent County | 1 |
| Montgomery County | 12 |
| Prince George's County | 13 |
| Queen Anne's County | 11 |
| Somerset County | 1 |
| Talbot County | 7 |
| Washington County | 18 |
| Wicomico County | 12 |
| Worcester County | 4 |
| Baltimore City | 279 |
| Virginia | 10 |
| West Virginia | 15 |
| Pennsylvania | 25 |
| Washington, DC | 1 |
| Delaware | 5 |
| Other | 8 |
| TOTAL | 882 |

Mode of Patient Transport*Patients Aged 15 and Older Treated at
Johns Hopkins Burn Center at Bayview
(June 2017 to May 2018)**Source: Maryland State Trauma Registry*

| Modality Type | Number |
|------------------|------------|
| Ground Ambulance | 458 |
| Helicopter | 36 |
| Other* | 380 |
| Not Valued | 8 |
| TOTAL | 882 |

**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 2017 to May 2018)

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 | 5 | 1 | 45 | 31 | 53 | 3 | 0 | 3 | 10 | 151 |
| 25 to 44 years | 6 | 11 | 102 | 59 | 112 | 5 | 4 | 10 | 17 | 326 |
| 45 to 64 years | 9 | 5 | 110 | 49 | 93 | 4 | 1 | 5 | 19 | 295 |
| 65 years and over | 0 | 2 | 53 | 16 | 26 | 6 | 0 | 2 | 5 | 110 |
| Total | 20 | 19 | 310 | 155 | 284 | 18 | 5 | 20 | 51 | 882 |

Final Disposition of Patients

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

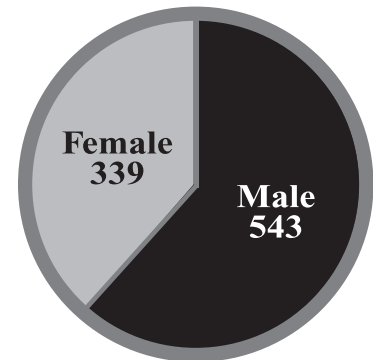
Source: Maryland State Trauma Registry

| Final Disposition | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|---|-----------------------|-----------------------|-----------------------|
| Home | 642 | 655 | 708 |
| Home with Services | 26 | 14 | 64 |
| Transfer to Another Acute Care Facility | 2 | 1 | 0 |
| Transfer to Another Service | 1 | 0 | 0 |
| Discharge to Extended Care Facility | 2 | 0 | 0 |
| Discharge to Alternate Caregiver | 1 | 0 | 1 |
| Rehabilitation Facility | 11 | 5 | 9 |
| Skilled Nursing Facility | 17 | 29 | 32 |
| Psychiatric Hospital | 6 | 8 | 5 |
| Morgue/Died | 15 | 14 | 18 |
| Unable to Complete Treatment | 4 | 13 | 15 |
| Jail | 7 | 1 | 7 |
| Hospice | 0 | 1 | 2 |
| Other | 0 | 1 | 2 |
| Not Valued | 1 | 1 | 19 |
| TOTAL | 735 | 743 | 882 |

Gender Profile

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview
(June 2017 to May 2018)

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 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|-------------------|-----------------------|-----------------------|-----------------------|
| 15 to 24 years | 99 | 114 | 151 |
| 25 to 44 years | 296 | 301 | 326 |
| 45 to 64 years | 242 | 236 | 295 |
| 65 years and over | 98 | 92 | 110 |
| TOTAL | 735 | 743 | 882 |

MARYLAND PEDIATRIC TRAUMA STATISTICS

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

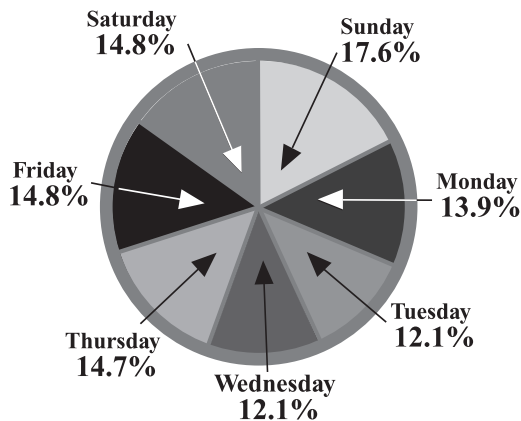
| Total Cases Treated at Pediatric Trauma Centers (3-Year Comparison) | | | |
|--|-----------------------|-----------------------|-----------------------|
| Source: Maryland State Trauma Registry | | | |
| Trauma Center | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
| CNHS | 704 | 710 | 712 |
| JHP | 1,126 | 912 | 775 |
| TOTAL | 1,830 | 1,622 | 1,487 |

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.

