Maryland Institute for Emergency Medical Services Systems

2016 - 2017

Annual Report

2016–2017 ANNUAL REPORT

CONTENTS

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

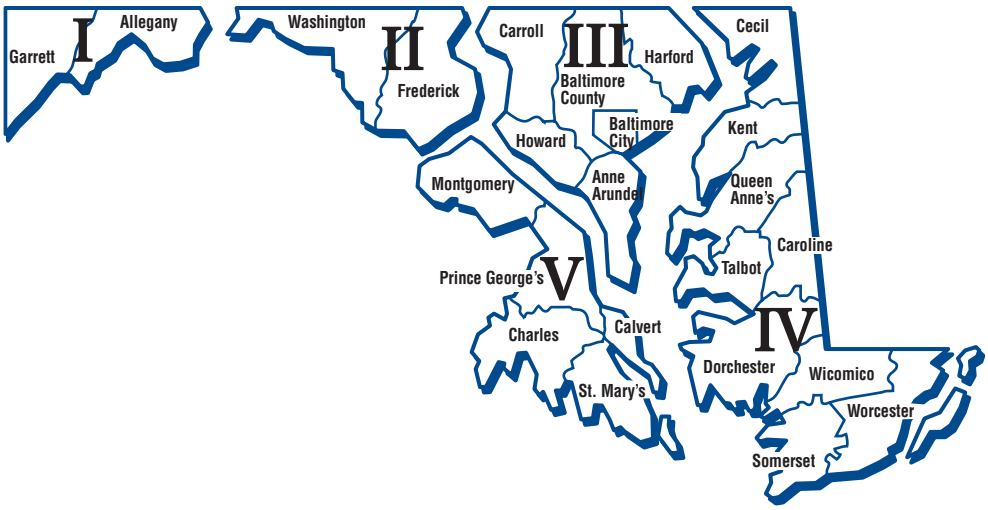
To be a state EMS system acknowledged as a leader for providing the highest quality patient care and that is sought out to help other EMS systems attain the same level of quality care.

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

This year's Annual Report marks nearly a quarter of a century since the passage of the law that created the State EMS Board, the Statewide EMS Advisory Council (SEMSAC), and MIEMSS. That law charged the Board with oversight of the statewide EMS system, created SEMSAC to advise and assist the Board, and tasked MIEMSS with the responsibility of coordinating the components of the system. The structure that the law codified was, itself, built upon an operational foundation that had been laid more than a quarter century before in the late 1960s and early 1970s when Maryland, along with the rest of the nation, began concerted efforts to reduce prehospital deaths from injury and illness. These strong underpinnings have provided a firm foundation on which Maryland EMS can grow and thrive.

This Annual Report also marks 25 years since creation of the Maryland EMS Operations Fund (MEMSOF), which became law one year before the structure of the EMS system was created. Developed to fund and sustain components of the EMS system, the MEMSOF has since provided critical support to MIEMSS; the Maryland Fire and Rescue Institute (MFRI); R Adams Cowley Shock Trauma Center; Maryland State Police Aviation Command; and the Senator William H. Amoss Fire, Rescue, and Ambulance Fund. MEMSOF, funded by a biennial surcharge on motor vehicle registrations, has provided a stable funding source that has kept the system going.

The combination of a stable funding source and a strong foundation and structure has helped Maryland's statewide EMS system flourish. It has provided the opportunity to pursue initiatives to improve the EMS system, which has helped to position Maryland EMS to meet the challenges of an ever-changing health care landscape. This year's Annual Report chronicles some of these initiatives.

I am pleased to report that Maryland has successfully completed its transition to National Registry testing for Maryland certification of emergency medical technicians (EMT) and emergency medical responders (EMR)[1]. The National Registry testing for basic life support (BLS) testing began in 2014, and initial testing results indicated that Maryland needed to improve student test performance. The EMS Board, MIEMSS, MFRI, Maryland State Firemen's Association (MSFA), and representatives from Maryland educational programs worked together to increase the educational resources available to students, streamline test registration procedures, increase availability of test sites, and provide financial support to cover certain testing costs. As a result of those efforts, Maryland's average National Registry pass rates for our basic life support providers have now exceeded the national average pass rates for well over a year, and we fully expect that these positive results will continue.

In other areas, our EMS jurisdictions and providers are pursuing new service delivery models that have the potential to revolutionize EMS. Several jurisdictions are implementing mobile integrated health (MIH) programs that target frequent users of the 9-1-1 system and connect these patients with medical and social programs within their communities in order to address unmet patient needs. These programs, based on an award-winning MIH program developed in Queen Anne's County, link patients to preventative health services, reduce 9-1-1 call volume, and improve patient health and the continuity of care—all of which helps avoid unnecessary hospital admissions and readmissions. These programs hold great promise.

Also during this year, Maryland EMS took the initial steps to link our prehospital medical record, eMEDS, with Maryland's Health Information Exchange (HIE). Linking eMEDS to the HIE will enable electronic communication of health data among EMS providers, physicians, hospitals, and other health care organizations and providers. This linkage will allow timely access to patient treatment history, past medical conditions, and laboratory results, which can result in safer, timelier, and more effective patient care. Developing and completing this linkage will occur over the next several years.

An area of great challenge for EMS and for our entire state has been dealing with the opioid crisis that has afflicted our communities. EMS is on the frontline of this crisis, responding to emergency calls to treat thousands of overdose victims each year. Maryland's communities rely on the lifesaving treatment rendered by our EMS providers, as the epidemic of opioid overdoses has reached every part of our state. EMS will continue to serve at the forefront of this crisis, working to save lives amid this scourge.

On behalf of all the members of the State EMS Board, I want to convey our sincere appreciation to Maryland's volunteer and career EMS providers and firefighters, as well as to our emergency, trauma, and specialty care physicians; emergency nurses; hospitals; and state and local agencies. Their dedication and commitment to cooperative excellence will continue to ensure the success of our statewide EMS system. We thank you for all you do to care for our citizens in need and pledge to continue to strengthen Maryland's exceptional EMS system.

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[1] The National Registry for Emergency Medical Technicians (National Registry) was established in 1970 in response to President Lyndon Johnson's Committee on Highway Traffic Safety recommendation for a national certifying agency for emergency medical technicians in order to establish and standardize training requirements.

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.

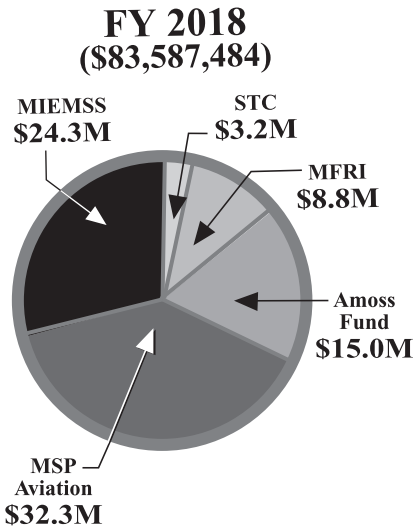
Administration is also responsible for inventory control, fleet management, travel services, and building operations and maintenance.

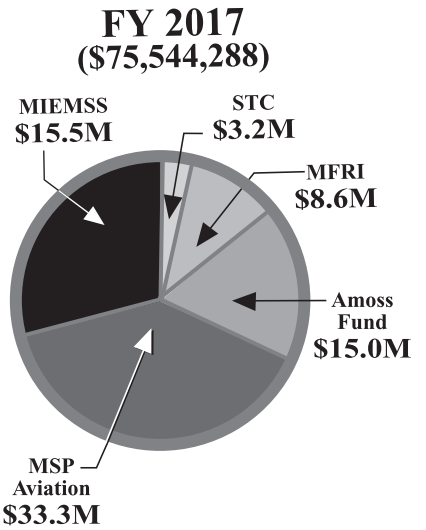
MIEMSS budget information is displayed by state object code in the chart to the right. The distribution of EMS operations funds statewide is shown below.

MIEMSS FY 2017
Expenditure by Object Code
(Includes All Funds)

FY 2017	Actual
Salaries and Wages	$9,173,897
Technical/Special Fees	1,497,872
Communication	943,796
Travel	488,124
Fuel and Utilities	140,544
Motor Vehicle Operations and Maintenance	256,071
Contractual Services	2,336,196
Supplies and Materials	144,396
Equipment—Replacement	224,832
Equipment—Additional	79,912
Fixed Charges	134,133
Grants	1,070,545
Total Expenditure	$16,490,318

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 2017 there were 2,138 patients transported by the Maryland State Police Aviation Command (MSPAC). Of these patients, 2,127 (99%) were transported from the scene at the request of the local emergency services and 11 (1%) were transported between hospitals to a higher level of care. Types of calls include the following:

- Motor vehicle crashes 986
- Falls 517
- Pedestrians.....99
- Assaults 72
- Gunshot wounds.....47
- Stabbings 41
- Industrial accidents.....35
- Burns 27

After the successful transition in 2015 to the AgustaWestland 139 (AW-139) model of aircraft, FY 2017 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

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, and contracts, including technology initiatives. The office also assisted in the administration of several state and federal grant programs.

In FY 2017 the Attorney General's Office provided the following services to MIEMSS.

- Reviewed and prosecuted 23 cases of alleged prohibited acts by EMS providers and applicants.
- Provided legal advice and support to the State Office of Commercial Ambulance Licensing and Regulation in all compliance matters, including contested cases.
- Prepared responses to 61 public information act requests, four subpoenas, and five research requests.
- Represented MIEMSS in one employment case, one federal bankruptcy case, and one matter before the Maryland Public Service Commission.

Assistant attorneys general worked with MIEMSS in FY 2017 to develop regulations establishing the criteria and process for determining whether the conversion of a hospital to a freestanding emergency medical facility will maintain adequate and appropriate delivery of emergency care within the statewide EMS system. The office also provided advice on the feasibility of Maryland EMS providers participating in community paramedicine and mobile integrated health programs, and supported the MIEMSS response to emerging infectious diseases.

The office participated in drafting several information technology procurements, including modifications to the electronic Maryland EMS Data System (eMEDS)[1] contract, a request for proposal for the migration of the MIEMSS statewide EMS

[1] *The electronic Maryland EMS Data System (eMEDS) is a service mark owned by MIEMSS and registered on the Principal Register of the United States Patent and Trademark Office.*

communications system to an internet protocol environment, selecting the MIEMSS data registry program, software maintenance agreements, and several business associate agreements under the Health Insurance Portability and Accountability Act (HIPAA).

Other tasks completed this past year included providing advice on MIEMSS' social media policy, various intellectual property issues, drafting agreements for out-of-state medical facilities, reviewing interagency memoranda of understanding, and reviewing and providing advice concerning the designation of Trauma and Specialty Centers and Base Stations.

In FY 2017 the assistant attorneys general made educational presentations at several venues, including the EMS Care 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.

The 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 assist the Office of Hospital Programs in monitoring Specialty Referral Centers for compliance with their requirements and the Office of Licensure and Certification in enforcing standards for EMS education programs.

The Maryland Orders for Life Sustaining Treatment (MOLST) program, which incorporated and replaced the EMS/DNR form in 2013, is provided support by the Attorney General's Office. The office 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. The MOLST form may be downloaded by the public for use, and MIEMSS continues to provide 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.

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 2017, 42 commercial ambulance services and 462 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.

After a thorough analysis and needs assessment of all commercial service and vehicle licensure processes, SOCALR recently replaced its service and vehicle licensing management application with a web-based system. The outdated database previously used for licensure management has been replaced with the Commercial Ambulance Licensing System (CALS), which was developed by MIEMSS information technology (IT) personnel. In FY 2018 the system will be expanded to accept application and payment submissions online and to process vehicle inspections electronically. This automated system will streamline licensing processes and reduce agency costs associated with service management, vehicle management, and the licensing processes.

In 2016 numerous commercial service base surveys were conducted under the department's new leadership. SOCALR team members assessed individual services' operational and administrative practices and regulatory compliance. These inspections will continue throughout FY 2018.

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 by assisting with the Voluntary Ambulance Inspection Program throughout Maryland (see page 28 for more information).

The department has been working closely with MIEMSS' IT and the Office of Licensure and Certification to support the electronic Maryland EMS Data System (eMEDS) patient care reporting process as it pertains to commercial services. Throughout the agency's transition to the new web-based Licensure System, SOCALR has worked diligently to ensure that commercial service personnel affiliations are accurately documented in the system. Furthermore, commercial service operations managers and service medical directors now have profiles within the Licensure System, enabling them to monitor service personnel licensure and affiliation information electronically.

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

Communications Engineering Services continues to lead in the design, implementation, and maintenance of the Statewide Public Safety Microwave System, which is a critical component of the EMS communications system in Maryland. This microwave system supports all state public safety agencies and many county public safety radio systems. MIEMSS continues to play a leadership role in the day-to-day maintenance of the system. The communications department has continued its partnership role with other state agencies by designing and establishing communication circuits in support of MIEMSS, Maryland State Police (MSP), Maryland Department of Natural Resources (DNR), Maryland State Highway Administration (SHA), county radio systems, and many 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.

With the completion of a major renovation to EMRC/SYSCOM in the latter half of FY 2016, Communications Engineering Services turned its focus back to relocating all of the core microwave transport systems in Washington County without any outages to public safety traffic. While the relocation effort was centered on the Hagerstown tower, it included equipment installation and work at nine other tower sites throughout the county. Only through careful planning and execution by the department's technical team was MIEMSS able to accomplish this project without interruption to EMS and public safety communications systems.

Maryland First: Statewide 700 MHz Radio System

MIEMSS remains an active partner in the MFiRST program, including serving a position on the Radio Control Board, the program's oversight panel. Because MIEMSS' Western Emergency Medical Resource Center (EMRC) is located in the program's phase four design area, Communications Engineering Services staff were key players in the technical design process, so as to ensure EMS communications systems can interface with MFiRST, and in the preparations for installing necessary equipment at the shared tower site. 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, enabling staff to be more efficient and to respond to system repairs more decisively. Work continues to integrate the MFiRST system alarms into the MIEMSS master alarm system, providing daily insight into maintenance and performance issues and rapid 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 was able to install enhanced alarm monitoring at 15 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 a new internet protocol (IP) based EMS system will be constructed and is vital to MIEMSS' future operations. It is a network deployed to MSP barracks, MIEMSS regional operating centers, jurisdictional emergency operations centers, public safety answering points (PSAP) that receive 9-1-1 calls, state and jurisdictional health departments, hospitals, and other allied agencies. Funding sources have included Public Safety Interoperable Communications grants, Urban Area Security Initiative grants, MIEMSS operating funds, the MFiRST program, the Maryland Department of Health, and local interoperability project funds. In addition to MFiRST, applications that currently operate on PSInet include the following.

- 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

Although analog technologies have served the EMS communications system and MIEMSS reliably since the early 1990s, a multi-year plan is in place for structural upgrades and to develop a geo-diverse survivable system. MIEMSS has released a request for proposal to the vendor community seeking a turn-key solution for a next-generation communications system. This new IP-based system will have the ability to support new technologies and services.

Although Communications Engineering Services is leveraging newer communications systems, a large portion of departmental responsibilities 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. To close a gap in coverage in the existing 44.74 MHz low-band radio system, MIEMSS added a new tower site in Leonardtown that greatly improved radio communications for helicopters in Southern Maryland.

Communications Engineering Services must react to many internal and external pressures to support the needs of MIEMSS' communications systems as well as those of its partners. In this reporting period, MIEMSS worked with Allegany and Talbot Counties as they renovated their primary and backup PSAP center locations. This cooperative effort was critical to maintaining 100% operational readiness for MIEMSS' Western and Region IV EMRC locations, which are operated by Allegany County and Talbot County, respectively.

Communications Engineering Services accomplished many other notable system enhancements and conducted several other projects in FY 2017.

- Implemented major design changes and hardware upgrades on the Eastern Shore to enhance capacity and reduce latency in preparation for EMS communications system upgrades.
- Expanded MIEMSS' radio programming template to incorporate county radio system upgrades.
- Worked with MFiRST on a new 700 MHz multicast design for an air-to-ground system for medical communications with MSP helicopters.
- Provided conventional communication circuits on MIEMSS infrastructure to help MSP Annapolis and Glen Burnie barracks transition to the MFiRST system.
- Acquired the Network Maryland Eastern Shore microwave system, allowing continued use of the system by MIEMSS and its public safety partners and eliminating the need to build a replacement system, saving taxpayers the cost of dismantling the current system. MIEMSS is currently adding these assets to its network monitoring system.
- Upgraded numerous microwave power and battery systems throughout the state to ensure reliable backup power for critical systems and to establish remote control and monitoring capabilities.
- Repaired the Snow Hill emergency microwave after an unusual mounting failure on the town's water tank.
- Worked with MFiRST, MSP, and DNR to mitigate potential wind farm interference to a key tower site in Cumberland.
- Relocated the Sideling Hill microwave traffic to Townhill to allow MFiRST to construct a new tower.
- Relocated and reinstalled tower equipment at Big Savage.
- Continued to work with Wicomico, Calvert, and Worcester Counties with their public safety radio system upgrades at tower sites shared with MIEMSS.
- Replaced legacy Cisco firewalls to enhance security on PSInet.
- Continued its support for local 9-1-1 centers through active participation on the Emergency Number Systems Board.

Despite the continued department staffing challenges, Communications Engineering Services was successful in completing many important projects while managing constantly changing priorities statewide. MIEMSS will continue to migrate systems to new, more resilient technologies that enhance services provided to the EMS community. None of this year's successes would be possible without the dedicated staff in the 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 comprised of 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 peer review 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 2017 Compliance Office Activity

- EMSOP reverification applications reviewed 3
- Criminal background investigations completed 7,709
- Incidents reported to IRC 109
- IRC investigations initiated 144
- IRC investigations conducted 124
- IRC investigations (FY 2016) continued 41
- IRC complaints forwarded to PRP 23
- Complaints dismissed by PRP.....1
- Complaints forwarded to EMS Board.....22
- Complaints requiring service 9
- Quality assurance officer courses conducted 2
- Quality assurance officers trained 75

EMS Board Actions

- Reprimands 4
- Probation 10
- Suspensions 5
- Revocations 8
- Remedial training 2
- Surrenders 0
- Evaluations 1
- Applications denied.....0
- Case resolution conferences 6
- Dismissed 0
- Counseling.....1
- Rehabilitation 5
- Random testing.....5
- Office of Administrative Hearings (OAH) hearings requested 6
- OAH hearings conducted 4
- OAH hearings defaulted.....0
- Settlement agreements 4

Quality Assurance

The Compliance Office continues to coordinate QA officer courses for EMSOPs and licensed commercial ambulance services. MIEMSS' Quality Assurance Officer course is continuously updated to keep pace with current topics. The initial training has been condensed from a two-day to a one-and-a-half day program, and lesson plans have been recently amended to enhance the learning experience for students.

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 2017 MIEMSS continued to focus on promoting and enhancing CISM capabilities through symposiums and training. The November 2017 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 April 2017 MIEMSS sponsored a two-day Crisis Response to Terrorism course and CISM team coordinators meeting at the EMS Care Conference in Ocean City. In partnership with the Annapolis City Fire Department, MIEMSS held an entry-level CISM course for over 40 providers over three days in June 2017.

These training sessions and CISM symposiums were 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. In FY 2017 *Maryland EMS News* covered various topics, including

- Annual Maryland EMS awards
- EMS Week appreciation and news
- Maryland EMS participation in the Cardiac Arrest Registry to Enhance Survival
- MIEMSS' new Licensure System
- Maryland opioid crisis information for EMS providers
- 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

Departmental staff also 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, 2017, over 9,500 users had liked MIEMSS' Facebook page, and over 1,100 users were following its Twitter feed. Posts on Facebook during this period had a total reach of over 1 million, 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 2017-2018 protocol manual was made available on MIEMSS' website in early 2017. 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 2017 the department produced the EMS Update 2017 training video, required viewing for Maryland EMS providers, which included changes and additions to the 2017-2018 EMS protocols. The production was made available to providers through MIEMSS' Online Training Center or company-level drills. Department staff also produced a version of the training for Base Station hospital personnel.

Other videos produced by Educational Support Services during the past year included 1) an EMS Week "thank you" message to providers in May 2017, 2), the April 19, 2017, Radiation Emergency Preparedness Symposium sponsored by Maryland Department of Health, 3) the Mid-Atlantic Life Safety Conference opening video, and 4) the memorial service program and video eulogies for the annual 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 2017, the annual Maryland EMS awards ceremony was held in the Lowe House of Delegates Office Building 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, Director of the Maryland Governor's Office of Homeland Security Walter F. (Pete) Landon 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 2017 department staff provided assistance with exhibits at the MSFA annual convention, the annual Maryland Association of Counties 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.