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

(June 2017 to May 2018)

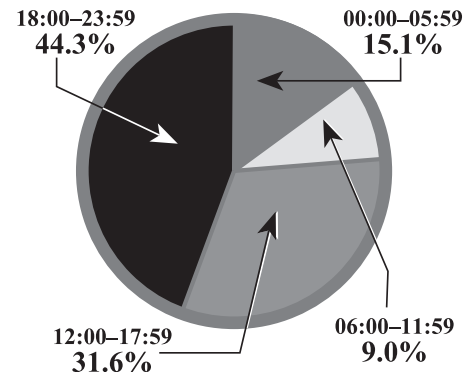
Source: Maryland State Trauma Registry



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

(June 2017 to May 2018)

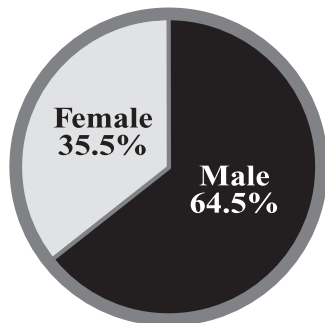
Source: Maryland State Trauma Registry



Gender Profile: Children Treated at Pediatric Trauma Centers

(June 2017 to May 2018)

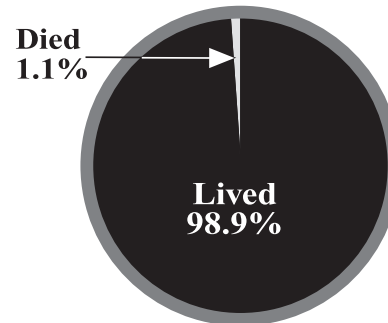
Source: Maryland State Trauma Registry



Outcome Profile: Children Treated at Pediatric Trauma Centers

(June 2017 to May 2018)

Source: Maryland State Trauma Registry



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.

**Mode of Patient Transport by Center:
Scene Origin Cases Only**

*Children Treated at Pediatric Trauma Centers
(June 2017 to May 2018)*

Source: Maryland State Trauma Registry

| Modality Type | CNHS | JHP | Total |
|------------------|---------------|---------------|---------------|
| Ground Ambulance | 59.2% | 75.8% | 69.3% |
| Helicopter | 24.8% | 15.5% | 19.2% |
| Other | 16.0% | 8.7% | 11.5% |
| TOTAL | 100.0% | 100.0% | 100.0% |

Note: Only patients brought directly from the scene to a Trauma Center are included in this table. For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National 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.

Origin of Patient Transport by Center

*Children Treated at Pediatric Trauma Centers
(June 2017 to May 2018)*

Source: Maryland State Trauma Registry

| Origin | CNHS | JHP | Total |
|-------------------|---------------|---------------|---------------|
| Scene of Injury | 44.8% | 64.0% | 54.8% |
| Hospital Transfer | 38.1% | 31.4% | 34.6% |
| Other | 17.1% | 4.6% | 10.6% |
| TOTAL | 100.0% | 100.0% | 100.0% |

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National 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.

Injury Type

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

Source: Maryland State Trauma Registry

| Injury Type | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|------------------------|--------------------------|--------------------------|--------------------------|
| Blunt | 91.8% | 93.1% | 93.8% |
| Penetrating | 6.3% | 4.3% | 4.1% |
| Burn | 0.1% | 0.0% | 0.1% |
| Near Drowning | 0.9% | 1.3% | 1.4% |
| Hanging | 0.1% | 0.1% | 0.1% |
| Ingestion | 0.1% | 0.0% | 0.1% |
| Crush | 0.1% | 0.0% | 0.0% |
| Animal Bite/Human Bite | 0.3% | 0.6% | 0.3% |
| Other | 0.3% | 0.6% | 0.1% |
| TOTAL | 100.0% | 100.0% | 100.0% |

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National 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.