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 2017 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
- 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

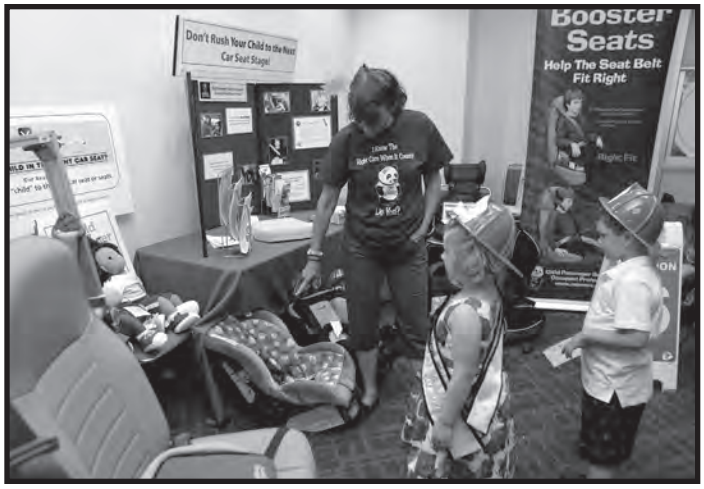
State Pediatric Emergency Medical Advisory Committee (PEMAC) members meet bimonthly, in person or electronically. Committee task forces meet regularly to update documents and procedures for the

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 2017 the FAN developed a new educational program for families focused on emergency call and emergency department readiness. The program was presented to EMS providers at the EMS Care conference and Maryland State Firemen's Association (MSFA) convention.

Associate State EMS Medical Directors for Pediatrics Allen Walker, MD, MBA, FAAP, and Jennifer F. Anders, MD, FAAP, serve on MIEMSS' Protocol Review Committee (PRC) to revise current medical protocols for EMS providers, review new protocols, and recommend modifications founded on evidence-based practices. In FY 2017 Drs. Walker and Anders made recommendations to the PRC to revise the high-performance CPR procedure to meet the needs of children at specific ages. These recommendations were incorporated in the protocols that became effective July 1, 2017.

MIEMSS' Pediatric Quality Improvement Committee (QIC) continues to coordinate training for pediatric transport teams and for Maryland's two designated Pediatric Base Stations, Children's National Medical Center and Johns Hopkins Children's Center, which provide statewide coverage for online and offline pediatric medical direction and community education. Through ongoing QI activities, recommendations are made that directly impact protocol development, revision, and advancement, as well as targeted pediatric education at conferences and seminars. The QIC and the Pediatric Data Analysis and Research Team (DART) meet bimonthly and have three ongoing data projects: 1) pediatric rapid sequence intubation conducted by Maryland State Police and US Park Police aeromedical teams, in partnership with The Johns Hopkins Hospital and Children's National Medical Center; 2) pediatric trauma patient triage and transport decisions by EMS providers (via data obtained from the electronic Maryland EMS Data System (eMEDS) and designated Adult Trauma Centers), and 3) review data collected on the pediatric sepsis protocol for EMS providers implemented in FY 2016. Dr. Anders, chair of the QIC and DART, is 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 and the Pediatric Education for Prehospital Professionals (PEPP) Steering Committee. 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.

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. 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 ENA and the Emergency Nurse Pediatric Course (ENPC). In August 2016 MIEMSS hosted the annual ENA delegate preparation meeting prior to their national General Assembly.

Maryland EMS for Children State Partnership Grant

MIEMSS is in the 12th year of an EMS for Children State Partnership Grant from the Maternal and Child Health Bureau/Heath Resources Services Administration of the US Department of Health and Human Services. This grant focuses 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 supports pediatric education for prehospital and hospital emergency health care providers (see Pediatric EMS and Hospital Education, on page 13).

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 16th year of funding from the Maryland Department of Transportation's (MDOT) Highway Safety Office. The project uses print and social media to promote CPS/OP messages, including MIEMSS' Facebook and Twitter accounts, regular website updates, and articles in *Maryland EMS News* and the *Maryland American Academy of Pediatrics* newsletter.

The FY 2017 project theme was "Don't Rush Your Child Through the Car Seat Stages," as many parents prematurely advance their children to the next car seat, increasing their risk of injury. Project deliverables included a 30-second public service announcement released in September 2016, to coincide with national Child Passenger Safety Week; 11 CPS exhibits, reaching approximately 2,200 EMS providers, emergency nurses, occupational therapists, elementary school families, and others; and approximately 17,000 pieces of educational material distributed through exhibits, mailings, and trainings, including 400 posters and 29 car seats/boosters or training dolls. More than 170 agencies received materials from this project.

In FY 2017 the CPS/OP project also developed new printed media in English and Spanish and participated in outreach efforts utilizing a vehicle thermometer display as part of a "never leave your child alone in a car" heatstroke prevention campaign.

A key component of this project is to train health care providers in CPS/OP. Training highlights this year included

- 9 courses at 4 hospitals, reaching 52 providers
- 8 national CPS certification and 2 update courses, reaching more than 100 health care providers and law enforcement professionals
- 4 scholarships awarded to cover the costs of a certified child passenger safety technician course
- 2 live webinars, reaching at least 67 people: "Getting Buckling Up Messages to Minorities" and "Pediatric Biomechanics for CPS," which are also archived on MIEMSS' website
- Pediatric Grand Rounds presented by car expert and pediatrician Dr. Alisa Baer to over 100 providers at Johns Hopkins Children's Center. Dr. Baer also presented at the 2017 Winterfest EMS Conference in January.
- Developing plans to train future CPS technicians how to safely restrain children with special needs

In partnership with the MDOT Highway Safety Office, the project was one of five nationwide awarded funding from the Governor's Highway Safety Association to conduct an educational campaign on drowsy driving prevention for health care providers. Work on the campaign began in July 2017.

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, 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 20 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 2017 Safe Kids Maryland hosted two statewide educational meetings and, with partners in the MSFA, State Fire Marshal, and Department of Health, supported three life safety conferences and seminars.

In June 2017 a collaborative Safe Kids/RISK WATCH program was held over four days at the MSFA 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. Two new safety topics were presented this year: water and pool safety from Safe Kids Worldwide and the Emergency Ready Families project from the EMS for Children FAN Council. 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.

Safe Kids Maryland continued its participation in the nationwide campaign to prevent hyperthermia in kids left in cars. The MSFA Fire Prevention Committee funded the purchase of the thermometer display discussed in the CPS/OP section above. To enhance messaging and visual impact, the thermometer demonstrates the highly-elevated temperatures inside a parked car compared with outside ambient temperature to raise awareness of the high risk for fatal injury to young children from heatstroke. New posters reminding families to never leave a child alone in a vehicle and to "ACT"

(Avoid heatstroke, Create reminders, Take action) were distributed to EMS and fire stations and to hospital emergency departments across Maryland. The temperature display was featured at the MDOT Highway Safety Summit, EMS Care 2017, and the MSFA annual convention. MIEMSS is coordinating the process for loaning the display to interested EMS agencies.

In recognition of the specialized care required for pediatric emergencies, EMS for Children Day was celebrated on May 24, 2017. Also on this day, four 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.

Pediatric EMS and Hospital Education

EMS for Children participated in a number of EMS and emergency nursing educational seminars and conferences in FY 2017, highlighting safe transport of children in ambulances, protocol changes, and high-performance CPR. Preconference sessions were delivered on PEPP, Pediatric Advanced Life Support (PALS), and pediatric vascular access. A Maryland EMS for Children State Partnership Grant also supported a STABLE neonatal education preconference at the state ENA conference in May 2017. PEPP-3 hybrid courses for ALS and BLS providers were offered in Washington County and Southern Maryland this year. Specific offering are listed in an annual continuing education chart, available on MIEMSS' website at http://bit.ly/2xuw5Zd.

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.

A Certified Pediatric Emergency Nurse (CPEN) Review Course, hosted by Peninsula Regional Medical Center in June 2017, was sponsored by EMS for Children. Over 25 nurses attended the fast-paced certification course. By increasing the number of nurses that are CPEN-certified and the number of emergency physicians that have taken the APLS course in Maryland, emergency departments across the state continue to strive to become more pediatric-ready, a federal EMS for Children Performance Measure that Maryland works toward each year.

EMERGENCY OPERATIONS

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 2017:

- Supported Washington, DC, and federal agencies during the Presidential Inauguration in January 2017
- Supported Washington, DC, and federal agencies during the Women's March in January 2017
- Facilitated temporary movement of Maryland CHEMPACKS to Washington, DC, for Inauguration and Women's March
- Provided assistance for nursing home closure in Washington County requiring contingency planning for rapid evacuation
- Provided assistance for a school bus crash on Rt. I-95 in Harford County
- Provided assistance for a white-powder incident at a Frederick County medical facility
- Monitored flu and environmental-related patient contacts among Maryland EMS providers, reporting this data to Maryland Department of Health (MDH)
- Provided support to Maryland Governor Larry Hogan's response to the opioid epidemic

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 2017 included

- MDH mass-fatality management tabletop exercise
- US Army Corp of Engineers, Baltimore District, flood response tabletop exercise
- US Naval Academy active assailant exercise
- BWI EPLEX mass-casualty exercise
- Hagerstown Airport exercise
- MIEMSS Region V Health Emergency Preparedness Coalition drill
- MEMA hurricane preparedness workshop

Preparedness Planning

As part of a Hospital Preparedness Program sub-grant award from MDH, MIEMSS developed a multi-year training and exercise plan to increase agency preparedness over the three-year period of July 1, 2017, to June 30, 2020. MIEMSS and the Maryland Emergency Management Agency continue to lead the Interdisciplinary Workgroup on the Response to Active Assailant Incidents, and an updated response plan is expected to be completed in FY 2018. MIEMSS also participates in a newly-created planning group for responding to complex coordinated attacks.

High Consequence Infectious Disease Patient Transport Teams

In FY 2017 MIEMSS hired an EMS Infectious Disease Program Coordinator for the high consequence infectious disease (HCID) transport program. Through this program, MIEMSS will assist in the development and maintenance of EMS teams that can transport a patient under investigation (or confirmed) for an HCID from the prehospital setting or by means of interfacility transfer. The HCID project is funded by a grant from the MDH with funds from the Hospital Preparedness Program Ebola Supplemental Grant, provided by the Assistant Secretary for Preparedness and Response, US Department of Health and Human Services.

MIEMSS has accepted applications for expressions of interest from EMS Operational Programs and commercial ambulance companies that wish to develop and maintain HCID transport teams. With the support of a multidisciplinary HCID advisory panel, MIEMSS and MDH will review and approve team applications in FY 2018. MIEMSS and local fire/EMS and public health departments will support training and exercises that ensure the team equipment and capabilities meet the program requirements.

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 2017 the EMRC handled 245,431 telephone calls and 197,927 radio calls. Of these 443,358 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 27,865 telephone calls and 8,499 radio calls. Of these 36,364 calls, the majority were related to requests for medevac helicopters.

EMRC/SYSCOM staff monitor EMS system activity so as to alert key MIEMSS staff of significant or extraordinary major medical incidents that may require MIEMSS support and response. In FY 2017 EMRC/SYSCOM generated 181 alerts for these types of incidents.

The communications center continues to participate in the National Disaster Medical System. Utilizing the Facility Resource Emergency Database (FRED), EMRC/SYSCOM obtains hospital bed status information for significant events and routine quarterly exercises, such as the Presidential Inauguration in Washington, DC, in January 2017. The FRED system is also utilized by EMRC/SYSCOM in support of local emergencies and exercises conducted statewide.

GOVERNMENT AFFAIRS

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.

- Protection from civil liability was established for individuals for any act or omission in giving any veterinary aid, care, or assistance to an animal at the scene of an emergency, in transit to a veterinary facility, or through communications with licensed veterinary personnel providing emergency veterinary assistance where the owner is not available to grant permission. The law applies to a number of specified individuals or entities, including an individual who is licensed by Maryland to provide medical care; a member of any state, county, municipal, or volunteer fire department ambulance and rescue squad, law enforcement agency, or corporate fire department; and a volunteer fire department or ambulance and rescue squad whose members have immunity.

- The Maryland General Assembly directed MIEMSS to conduct a study and make recommendations about locations where automated external defibrillators (AEDs) could be most beneficial. The study, which must be submitted by December 1, 2017, must also compile AED pricing information, including installation and training costs, and provide a summary of the immunity from liability provisions in Maryland law regarding the use of AEDs.
- MIEMSS was also tasked with conducting a study, due to be completed by November 1, 2017, evaluating the impact of mobile integrated health (MIH) programs in Maryland and exploring the potential for expanding these programs. MIH programs target high utilizers of EMS and conduct in-home visits to assess, treat, and refer patients to appropriate services outside of the emergency context. Key to ensuring further establishment and growth of MIH programs, the study will also examine possible solutions to the lack of secured funding for EMS participation in these programs.
- MIEMSS is partnering with the Maryland Health Services Cost Review Commission to evaluate the impact of emergency department (ED) overcrowding on EMS response times and Maryland's patient population, and to develop a plan to address this overcrowding. This study will be submitted by December 15, 2017.

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 Centers are designated at one of four levels of care, which provides for the appropriate resources necessary to care for injured and ill patients across the state. Memoranda of understanding are in place with out-of-state hospitals to facilitate trauma services for injured patients requiring a higher level of care in outlying areas of the state. Adult Trauma Center regulations were revised in FY 2017, and are currently in the promulgation process, and a workgroup has been convened to revise adult and pediatric burn center regulations.

Trauma and Specialty Referral Centers access patient EMS care information via the electronic Maryland EMS Data System (eMEDS) for inclusion in the web-based Maryland State Trauma Registry (MTR), which includes a recently revised data dictionary for adult trauma patients. The Maryland Hand Trauma Registry has been upgraded to a web-based version with International Classification of Diseases (ICD) 10 codes (medical reference sets). Partnering with the American Trauma Society, MIEMSS hosted a Trauma Registrar Course for 25 participants on June 5–6, 2017. Since 2015 all Maryland Adult and Pediatric Trauma Centers also submit data to the National Trauma Data Bank, which assists the centers in benchmarking their trauma center with other centers from around the country.

The Maryland Burn Collaborative continues to meet to focus on burn data and submission, standard audit indicators, burn regulation revision, and performance improvement, and is in the process of developing a Maryland burn center "scorecard" to monitor these metrics.

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

- Emergency department documentation of patient's temperature
- Emergency department documentation of patient's Glasgow Coma Scale score
- 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 launched a number of trauma and injury prevention initiatives in FY 2017. The Falls for Fall program on September 22, 2016, focused on ways to prevent falls, which are now considered traumatic

Stroke Core Measures (5-Year Comparison)

Core Measure	CY 2012	CY 2013	CY 2014	CY 2015	CY 2016
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	88.5%	86.9%	90.9%	91.4%	93.1%
Percent of patients with ischemic stroke or TIA who receive antithrombotic therapy by the end of hospital day two	97.6%	98.0%	98.5%	98.6%	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	90.2%	96.2%	98.1%	98.2%	98.2%
Percent of patients with an ischemic stroke or TIA prescribed antithrombotic therapy at discharge	98.4%	98.7%	98.9%	99.3%	99.5%
Percent of patients with an ischemic stroke or TIA with atrial fibrillation/flutter discharged on anticoagulation therapy	94.6%	95.6%	97.2%	96.1%	97.7%
Percent of patients with ischemic or hemorrhagic stroke, or TIA with a history of smoking cigarettes, who are, or whose caregivers are, given smoking cessation advice or counseling during hospital stay	97.7%	98.8%	97.7%	98.1%	99.0%
Percent of ischemic stroke or TIA patients with a cholesterol LDL level=100, or LDL not measured, or on cholesterol-reducer prior to admission who are discharged on statin medication	93.3%	96.0%	97.1%	97.9%	98.3%
Percent of stroke patients who undergo screening for dysphagia (difficulty swallowing) with an evidence-based bedside testing protocol approved by the hospital before being given any food, fluids, or medication by mouth	85.9%	89.5%	87.6%	87.7%	90.2%
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	91.7%	93.6%	95.8%	96.9%	97.2%
Percent of patients with stroke who were assessed for rehabilitation services	98.0%	98.5%	98.7%	98.7%	99.1%

Source: Get With the Guidelines-Stroke Registry

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

events and documented in trauma center data. On April 5, 2017, the TQIC joined together for the second annual statewide Distracted Driving Day, during which each Trauma Center in Maryland participated to spread the word about the perils of distracted driving. And on March 3, 2017, the TQIC hosted Stop the Bleed training with the support of the American College of Surgeons, Maryland Committee on Trauma, and TraumaNet. Attendees were encouraged to become instructors and move the program to their hospitals and communities.

Primary and Comprehensive Stroke Centers

Maryland's statewide regional system approach to stroke care, including 35 designated Primary Stroke Centers and 3 designated Comprehensive Stroke Centers, helps to ensure prompt and appropriate care of acute stroke patients. The statewide system continues to evolve as new literature and data findings on stroke care is published. All Stroke Centers are re-designated every five years; in FY 2017, 26 Primary Stroke Centers were due for re-designation and one hospital filed a Letter of Intent seeking initial designation.

Each Primary and Comprehensive Stroke Center submits data monthly to the American Heart Association's Get With the Guidelines–Stroke registry (AHA-GWTG). MIEMSS accesses the registry each month and monitors for compliance with the core performance measures for standards of care established by the AHA and American Stroke Association (ASA) (see page 16). MIEMSS utilizes this data to benchmark Maryland's compliance rate with the core performance measures to national compliance rates, as compliance has been shown to improve patient outcomes. The annual state aggregate data for CY 2016 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%.

The Stroke Quality Improvement Committee (QIC), composed of representatives from each designated Stroke Center, continues its efforts to improve stroke care throughout the state, including a focus on improving the interfacility transfer times for stroke patients with large vessel occlusions requiring endovascular treatment. In FY 2017 the QIC also continued efforts to improve door to intravenous tissue plasminogen activator (IV t-PA) times utilizing the GWTG data. The Stroke Centers used this data to support changes to their stroke alert protocols, improve their response times, and to share best practices and processes with each other. 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 2016 Maryland's mean door to t-PA time was 52.4 minutes, while the national mean was 53.4 minutes. Additionally, 78.4% of all acute ischemic stroke patients eligible to receive t-PA had a door to t-PA time of 60 minutes or less, lower than the national rate of 78.9%.

Perinatal Referral Centers

In Maryland there are 13 designated Level III and 2 designated Level IV Perinatal Referral Centers. All Perinatal Referral Centers are re-designated every five years, and the re-designation process for the Level III Centers was ongoing throughout FY 2017.

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. In FY 2017 the MIEMSS perinatal database was launched, enabling Level III and Level IV Perinatal Referral Centers to directly upload their annual report data on the current status of care and on health outcomes. Database elements and indicators include variables related to maternal and infant health. The MIEMSS Perinatal Advisory Committee will 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.

MIEMSS continues to work closely with MDH in supporting all Perinatal Referral Centers that have the ability to participate in the Vermont Oxford Network, a system that provides each center the information necessary to benchmark their data to data from all centers in the network.

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 328 public access AED applications in FY 2017. Current as of June 30, 2017, 5,615 locations with AEDs onsite were actively registered in this program. 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 program has documented 202 (25.0%) successful AED uses out of 809 reported SCAs, as measured by the patient having a return of pulse at EMS arrival, during EMS arrival, or during EMS transport. Of the overall arrests, 459 were witnessed, and 148 of those witnessed arrests regained a pulse at the time of EMS arrival, for a 32.2% 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 multifaceted 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

Hospital 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. There are 27 MIEMSS-designated centers, 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. This, however, 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 College of Cardiology Foundation's ACTION 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 committees address the treatment of STEMI patients in Maryland, and are guided by three objectives:

1. Assess the current status of STEMI care in the region, including availability of resources within and adjacent to the region.
2. Develop a regional-based plan for optimizing outcomes of STEMI patients consistent with the Maryland EMS protocols and COMAR.
3. Continue to monitor data and the implementation of the plan.

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, Inc., the industry leader for emergency patient care reporting. MIEMSS owns a statewide site license for the eMEDS software, permitting EMS in Maryland to use it at no cost and no additional burden on local funding. All 24 of Maryland's jurisdictional EMS Operational Programs (EMSOPs) and most licensed commercial ambulance services submit patient care reports directly into eMEDS. Maryland now 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 revamping eMEDS to provide 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 FY 2018. As part of this effort, eMEDS will be upgraded to ImageTrend's Elite software program, which will make Maryland's system compatible with 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

The department continues to work with MIEMSS' Licensure and Certification office and ImageTrend to implement a new provider registry to replace the Maryland Prehospital Provider Registry system. MIEMSS implemented the new system in FY 2017 using 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). MIEMSS and MSPAC use this application to streamline the process of selecting, assigning, and tracking aircraft to respond to medevac requests in and around Maryland. Prior to obtaining Flight Vector, both agencies had to coordinate information across multiple systems in order to dispatch and track MSPAC and allied agency aircraft. Along with accelerating the request and dispatch process, the system

improves MSPAC flight safety by providing real-time, automated tracking of MSPAC aircraft. The system also permits MIEMSS to automate a previously paper-based system used for tracking Emergency Medical Resource Center (EMRC) consults. The system includes a disaster recovery instance located at a Maryland State Police data center that is geographically separate from the MIEMSS data center.

Maryland Emergency Medical Resource and Alerting Database

The Maryland Emergency Medical Resource and Alerting Database (MEMRAD), which operates on the HC-Standard software system provided by Global Emergency Resources, is hosted and supported by the department. County Hospital Alert Tracking System (CHATS) and Facility Resource Emergency Database (FRED) are applications within the MEMRAD system, and are mission-critical services for EMS operations and for disaster response. CHATS is a public, web-based service that displays alert status information for hospitals in Maryland and adjacent regions. It is used daily 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' IT hosts and supports the Maryland State Trauma Registry and related specialty registries (see the Health Care Facilities and Special Programs report on page 15). IT assisted with implementation of new hand, eye, and burn registry systems in FY 2017, and continued to support the integration of prehospital treatment data and hospital outcome data between eMEDS and the trauma registry.

EMRC/SYSCOM Support

The department provides 24/7 technical support to EMRC/SYSCOM in coordination with MIEMSS' Communications Engineering Services, including computer support for MSPAC functions in SYSCOM.

Help Desk and User Support

A major ongoing mission for the department is to support end users, both agency staff and EMS providers statewide, in the use of their PC equipment and applications. IT's dedicated and skilled user support staff helps agency personnel navigate technology by creating, supporting, maintaining, and improving IT infrastructure; protecting data and systems through improved IT security; and providing quick resolutions to PC and application software issues.

Project Management

IT provides project management services for various initiatives at MIEMSS. Currently, IT is working to establish an off-site disaster recovery location to enable continuity of operations and mission-critical applications in the event of system failures at MIEMSS' headquarters in Baltimore. This project will continue into FY 2018. IT staff is also assisting with the integration of eMEDS with Chesapeake Regional Information System for our Patients (CRISP), a health information exchange service for Maryland and Washington, DC. Aligning these two systems will make patient medical data, such as medical history and medications, available to EMS providers and hospital physicians at the point of care. The integration of eMEDS with CRISP is a significant undertaking and requires an evaluation of various methodologies, its utility to EMS providers and hospitals, and funding sources. This effort will continue throughout FY 2018.

Initiatives for FY 2018

Security Improvements: In FY 2017 the Security Information Department developed improved policies and implemented several systems to enhance data security at MIEMSS. Work will continue into FY 2018 to implement endpoint protection, data leak protection, full disk encryption, and monitoring systems throughout the MIEMSS network. MIEMSS also implemented a user training system that incorporates online security training with real-world testing to guard against user-based security threats such as phishing and spoofing.

Case Management System: MIEMSS will develop and implement a case management system to support EMS provider and service compliance investigations initiated by the EMS Board. These investigations gather a large amount of confidential data in a variety of formats, including text, photographs, videos, and audio recordings, that require annotation, presentation, and storage consistent with legal requirements.

Commercial Ambulance Licensing System: In FY 2017, to automate certain functions in the licensing and regulation of commercial ambulance services in Maryland, the Data Management Department developed a custom registry application for use by the State Office of Commercial Ambulance Licensing and Regulation (SOCALR). This initial effort has been successful and will continue into FY 2018 with additional development and enhancement.

Improve Computer Resources, Network Reliability, and Disaster Preparedness: IT will upgrade 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 emergency situations.

Strengthen Data Analysis: Recognizing the importance of accurate, timely, and accessible prehospital patient care data, data analysis capability will be expanded by emphasizing statistical reporting, quality improvement and assurance, and practical applications of EMS and hospital data. New analysis tools, those coming with the upgrade to Elite and those 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.

Data to Desktop: The MIEMSS Data Management Department will 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 the vast datasets maintained by MIEMSS.

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.

Licensure and Certification continues to monitor the implementation of the *EMS Agenda for the Future: A Systems Approach* by evaluating the standards defined in the National Highway Traffic Safety Administration's National EMS Education Standards publication as they apply to current providers and students attending EMS education programs. Licensure and Certification continues to offer courses through the MIEMSS Online Training Center and implement programs that streamline the provider licensure/certification renewal process. In FY 2017 Licensure and Certification fully implemented the new web-based Maryland Licensure System.

Maryland EMS Providers and Education Programs

FY 2017 EMS Provider Data

Licensure and Certification had a steady workload in FY 2017 issuing 1,686 initial prehospital provider certifications and licenses and renewing 5,490 certifications and licenses. The vast majority of entrants into Maryland EMS are through an emergency medical technician (EMT) initial provider course. Licensure and Certification tested 1,365 EMT students in 103 courses in FY 2017.

In FY 2017 the total number of Maryland EMS providers increased. The number of emergency medical dispatchers (EMDs) remained relatively steady, as did the number of emergency medical responders (EMRs), despite many law enforcement organizations switching from EMR certifications to the Law Enforcement Emergency Medical Care Course (LEEMCC) for required medical training. The drop in the number of EMRs associated with law enforcement was offset by the issuance of EMR cards to qualifying students who successfully completed EMT courses in FY 2015 but did not certify as EMTs.

The number of EMTs continues to increase, primarily due to initiatives designed to address the challenges faced as a result of the move to NREMT testing for basic life support (BLS) level providers (see page 22 for details).

The number of cardiac rescue technicians (CRT) held steady this year as providers approach the end of their transition period with the NREMT, which will no longer certify providers at the Intermediate/99 level. Maryland, however, will continue to license CRTs.

The number of paramedics increased to an all-time high as many CRT providers have transitioned to this level during the NREMT transition period.

The number of Maryland providers over the last five fiscal years is shown on page 23. Licensure and Certification works 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.

EMR to EMT Bridge Process

MIEMSS' BLS Committee of the Statewide EMS Advisory Council (SEMSAC) conducted a gap analysis between the EMR and EMT programs and evaluated the feasibility of creating a bridge process for certified EMR providers, which was subsequently approved by the Maryland EMS Board. The new bridge process allows EMR providers who wish to achieve an EMT certification to credit prior training toward their EMT course. Although these students would need to enroll in a full EMT course, they are only required to complete 144 of the 165 course hours.

EMS Education

Forty-five EMS Board–approved educational programs in Maryland offered initial and continuing education courses in FY 2017, and 23 LEEMCC

programs were registered with Licensure and Certification. Although LEEMCC does not lead to state EMS certification, the department works closely with the Maryland Police and Correctional Training Commissions on the medical content provided in the course.

The Online Training Center, MIEMSS' distance learning management system, reached 46,496 registered users in FY 2017. System users include not only all levels of prehospital care providers, but also other professionals such as nurses, physicians, students, and administrators who must access the center for required training. Of these registered users, 14,725 were active during FY 2017.

The Online Training Center hosted 22 courses in FY 2017. One new course was made available this fiscal year: *Maryland EMS Update 2017*, which covered all provider levels in a single course. Projected course topics for FY 2018 include the Maryland *EMS Update 2018*, EMD cardiac arrest training, and updated medevac training content. Licensure and Certification continues to review upgrades to the Online Training Center to keep the system in line with the ever-changing educational technologies available to providers. A major system upgrade is anticipated in FY 2018.

Transition to National 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. All Maryland EMR, EMT, and paramedic providers have completed initial or renewal courses that incorporate the new education standards. Providers who have a CRT license have until the 2018–2019 recertification cycle to transition to paramedic with the NREMT, or they may maintain 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.

To align Maryland EMS provider certification and licensing with the *EMS Agenda for the Future*, MIEMSS requires certain provider levels to fulfill national-level requirements. Beginning in FY 2015, all new EMR or EMT certification candidates have been required to complete an NREMT cognitive examination prior to state certification. EMT students who were required to test with the NREMT during the first year of implementation were substantially impacted by this change.

Students-in-Process Extension for NREMT Testing

During FY 2017 Licensure and Certification continued to work closely with many stakeholders to develop best practices for EMS education and the NREMT cognitive examination. To mitigate the impact of this new requirement for EMT students, MIEMSS worked with the NREMT to obtain a six-month extension for certain EMT candidates to retake the NREMT cognitive examination one time. Eligible candidates must have successfully completed an EMT course between October 1, 2014, and September 30, 2015, have successfully completed the Maryland practical examination, and have demonstrated a genuine interest in completing the Maryland certification process by, for example, completing an NREMT test preparation program, completing a survey distributed by MIEMSS in 2016, or having been identified as not receiving the survey at that time. These special extensions will expire in March 2018. Also, the Maryland EMS Board voted to pay for both the first and second NREMT cognitive examination attempt for EMR and EMT candidates who had a valid affiliation on file with MIEMSS at the time of their course completion. As a result of these efforts the Maryland average for first-time pass rates of EMR and EMT NREMT cognitive examinations has surpassed the national average.

National Continued Competency Program Model for National Registry Renewal

Effective July 1, 2016, Maryland moved to the National Continued Competency Program (NCCP) Model for NREMT certification renewal. This model applies to all paramedic-level providers, who are required to maintain NREMT paramedic certification, and EMR-, EMT- or CRT-level providers who are eligible and wish to maintain their NREMT certifications. Effective FY 2017 Maryland CRTs are no longer required to maintain NREMT (I-99) certification to be eligible for state certification. Until the NREMT fully eliminates the I-99 certification level, Maryland CRTs may choose to either maintain the national certification or complete the Maryland CRT renewal process, which mirrors the paramedic NCCP model. The NCCP model reduces the number of required continuing education credits needed for renewal, and increases the percentage of these hours that can be obtained from distributed learning courses. More information on how the NCCP renewal process affects Maryland providers can be found on the MIEMSS website under the EMS Providers tab.

Maryland Provider Registry for Licensure and Certification

A significant achievement for the department in FY 2017 was the implementation of the new, web-based Licensure System. The software, delivered through ImageTrend, Inc., allows providers, students, administrators, and EMS education programs increased access to MIEMSS' licensure/certification process. MIEMSS' Licensure System is now the system of record for provider certification and agency affiliation information, which will be integrated with eMEDS, MIEMSS' electronic patient care reporting tool, after its upgrade to a new software platform in FY 2018.

MIEMSS formed an eLicensure Statewide Steering Committee to develop recommendations for modifications and improvements to the Licensure System. The committee includes representatives appointed by their highest jurisdictional authorities from EMS Operational Programs, commercial services, and EMS education programs. These representatives have assigned roles within their organizations that require the use of the Licensure System, possess an understanding of their organization's needs within the system, and are voting members of the committee.

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 22nd Annual EMS Medical Directors' Symposium was held at the James N. Robey Public Safety Training Center in Marriottsville, Maryland, on April 13, 2017. It was attended by the regional, jurisdictional, and commercial ambulance service medical directors, Base Station physicians and coordinators, the highest jurisdictional officials, quality assurance officers, and MIEMSS personnel. This year's keynote speaker was Christopher Hunter, MD, PhD, FACEP, who currently holds an academic position at Orlando Regional Medical Center. Dr. Hunter's presentation was titled "Orlando United: Coordinating the Medical Response to the Pulse Nightclub Shooting." Other symposium presentations included

- "State of the State," by Richard Alcorta, MD
- "Maryland Search and Rescue – The Evolution and Trajectory of Maryland's Only Wilderness EMS Agency," by Michael Millin, MD
- "Pediatric Destination Decision Making: The PDTree Project," by Jennifer Anders, MD, and Cynthia Wright-Johnson, RN
- "Updates from the State Tactical EMS Committee," by Matthew Levy, DO
- "eMEDS® Elite – Where have we been? Where are we now? Where are we going?," by Jason Cantera, EMT
- "Provider Support Following Critical Calls and Incidents: Review of Resources and Large Scale Responses in Maryland," by Randy Linthicum, MS, NRP, Lt. Marc Junkerman, Chief Steven White (Retired), and Cynthia Gee, MS, EMT

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 May 17, 2017. Dr. Alcorta serves as the BDLS medical director and course director. The Maryland Regional NDLS Coalition is composed of MIEMSS, Johns Hopkins Office of 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. Fifty participants successfully completed the one-day BDLS course.

Number of EMDs and EMRs (Includes Current, Extended, Jeopardy, Military Status, and Inactive)

Level	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
EMD	1,182	1,113	1,163	1,189	1,465
EMR	3,478	2,821	2,258	2,256	2,084

Number of EMTs, CRTs, and Paramedics (Includes Current, Extended, Jeopardy, Military Status, and Inactive)

EMT	18,982	18,847	19,377	19,282	20,336
CRT	824	781	746	757	724
Paramedic	3,055	3,207	3,424	3,605	3,706
TOTAL	**22,861**	**22,835**	**23,547**	**23,644**	**24,766**

The Maryland Medical Protocols for Emergency Medical Services Providers

The Maryland Medical Protocols for Emergency Medical Services Providers is the official medical reference for Maryland EMS providers, and is available on MIEMSS' website. Some major additions and changes, listed below, were made to the protocols effective July 1, 2017.

- Terbutaline was removed from the advanced life support formulary.
- The Termination of Resuscitation Protocol was modified with a new ALERT to allow providers, in consultation with a Pediatric Base Station, to stop efforts on patients less than 18 years old in rare circumstances.
- A new Syncope Protocol was added for adult and pediatric patients.
- A new Overdose/Poisoning: Carbon Monoxide/Smoke Inhalation Protocol was added, which includes more formal direction for referral to the Center for Hyperbaric Medicine. This new protocol replaced the treatment for carbon monoxide/smoke inhalation patients that was previously covered in the Overdose: Inhalation Protocol.
- The fibrinolytic checklist was removed in the evaluation of stroke patients at the recommendation of the State Stroke Committee. The fibrinolytic checklist is still used to evaluate ST-elevation myocardial infarction (STEMI) patients.
- The site identification criteria for intraosseous insertion was improved.
- The Pelvic Stabilization Binder Device Pilot Protocol was expanded to allow for appropriately-sized pediatric pelvic binder use.
- The Sexual Assault Protocol was enhanced, and Maryland Coalition Against Sexual Assault (MCASA) recognized hospitals were identified as appropriate destinations for these patients.
- The medical consultation requirement was removed for the administration of midazolam for the bucking endotracheal intubated patient.
- The Transport to Freestanding Emergency Medical Facility Pilot Protocol was expanded to allow EMS to transport, with medical consultation, stable Priority 2 patients to a Freestanding Emergency Medical Facility.
- The Mobile Integrated Community Health (MICH) Pilot Protocol was expanded following a successful review of the Queen Anne's MICH pilot.
- The Mark I/DuoDote Optional Supplemental Program was revised to reflect consistency with the standardized dosing that is delivered with the CHEMPACK program—the forward placement of nerve agent antidotes throughout the state.

There are 46 Base Stations designated by the EMS Board. All new 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 *Maryland EMS Update for Hospital Base Station Personnel* training video, so that they can communicate with EMS providers and provide appropriate on-line medical consultation and direction. The *Base Station Communications Course for Emergency Department Personnel* was taught at several hospitals in FY 2017, resulting in 706 Base Station certificates issued to emergency department physicians and nurses, along with the approval of three new physician Base Station instructors.

Strengths, Weaknesses, Opportunities, and Threats Analyses

Washington County Commissioners requested the assistance of State EMS Medical Director Richard Alcorta, MD, to facilitate a strengths, weaknesses, opportunities, and threats (SWOT) analysis. The approved SWOT report was generated by the Washington County SWOT Taskforce, which included representation from each EMS and fire company in Washington County, Washington County Department of Emergency Services, Meritus Medical Center, and Hagerstown Community College. The SWOT report, which highlighted many of MIEMSS' recommendations that have been already implemented by the county, was formally presented to the Washington County Commissioners.

CARES Program

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

An updated and consolidated Cardiac Arrest tab in eMEDS, MIEMSS' prehospital patient care reporting system, allows EMS providers to readily enter comprehensive prehospital cardiac arrest information. The prehospital information can then be directly exported by MIEMSS to the CARES registry when it is first entered, saving time for the provider and EMS CARES coordinators. Using a single eMEDS 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 on-going care in the emergency department.

The Cardiac Arrest Registry to Enhance Survival was deployed in 2016. Maryland cardiac arrest data was exported to CARES starting in January 2016 for nine EMS Operational Programs (EMSOPs) and the hospitals within those jurisdictions. All other Maryland EMSOPs and hospitals were phased in the program throughout 2016. All 24 Maryland EMSOPs, the sub-divisions within jurisdictions, and Maryland hospitals and Freestanding Emergency Medical Facilities currently submit their cardiac arrest information to CARES.

The nine preliminary EMSOPs and hospitals within them were included in the 2016 CARES national reports, as they submitted data to CARES for the entire calendar year (see data on page 70). In 2017 all of the Maryland EMSOPs will be included in the CARES annual national report, which will come out in spring 2018.

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 defibrillators (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

Dr. Alcorta is a member of the Governor's Opioid Operational Command Center, which was established by Executive Order 01.01.2017.01 signed by Governor Larry Hogan in response to the heroin and opioid crisis in Maryland. Governor Hogan subsequently declared a State of Emergency by Executive Order to combat the heroin, opioid, and fentanyl crisis in Maryland. MIEMSS and the EMS Board continuously strive to improve the chances of survival for substance-dependent individuals who overdose. MIEMSS has authorized basic life support providers to administer naloxone, enhanced EMS provider education and community awareness on opioids, and produced an opioid overdose information card, with a crisis hotline phone number and instructions for emergency treatment of an opioid overdose, that EMS providers can distribute to patients. MIEMSS is also partnering with the Maryland Department of Health to identify individuals who need treatment for substance dependency.

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 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.

New in FY 2017, EMS encounters resulting in naloxone administration for opioid overdose patients are now identified and reported to the Maryland Department of Health. 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 1,700 data requests.

REGIONAL PROGRAMS

Mission

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

Regional Programs consists of five offices throughout the state that are responsible for monitoring the operation of the regional EMS system, acting as advocates for services through state policy development, and representing MIEMSS in the implementation and maintenance of these policies. Regional administrators are expected to be available to local resources to assist in large-scale responses, and, in many cases, are the first state representative on the scene. Additionally, Regional Programs supports the Emergency Operations office by participating in exercises, assisting in planned mass gatherings, and supporting emergency response efforts. (See page 13 for the Emergency Operations departmental report.)

Regional Programs 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 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

MIEMSS Grant Disbursements (FY 2017) 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	$47,645	$28,000	$0	$46,695	$122,340
Region II	$49,001	$28,000	$7,114	$35,000	$119,115
Region III	$114,226	$98,000	$12,956	$87,305	$312,487
Region IV	$92,075	$67,998	$19,557	$36,000	$215,630
Region V	$99,062	$78,000	$12,491	$45,000	$234,553
Total	$402,009	$299,998	$52,118	$250,000	$1,004,125

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 2017 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 EMS Operational Program, ensuring applications are completed, submitted, and funds are expended appropriately. In FY 2017 Region II assisted local jurisdictions in the development and deployment of a mobile ambulance bus program funded by HPP.

State Homeland Security Grant Program

A percentage of the State Homeland Security Grant Program 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 2017 grant funds. Ten applications totaling over $700,000 in requested funds were received for the $250,000 allocated. MIEMSS staff, MEMA, and SEMSAC are in the process of reviewing funding priorities for 2018 to ensure effective utilization of funds. MIEMSS expects to be able to release the grant application for 2018 about eight months earlier than 2017 to give jurisdictions time to execute more complex projects. See page 74 for FY 2013 - FY 2016 grant program information.

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 (AEDs), 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

In 2017 Regional Programs led the effort to redesignate 11 Base Stations, the hospitals that provide physicians' orders to prehospital providers, and to evaluate an application for a new Base Station. In cooperation with the Medical Director's Office and Office of Hospital Programs, regional offices coordinated the FY 2017 site visits required for redesignation. Regional Programs has also taken the lead for organizing the annual statewide Base Station Coordinators Symposium.

Quality Assurance and Improvement

Regional administrators are in the process of developing a new company-level chart course to assist local QA officers in reviewing eMEDS reports.

Jurisdictions in Regions I and IV continue to implement strengths, weaknesses, opportunities, and threats (SWOT) initiatives with the assistance of regional offices. In FY 2017 a Washington County SWOT initiative, with assistance provided by regional administrators in Regions II and V, was approved by county commissioners (see page 24 for additional information on this SWOT initiative).

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.

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. While not mandated, inspections in all jurisdictions are on the rise. VAIP inspections conducted in 2016 are indicated in the table below.

Conferences and Training

Regional Programs provides support to a number of statewide and regional EMS conferences and training opportunities, including the following successful programs held in FY 2017.

- Winterfest Conference, Tilghman Island, January 2017. Talbot County Department of Emergency Services held its annual conference, including presentations by EMS for Children, a 12-hour EMT skills class, and 12 hours of continuing education required for BLS recertification.
- Miltenberger Emergency Services Seminar, Rocky Gap, March 2017. MIEMSS, local hospitals, and other local agencies and institutions supported this educational conference for prehospital providers, fire/rescue personnel, and nurses.
- EMS Care Conference 2017, Ocean City, May 2017. This event offered a two-day conference, preceded by three days of preconference programs, with a record-setting attendance of over 300 participants.
- Emergency Response Symposium, College Park, May 2017. The Maryland Emergency Response System conference featured senior executive response officials from Philadelphia who reviewed law enforcement, EMS, and fire department responses to the 2015 Amtrak derailment and an after-action analysis of recent terrorist attacks in Israel.