Mechanism of Injury

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

Source: Maryland State Trauma Registry

| Mechanism of Injury | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|-----------------------|--------------------------|--------------------------|--------------------------|
| Cut/Pierce | * | 1.4% | 1.7% |
| Drowning/Submersion | * | 1.4% | 1.4% |
| Falls | * | 44.6% | 39.8% |
| Fire/Flame | * | 0.1% | 0.1% |
| Firearm | * | 1.7% | 1.4% |
| Machinery/Mechanical | * | 0.2% | 0.2% |
| Motor Vehicle Crash | * | 19.2% | 19.3% |
| Motorcycle Crash | * | 0.5% | 0.1% |
| Pedal Cycle Crash | * | 4.7% | 6.1% |
| Pedestrian Incident | * | 8.0% | 9.8% |
| Other Transport | * | 0.3% | 0.1% |
| Natural/Environmental | * | 2.3% | 2.5% |
| Struck by/Against | * | 8.3% | 9.8% |
| Abuse | * | 5.7% | 4.6% |
| Other | * | 1.4% | 1.7% |
| Not Valued | * | 0.2% | 1.4% |
| TOTAL | 100.0% | 100.0% | 100.0% |

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National 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.

**Due to difference in ICD9 and ICD10 coding, new categories were developed for the mechanisms of injury. The Maryland Trauma Registry began using ICD-10 in January, 2016. Therefore, there will not be mechanisms of injury for June, 2015 to May, 2016 included in this table.*

Etiology of Injuries by Age

Children Treated at Pediatric Trauma Centers (June 2017 to May 2018)

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 | 3.8% | 0.0% | 0.0% | 16.4% | 0.0% | 0.0% | 0.7% | 0.0% | 36.3% | 11.3% |
| 1 to 4 years | 20.9% | 0.0% | 19.3% | 32.5% | 0.0% | 20.0% | 13.0% | 10.0% | 28.0% | 24.4% |
| 5 to 9 years | 32.8% | 50.0% | 34.5% | 30.3% | 19.0% | 48.0% | 14.4% | 33.3% | 10.2% | 27.9% |
| 10 to 14 years | 34.8% | 0.0% | 41.4% | 17.4% | 62.0% | 20.0% | 46.6% | 52.3% | 18.5% | 29.0% |
| 15+ years | 7.7% | 50.0% | 4.8% | 3.4% | 19.0% | 12.0% | 25.3% | 4.4% | 7.0% | 7.4% |
| TOTAL | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National 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 2017 to May 2018)

Source: Maryland State Trauma Registry

| Age | Number of Injured Patients | | Number of Deaths | |
|----------------|----------------------------|--------------------|------------------|--------------------|
| | Total | Maryland Residents | Total | Maryland Residents |
| Under 1 year | 172 | 168 | 4 | 4 |
| 1 to 4 years | 363 | 344 | 7 | 7 |
| 5 to 9 years | 412 | 396 | 0 | 0 |
| 10 to 14 years | 429 | 406 | 2 | 2 |
| 15+ years | 111 | 106 | 3 | 3 |
| TOTAL | 1,487 | 1,420 | 16 | 16 |

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

Source: Maryland State Trauma Registry

| Age | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|----------------|-----------------------|-----------------------|-----------------------|
| Under 1 year | 216 | 224 | 172 |
| 1 to 4 years | 429 | 404 | 363 |
| 5 to 9 years | 563 | 494 | 412 |
| 10 to 14 years | 511 | 415 | 429 |
| 15+ years | 111 | 85 | 111 |
| TOTAL | 1,830 | 1,622 | 1,487 |

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

Source: Maryland State Trauma Registry

| Age | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|----------------|-----------------------|-----------------------|-----------------------|
| Under 1 year | 8 | 13 | 4 |
| 1 to 4 years | 10 | 8 | 7 |
| 5 to 9 years | 7 | 6 | 0 |
| 10 to 14 years | 3 | 8 | 2 |
| 15+ years | 0 | 1 | 3 |
| TOTAL | 28 | 36 | 16 |

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.

Final Disposition of Patients
Children Treated at Pediatric Trauma Centers
(3-Year Comparison)

Source: Maryland State Trauma Registry

| Final Disposition | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|---------------------------|-----------------------|-----------------------|-----------------------|
| Inpatient Rehab Facility | 2.2% | 2.8% | 1.8% |
| Skilled Nursing Facility | 0.0% | 0.0% | 0.1% |
| Specialty Referral Center | 0.2% | 0.2% | 0.2% |
| Home with Services | 0.6% | 0.6% | 0.4% |
| Home | 94.1% | 92.4% | 93.9% |
| Acute Care Hospital | 0.2% | 0.1% | 0.6% |
| Morgue/Died | 1.5% | 2.2% | 1.1% |
| Foster Care | 1.0% | 1.4% | 1.1% |
| Hospice Care | 0.0% | 0.0% | 0.1% |
| Jail | 0.1% | 0.1% | 0.1% |
| Psychiatric Hospital | 0.1% | 0.1% | 0.5% |
| Elopement | 0.0% | 0.0% | 0.1% |
| Other | 0.0% | 0.1% | 0.0% |
| TOTAL | 100.0% | 100.0% | 100.0% |

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National 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.

Etiology of Injuries by Age

Children Treated at Pediatric Trauma Centers or Adult Trauma Centers (June 2017 to May 2018)

Source: Maryland State Trauma Registry

| Age | Motor Vehicle Crash | Motorcycle | Pedestrian | Fall | Gunshot Wound | Cut/Pierce | Struck by/ Against | Pedal Cyclist | Other | Total |
|----------------|---------------------|---------------|---------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|
| Under 1 year | 4.0% | 0.0% | 0.6% | 18.1% | 0.0% | 0.0% | 0.8% | 0.0% | 34.6% | 12.4% |
| 1 to 4 years | 23.5% | 0.0% | 22.5% | 35.5% | 0.0% | 18.5% | 19.7% | 8.7% | 31.4% | 27.8% |
| 5 to 9 years | 35.0% | 100.0% | 37.5% | 29.2% | 18.2% | 48.2% | 17.3% | 34.0% | 13.3% | 29.1% |
| 10 to 14 years | 37.5% | 0.0% | 39.4% | 17.2% | 81.8% | 33.3% | 62.2% | 57.3% | 20.7% | 30.7% |
| TOTAL | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Note: Children's National 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.

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

*Children Treated at Pediatric Trauma Centers
(June 2017 to May 2018)*

Source: Maryland State Trauma Registry

| County of Injury | Number |
|------------------------|------------|
| Allegany County | 1 |
| Anne Arundel County | 55 |
| Baltimore County | 127 |
| Calvert County | 11 |
| Caroline County | 6 |
| Carroll County | 16 |
| Cecil County | 4 |
| Charles County | 19 |
| Dorchester County | 5 |
| Frederick County | 21 |
| Harford County | 23 |
| Howard County | 25 |
| Kent County | 7 |
| Montgomery County | 69 |
| Prince George's County | 148 |
| Queen Anne's County | 9 |
| St. Mary's County | 39 |
| Talbot County | 3 |
| Washington County | 11 |
| Wicomico County | 1 |
| Worcester County | 3 |
| Baltimore City | 192 |
| Virginia | 2 |
| Pennsylvania | 1 |
| Washington, DC | 10 |
| Other | 2 |
| Not Indicated | 5 |
| TOTAL | 815 |

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 54.8% of the total cases treated at Pediatric Trauma Centers. For children who were burn patients at each hospital, see Maryland Pediatric Burn Statistics.