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

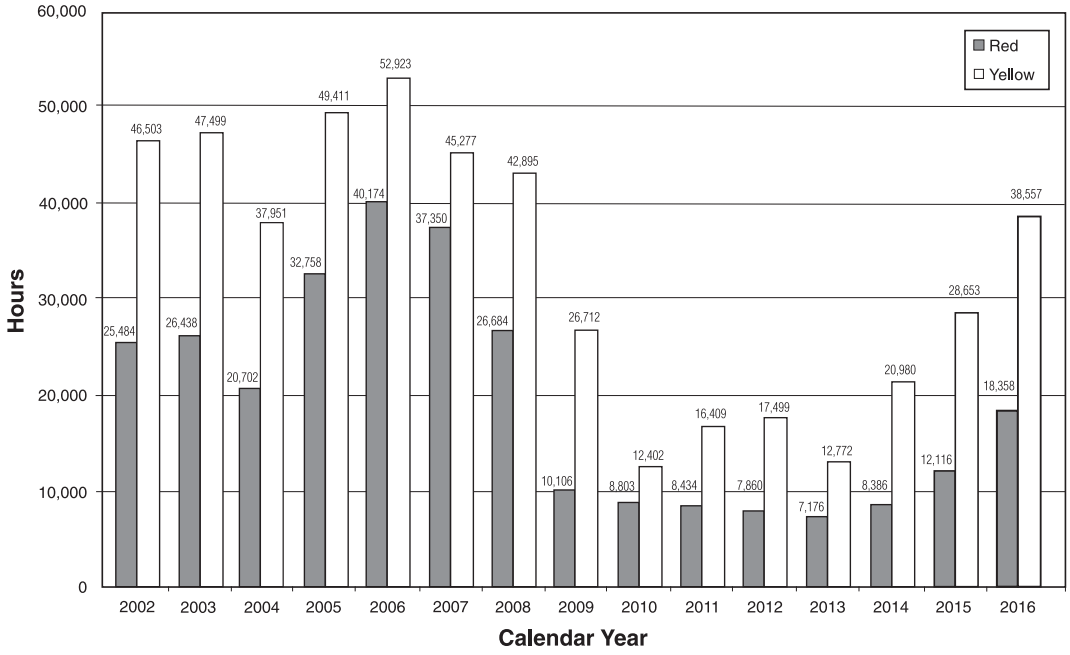
Region I staff support local jurisdictions by serving on committees that coordinate health and medical activities within the region, ensuring timely and effective communication of relevant EMS health and medical preparedness issues.

The Region III Health and Medical Coalition is a subcommittee of the Baltimore Urban Area Working Group and is chaired by Christina Hughes of MedStar Franklin Square Medical Center. In FY 2017 the coalition continued to enhance emergency preparedness and response capabilities in this region, refine operational plans for medical ambulance buses and the Alternate Care Site and Training Center, and develop scarce resource plans and hospital evacuation projects. Region V participated in a number of programs in 2016, including Prince George's County Health Care

2016 VAIP Inspections

Region	BLS Transport	BLS Non-Transport	ALS Transport	ALS Non-Transport
I	1	16	30	7
II	37	58	23	20
III	5	18	34	5
IV	11	11	28	8
V	4	0	6	0

State Diversion Alert Totals (Calendar Years 2002 to 2016)



Coalition, Washington, DC, hospital preparedness initiatives, and the National Emergency Department Overcrowding Score (NEDOCS) pilot project, which concluded in 2016. NEDOCS records emergency department data, including longest wait time, longest admitting wait time, number of patients, and number of high-resource patients, to produce a score that establishes a baseline for assessing diversion needs and, long-term, could help prevent a diversion ripple-effect among hospitals. Valuable lessons learned from the NEDOCS pilot were shared with the Region V EMS Advisory Council, partner hospitals, and other colleagues working toward reducing diversion overutilization.

Region V Staff also led an effort to develop a mass casualty concept of operations document for jurisdictions in Southern Maryland, including multi-year exercise programs that will be implemented in FY 2018. The concept of operations will provide a framework for responding to major incidents that require assets from all three counties.

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) 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.

The Region I office recently led an effort to update hospital alert policies following an increase in diversion usage by hospitals in Allegany and Garrett Counties. Additionally, the Region II office helped develop consistent internal alert policies for hospitals in that region, which reduced ambulance diversion time by 20% in the last quarter of FY 2016 compared to the previous three quarters.

MARYLAND TRAUMA AND SPECIALTY REFERRAL CENTERS

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

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

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

Level II Adult Trauma Centers
- Johns Hopkins Bayview Medical Center, Baltimore City (MIEMSS Region III)
- 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
- 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)

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

MARYLAND DESIGNATED SPECIALTY REFERRAL CENTERS

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

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

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

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

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

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

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

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

Primary Stroke Centers
- 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 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

- 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 serves as the state's Primary Adult Resource Center (PARC) and treated 6,095 patients from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Over this 12-month period, 82% of patients admitted to the Shock Trauma Center arrived by ground transportation and 18% arrived by air. Demographic data obtained indicate that the majority of admissions were male (68%) and aged 15-35 years (42%), followed by patients aged 56 or older (32%) and 36-55 (26%).

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.

Trauma Staff

Thomas M. Scalea, MD, FACS, MCCM, is the physician-in-chief for the Program in Trauma, and Karen E. Doyle, MBA, MS, RN, NEA-BC, FAAN, is the senior vice-president of nursing and operations.

Center for Hyperbaric Medicine

The Center for Hyperbaric Medicine is the statewide referral center for individuals who experience decompression sickness, carbon monoxide poisoning, smoke inhalation, delayed effects of radiation treatment, non-healing wounds, and/or gas gangrene. Established in 1965, the center is able to provide treatment around-the-clock, 365 days a year. Robert Rosenthal, MD, is the center's director. In FY 2017 therapeutic hyperbaric oxygen treatment was provided to 810 patients.

The Center for Hyperbaric Medicine is the only multi-place chamber in Maryland. Internationally recognized for its leadership and expertise in the clinical application of hyperbaric therapy, the center is capable of simultaneously accommodating 10 stretcher patients or 23 seated patients. Hyperbaric oxygen 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 in a special chamber. The center treats a wide spectrum of patients, from the most critically ill inpatients to ambulatory outpatients. The large interior space of the chamber is an alternative for patients who cannot tolerate monoplace (single individual) chambers.

FY 2017 Annual Report

Notable Accomplishments

The Shock Trauma Center continues to be the nation's premier trauma center, advancing care and developing new lifesaving techniques. Shock Trauma Center resources are also available to regional EMS agencies or jurisdictions with specialized medical or rescue needs that are developing individualized disaster or tactical response plans.

The GO-TEAM

The Shock Trauma Center maintains the GO-TEAM, an advanced resuscitative team led by Medical Director Andrew Pollak, MD, 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 2017 there were 10 requests for the GO-TEAM, with 7 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 the Shock Trauma Center. These civilian-military partnerships are crucial in keeping military medics continuously ready for wartime casualty care.

Quality Management/Quality Improvement

The Shock Trauma Center 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 Shock Trauma Quality Improvement Committee is responsible for outlining the quality program, monitoring performance, and developing new initiatives.

The Quality Management Coordination Committee meets weekly to conduct quality improvement activities, including a review of surgical and medical judgment and decision-making for all patient deaths and complications. The committee examines every unexpected outcome at the Shock Trauma Center, and if a quality issue is suspected or identified, it is referred to the appropriate division for review and recommendation for corrective action.

The multidisciplinary Medical Peer Review Committee meets monthly to review all patient deaths and complications referred by the program development and quality manager.

Injury Prevention Programs and Initiatives

In a proactive effort to combat preventable injury, the Center for Injury Prevention and Policy (CIPP), led by Tara Carlson, MS, RN, was established in 2011 to research, evaluate, and implement trauma prevention programs on a community, regional, and national level. The mission of the CAPP is to reduce preventable injuries and violence, and to mitigate the consequences when it does occur, while establishing a culture of injury prevention in Maryland. Several programs operate under the CIPP umbrella, including

- Violence Prevention Program
- Bridge Program, a domestic/intimate partner violence prevention initiative
- Trauma Prevention Program
- Saving Maryland's At Risk Teens (SMART)
- Adult Court-Ordered Drinking and Driving Monitoring Program
- Trauma Survivors Network

For additional information about these programs, see the Neurotrauma Center report on page 57.

Educational Programs and Training

The Shock Trauma Center has an active prehospital outreach program, which includes both in-hospital and out-of-hospital training for providers. Observation programs are offered in the Trauma Resuscitation Unit (TRU) and critical care units to provider a better understanding of the relationship between prehospital procedures and definitive in-hospital treatment. Evening educational events are held on site and broadcast to 24 locations. The Advanced Airway Program is tailored to the needs of prehospital providers, and focuses on integrating critical thinking and advanced skill performance.

Training is central to the mission of the Shock Trauma Center. The Surgical Critical Care Fellowship Program is the largest Accreditation Council for Graduate Medical Education (ACGME) training program in the country. Shock Trauma Center offers fellowships in surgical critical care, anesthesiology, orthopaedic surgery, emergency medicine, and acute care surgery. 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 the Shock Trauma Center 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 2017 over 400 classes were provided to health care workers, including medical students, EMS providers, attending physicians, and nurses.

Research

During the course of a research study entitled Emergency Preservation and Resuscitation for Cardiac Arrest from Trauma (EPR-CAT), Dr. Thomas Scalea conducted the first ever EPR-CAT procedure on a trauma patient this year.

Three Shock Trauma Center physicians have received research funding from the US Department of Defense (DoD): 1) Sarah Murthi, MD, to assess shock via ultrasound, 2) Jay Menaker, MD, to research spinal cord injury outcomes secondary to blood pressure management, and 3) Rosemary Kozar, MD, PhD, for a pre-clinical study on dried plasma use and outcomes in polytrauma. Dr. Kozar also received funding this year to study miRNA biomarkers in trauma. Deborah Stein, MD, Shock Trauma Center's chief of trauma, is also the site principal investigator on a DoD-funded study on sigh ventilation in trauma patients. The Shock Trauma Center is leading the country in enrollments for this study for the second consecutive year.

In collaboration with the UMSOM Department of Orthopaedics, Dr. Stein is also the trauma investigator for a study, funded by the Patient Centered Outcomes Research Institute, to investigate two forms of anticoagulation therapy for trauma patients sustaining extremity fractures.

The partnership between the Shock Trauma Center and C-STARS program has generated new research endeavors. Samuel Galvagno, MD, receives funding from the Air Force to study the prediction of shock via blood analysis during patient transport. Thomas Grissom, MD, receives funding from the Air Force to simulate and study the "handoff" procedures for transferring an injured patient from remote locations to definitive care. Peter Hu, PhD, works closely with C-STARS on developing predictive algorithms for physiological response utilizing continual vital signs (CVS) and CVS in conjunction with biomarkers. Dr. Hu received multiple grants from the Air Force to utilize CVS and video capture of resuscitation and operative procedures.

The Shock Trauma Center's Nursing Research Council is completing a report of findings regarding correlations between unprofessional behaviors and nurses' burnout scores and intent to transfer or leave their units. These findings were presented at the 2016 Society of Trauma Nurses' Conference. Also, data analysis is underway for a nurse-led study of three elements: 1) the impact education has on end-of-life care, 2) an order set for withdrawal of life-sustaining measures, and 3) the impact a debriefing program has on trauma nurses' perception of moral distress and quality of death and dying. The Nursing Research Council also plans to study risk factors for constipation in trauma patients.

Rehabilitation

Post-acute inpatient and outpatient services for Shock Trauma Center patients are primarily provided by the University of Maryland Rehabilitation & Orthopaedic Institute and the University of Maryland Medical Center Midtown Campus.

Level I Adult Trauma Center

The Johns Hopkins Hospital

1800 Orleans Street, Baltimore, Maryland
MIEMSS Region III

The Johns Hopkins Hospital serves the residents of Baltimore City and surrounding counties, as well as patients throughout the state. The Johns Hopkins Hospital treated 1,864 trauma patients from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Adult trauma services at The Johns Hopkins Hospital are provided by the Division of Acute Care Surgery.

Mission

At The Johns Hopkins Hospital, we strive to improve the health of our community and the world by setting the standard of excellence in patient care. We are committed to providing the highest quality care and service for all people in the prevention and treatment of human illness. We demonstrate this by providing exemplary care for each of our patients and their families; providing highly specialized services to a broad community; building a work environment where each person is valued, respected, and has an opportunity for personal and professional growth; advancing excellence in health services education; fostering health sciences research; and strengthening relationships with universities, colleges, other hospitals, agencies, and our community.

Trauma Staff

David T. Efron, MD, FACS, is the director for adult trauma at The Johns Hopkins Hospital, and Kathy Noll, MSN, RN, is the trauma program manager.

FY 2017 Annual Report

Notable Accomplishments

The Johns Hopkins Hospital has been ranked the #1 hospital in the nation for 21 out of the past 27 years by *US News and World Report*, and continues to be a leader across multiple specialties. The hospital experienced significant growth since the Sheikh Zayed Tower opened in May 2012. This growth has allowed for the expansion of hospital services and infrastructure. The Johns Hopkins Hospital partnered with GE Healthcare to build a state-of-the-art centralized control center dedicated to optimizing throughput. The new Johns Hopkins Capacity Command Center provides real-time analytics to better inform decisions in placing the right patient in the right bed at the right time, and to monitor patient movement both in and out of the hospital.

In summer 2016 the trauma and emergency surgery departments at The Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center were unified under a single Division of Acute Care Surgery. Trauma coverage at both centers is now shared by a larger pool of attending surgeons. Dr. Efron is the chief of the Division of Acute Care Surgery in addition to the trauma center director at The Johns Hopkins Hospital.

Quality Management/Quality Improvement

In FY 2017 The Johns Hopkins Hospital utilized an evidence-based approach to its blood management program, focusing on improving patient outcomes and reducing variation in transfusion practices. This resulted in decreased length of stay, reduced risk, and cost savings. The Johns Hopkins Hospital is only the second hospital in the nation to undergo voluntary accreditation review of its blood management program by the Joint Commission and the American Association of Blood Banks (AABB).

Elliott R. Haut, MD, PhD, the vice chair of Quality, Safety, and Service in the Department of Surgery, was the recipient of the 2016 Armstrong Award for Excellence in Quality and Safety at The Johns Hopkins Hospital. Dr. Haut has worked to improve outcomes and eliminate preventable harm in the area of deep vein thrombosis (DVT) and pulmonary embolism prevention. The Agency for Healthcare Research and Quality has cited The Johns Hopkins Hospital program for its effective approach to implementing clinical decision support for improving DVT prophylaxis.

Judy Schroeder, MS, RN-BC, has joined the staff as a dedicated full-time quality/performance improvement coordinator. She has been involved with multiple ongoing projects, including emergency department temperature monitoring, an alcohol screening and brief intervention program, and enhanced multidisciplinary morbidity and mortality efforts.

Injury Prevention Programs and Initiatives

A falls prevention awareness event took place at The Johns Hopkins Hospital on September 22, 2016. Information was available on health conditions that predispose individuals to falls and how to safeguard the home from fall risks. The highlights of the day's events were an appearance by "TraumaRoo," the injury prevention mascot, and two Tai Chi demonstrations that emphasized balance and flexibility to help reduce fall risks.

The hospital also participated in Distracted Driving Prevention Awareness Day on April 5, 2017, an initiative of the Maryland Trauma Quality Improvement Committee. The event featured distracted driving crash data, evidence-based prevention programs, and policy implementation. Representatives from the Maryland Legal Resource Center, Maryland Department of Transportation Highway Safety Office, Maryland State Police, and AT&T were present. There was an opportunity for participants to engage in a distracted driving virtual reality simulator and receive information on the risks and outcomes associated with distracted driving.

The Johns Hopkins Falls Prevention Clinic has developed a condensed screening questionnaire for providers to use as part of a falls prevention pathway. This tool promotes provider awareness in the hospital and in outpatient settings, and serves as a referral pathway for additional services through the clinic. Levan Atanelov, MD, directs the center's comprehensive multidisciplinary program designed for patients at risk of falls or with recurrent falls.

Representatives from adult trauma services have entered into discussions with the Baltimore City Health Department to re-implement the Safe Streets model for decreasing violence-related shootings in the city. Utilizing a hospital-based violence prevention program to target high-risk youth, responders will work with a case manager to provide access to violence-prevention services. The program aims to reduce homicides in target areas and decrease readmissions for violence-related injuries.

Educational Programs and Training

Many trauma attending physicians at The Johns Hopkins Hospitals are also instructors for Advanced Trauma Operative Management (ATOM), Advanced Trauma Life Support (ATLS), Advanced Surgical Skills for Exposure in Trauma (ASSET), and Rural Trauma Team Development (RTTDC) courses.

Trauma faculty and staff provide EMS continuing education by offering the Critical Care Paramedic Course and classes at the Baltimore City Fire Academy on topics such as EMS protocols, tourniquets, trauma systems response, head injury, balloon pumps, and ventricular assist devices.

The Johns Hopkins Medicine Simulation Center is a state-of-the-art training facility that allows trauma 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.

In support of a nationwide campaign to provide education in hemorrhage control, Stop the Bleed training courses are underway at The Johns Hopkins Hospital. This program is designed to teach hospital employees and the public how to stop life-threatening hemorrhage through the application of bleeding control dressings and tourniquets. Plans are ongoing to provide training for security officers, and to strategically place Stop the Bleed kits around the hospital.

Research

Adult trauma services at The Johns Hopkins Hospital has an active research program. 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. This research resulted in 29 peer-reviewed publications this past academic year.

The Johns Hopkins Center for Gun Policy and Research, a division of the Johns Hopkins Bloomberg School of Public Health, continues 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.

Rehabilitation

The Johns Hopkins Hospital is accredited by the Commission on Accreditation of Rehabilitation Facilities (CARF). The hospital maintains an inpatient rehabilitation program that offers physical, occupational, and speech therapy. The trauma center also partners with various rehabilitation centers independent of the hospital.

Level II Adult Trauma Center

Johns Hopkins Bayview Medical Center

4940 Eastern Avenue, Baltimore, Maryland
MIEMSS Region III

The Johns Hopkins Bayview Medical Center serves the citizens of eastern Baltimore City, eastern Baltimore County, and Harford and Cecil Counties. The hospital evaluated and treated 2,838 trauma patients from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Adult trauma 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.

Trauma Staff

Raymond Fang, MD, FACS, is the trauma medical director at Johns Hopkins Bayview Medical Center, and Marie Dieter, MSN, MBA, RN, TCRN, is the trauma program manager.

FY 2017 Annual Report

Notable Accomplishments

The trauma program at Johns Hopkins Bayview Medical Center experienced growth in FY 2017. In addition to the 14% increase in trauma patient volume, the program welcomed a new trauma medical director and added an additional trauma surgeon and trauma nurse practitioner. Following integration of the Trauma/Acute Care Surgery Department at Johns Hopkins Bayview Medical Center with trauma services at The Johns Hopkins Hospital, a combined group practice now shares physician resources and expertise at both locations as components of the Division of Acute Care Surgery.

Quality Management/Quality Improvement

The trauma program has a 5-tiered quality management evaluation process that reviews patient care and outcomes at the individual and system level. System review revealed a need to improve hand-off communications from the emergency department (ED) to operating room (OR) staff for care of the most critically-ill patients. The subsequent hand-off communication initiative was multidisciplinary and included ED/OR nursing, trauma surgeons, anesthesiologists, and surgical residents. ED nurses now accompany patients into the OR suite and provide a verbal report to the entire surgical team. Feedback from this process change has been overwhelmingly positive from all disciplines as an enhancement in patient care.

Injury Prevention Programs and Initiatives

In FY 2017 the trauma program focused on injury prevention initiatives for the two most common injury mechanisms presenting at Johns Hopkins Bayview Medical Center: falls and motor vehicle crashes. With the support of a community partner, Dundalk Invest Heath, the third annual Fall Prevention Awareness Fair was held in September 2016, during which multiple hospital departments provided fall prevention education to their patients. Trauma program staff participated in Distracted Driving Prevention Awareness Day on April 5, 2017, an initiative of the Maryland Trauma Quality Improvement Committee, by hosting an information fair. The trauma program at Johns Hopkins Bayview Medical Center partnered with WBFF Fox45 to provide distracted driving education throughout the greater Baltimore City television broadcast area. Additional partners included the State Highway Administration, Baltimore City Police Department, Harford County Sheriff's Department, Maryland State Police, and numerous other hospital departments. AT&T provided a distracted driving simulator for the event. Plans are underway to make the distracted driving prevention fair an annual event. In addition to these formal programs, members of the trauma program staff also participate in state and local committees that focus on fall and distracted driving prevention.

Educational Programs and Training

Education is the foundation to improving practice at all levels. The trauma program supported semiannual education for EMS providers with trauma care presentations at two full-day educational seminars. The program facilitates nursing trauma care education at unit level in-services and during an annual fall seminar. Physicians' education is facilitated through support of multiple conferences. The program also supports the Maryland Committee on Trauma's educational programs by providing Advanced Trauma Life Support and Advanced Trauma Care for Nurses courses.

On May 17, 2017, the program held its first annual Trauma Survivor's Day, featuring a Johns Hopkins Bayview Medical Center trauma survivor's story that highlighted his courage and determination to recover from a severe injury. The trauma survivor and his family described their experiences and met many of his caregivers across the continuum of trauma care.

Under the leadership of Elliott R. Haut, MD, PhD, the trauma program offered its first informational session on May 23, 2017, for the nationwide Stop the Bleed campaign. This session educated over 500 attendees on the importance of rapid hemorrhage control. An inaugural Stop the Bleed course to Johns Hopkins surgical residents was then held on May 31, 2017.

Research

The integrated Division of Acute Care Surgery provides the trauma program 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 pre-existing, pre-injury comorbidities. Johns Hopkins Bayview Medical Center cares for a large patient population over the age of 65, and is fortunate to have access to an inpatient rehabilitation center on its campus. The trauma program 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

Prince George's Hospital Center

3001 Hospital Drive, Cheverly, Maryland
MIEMSS Region V

Prince George's Hospital Center serves the residents of Prince George's and surrounding counties and Washington, DC. The hospital is in close proximity to four major highways, making the facility a prime location for EMS transport for Prince George's County and Washington, DC. With 3,769 trauma patients treated from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry, Prince George's Hospital Center is the second busiest trauma center in Maryland. (See pages 75 to 80 for additional patient data.) Adult trauma services at Prince George's Hospital Center are provided by Trauma Services.

Mission

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.

Trauma Staff

R. Sean Benoit, MD, MBA, FACS, is the trauma medical director at Prince George's Hospital Center, and the trauma program manager is Dawn Moreland, BSN, RN, TCRN.

FY 2017 Annual Report

Notable Accomplishments

In FY 2017 Prince George's Hospital Center partnered with the University of Maryland and the residents of Prince George's County and Washington, DC, to create the National Capital Region Violence Intervention Program (CAP-VIP), a hospital-based violence intervention program. CAP-VIP has three components:

- The Violence Intervention Research Project, which engages in continuous data collection, analysis, and evaluation of violent injury and interventions
- Trauma Informed Care, which provides psychosocial services for survivors of violent injury
- The Violence Prevention Program, which engages in violence prevention outreach initiatives for youth and adults living in the National Capital Region.

Quality Management/Quality Improvement

Prince George's Hospital Center's Trauma Services has 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, which is designed to improve the quality and timeliness of patient care.

Injury Prevention Programs and Initiatives

In FY 2017 Prince George's Hospital Center hired a new injury prevention coordinator, and continued to operate many existing injury prevention programs. The hospital's injury prevention is focused on several components, including falls, motor vehicle crashes, and violent crimes. Injury prevention initiatives include partnerships with local churches and the Prince George's County Police Department in a gun buy-back program, partnering with AT&T to reduce distracted driving, creating the Violence Intervention Program, reaching out to local schools to educate youth, and working with local nursing homes to reduce falls by elderly residents.

Educational Programs and Training

During FY 2017 Prince George's Hospital Center offered Trauma Nurse Core Course (TNCC) classes for nurses in the emergency department, intensive care unit (ICU), and the operating room, as well as to nurses throughout Maryland and surrounding states. In addition to the TNCC course, a Trauma Core Course is offered to all nursing staff who treat trauma patients on the medical/surgical floors and in the ICU.

Prince George's Hospital Center supported the Stop the Bleed initiative, a nationwide campaign to provide education in hemorrhage control, and Trauma Services also conducted a distracted driving campaign and is developing new programs for fall prevention and counseling victims of violence.

Research

Prince George's Hospital Center recently hired a new institutional review board director, and expects to conduct many collaborative research projects in the future.

Rehabilitation

Prince George's Hospital Center has 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 Rehab Center.

Level II Adult Trauma Center

Sinai Hospital

2401 West Belvedere Avenue, Baltimore, Maryland
MIEMSS Region III

Sinai Hospital, located in the northwest corridor of Baltimore City, serves the Greater Baltimore metropolitan area. Sinai Hospital treated 2,114 trauma patients from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Adult trauma services at

Sinai Hospital are provided by the Acute Care Division of Surgery.

Mission

Sinai Hospital is part the LifeBridge Health System. Under the new 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.

Trauma Staff

Hashim Hesham, MD, FACS, is the trauma program medical director at Sinai Hospital, and Lauren Smith, MSN, ACNP-BC, is the trauma program manager.

FY 2017 Annual Report

Notable Accomplishments

Sinai Hospital has partnered with the Baltimore City Health Department and Safe Streets to expand its Violence Intervention Program, recently supporting an additional post in Baltimore's Park Heights community. The goal of the program is to intervene at the time a trauma patient presents at the hospital, and help to break a recurrent cycle of violence. The program has achieved multiple successes since it began in 2012. It focuses on youth development through its Kujichagulia Center, a name derived from the Swahili word meaning self-determination, by mentoring students from local schools, providing a jobs program, and offering case management services.

Sinai Hospital has also recruited two new trauma/critical care fellowship-trained surgeons, Farheen A. Qurashi, MD, who formerly worked at MedStar Washington Hospital Center, and Mark Blum, MD, formerly of Virginia Commonwealth University Health System.

Quality Management/Quality Improvement

The trauma program at Sinai Hospital has been working on several quality improvement initiatives this past year. To improve pain scores and decrease narcotic use in patients with multiple rib fractures, the trauma program implemented a new protocol utilizing subcutaneous pain pumps. In a second project, the trauma bay orientation was improved based on input from emergency room nursing and other trauma team members. The course now utilizes simulation to teach roles, responsibilities, and basic skills, with the goal of process improvement during trauma resuscitation. This project will be presented nationally at the Emergency Nurses Association conference in September 2017. The trauma program continues to expand and update its policies and clinical practice guidelines, most recently for trauma in pregnancy, pain management in rib fractures, and massive transfusion protocols.

Injury Prevention Programs and Initiatives

Sinai Hospital continues to be active in community injury prevention initiatives. The Violence Intervention Program was expanded this year by adding more hospital and street responders, in addition to the new Safe Streets post in Park Heights. Social work staffing was also increased in the Emergency Department for more comprehensive coverage. To date, the Sinai Hospital Intervention Program has approached 85 patients and enrolled 15 victims of violence, taking advantage of the "teachable moment" that a traumatic experience provides and connecting patients to community resources.

The trauma program continues to host Stepping ON! fall prevention courses yearly. A fall prevention event, "Ready, Stand, Balance," was held for community members in September 2016. Both of these fall prevention events teach strength and balance, and bring together a variety of experts to educate the public on the most common fall risks and how to prevent them. The trauma program partnered with AT&T's It Can Wait campaign to participate in Distracted Driving Prevention Awareness Day on April 5, 2017, an initiative of the Maryland Trauma Quality Improvement Committee, to educate the community on the dangers of distracted driving. Most recently, the trauma program joined in the efforts of the Maryland Committee on Trauma to offer training in Stop The Bleed, a national campaign educating the community how to utilize tourniquets and wound packing to control bleeding until first responders arrive. Sinai Hospital currently has 30 certified trainers and is ready to take the initiative out into the community.

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

Educational Programs and Training

Several trauma program staff members at Sinai Hospital teach Advanced Trauma Life Support (ATLS), Trauma Nurse Core Course (TNCC), 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. In FY 2017, emergency and trauma department providers from Sinai Hospital delivered lectures on current topics in emergency and trauma care for EMS and other trauma centers throughout the state.

The simulation lab at Sinai Hospital continues to grow, providing hands-on instruction, multidisciplinary training, and team-building opportunities. In addition to the updated trauma bay orientation, Sinai Hospital has updated internal education programs, such as the Basic Trauma course, to keep up with current evidence, standardize courses, and improve access for providers. Sinai Hospital continues to support schools across Maryland by training nurses, advanced practice providers, and EMS providers, among others.

Sinai is the third largest teaching hospital in the state, training residents in multiple specialties. The hospital surgical residency currently has 15 residents, from interns through fifth year. All surgical residents and advanced practice providers in the trauma program maintain current BLS, ACLS, and ATLS certifications. The surgical residents receive additional trauma training in Advanced Trauma Operative Management (ATOM), Focused Abdominal Sonography in Trauma (FAST), and Advanced Surgical Skills for Exposure in Trauma (ASSET). They also complete an eight-week rotation at the R Adams Cowley Shock Trauma Center during their post-graduate III-V years.

Research

Three ongoing studies at various stages are taking place within the trauma program. Understanding Barriers to Trauma Discharges: Improving Hospital Length of Stay Through Efficiency Driven Protocols looks at improving communication and documentation to reduce length of stay (LOS). This study is in its third year, and was presented at a Maryland Committee on Trauma meeting and the Academic Surgical Congress. Predictors of In-Hospital Mortality in Geriatric Patients Presenting with Subdural Hematoma, is researching what symptoms accurately indicate poor outcome. This study has been accepted for presentation at the annual congress of American College of Surgeons in September 2017. The third study, currently in its preliminary stages, will collect data on improvements in pain score and LOS for rib fracture patients after the implementation of the hospital's new subcutaneous pain pump protocol.

Rehabilitation

Sinai Hospital's rehabilitation services are integrated throughout the patient's hospital stay. When a patient is ready for discharge, Sinai Hospital can accommodate them in a 57-bed inpatient rehabilitation center. A full spectrum of acute and subacute rehabilitation services is offered, including pain management, aquatic therapy, physical therapy, occupational therapy, and speech-language and swallow therapies. The rehabilitation center also offers programs such as driving evaluations and return-to-work programs.

Level II Adult Trauma Center

Suburban Hospital – Johns Hopkins Medicine

8600 Old Georgetown Road, Bethesda, Maryland
MIEMSS Region V

Suburban Hospital – Johns Hopkins Medicine, primarily serves the residents of Montgomery County, but is also easily accessible from Frederick and Prince George's Counties. Suburban Hospital cared for 1,632 trauma patients from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Adult trauma services at Suburban Hospital 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 its patients and their families.

Trauma Staff

Dany Westerband, MD, FACS, is the medical director at Suburban Hospital, and Melissa E. Meyers, RN, BSN, MBA, TCRN, is the trauma program director.

Fiscal Year 2017 Report

Notable Accomplishments

In September 2016 Suburban was awarded a Certificate of Need from the Maryland Health Care Commission for infrastructure and campus expansion. The campus enhancement project includes a 300,000 square-foot clinical addition to the hospital and renovations to the existing facility. New state-of-the-art operating room suites will be built to accommodate innovations in surgical care technology. Additional private patient rooms will be designed and constructed to provide greater patient comfort and improve infection control. Other campus enhancements include increased on-campus parking and dedicated medical office space for specialty physicians supporting the trauma, cardiac, and stroke programs.

Quality Management and Quality Improvement

The program has initiated several quality improvement projects. One of them is a chart auditing process for clinicians, which includes a self-auditing checklist to help verifying the completeness and accuracy of the electronic documentation of all trauma resuscitations.

Another project centers on the bimonthly Trauma Nursing Education Conference, during which trauma patient cases that have been managed at Suburban Hospital are reviewed, with a special focus on nursing interventions that could impact patients' outcomes.

Injury Prevention Programs and Initiatives

Suburban Hospital has participated in multiple statewide injury prevention activities in FY 2017. In September 2016 a Fall Prevention Fair was held on campus, and in April 2017 a Distracted Driving Awareness campaign, an initiative of the Maryland Trauma Quality Improvement Committee, was held on-site in collaboration with the Montgomery County Police Department, AT&T, and the Maryland Department of Transportation's Highway Safety Office.

Trauma services at Suburban Hospital conducts a high-risk youth program. In addition to discussing the effects of alcohol and drugs with the young participants, trauma nurses highlight the consequence of poor decisions and dangerous behaviors, which often end in the trauma bay.

Educational Programs and Training

Suburban Hospital's Emergency Department continues to be a training site for prehospital care providers through an agreement with Montgomery County Training Academy and Montgomery County Community College.

The hospital also 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.

In fall 2016 Suburban Hospital launched its Stop the Bleed initiative, a free training program that is part a nationwide campaign to teach health care providers and the public how to stop bleeding and save a life in an emergency. Suburban Hospital was the first hospital in the region to offer Stop the Bleed training, and it is the only hospital currently making training accessible to the community on a monthly basis. The Trauma Center's ultimate goal is to train every citizen in Montgomery County as an immediate responder for bleeding control, while also promoting the installation of bleeding control kits in public places throughout Montgomery County. To date, many hospital employees and over 200 county citizens have been trained in bleeding control techniques.

In June 2017 Suburban Hospital's annual four-hour seminar, "Critical Issues in Trauma," was again offered at the Johns Hopkins University 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.

Research

Suburban Hospital 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 Hospital retains a memorandum of understanding with the Adventist HealthCare Rehabilitation Center to provide these services. Occupational, physical, and speech therapy are provided on-site to trauma patients during their hospital stay. On admission, 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

Located in Hagerstown, Meritus Medical Center serves the residents of Washington and Frederick counties, southern Pennsylvania, and the eastern panhandle of West Virginia. Meritus Medical Center received 1,362 trauma patients from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Adult trauma services at Meritus Medical Center are provided by the Emergency Department.

Mission

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

Trauma Staff

Frank Collins, MD, is the trauma department medical director at Meritus Medical Center, and Susie Burleson, DNP, MBA, RN, is the trauma department program manager.

Notable Accomplishments

Meritus Medical Center provided continuing education through its biannual trauma conferences to more than 230 providers, including EMS, hospital staff, and local health care providers outside the organization.

The trauma department at Meritus Medical Center participated in Distracted Driving Prevention Awareness Day on April 5, 2017, an initiative of the Maryland Trauma Quality Improvement Committee, by partnered with AT&T to reach out to over 100 people about the dangers of this risky behavior. Injury prevention classes for the community reached more than 2,200 individuals in FY 2017. In addition, the trauma department's car seat program assisted with 69 car seat checks throughout the year, and its loaner program provided 13 car seats to families in need of a child passenger safety seat.

Quality Management/Quality Improvement

Meritus Medical Center has worked hard to improve trauma documentation during the past year. To help identify those patients who do not present as trauma patients, but clearly meet the trauma criteria, the trauma department ensures that each patient has a complete vital signs assessment on arrival and discharge. The trauma department 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 2017 Meritus Medical Center trauma department taught several Stepping ON! classes in the community to help decrease falls among the elderly, reaching 20 seniors. The department also worked collaboratively with Safe Kids Washington County to provide education to 2,243 children in the community on various topics, including activities on bicycle, fire, poison, sun, and pedestrian safety. Trauma Services staff participated in statewide injury prevention days, promoting distracted driving awareness and falls prevention. Again this year, the trauma department organized the annual Kids' Safety Art Contest for students in grades K-5 in Washington County.

Educational Programs and Training

In FY 2017 the trauma department organized free trauma conferences in the fall and spring for staff and EMS providers, and also provided Trauma Nurse Core curriculum and Emergency Nursing Pediatric Care courses at the hospital. Trauma department staff also provide one-on-one car seat installation assistance to families in the community, teaching parents and grandparents how to properly install child passenger safety seats. Each spring, the trauma department team recognizes a Trauma Nurse of the Year for their outstanding care of trauma patients. The honoree is granted an educational stipend to spend at a trauma conference.

In May 2017 the trauma department became part of a nationwide campaign to provide education in hemorrhage control by teaching Stop the Bleed classes in the community. Additional trainings will be offered in 2018.

Research

Meritus Medical Center has a professional Nursing Research Council that studies evidence-based best practices in nursing.

Rehabilitation

Meritus Health Total Rehab Care is the largest comprehensive rehabilitation center in the region, with a unit within Meritus Medical Center as well as an outpatient facility at the nearby Robinwood Professional Center. The medical director, nursing staff, therapists, social workers, and program managers at Total Rehab Care work together to provide cutting edge treatment to its patients. A full range of rehabilitation programs, including comprehensive adult inpatient rehabilitation, outpatient pediatric and adult services, traumatic brain injury rehab, and an inpatient joint replacement program, is available at the center. Total Rehab Care inpatient rehabilitation unit is certified to meet national rehabilitation standards as set forth by the Commission on Accreditation of Rehabilitation Facilities (CARF).

Level III Adult Trauma Center

Peninsula Regional Medical Center

100 East Carroll Street, Salisbury, Maryland
MIEMSS Region IV

Located in Salisbury, 30 miles west of Ocean City, Peninsula Regional Medical Center is the only Adult Trauma Center located on the Eastern Shore of Maryland. Peninsula Regional Medical Center provides services to not only the residents on the Delmarva Peninsula, but also to Sussex County in southern Delaware and Accomack County in Northern Virginia. Peninsula Regional Medical Center received 1,397 trauma patients from June 1, 2016, to May 30, 2017, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.) Adult trauma services at Peninsula Regional Medical Center 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.

Trauma Staff

Brion McCutcheon, MD, is the trauma medical director at Peninsula Regional Medical Center, and Kari Cheezum, MSN, RN, CEN, TCRN, is the trauma program manager.

FY 2017 Annual Report

Notable Accomplishments

In FY 2017 the surgical services renovation project was completed, which increased the size of existing operating rooms from 400 to 600 square-feet and added four 800 square-foot rooms. The 16-hour Trauma Orientation Program was improved by purchasing comprehensive online education modules developed by the Society of Trauma Nurses. Instead of being offered three times a year with the potential for different content and speakers, this course is now standardized and offered on a continual basis. A test that follows each module is used to validate learned concepts.

Trauma Program Manager Kari Cheezum and EMS Nurse Liaison Doug Walters, RN, EMT-I, have each achieved certification as a Trauma Nursing Core Course (TNCC) instructor so they may assist the course director by offering more in-house classes to certify nursing staff.

In November 2016 PRMC upgraded its electronic medical record system by transitioning to Epic software. The trauma team now utilizes real-time computer documentation for all trauma activations, with the goal of improving communication and patient safety.

Quality Management/Quality Improvement

In FY 2017 the Trauma Committee revised the adult Massive Transfusion Protocol and developed a similar protocol specifically for pediatric patients. Based on over and under triage data from the Maryland State Trauma Registry, Peninsula Regional Medical Center also made revisions to the trauma activation criteria, including to the naming criteria for activations. To prevent confusion or inappropriate notification between trauma activation and disaster/fire pages, the Trauma Committee elected to change the name of the highest activation, previously known as Red Code, to Trauma Red and the modified activation, previously known as Yellow Code, to Trauma Yellow. Other quality improvement initiatives at Peninsula Regional Medical Center include 1) a new process developed through the Performance Improvement and Patient Safety program and Department of Radiology to identify missed injuries and review ultrasound results, 2) the creation of a separate emergency department morbidity and mortality conference, and 3) the continuation of feedback from the EMS nurse liaison to EMS providers through a standardized performance improvement process.

Injury Prevention Programs and Initiatives

The trauma center continues to coordinate and participate in community-based injury prevention initiatives. In fall 2016 Peninsula Regional Medical Center participated in a statewide fall injury prevention initiative. During the prom season of spring 2017, Trauma Center nurses and staff assisted the Wicomico Highway Safety Task Force, Wicomico Sheriff's Department, Salisbury Fire Department, Salisbury Police Department, and the Maryland State Police Aviation Command with a mock-crash scenario for local high schools. In April 2017 trauma department staff participated in a second statewide injury prevention initiative that focused on distracted driving awareness and prevention, an initiative of the Maryland Trauma Quality Improvement Committee.

Trauma department staff continues to work with the Maryland Division of the American Trauma Society and local communities to hold wellness events for the public. For the past five years, trauma department staff, along with TraumaRoo, the American Trauma Society's children's safety program mascot, provided injury prevention education to children at the Maryland State Firemen's Association's Annual Convention and Conference in Ocean City. In FY 2017 trauma department staff 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, and they continue to be active members of the Ocean City Pedestrian Safety Task Force, which focuses on improving pedestrian safety in Worcester County, including Ocean City.

Educational Programs and Training

Peninsula Regional Medical Center continues to assist in planning, coordinating, and sponsoring regular educational events. A multidisciplinary group coordinates and sponsors the annual Topics in Trauma Conference, which is in its twenty-seventh 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 2017 Peninsula Regional Medical Center continued to provide educational classes for EMS providers from Worcester, Wicomico, and Somerset Counties. Prehospital Basic Trauma Life Support, Advanced Life Support (ALS) Paramedic recertifications/refreshers, and ALS Skills are just a few of the classes offered. Peninsula Regional Medical Center continues to support Wor-Wic Community College EMS programs as a clinical site for students.