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

*Children Treated at Pediatric Trauma Centers
(June 2017 to May 2018)*

Source: Maryland State Trauma Registry

| County of Residence | Number |
|------------------------|------------|
| Allegany County | 1 |
| Anne Arundel County | 53 |
| Baltimore County | 113 |
| Calvert County | 8 |
| Caroline County | 8 |
| Carroll County | 16 |
| Cecil County | 4 |
| Charles County | 19 |
| Dorchester County | 5 |
| Frederick County | 15 |
| Harford County | 25 |
| Howard County | 20 |
| Kent County | 9 |
| Montgomery County | 66 |
| Prince George's County | 150 |
| Queen Anne's County | 3 |
| St. Mary's County | 35 |
| Talbot County | 2 |
| Washington County | 7 |
| Wicomico County | 1 |
| Worcester County | 1 |
| Baltimore City | 204 |
| Virginia | 13 |
| West Virginia | 1 |
| Pennsylvania | 9 |
| Washington, DC | 18 |
| Delaware | 3 |
| Other | 6 |
| TOTAL | 815 |

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 54.8% of the total cases treated at Pediatric Trauma Centers. For children who were burn patients at each hospital, see Maryland Pediatric Burn 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 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|-----------------------------|--------------------------|--------------------------|--------------------------|
| None | 50.2% | 48.4% | 49.6% |
| Seatbelt | 8.9% | 8.3% | 6.7% |
| Airbag & Seatbelt | 12.1% | 13.8% | 15.2% |
| Airbag Only | 4.6% | 4.0% | 6.5% |
| Infant/Child Seat | 12.7% | 14.3% | 11.4% |
| Protective Helmet | 10.5% | 10.2% | 10.2% |
| Other Protective Device | 0.0% | 0.2% | 0.0% |
| Padding/Protective Clothing | 0.8% | 0.2% | 0.2% |
| Unknown | 0.2% | 0.6% | 0.2% |
| TOTAL | 100.0% | 100.0% | 100.0% |

Note: Table reflects 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 Statistics.

MARYLAND PEDIATRIC BURN STATISTICS

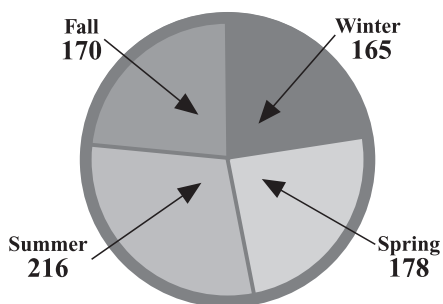
Total Number of Pediatric Burn Cases
Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (3-Year Comparison)
 Source: Maryland State Trauma Registry

| Institution | Legend Code | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|---|-------------|-----------------------|-----------------------|-----------------------|
| Children's National Health System Pediatric Burn Center | CNHSPBC | 244 | 247 | 286 |
| Johns Hopkins Pediatric Burn Center | JHPBC | 394 | 373 | 392 |
| Johns Hopkins Burn Center at Bayview | JHBC | 16 | 28 | 51 |
| TOTAL | | 654 | 648 | 729 |

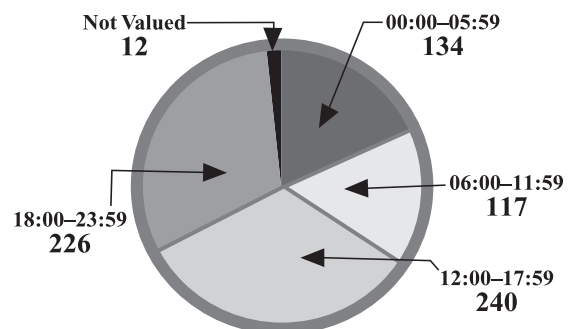
Place of Injury
Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2017 to May 2018)
 Source: Maryland State Trauma Registry

| Place of Injury | Number |
|-------------------------------------|------------|
| Non-Institutional Private Residence | 284 |
| Institutional Private Residence | 1 |
| School | 6 |
| Sports or Athletic Area | 2 |
| Street/Highway | 5 |
| Trade and Service Area | 9 |
| Industrial and Construction Area | 1 |
| Other Places | 21 |
| Unspecified Place | 400 |
| TOTAL | 729 |

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 2017 to May 2018)
 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 2017 to May 2018)
 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 2017 to May 2018)

Source: Maryland State Trauma Registry

| County of Injury | Number |
|------------------------|------------|
| Allegany County | 3 |
| Anne Arundel County | 19 |
| Baltimore County | 74 |
| Calvert County | 4 |
| Carroll County | 4 |
| Cecil County | 5 |
| Charles County | 17 |
| Dorchester County | 2 |
| Frederick County | 7 |
| Harford County | 12 |
| Howard County | 24 |
| Kent County | 1 |
| Montgomery County | 73 |
| Prince George's County | 112 |
| St. Mary's County | 6 |
| Talbot County | 2 |
| Washington County | 12 |
| Wicomico County | 4 |
| Baltimore City | 111 |
| Virginia | 3 |
| West Virginia | 3 |
| Pennsylvania | 4 |
| Washington, DC | 2 |
| Other | 2 |
| Not Valued | 223 |
| TOTAL | 729 |

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 2017 to May 2018)

Source: Maryland State Trauma Registry

| County of Residence | Number |
|------------------------|------------|
| Allegany County | 3 |
| Anne Arundel County | 34 |
| Baltimore County | 106 |
| Calvert County | 7 |
| Carroll County | 11 |
| Cecil County | 6 |
| Charles County | 23 |
| Dorchester County | 1 |
| Frederick County | 11 |
| Harford County | 23 |
| Howard County | 33 |
| Kent County | 1 |
| Montgomery County | 86 |
| Prince George's County | 152 |
| Queen Anne's County | 1 |
| St. Mary's County | 10 |
| Talbot County | 3 |
| Washington County | 14 |
| Wicomico County | 6 |
| Worcester County | 3 |
| Baltimore City | 182 |
| Virginia | 1 |
| West Virginia | 4 |
| Pennsylvania | 4 |
| Delaware | 1 |
| Other | 3 |
| TOTAL | 729 |

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 2017 to May 2018)

Source: Maryland State Trauma Registry

| Modality Type | CNHSPBC | JHPBC | JHBC | Total |
|------------------|------------|------------|-----------|------------|
| Ground Ambulance | 98 | 190 | 6 | 294 |
| Helicopter | 12 | 9 | 0 | 21 |
| Other* | 173 | 191 | 44 | 408 |
| Not Valued | 3 | 2 | 1 | 6 |
| TOTAL | 286 | 392 | 51 | 729 |

**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 2017 to May 2018)

Source: Maryland State Trauma Registry

| Origin Type | CNHSPBC | JHPBC | JHBC | Total |
|-------------------|------------|------------|-----------|------------|
| Scene of Injury | 99 | 113 | 30 | 242 |
| Hospital Transfer | 70 | 148 | 7 | 225 |
| Other | 113 | 88 | 14 | 215 |
| Not Valued | 4 | 43 | 0 | 47 |
| TOTAL | 286 | 392 | 51 | 729 |

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 2017 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 | 1 | 3 | 30 | 39 | 0 | 3 | 9 | 85 |
| 1 to 4 years | 8 | 5 | 10 | 152 | 178 | 3 | 6 | 12 | 374 |
| 5 to 9 years | 4 | 0 | 8 | 64 | 50 | 3 | 2 | 3 | 134 |
| 10 to 14 years | 2 | 0 | 15 | 31 | 48 | 1 | 4 | 2 | 103 |
| 15 years and over | 0 | 0 | 9 | 8 | 13 | 1 | 1 | 1 | 33 |
| Total | 14 | 6 | 45 | 285 | 328 | 8 | 16 | 27 | 729 |

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 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|--|--------------------------|--------------------------|--------------------------|
| Home | 597 | 601 | 642 |
| Home with Services | 20 | 19 | 42 |
| Transfer to an Acute Care Facility | 9 | 7 | 17 |
| Rehabilitation Facility | 13 | 10 | 6 |
| Morgue/Died | 4 | 0 | 3 |
| Skilled Nursing Facility | 2 | 0 | 0 |
| Alternate Caregiver | 4 | 2 | 8 |
| Foster Care | 2 | 2 | 6 |
| Transfer to Inpatient Psychiatric Facility | 0 | 0 | 1 |
| Unable to Complete Treatment/Left Against Medical Advice | 2 | 0 | 0 |
| Other | 0 | 1 | 2 |
| Not Valued | 1 | 6 | 2 |
| TOTAL | 654 | 648 | 729 |

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 2017 to May 2018)