In March 2017 five Peninsula Regional Medical Center emergency/trauma nurses became certified to teach Stop the Bleed in support of the nationwide campaign to educate the public on the proper ways to identify and stop life-threatening hemorrhage.

Rehabilitation

Peninsula Regional Medical Center maintains an in-house rehabilitation program that offers physical, occupational, and speech therapy. The hospital also partners 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. In FY 2017 PRMC referred 74 patients to rehabilitation facilities.

Level III Adult Trauma Center

Western Maryland Regional Medical Center

12500 Willowbrook Road, Cumberland, Maryland
MIEMSS Region I

Located in Cumberland, Western Maryland Regional Medical Center, part of Western Maryland Health System, is the only Maryland-designated Adult Trauma Center serving Allegany and Garrett Counties. Western Maryland Regional Medical Center received 626 trauma patients from June 1, 2016, to May 31, 2017, according to the Maryland State Trauma Registry. (See pages 75 to 80 for additional patient data.)
Adult trauma services at Western Maryland Regional Medical Center are provided by the Emergency Department Team.

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*

Trauma Staff

Juan Arrisueno, MD, is the trauma director at Western Maryland Regional Medical Center, and Elizabeth Wooster, PhD, RN, MS, MsEM, is the trauma services program manager.

FY 2017 Annual Report

Quality Management/Quality Improvement

In FY 2017 Western Maryland Regional Medical Center implemented several new pathways of care, with the goal of standardizing patient care based on evidence-based best practices to improve patient outcomes. The hospital's emergency department set several measures in place to enhance patient throughput, resulting in a decreased length of stay by 50 minutes and improving overall patient care.

Trauma Services Program Manager Dr. Elizabeth Wooster facilitates communication between hospital and prehospital personnel (as the Base Station coordinator), serves as the specialty care transport coordinator, and holds positions on the Miltenberger Emergency Services Seminar planning committee, MIEMSS Region I EMS Advisory Council, and MIEMSS' Adult Trauma Standards Workgroup. Dr. Wooster also serves as the chair of the Maryland Trauma Center Network (TraumaNet).

Injury Prevention Programs and Initiatives

In support of a nationwide campaign to provide education in hemorrhage control, Western Maryland Regional Medical Center received multiple grants to teach Stop the Bleed courses. The hospital partnered

with Allegany County Department of Emergency Services and Garrett County Department of Public Safety to teach these courses to local EMS/fire and law enforcement and citizens of MIEMSS Region I and surrounding bordering counties in Pennsylvania and West Virginia. The first course was taught in November 2016. Western Maryland Regional Medical Center has now taught over 700 students, including 51 police officers, through its Stop the Bleed initiative.

Western Maryland Regional Medical Center participated in Distracted Driving Prevention Awareness Day on April 5, 2017, an initiative of the Maryland Trauma Quality Improvement Committee. The hospital partnered with EMS chiefs from Allegany and Garrett Counties and AT&T to hold four presentations on distracted driving awareness for the public. Literature was also distributed to high school students throughout MIEMSS Region I.

In FY 2017 trauma staff from Western Maryland Regional Medical Center delivered the lecture "Trauma Nurses Talk Tough" to high school and college students in MIEMSS Region I, along with Mineral and Hampshire Counties in West Virginia and several schools in Somerset County, Pennsylvania. The trauma staff also conducted the Watch Your Step falls prevention program, which primarily serves senior populations.

Educational Programs and Training

Western Maryland Regional Medical Center is the trauma education hub for MIEMSS Region I, and offers continuing education credit for these courses:

- Advanced Cardiac Life Support
- Pediatric Advanced Life Support
- Neonatal Advanced Life Support
- Trauma Nursing Core Course
- Specialty Care Transport Medicine
- R Adams Cowley Shock Trauma Center telelink classes
- Annual trauma seminar at Miltenberger Emergency Services Seminar
- Cadaver lab clinical competency for physicians

In addition, the hospital offers skills training for nurses, emergency room technicians, and EMS providers; a multidisciplinary journal club; multidisciplinary case reviews; and weekly instruction by a visiting professor.

Rehabilitation

The Comprehensive Inpatient Rehabilitation Unit, located within Western Maryland Health System, operates 24-hours a day. It is a 13-bed unit dedicated to providing rehabilitation services on a full-time basis. 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

The MedStar Washington Hospital Center treats patients from Washington, DC, and nearby counties in Maryland and Virginia. It is also the primary referral hospital for trauma patients transferred from other hospitals in parts of Delaware, Southern Maryland, the Eastern Shore, Northern Virginia, and West Virginia. In FY 2017, MedStar Washington Hospital Center treated 1,828 trauma patients from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. Adult Trauma services at MedStar Washington Hospital Center are provided by the MedStar Trauma Team.

Mission

MedStar Washington Hospital Center, a valued member of MedStar Health, is dedicated to delivering exceptional PATIENT FIRST health care. We provide the region with the highest quality and latest medical advances through excellence in patient care, education, and research. The hospital's vision is to be the trusted leader in caring for people and advancing health utilizing the following guiding principle: To treat each patient as we would a member of our own family by providing the best medical treatment with caring and compassion, responsive service, and intelligent use of resources. Through this achievement, we will be recognized as a national model for excellence in patient-centered care.

MedStar Washington Hospital Center values are

- *Service – We strive to anticipate and meet the needs of our patients, physicians, and coworkers.*
- *Patient First – We strive to deliver the very best to every patient every day. The patient is the first priority in everything we do.*
- *Integrity – We communicate openly and honestly, build trust, and conduct ourselves according to the highest ethical standards.*
- *Respect – We greet each individual, those we serve and those with whom we work, with the highest professionalism and dignity.*

- *Innovation – We embrace change and work to improve all we do in a fiscally responsible manner.*
- *Teamwork – System effectiveness is built on the collective strength and cultural diversity of everyone, working with open communication and mutual respect.*

Trauma Staff

Jack Sava, MD, is the medical director for the MedStar Trauma Team at MedStar Washington Hospital Center, and Susan Kennedy, RN, BSN, is the program manager.

Fiscal Year 2017 Report

Notable Accomplishments

In FY 2017 the MedStar Trauma Team participated in a multidisciplinary committee to rewrite the Washington, DC, Department of Health's mass casualty plan, developed a new triage criteria category for care of pregnant patients in shock with imminent delivery, and developed clinical guidelines for the use of resuscitative endovascular balloon occlusion of the aorta (REBOA).

Quality Management/Quality Improvement

Quality improvement initiatives in FY 2017 at the adult trauma center included revised cervical spine protocols and revised discharge instruction for stab wound care, gunshot wound care, and care of chest tube and pneumothorax sites.

Injury Prevention Programs and Initiatives

The MedStar Trauma Team held a number of injury prevention programs in FY 2017:

- Matter of Balance fall prevention class
- Drunk/distracted driving event
- Participated in the YMCA's "Thingamajig" annual health and safety event at Prince George's County Equestrian Center, with 4,000 in attendance
- Host for District of Columbia Trauma Injury Prevention Coordinator's Collaborative and National Organization for Youth Safety monthly meetings
- Member of the National Network of Hospital-based Violence Intervention Programs Policy Working Group
- ThinkFirst injury prevention monthly events
- Monthly male survivors group events
- Stop The Bleed campaign events

Educational Programs and Training

MedStar Trauma Team has a robust educational program, including an average of 3 clinical fellows, 55 residents, and 25 medical students trained per year. Four Advanced Trauma Life Support and Advanced Trauma Care for Nurses courses are available for health care providers, as are EMS continuing education opportunities, such as BLS refresher training and trauma lectures.

Research

Several MedStar Trauma Team staff members published research studies in peer-reviewed journals in FY 2017, or have completed studies awaiting publication, including "Safety of early ambulation following blunt abdominal solid organ injury: a prospective observational study," "Extremity vascular injury management: Good outcomes using selective referral to vascular surgeons," "A pilot program to improve nursing and surgical intern collaboration: Lessons learned from a mixed-methods study," and "From trauma to treatment: Optimizing vascular trauma patient management."

Adult Burn Center

Johns Hopkins Bayview Medical Center

4940 Eastern Avenue, Baltimore, Maryland

Johns Hopkins Bayview Medical Center serves the residents of Maryland and certain regions of adjacent states. Johns Hopkins Bayview Medical Center treated 740 burn patients from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. (See pages 81 to 83 for additional patient data.) Adult burn services at Johns Hopkins Bayview Medical Center are provided by the Burn Center.

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.

Burn Staff

The medical director at Johns Hopkins Bayview Medical Center's adult burn unit is Julie Caffrey, DO, MS, and the burn program coordinator is Natalie Tredway, BSN, RN.

FY 2017 Annual Report

Notable Accomplishments

The Johns Hopkins Bayview Medical Center Burn Center was reverified by the American Burn Association (ABA) in FY 2017, and it continues to be the only ABA-verified burn center in Maryland.

In FY 2017 the Burn Center hired a burn program coordinator to maintain quality/performance improvement programs; monitor and maintain compliance with national and statewide burn regulatory requirements; participate in regional and statewide burn care activities, meeting, and conferences; and monitor national and statewide trends in burn care.

Quality Management/Quality Improvement

The Burn Center has developed a dashboard to track quality metrics specific to burn patients. The dashboard also helps staff identify areas of opportunity, improve treatment techniques, and improve patient outcomes.

In FY 2017 the Burn Center implemented four new policies standardizing the initial management of patients: burn team activation policy, electrical injury policy, chemical injury policy, and inhalation injury policy. The burn team activation policy designates the timeframe and level of response required by the burn team when responding to burn patients in the emergency room.

Injury Prevention Programs and Initiatives

Johns Hopkins Bayview Medical Center realizes the importance of community outreach and education, and Burn Center staff participate in many programs related to burn injury prevention. Carrie Cox, MS, RN, is the community outreach and education coordinator for the Burn Center, and Thomas McLhinney plays a vital role in burn prevention programs in his role as a community program manager.

In FY 2017 the Burn Center participated in various fire safety and burn programs for adults and senior citizens, the Kiwanis Community Burn Prevention Program for school-aged children, the Safe Babies Program for newborns and their parents, and the Juvenile Fire-setter Program for at-risk youth and their parents. Every year, the Burn Center staff participates in a number of statewide health and safety fairs for community members of all ages.

Educational Programs and Training

The Johns Hopkins Bayview Medical Center Burn Center offers an EMS/firefighter burn course for prehospital providers in Maryland and Pennsylvania, and also offers rotation time in the center for EMS students upon request. Burn Center staff and faculty participate annually in advanced life support updates for Baltimore City and other Maryland counties, deliver lectures at EMS regional conferences throughout the state, and offer biannual education through the EMS Care conference.

The Burn Center offers clinical education for health care professionals throughout the region who may come into contact with burn patients, enhancing the care that these patients receive. Clinical education programs currently provided include Advanced Burn Life Support provider certification courses, which are taught biannually at the Burn Center as well as throughout the region; the Emergency Department Burn Poster Program; the Military Burn Education Program, in conjunction with the Center for the Sustainment of Trauma and Readiness Skills (C-STARS); and on-site clinical training for medical, nursing, rehabilitation, psychology, and dietician students.

Johns Hopkins Bayview Medical Center provides annual fellowship training for physicians in general and plastic surgery tracks, and has been doing so for over 20 years. Burn physicians all over the world, many of whom are now burn center directors or attending physicians, have received training at the Burn Center. Residency training is also offered in partnership with many 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

Faculty at the Burn Center is involved in several collaborative research projects with other hospital departments, including critical care service, nursing, burn nutrition, burn rehabilitation, psychology, and with other physician and fellowship staff. The Michael D. Hendrix Burn Research Laboratory actively studies non-healing wound environments in animal models, and is looking at ways to improve or accelerate burn wound healing.

Clinical studies this past year included

- A Goniometry Paradigm Shift to Measure Burn Scar Contracture in Burn Patients
- Prevalence of Post-traumatic Stress Disorder Symptoms in Burn Center Clinical Staff
- Classification and Prognostic Factors in Inhalation Injuries

- A Quality Improvement Project: UV Light Technology for MRSA Decolonization of the Burn Unit
- Use of HUD Epicel in Burn Patients Requiring Grafting
- Inhalational Injury Effects on AQP5 Expression
- Direct Measure of Renal Function in Severely Burned Patients

The Burn Center publishes its findings and presents at various local, regional, and national conferences. In FY 2017 Burn Center colleagues were invited to present at the American Burn Association Conference, the Mid-Atlantic Region Burn Conference, the Armstrong Institute Symposium, and the American Association of Critical-Care Nurses Chesapeake Chapter Conference. Burn Center colleagues also wrote textbook chapters and were published in peer-reviewed journals including the *Journal of Burn Care and Research, Plastic and Reconstructive Surgery,* and *Eplasty*.

Rehabilitation

The burn rehabilitation team is dedicated to rehabilitating burn survivors to become functional, productive, and happy members of society. Rehabilitation staff includes two full-time and one per diem occupational therapists and two full-time and three per diem physical therapists. There are two full-time speech therapists who evaluate patients throughout Johns Hopkins Bayview Medical Center, including the Burn Center.

In addition to treatments conducted at bedside, all inpatients and outpatients are treated in the rehabilitation gym, located in the Burn Center. Every patient admitted to the Burn Center is seen by physical and occupational therapists within 24 hours of admission. Most burn inpatients are treated on a daily basis. The burn rehabilitation team evaluated 362 inpatients this year.

Burn patients throughout the region seek treatment at Johns Hopkins Bayview Medical Center. The rehabilitation staff works with case management and social work providers to discharge patients to appropriate levels of care that are close to home, if possible. The Burn Center has a close working relationship with the Johns Hopkins Specialty Hospital for inpatient rehabilitation. Burn rehabilitation staff have also provided in-service training to therapy practices outside of the hospital to enhance the patient continuum of care, and are always available for consultation.

Outpatient therapy is provided in the burn gym. In FY 2017, 78 patients were referred to the burn gym for outpatient therapy. On average, a burn outpatient participates in therapy 1 to 1.5 hours a day for four days a week.

Adult Burn Center

MedStar Washington Hospital Center

110 Irving Street, NW, Washington, DC

The Burn Center at MedStar Washington Hospital Center is the regional adult 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 treated 1,047 patients from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. The outpatient burn clinic provides care for more than 850 patients annually. Jeffrey Shupp, MD, is the Burn Center director, and Susan Kennedy, RN, BSN, is the program manager.

The Burn 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.

This 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. The Burn Center provides care for an array of thermal, electrical, and chemical injuries as well as soft tissue lesions.

Pediatric Trauma Center

Johns Hopkins Children's Center

1800 Orleans Street, Baltimore, Maryland

Johns Hopkins Children's Center serves the residents of Maryland and surrounding states. In FY 2017 Johns Hopkins Children's Center treated 912 trauma-injured children from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. (See pages 84 to 87 for additional patient data.) Pediatric trauma services at Johns Hopkins Children's Center 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*

Trauma Staff

The medical director of the Pediatric Trauma and Burn Program at Johns Hopkins Children's Center is Dylan Stewart, MD, FACS, and the program manager is Susan Ziegfeld, MSN, PNP-BC.

FY 2017 Annual Report

Quality Management/Quality Improvement

The Pediatric Trauma Program has a vigorous performance improvement program. Through data collection, trending, and benchmarking, several clinical processes have shown improvement. The center decreased trauma bay length of stay and improved overall emergency department throughput based on the pediatric targets prepared by the Academy of Administrators in Academic Emergency Medicine (AAAEM). The center is currently investigating optimal dispositions for children with traumatic brain injuries.

Injury Prevention Programs and Initiatives

Johns Hopkins Children's Center has a robust injury prevention program, offering services to inpatients and the community. Trained child passenger safety technicians provide car seat demonstrations and assist with on-site installations for patients prior to discharge. Thanks to financial support from the Maryland Trauma Network (TraumaNet), the injury prevention team is able to provide conventional car seats to families that demonstrate financial need. In addition, the injury prevention team facilitates a special needs loaner program for children requiring alternative devices for safe transport. The loaner program at Johns Hopkins Children's Center allows families to utilize alternative transport equipment for the duration of their child's recovery, without having to incur the cost of purchasing a seat on their own. In addition to inpatient consultation, the injury prevention team hosts biannual car seat inspections open to patients and their families and to the community. Child passenger safety technicians are on hand to check for recalls, ensure car seats are optimal for the child's age and body size, and check harness fit and proper installation.

In September 2016, in recognition of National Fall Prevention Month, pediatric and adult trauma centers at The Johns Hopkins Hospital held a Fall Prevention Awareness Seminar and Health Fair. The event featured tai chi demonstrations to highlight how to prevent falls through improving balance.

As part of the Maryland Trauma Quality Improvement Committee's initiative to recognize National Distracted Driving Awareness Month, pediatric and adult trauma centers at The Johns Hopkins Hospital partnered with the Maryland State Police, AT&T, and the American Pediatric Surgical Nurses Association for the third annual Distracted Driving Prevention Awareness Seminar and Health Fair in April 2017. The event featured information on distracted driving crash data, evidence-based prevention programs, and policy implementation and successes. Attendees had the opportunity to try a distracted driving virtual reality experience.

The Pediatric Trauma Program has also partnered with the Johns Hopkins Bayview Medical Center to participate in the nationwide Stop the Bleed campaign to educate the public in hemorrhage control techniques.

Educational Programs and Training

The Pediatric Trauma and Burn Program 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. The program also offers Advanced Trauma Life Support courses, taught by Dr. Stewart, Ms. Ziegfeld, and Dr. Isam Nasr, the center's associate director.

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 (ACGME). One fellow per year is accepted, allowing a junior and senior fellow to train in the program at all times. Under the direction of the general pediatric surgery (GPS) attending, GPS fellows are responsible for the management of all trauma and burn patients at Johns Hopkins Children's Center. Six months of the first year of fellowship are scheduled at the University of Maryland Medical Center, and the remaining 18 months are at Johns Hopkins Children's Center. The International Pediatric Surgery Fellowship program is a new addition to the Johns Hopkins Children's Center, having begun in July 2017. The international fellows will focus on the management of complex surgical patients using minimally invasive surgical techniques.

Research

The Pediatric Trauma Center maintains an active research program, and its faculty and staff have presented work nationally and internationally. Members of the pediatric trauma team have received national and local grants, including a grant 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 Sanitarium for Children of Baltimore City foundation was received for a pilot study on bicycle safety in the urban setting, tailored to cultural diversity. The Pediatric Trauma Program continues to participate in multisite projects, including studies on care transitions and teamwork in pediatric trauma, youth violence prevention, and open fractures in children.

Pediatric Trauma Program staff had a successful year of podium and poster presentations at academic conferences across the country, including at annual meetings for the Pediatric Trauma Society, American Pediatric Surgical Association, National Neurotrauma Society, Pediatric Academic Society, and the Society of Critical Care Medicine.

In FY 2017 the pediatric trauma team authored or co-authored seven publications in peer-reviewed journals, including the *Journal of Trauma and Acute Care Surgery*, *Journal of Pediatric Orthopaedics, Pediatric Emergency Care,* and *Plastic and Reconstructive Surgery*.

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 also trained as certified child passenger safety technicians and support the Johns Hopkins Children's Center's injury prevention program. The center partners with the Kennedy Krieger Institute and the Mount Washington Pediatric Hospital for children needing continual inpatient rehabilitation.

Pediatric Trauma Center

Children's National Medical Center

111 Michigan Avenue, NW, Washington, DC

Children's National Medical Center serves the pediatric residents of Washington, DC; multiple counties within Maryland, including Montgomery and Prince George's; Southern Maryland; and certain regions of adjacent states. Children's National Medical Center treated 708 trauma patients from Maryland from June 1, 2016, through May 31, 2017, according to the Maryland State Trauma Registry. (See pages 84 to 87 for additional patient data.) Pediatric trauma services at Children's National Medical Center are provided by the Division of Emergency Trauma and Burn Surgery through its Trauma Program.

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.

Trauma Staff

The medical director of the Division of Emergency Trauma and Burn Surgery at Children's National Medical Center is Randall S. Burd, MD, PhD, and the program manager is Jennifer Fritzeen, MSN, RN.

FY 2017 Annual Report

Notable Accomplishments

In FY 2017 Children's National Medical Center continued a three-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 will also facilitate easy data upload into the trauma registry. Children's National Medical Center and Cerner plan to launch the trauma flowsheet in FY 2018.

Quality Management/Quality Improvement

The Trauma Program at Children's National Medical 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, the trauma and radiology departments worked together to make evidenced-based changes to the hospital's solid organ injury guidelines. These changes decreased intensive care unit (ICU) admissions and decreased length of stay by 50%, while increasing the quality of care delivered to this population.

Additional quality improvement efforts were made in FY 2017 using chart review, video review, and simulated events to identify issues, strategize a plan for improvement, and measure outcomes. From these efforts, an enhancement was made to the trauma bay to support care of penetrating trauma admissions. Simulation exercises identified equipment changes to be made and equipment set-up education needs, leading to extensive training for staff and equipment and room redesign.

Injury Prevention Programs and Initiatives

In FY 2017 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 (THEARC), and at a local birthing hospital weekly. In FY 2017 the program staff conducted 870 car seat inspections. In May 2017 Safe Kids DC, in partnership with YMCA of Metropolitan Washington, was awarded a grant from Safe Kids Worldwide and Graco to provide 100 families in underserved areas with car seats and car seat education.

The Trauma Program partnered with the Freddie Mac Child and Adolescent Protection Center in FY 2017 to launch The Period of Purple Crying, a program designed to teach families the risk of inflicted abusive head trauma during infancy. The program was initially offered to families admitted to Children's National Medical Center, and has now expanded to partnering birthing centers, prenatal clinics, and parenting groups. To date over 1,500 families have been educated through this program. Additionally, in October 2016 Children's National Medical Center became the first hospital to partner with the Childhelp organization to provide intake call center services for the National Child Abuse Hotline.

Educational Programs and Training

In FY 2017 multiple trauma educational programs were offered at Children's National Medical Center. 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. Pediatric Care After Resuscitation (PCAR) trained 44 nurses at its fourth yearly appearance at Children's National Medical Center. The first annual Child Abuse Prevention Symposium was held in March 2017. This inaugural event hosted 184 nurses, physicians, social workers, child life therapists, and government employees.

In January 2017 Children's National Medical Center partnered with George Washington University Medical Center and Washington Hospital Center to offer an inaugural hemorrhage control training symposium for health care providers, as part of the nationwide Stop the Bleed campaign. Children's National Medical Center now offers the training monthly, and is expanding into community-based courses.

Research

The Trauma Program maintains an active research program with multi-year studies in place. In FY 2017 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 FY 2017 clinical staff authored or co-authored 11 trauma-related publications in peer-reviewed journals, including the *Annals of Emergency Medicine, JAMA*, *Journal of Pediatric Orthopedics,* and *Pediatric Critical Care Medicine*. A complete listing of current research studies and publications is available on Children's National Medical Center's website.

Rehabilitation

The Department of Physical Medicine and Rehabilitation at Children's National Medical Center consists of three divisions: Pediatric Rehabilitation Medicine, Physical Therapy, and Occupational Therapy. Physicians, advanced practice nurses (APN), registered nurses, physical therapists, occupational therapists, and rehabilitation aides deliver interdisciplinary care to patients at the National Center for Children's Rehabilitation (acute inpatient medical care) and Children's National Medical Center, 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 serves the residents of Maryland and surrounding states. Johns Hopkins Children's Center treated 373 burn-injured patients from Maryland from June 1, 2016, through July 1, 2017, according to the Maryland State Trauma Registry, plus had an additional 900 burn clinic visits. (See pages 88 to 91 for additional patient data.) Pediatric burn services at Johns Hopkins Children's

Center are provided by the Pediatric Trauma and Burn Program.

Mission

The mission of the Pediatric Burn Program at the Johns Hopkins Children's Center is to make a positive difference in the lives of children through pediatric burn injury prevention, education, evidenced-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 by pediatric professionals to the seriously burned pediatric patient*
3. *To evaluate the effectiveness of the burn care delivered by ongoing evidence-based research and performance improvement programs*

Burn Staff

The medical director of the Pediatric Trauma and Burn Program at Johns Hopkins Children's Center is Dylan Stewart, MD, FACS, and the program manager is Susan Ziegfeld, MSN, PNP-BC.

FY 2017 Annual Report

Quality Management/Quality Improvement

The Pediatric Burn Program at Johns Hopkins Children's Center has a vigorous performance improvement program. Through data collection, trending, and benchmarking, several clinical processes have shown improvement, including decreases in the time to patients' first pain medication and time to burn wound care. Since implementation of the nurse-driven fluid resuscitation protocol, over- and under-resuscitation has been minimized, and patient length of stay in the pediatric intensive care unit (PICU) has decreased.

The Sunshine laser program, designed to treat burn scars, was initiated in December 2016. This is a burn-specific laser program derived from the hospital's burn late-effects clinic. Despite aggressive scar prevention, some children develop burn scars that cause pain, significant itching, and movement restrictions. The Sunshine program is an outpatient surgical clinic held monthly. Significant improvements in quality of life have been reported by patients and their families.

The Burn Program initiated another exciting program in FY 2017, the Pediatric Injury Quality Improvement Consortium (PIQIC) after recognizing the need for pediatric-specific quality and performance metrics to evaluate pediatric burn outcomes. Four additional pediatric burn centers from around the country were invited to participate in PIQIC. The consortium's inaugural meeting was in November 2016, and monthly teleconferences have been held since then. 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 also establishing national performance standards. Data-sharing and multisite research among PIQIC members are under development.

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. The burn psychology team has collaborated with other pediatric burn centers through PIQIC to establish a focused psychology screening process across sites.

Injury Prevention Programs and Initiatives

Johns Hopkins Children's Center has a robust injury and burn prevention program offering services to inpatients and the community. The injury prevention team has established relationships with elementary schools, youth groups, religious institutions, and summer camps to bring burn prevention education to nearby communities. Burn registry data is used to identify high-risk areas and help focus outreach topics that have the most relevance to the intended audience. Education is geared toward the children's age and developmental level, and covers the biology (layers) of the skin, severity of burns, mechanisms of burn injury, burn prevention, and burn treatment.

The injury prevention team offers ongoing education to burn nurses at Johns Hopkins Children's Center. 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 national data, and burn prevention services offered by the hospital.

Along with nurses from the Pediatric Burn Program, Emergency Department, and PICU, the injury prevention team participates in community outreach events such as health fairs, festivals, and sporting events to provide the community with burn prevention education. Events include interactive burn prevention educational activities, take-away literature, and burn prevention safety product giveaways.

Educational Programs and Training

The Pediatric Trauma and Burn Program 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. The program also offers Advanced Trauma Life Support courses, taught by Dr. Stewart, Ms. Ziegfeld, and Dr. Isam Nasr, the center's associate director.

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 (ACGME). One fellow per year is accepted, allowing a junior and senior fellow to train in the program all times. Under the direction of the general pediatric surgery (GPS) attending, GPS fellows are responsible for the management of all trauma and burn patients at Johns Hopkins Children's Center. Six months of the first year of fellowship are scheduled at the University of Maryland Medical Center, and the remaining 18 months are at Johns Hopkins Children's Center. The International Pediatric Surgery Fellowship program is a new addition to the Johns Hopkins Children's Center, having begun in July 2017. The international fellows will focus on the management of complex surgical patients using minimally invasive surgical techniques.

Research

Pediatric Burn Program staff had a successful year of podium and poster presentations at academic conferences across the country, including at annual meetings for the American Burn Association, Pediatric Trauma Society, and the American Pediatric Surgical Association.

The Pediatric Burn Program has several ongoing research projects, including a studies of laser treatment of burn scars, functional outcomes of hand burns, and child quality of life and parent post-traumatic stress disorder following a burn injury.

Rehabilitation

Johns Hopkins Children's Center has a state-of-the-art pediatric rehabilitation program that offers inpatient rehabilitation and comprehensive outpatient services. The hospital partners with Mount Washington Pediatric Hospital for burn patients needing continual inpatient rehabilitation.

The pediatric burn late-effects clinic now holds four sessions a year. This multidisciplinary clinic provides care for the late effects of burn injuries to children, including contractures, burn scars, and post-traumatic stress.

Pediatric Burn Center

Children's National Medical Center

111 Michigan Avenue, NW, Washington, DC

Children's National Medical Center serves the pediatric residents of Washington, DC; multiple counties within Maryland, including Montgomery and Prince George's; Southern Maryland; and certain regions of adjacent states. Children's National Medical Center treated 242 burn-injured patients from Maryland from June 1, 2016, through July 1, 2017, according to the Maryland State Trauma Registry, plus had an additional 588 burn clinic visits. (See pages 88 to 91 for additional patient data.) Pediatric burn services at Children's National Medical Center are provided by the Division of Emergency Trauma and Burn Surgery through the hospital's Burn Program.

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.

Burn Staff

The medical director of the Division of Emergency Trauma and Burn Surgery at Children's National Medical Center is Randall S. Burd, MD, PhD, and the program manager is Jennifer Fritzeen, MSN, RN.

FY 2017 Annual Report

Notable Accomplishments

Children's National Medical Center recently expanded its burn laser program by incorporating burn laser procedures, previously administered by a different department, into the Burn Program. Pulse dye and CO_2 fractionated lasers are used to treat patients with functional limiting scars and pruritus. The Burn Program will be partnering with other pediatric burn centers to determine pediatric best practice in laser treatment.

Quality Management/Quality Improvement

The Burn Program has a robust quality improvement program. Several quality projects have focused on the enhancement of burn care in FY 2017, including the improvement in fluid management in patients with a greater than 15% total body surface area (TBSA) burn

injury. With a fluid template now completed by critical care nurses in collaboration with the burn surgeon, patients are having the appropriate fluid titrated during the first 24 hours after injury. This adequate fluid titration decreases the risk for compartment syndrome, pneumonia, and other adverse complications.

The Burn Program is one of five charter members of the Pediatric Injury Quality Improvement Consortium, which will be implementing benchmark metrics in the care of the burn patients, developing best practice protocol in burn care, and contributing to multicenter research in burn management.

Injury Prevention Programs and Initiatives

In FY 2017 the Burn Program partnered with the DC Firefighters Burn Foundation to offer educational opportunities within the community. Children's National Medical Center partnered with the foundation to sponsor a burn prevention fair for over 240 children in the main atrium of the hospital.

Educational Programs and Training

In FY 2017 multiple burn educational programs were offered at Children's National Medical Center. Trauma Update, a half-day trauma and burn conference, was offered in the spring and fall. Over 100 nurses, respiratory therapists, EMTs, and paramedics attended each event. Pediatric Care After Resuscitation (PCAR) trained 44 nurses in its fourth yearly appearance at Children's National Medical Center.

Also in FY 2017 Children's National Medical Center sponsored over 40 nurses, therapists, and physicians to attend the Northeast Regional Burn Conference and 6 nurses and therapists to attend the American Burn Association National Conference.

Six nurses and child-life therapists completed The Journey Back training through the Phoenix Society in FY 2017. The Journey Back is a program for parents, teachers, or any caring adult who is assisting a child with a positive return to school after a burn injury or traumatic loss. With templates, worksheets, videos and other resources, The Journey Back addresses the academic, physical, social, and emotional aspects of the recovery process. It is designed for any caring adult who wants to help ensure the smoothest return possible for a child in their life.

Research

The Burn Program maintains an active research program with multi-year studies in place. In FY 2017 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.

Journals featuring clinical staff publications are listed in the Children's National Medical Center's Trauma Program report (see page 49), and a complete listing of current research studies and publications is available on Children's National Medical Center's website.

Rehabilitation

The Department of Physical Medicine and Rehabilitation at Children's National Medical Center consists of three divisions: Pediatric Rehabilitation Medicine, Physical Therapy, and Occupational Therapy. Physicians, advanced practice nurses (APN), registered nurses, physical therapists, occupational therapists, and rehabilitation aides deliver interdisciplinary care to patients at the National Center for Children's Rehabilitation (acute inpatient medical care) and Children's National Medical Center, 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 location at The Johns Hopkins Hospital is the sole designated Eye Trauma Center in Maryland. Faculty, staff, and trainees within the Department of Ophthalmology collaborate with adult and pediatric emergency departments of The Johns Hopkins Hospital and care teams across Johns Hopkins Medicine to co-manage the care needs of patient populations within and outside of Maryland. Dedicated eye treatment rooms, operating rooms, and on-call coverage from every subspecialty ensure that patients are treated at the highest standard of care, 24 hours a day.

The Wilmer Eye Institute is among the largest academic departments of ophthalmology in the United States, based on its size of faculty, breadth of expertise, and robustness of research activity. Wilmer Eye Institute has over 160 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.

Trauma Staff

The director of the Eye Trauma Center is Fasika Woreta, MD, MPH, and Shailaja Chopde, MSN, RN, nurse manager, is the eye trauma coordinator.

FY 2017 Annual Report

Notable Accomplishments

Dr. Fasika Woreta, the Eye Trauma Center's new director, is also the associate residency program director and assistant professor of ophthalmology within the Division of Cornea, Cataract, and External Disease. Dr. Woreta has worked diligently in assembling a comprehensive team of subspecialists with specific interest and expertise in ocular trauma (clinical, research, and educational). Experts now recruited to care management and oversight roles in the Eye Trauma Center include Dr. Courtney Kraus (pediatric ophthalmology), Dr. Mira Sachdeva (retina), Dr. Nicholas Mahoney (oculoplastics), Dr. Pradeep Ramulu (glaucoma), and Dr. Amanda Crum (optometry). FY 2017 pilot projects in the area of telemedicine have laid the groundwork for capturing images of the eye at the point-of-care in emergency departments, so that ophthalmologists can remotely participate in triage and clinical management. On July 1, 2016, The Johns Hopkins Hospital and additional facilities successfully rolled out a unified electronic health record (replacing over 100 standalone systems), providing significant opportunity for improved care coordination. Dr. Woreta and her team have committed significant time and resources toward building these solutions and trauma data reporting capabilities into Epic, the institute's patient care record software.

Quality Management/Quality Improvement

The Eye Trauma Center formed a new performance improvement committee that meets quarterly to discuss performance and quality improvement issues, flag any cases requiring loop closure and presentation at morbidity and mortality meetings, identify opportunities for new projects and improvement initiatives, assess demographic and injury trends, and review surveillance measures such as returns to the operating room, complication rates, ophthalmology response times, and assurance of surgical staff availability. The committee members include Dr. Fasika Woreta, Dr. Roomasa Channa (the associate director of the Eye Trauma Center), Shailaja Chopde, the physician assistant providing consult coverage in the emergency departments, The Johns Hopkins Hospital quality improvement team leader, and the assistant administrator with oversight of surgical services. To improve timely access for trauma cases, the Eye Trauma Center has also implemented a daily emergency hold time into the schedule at the Bendann Surgical Pavilion in Baltimore City.

Injury Prevention Programs and Initiatives

In FY 2017 the Eye Trauma Center developed a monthly schedule of eye health campaigns to increase public awareness on eye health and injury prevention (e.g., sports injury prevention month and glaucoma testing month) based on an editorial calendar published by the American Academy of Ophthalmology. This messaging is displayed digitally on over 220 TV screens at multiple Johns Hopkins campuses. Through its Dana Center for Preventive Ophthalmology, the Eye Trauma Center also participates regularly in promoting access to preventive services, including free, community-based glaucoma screenings and, most recently, a refugee eye health screening led by Wilmer Eye Institute residents.

Educational Programs and Training

Dr. Fasika Woreta presents at domestic and international conferences, is currently authoring a book chapter, and is undertaking the development of a visual atlas of trauma. Each year, Eye Trauma Center leaders provide education on eye trauma identification and management to multidisciplinary care teams within The Johns Hopkins Hospital adult and pediatric emergency departments, which are the point of entry for all eye trauma patients. Dr. Woreta has collaborated with other faculty leaders in developing opportunities to host trauma lectures and wet labs at the Eye Trauma Center, for the benefit of ophthalmologists and ophthalmologists-in-training in Maryland and adjacent regions.

Shailaja Chopde and fellow nurses volunteer their time to represent the Eye Trauma Center at a number of institutionally-sponsored and community-organized events, including the Johns Hopkins' Fall Risk Prevention Seminar in September 2016 and public health screenings. Trauma is also a standing topic of presentation at the annual Wilmer Nursing Conference.

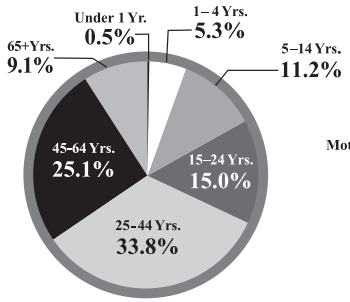
The Eye Trauma Center recently launched a website and has been working to improve the quality and accessibility of information available to referring providers and the public.

Wilmer Eye Institute at The Johns Hopkins Hospital Demographics

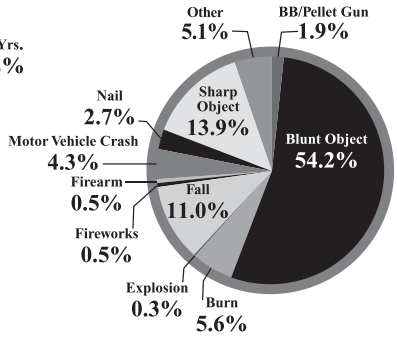
(June 2016 to May 2017)

Source: Maryland Eye Trauma Registry

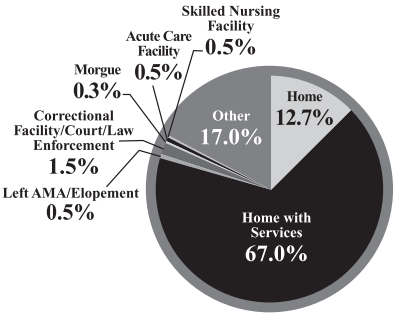
Age



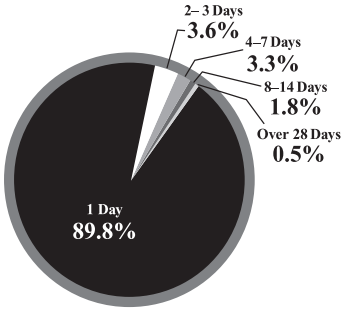
Injury Type



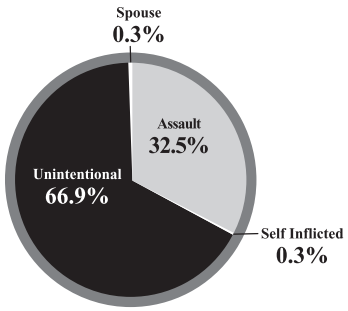
Final Disposition



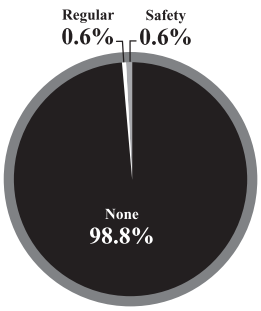
Length of Stay



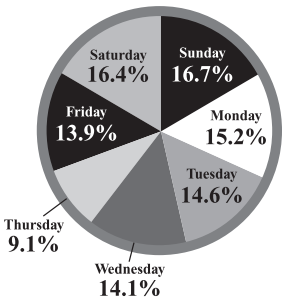
Intentionality



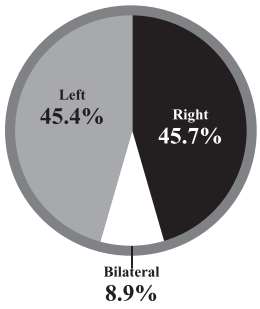
Eye Protection



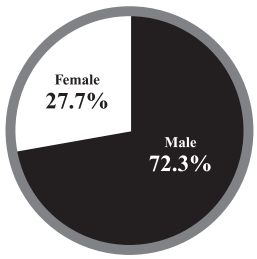
Day of Week



Eye Injured



Gender



Research

Eye Trauma Center faculty and staff published a considerable number of eye trauma papers in FY 2017. From comprehensive ophthalmology to complex orbital trauma, medical students, residents, fellows, and faculty members are prolific authors and actively involved in clinical and bench research. The Wilmer Eye Institute is annually awarded the highest level of federal grant funding for a US-based ophthalmology program from the National Eye Institute, a division of the National Institutes of Health.

Rehabilitation

The Wilmer Eye Institute offers Eye Trauma Center patients direct, in-house access to a full complement of clinical services and resources necessary for visual recovery, or, in the case of irreversible injury, functional accommodation. 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. Wilmer Eye Institute also employs 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

Located in Baltimore City, The Curtis National Hand Center at MedStar Union Memorial Hospital serves as the state's referral center for the specialized care of injuries to the hand, wrist, and elbow. In FY 2017, 1,815 patients with traumatic hand injuries were cared for at the center. The unique nature of the center's services also draws patients from a broad geographic region, including Pennsylvania, Delaware, Virginia, West Virginia, and Washington, DC.

The 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 Curtis National Hand Center's major focus. Over 32% 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 orthopaedic 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.

Trauma Staff

The medical director of the Curtis National Hand Center is James P. Higgins, MD, and the trauma department program manager is Cynthia Johnson.

FY 2017 Annual Report

Notable Accomplishments

In FY 2017 the hand center expanded its academic offerings, increased collaboration with affiliated institutions, and increased participation by friends and alumni around the region and country.

The 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/Quality 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. 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 2017 the Curtis National Hand Center 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. Trauma Medical Director Dr. James P. Higgins has been active with speaking engagements throughout the state and surrounding areas. Additionally, hand trauma labs are scheduled on a regular basis, giving staff the opportunity to learn, practice, and update their skills.