Source: Maryland State Trauma Registry

| Length of Stay | Less Than 10% TBSA | 10 - 19% TBSA | 20% or Greater TBSA | Not Valued | Total |
|-------------------|-----------------------|------------------|------------------------|---------------|-------|
| 1 Day | 499 | 7 | 2 | 64 | 572 |
| 2 - 3 Days | 28 | 5 | 0 | 4 | 37 |
| 4 - 7 Days | 17 | 6 | 0 | 0 | 23 |
| 8 - 14 Days | 5 | 5 | 2 | 3 | 15 |
| 15 - 21 Days | 2 | 1 | 1 | 0 | 4 |
| 22 - 28 Days | 1 | 1 | 0 | 0 | 2 |
| Over 28 Days | 1 | 0 | 0 | 0 | 1 |
| Not Valued | 67 | 0 | 0 | 8 | 75 |
| TOTAL | 620 | 25 | 5 | 79 | 729 |

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)

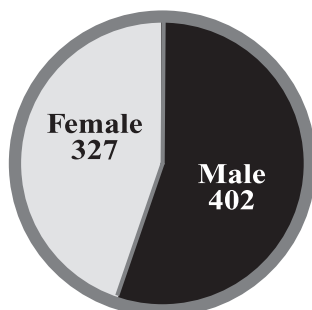
Source: Maryland State Trauma Registry

| Age Range | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|-------------------|--------------------------|--------------------------|--------------------------|
| Under 1 year | 72 | 96 | 85 |
| 1 to 4 years | 357 | 328 | 374 |
| 5 to 9 years | 135 | 124 | 134 |
| 10 to 14 years | 72 | 72 | 103 |
| 15 years and over | 18 | 28 | 33 |
| TOTAL | 654 | 648 | 729 |

Gender Profile

Patients Treated at Pediatric Burn Centers and
Patients Less Than Age 15 Treated at
Johns Hopkins Burn Center at Bayview
(June 2017 to May 2018)

Source: Maryland State Trauma Registry



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

(3-Year Comparison)

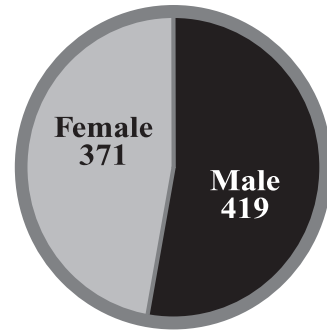
Source: Maryland State Trauma Registry

| | June 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|---------------------------------------|--------------------------|--------------------------|--------------------------|
| Unique Patients | 674 | 720 | 790 |
| Total Pediatric Burn Clinic Visits | 1,459 | 1,572 | 1,665 |

Gender Profile

*Patients Treated at the Pediatric Burn Clinics
at Johns Hopkins Pediatric Center and
Children's National Health System
(May 2017 to June 2018)*

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 2015 to May 2016 | June 2016 to May 2017 | June 2017 to May 2018 |
|-------------------|--------------------------|--------------------------|--------------------------|
| Under 1 year | 57 | 90 | 91 |
| 1 to 4 years | 364 | 378 | 427 |
| 5 to 9 years | 154 | 132 | 138 |
| 10 to 14 years | 83 | 83 | 109 |
| 15 years and over | 16 | 37 | 25 |
| TOTAL | 674 | 720 | 790 |

Etiology of Injuries by Age

Patients Treated at the Pediatric Burn Clinics

At Johns Hopkins Pediatric Center and Children's National Health (June 2017 to May 2018)

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 | 4 | 37 | 46 | 0 | 1 | 0 | 3 | 91 |
| 1 to 4 years | 4 | 4 | 11 | 193 | 191 | 0 | 4 | 0 | 20 | 427 |
| 5 to 9 years | 2 | 1 | 11 | 63 | 52 | 0 | 1 | 1 | 7 | 138 |
| 10 to 14 years | 1 | 0 | 17 | 35 | 45 | 1 | 1 | 1 | 8 | 109 |
| 15 years and over | 0 | 0 | 5 | 4 | 13 | 1 | 1 | 0 | 1 | 25 |
| Total | 7 | 5 | 48 | 332 | 347 | 2 | 8 | 2 | 39 | 790 |

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