Educational Programs and Training

The Curtis National Hand Center hired a clinical research director this year, who will be instrumental in ongoing research and educational studies, labs, and publications.

The hand center is one of the largest training centers for hand surgery. The surgeons of the hand center have contributed some of the most important publications about the care of the injured hand and upper extremity, and continue to lecture worldwide on hand trauma.

Research

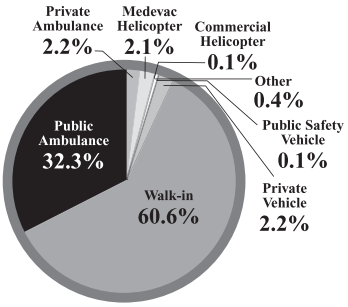
Research projects, funded by both internal and external sources, look at a wide range of pertinent questions, including those in microsurgery, surgery of the peripheral nerve, bone and soft tissue problems, and

The Curtis National Hand Center at MedStar Union Memorial Hospital

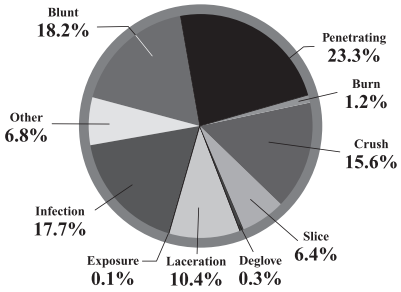
(July 2016 to June 2017)

Source: Maryland Hand Trauma Registry

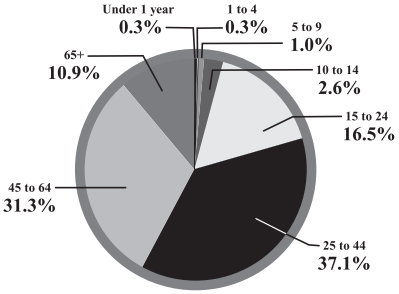
Transport Mode



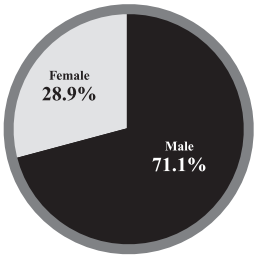
Injury Type



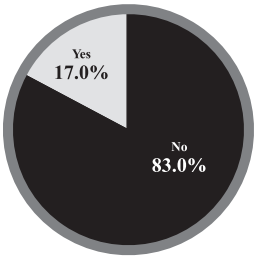
Age



Gender



Work Related



reconstruction after significant trauma. Collaborations with the region's scientists and other investigators promote thinking and new developments in this vital area.

Rehabilitation

The hand specialists at the center 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.

Additionally, 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, post-operatively or post-injury
- Exercise programs to restore motion, strength, and fine and gross motor coordination
- Home exercise programs
- Sensory re-education programs after nerve injury
- Thermal and electrical modalities to minimize pain and swelling, facilitate restoration of joint motion and tendon gliding, and decrease hypersensitivity
- Whirlpools to assist with wound healing
- Social worker consultations

Neurotrauma Center

R Adams Cowley Shock Trauma Center

22 S. Greene Street, Baltimore, Maryland

The Neurotrauma Center at the R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, provides comprehensive management for patients with injuries of the brain, spinal cord, and spinal column. According to the Maryland State Trauma Registry, from June 1, 2016, to May 31, 2017, the Neurotrauma Center provided care to 2,318 patients with traumatic brain injury, 548 patients with spinal column or spinal cord injuries, and 508 patients who suffered from both traumatic brain and spinal column or spinal cord injuries.

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 Neurotrauma Center provides the following:

- A dedicated, highly trained, and experienced multidisciplinary clinical staff including physicians; nurses; respiratory, physical, occupational, and speech 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
- Comprehensive radiology services with a dedicated high-speed 64-slice computed tomography (CT) scanner, a dedicated 40-slice CT scanner, and a dedicated trauma angiography suite accessible on a 24-hour basis
- 13 critical care/intensive care beds
- 23 intermediate care beds, with the capacity for additional beds as needed in the adjacent University of Maryland Medical Center
- A trauma and specialty care ambulatory center with 14 exam rooms

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 Staff

Bizhan Aarabi, MD, FACS, FACSC, is the co-medical director of the Neurotrauma Critical Care Unit and chief of trauma neurosurgery, and Deborah Stein, MD, MPH, FACS, FCCM, is the co-medical director of the Neurotrauma Critical Care Unit and chief of trauma.

FY 2017 Annual Report

Notable Accomplishments

In FY 2017 the Neurotrauma Center reduced the catheter-associated urinary tract infection rate by 50%, achieved a 10% increase in nurses holding a Trauma Certified Registered Nurse accreditation, and opened three additional intermediate care beds.

Quality Management/Quality Improvement

In FY 2017 the Neurotrauma Center implemented several quality improvement initiatives:

- Established a falls reduction nursing bundle, focusing on agitated patients with traumatic brain injury
- Developed and implemented a tracheostomy pressure ulcer prevention bundle and audit tool
- Initiated an interdisciplinary evidence-based agitation management work group, with the goal of developing and implementing guidelines for patients with traumatic brain injury

Injury Prevention Programs and Initiatives

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

- The Violence Intervention Program identifies patients who are victims of violent injury in an effort to intervene and disrupt the cycle of violence, retaliation, and continued exposure to trauma.
- The Bridge Program is a domestic/intimate partner violence initiative aimed at breaking the cycle of abuse by intervening with patients throughout the hospital utilizing a multidisciplinary care team and community resources. The team is available to respond 24/7.
- Promoting Healthy Alternatives for Teens is designed to expose youth to the consequences associated with poor decision-making by providing testimonials from victims and perpetrators of violence, as well as creative self-expression through spoken word poetry, theater, and role-playing exercises.
- The Trauma Prevention Program holds assemblies at high schools throughout Maryland that focus on impaired and/or distracted driving. In FY 2017 the CIPP presented 27 programs reaching 6,681 students and community members with important prevention messages.

- The Saving Maryland's At Risk Teens Program targets high school students involved in dangerous behaviors related to drug and/or alcohol abuse. The weekly two-hour program reviews healthy and safe decision-making for teens.
- Trauma Survivors Network (TSN) is a unique program created in collaboration with the American Trauma Society. The TSN is a compilation of programs, support groups, resources, and services with an underlying goal of helping patients and family members connect and rebuild their lives following a serious injury.

Educational Programs and Training

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

As the state's designated referral center for head and spinal cord/column injuries, the Neurotrauma Center employs a multidisciplinary team of clinical experts. The team utilizes evidence-based treatment strategies designed to ensure immediate diagnostic and therapeutic access for patients with traumatic brain, spinal column, and spinal cord injuries. The staff and faculty of the Neurotrauma Center avails its clinical and research expertise globally to health care providers. Two peer-reviewed journal articles featuring research by Neurotrauma staff and faculty were published in FY 2017: "Outcome of suicidal hanging patients and the role of targeted temperature management in hanging induced cardiac arrest" in the *Journal of Trauma and Acute Care Surgery* and "Delirium in trauma patients: prevalence and predictor" in *Critical Care Nurse*.

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. In collaboration with other medical centers, the Neurotrauma Center has an important role in advancing the medical community's understanding of severe head and spinal trauma.

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.

After a traumatic injury, an injured patient and their family needs extra support from an experienced team of health professionals. Comprehensive care comes from a multidisciplinary team of specialists including physicians, nurses, physical therapists, occupational therapists, speech therapists, and social workers. Care may be provided at the bedside for the patient's physical, psychosocial, and emotional needs.

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.

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.

Top Ten Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Aged 15 and Over) (June 2016 to May 2017)

Source: Maryland State Trauma Registry

Rehabilitation Center	Number
Adventist Health Care	43
Future Care	26
Genesis Health Care	88
Johns Hopkins Bayview Specialty Hospital Inpatient Rehabilitation	38
Johns Hopkins Hospital Inpatient Rehabilitation Center	32
HCR Manor Care	28
Health South Chesapeake Rehabilitation Center	71
MedStar Good Samaritan Hospital	49
Sinai Rehabilitation Center	76
University of Maryland Rehabilitation & Orthopaedic Institute	487

Note: Total patients aged 15 and over that went to rehabilitation centers = 1,732

Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Aged 14 and Under) (June 2016 to May 2017)

Source: Maryland State Trauma Registry

Rehabilitation Center	Number
Hospital for Sick Children	2
Kennedy Krieger Institute	22
Mt. Washington Pediatric Hospital	9
MedStar National Rehabilitation Network	4

Note: Total patients aged 14 and under that went to rehabilitation centers = 37

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 National Capital Region 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 twelve, including a director; planning/organization, finance/logistics, and training/exercise program managers; logistics, training, and exercise coordinators; a financial administrator; a data analyst, and planners. 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 2017 MDERS formalized its methodology for enhancing response capabilities, adjusted 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 2016 MDERS worked 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.

Staffing Enhancements

Initially, MDERS staff had been assigned to either Prince George's or Montgomery County to support local initiatives. In order to better integrate efforts, leverage resources, and ensure standardization, the staff was unified in late 2015. In 2016, with the formal adoption by the steering committee of the POETEE planning model, the director recommended a staffing adjustment to align MDERS personnel with specific portions of the preparedness cycle, as well as an increase in staff to accommodate additional workload. Endorsed by the steering committee, MDERS staff was recast into three programs that align with the POETEE process: planning and organization, finance and logistics, and training and exercises. During the past year, MDERS welcomed several new staff members to fill these roles.

Investment Overview

The National Capital Region Homeland Security Executive Committee approves the MDERS budget, including these notable investments.

EMS Mobile Data Enhancement

Funding was provided to supply computer imaging and software/hardware upgrades to tablet devices, first implemented in FY 2014, that are used for patient care reports and other applications.

Training and Exercise Cache

With the introduction of personnel dedicated to provide in-house training and exercises, MDERS has acquired a cache with all the necessary equipment and supplies to host a number of events. This equipment will be available for use by MDERS staff, stakeholders, and partner agencies.

Infectious Disease Protection Cache

This project provided personal protective equipment specifically for infectious disease responses. In 2016 first responder agencies were supplied with equipment to protect personnel for up to 96 hours. In 2017, 11 hospitals in the Maryland-NCR were provided with filter cartridges for powered air purifying respirators used for training and emergency responses.

Infectious Disease Sanitation Equipment

This project provided two mobile sanitation units for each jurisdiction to decontaminate facilities and vehicles, especially those exposed to infectious diseases.

Joint Command Vehicle for Law Enforcement

This recently completed multi-year project secured two identical secondary command vehicles to provide command unit capability and interoperability to agencies within Montgomery County.

Response Enhancement for Health Services

A vehicle and trailer for each jurisdiction was funded to support responses to mass casualty and mass fatality events, as well medical countermeasure distribution.

First Watch Situational Awareness Program

This project is a continuation from previous fiscal years, working to bring the Maryland-NCR online with the First Watch program. Situational awareness monitoring software is currently being expanded to enable all NCR jurisdictions to interface with each other.

High-Threat Emergency Medical Kits for Law Enforcement

This initiative provided the tactical medics and EMTs of Prince George's County Police Department Special Operations Division with medical kits designed to support care in mass casualty incidents, specifically in hot zone environments where evacuation of patients is not readily possible.

Rhodium Software

As MDERS continues to build out incident command capability among its partner agencies, a computer-based platform for managing incidents was deemed necessary. A group of subject matter experts determined Rhodium ICS software was the best fit. MDERS worked with the vendor to customize the software to interact with computer aided dispatch and other systems. The software is currently being deployed to stakeholders.

Training and Exercises

As part of the capability development process, a number of trainings and exercises were conducted throughout FY 2017. Nearly $500,000 was invested in over 25 events that supported response enhancement, including

- Annual MDERS symposium
- 11 complex coordinated attack (CCA) workshops for law enforcement/fire/EMS
- Workshops in capability development for stakeholders
- High-threat medicine training
- Live tissue lab
- Incident command system (ICS) training and equipment
- Project management certification
- Professional development for MDERS staff
- Medical ATV/UTV operator training
- Rappelling training
- Stakeholder management training
- Search operations workshop
- Tactical Emergency Casualty Care (TECC) training for law enforcement/fire/EMS
- SWAT command school
- SWAT counterterrorism training
- Pinnacle Emergency Medical Service conference
- Journal of Emergency Medical Services conference
- Urban Area Security Initiative conference
- Maryland Emergency Management conference
- International Association of Fire Chiefs conference
- All Hazards Planning manager course
- MIEMSS Region V Hospital Coalition crisis communications plan drill
- MIEMSS Region V Hospital Coalition training/exercise plan development workshops
- Bioquell training
- Rhodium ICS training

Annual Emergency Response System Symposium

MDERS hosted the Emergency Response System Symposium 2017, *Interdisciplinary Response to Terror and Mass Casualty Incidents,* in May 2017 in College Park. This event, which was attended by nearly 400 responders, featured presentations on the 2015 Amtrak derailment in Philadelphia and recent terrorist attacks in Israel. Invited speakers represented a wide range of emergency operation fields that respond to mass casualty events. The all-day conference highlighted the importance of cross-disciplinary and cross-jurisdictional capability building. Topics included mass casualty management, medical interventions in high-threat environments, law enforcement response to threats, hospital receipt of patients, emergency management functions of recovery, and public health impacts.

Additional MDERS Activities and Initiatives

Program staff completed a gap analysis and procured supplies for its training and exercise cache, with additional equipment and supplies scheduled for procurement in FY 2018. MDERS also procured 12 "Table Top in a Box" kits, which will be implemented in Montgomery and Prince George's Counties for mobile ICS training and exercises.

MDERS staff supports or leads workgroups that address specific capabilities and initiatives in topics like tactical emergency casualty care, medical cache, and high-threat medicine. Besides serving as a platform for collaboration throughout the Maryland-NCR, MDERS brings in subject matter experts to advise the group on evidence-based solutions and best practices.

The MDERS staff represents its stakeholders by holding positions on a number of regional committees hosted through the Metropolitan Washington Council of Governments. As a conduit between the local jurisdictions and the larger NCR, MDERS minimizes the burden on participants while ensuring their interests are represented and supported through regional funding. MDERS staff participate in meetings and activities coordinated by Regional Emergency Support Function services, the Regional Programmatic Working Group, the Regional Planning Guidance Working Group, the NCR Emergency Response System, the NCR Complex Coordinated Attack Forum, and the NCR Homeland Security Executive Committee, Policy Group, and Advisory Council. MDERS participates in the annual National Capital Region Threat Hazard Identification and Risk Analysis initiative, and also takes part in activities carried out by the Maryland Emergency Management Agency's Complex Coordinated Attack and Maryland Active Assailant workgroups.

As part of the evaluation portion of the capability development planning cycle, MDERS staff initiated a TECC data collection process in early 2017. The findings from this data set will provide direction for allocating resources. Data from MDERS' TECC capability development plan identified 60 usage cases of TECC supplies by the Prince George's County Police Department. TECC usage forms have also been implemented by Montgomery County Police Department and will be tracked in the same manner.

Montgomery County Fire and Rescue Service and Prince George's County Fire and EMS Department began TECC training for all 5,000 staff members in July 2017. The program is based on the MDERS-funded TECC video series, and the practical sessions

include equipment and supplies also funded by the program. All TECC equipment currently in operation or planned for fire/rescue/EMS apparatus in these two counties has been funded through the ERS initiative.

The hospital phase (i.e., first receiver interface) of the TECC capability development plan will take place in FY 2018. In collaboration with the regional hospital coalition, MDERS has scheduled a workshop to provide TECC supplies and awareness training to hospital emergency department staff.

Emergency Health Services Department, University of Maryland Baltimore County

The Emergency Health Services (EHS) Department 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 2016-2017 academic year was an exciting time for EHS, with many noteworthy accomplishments.

- Jennifer Lee Jenkins, MD, MSc, FACEP, an alumna of EHS undergraduate and graduate degree programs, became the department's new chair. Dr. Jenkins succeeded Bruce J. Walz, PhD, NRP, who served as the department chair for over two decades and continues to serve the UMBC community.
- EHS was awarded a contract for over $700,000 to create a video training series for EMS provider preparedness in responding to calls with high infectious disease patients. The project is funded by the Centers for Disease Control and Prevention on behalf of the Maryland Department of Health. These training videos will be available for continuing education credit for Maryland providers.
- The University's first PhD program in Emergency Services will be available through EHS in conjunction with the Maryland Institute for Policy and Research. Students may concentrate in either health or emergency management.
- EHS joined UMBC in celebrating its 50th year as a public university in Maryland.

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 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 Hong K. Kim, MD, MPH, 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 300 years of combined poison center experience, ensuring that callers have access to experienced, qualified, and well-trained staff.

In CY 2016 the MPC received 44,426 calls. While 32,394 of these calls involved a human exposure, the remaining 12,032 were requests for information or involved animal exposures. Children under the age of six accounted for 42% of poison exposures. The top five causes of poisoning were analgesics, sedatives/antipsychotics/hypnotics, cosmetics/personal care products, household cleaners, and antidepressants. Sixty-three 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 1,920 cases in 2016. In 14% 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. The 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 the Maryland Department of Health's (MDH) 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 106% from 2015 to 2016, and increased 640% from 2010 to 2016. 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 2016 the MPC received 448 calls regarding bystander naloxone administration, a 73% increase over 2015. Law enforcement officers constituted 85% of the callers reporting naloxone administration. Of the total number of patients reported to MPC for naloxone administration, 79% were transported to a health care facility and the MPC monitored and participated in the care of 76% 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 2016 included

- Comparison of atypical antipsychotic exposures in children
- Incorporation of poison center services in a statewide overdose education and naloxone distribution program
- Reversal of opioid-induced ventilatory depression using low-dose naloxone (0.04 mg)
- Epidemiology of pediatric poisonings presented to the poison control center in Cairo, Egypt, 2009-2013
- Bupropion abuse reported to US poison centers
- 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 public education coordinator. In 2016 the MPC attended 87 programs throughout Maryland, reaching approximately 5,500 people. Organizations that partnered with the 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. Fourteen county school systems and daycare centers used educational materials from the MPC in their classrooms. More than 160,000 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 20-26, 2016) activities included mailings to emergency departments throughout the state. The MPC also partnered with Safe Kids Baltimore, Safe Kids Carroll County, Safe Kids Frederick County, Safe Kids Washington County, the Wicomico County Health Department, St. Mary's County Public School nurses, and Cecil County Department of Emergency Services to offer Poison Prevention Week kits to elementary schools in their areas, reaching more than 19,400 students.

The MPC publishes *Poison Prevention Press*, a bimonthly e-newsletter for the public that highlights poison safety topics. Articles published in 2016 included "Button Batteries," "Child-resistant Containers," "Insect Repellents," "Eye Exposures," and "Keeping Toddlers Safe from Grandma's Medicines." The MPC's Facebook page shares content with the public on topics related to poison prevention and safety. In 2016 MPC staff generated 76 posts that were viewed more than 46,000 times by at least 6,247 unique users.

Health professional education is coordinated by Lisa Booze, PharmD, CSPI. Programs and materials are designed to help health professionals better assess and manage poisoning and overdose cases. In 2016, 42 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 11,000 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, @MPCToxTidbits, posts clinical and medical toxicology content relevant for health care providers. MPC tweeted 272 times in 2016, garnering more than 110,000 impressions and 2,600 engagements.

ToxTidbits is a monthly e-newsletter that covers important toxicology information, updates, and news for health professionals. Among the topics addressed in 2016 were "Carbon Monoxide Myths," "Synthetic Opioids," "Physostigmine," "Lionfish Stings," "Carfentanil," and "Bystander Naloxone and the Poison Center." ToxTidbits is emailed to subscribers and faxed to every emergency department in MPC's service area. Current and past issues of ToxTidbits and Poison Prevention Press, and information on how to subscribe to them, can be found at www.mdpoison.com.

Reason for Poisoning (CY 2016)

Circumstance	Number of Patients	Percentage
Unintentional	23,368	72.1
Intentional	7,409	22.9
Adverse Reaction	1,093	3.4
Other and Unknown	524	1.6
TOTAL	32,394	100.0

Medical Outcome of Poisoning (CY 2016)

Medical Outcome	Number of Patients	Percentage
No Effect/Minor Effect	27,411	84.6
Moderate Effect	2,466	7.6
Major Effect	610	1.9
Death	53	0.2
Other and Unknown	1,854	5.7
TOTAL	32,394	100.0

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

Location of Poisoning Exposure by MIEMSS Region (CY 2016)

Region	Number of Exposures	Percentage
Region I	900	2.8
Region II	2,577	8.0
Region III	19,349	59.7
Region IV	3,173	9.8
Region V*	3,090	9.5
Unknown County/ Other state	3,305	10.2
TOTAL	32,394	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. An additional 15,538 human exposures in Maryland were reported to the National Capital Poison Center in 2016.*

The complete Maryland Poison Center 2016 Annual Report can be found at www.mdpoison.com.

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 2017 Patricia C. Dischinger, PhD, retired from the NSC and the UMSOM after spending her career there working on injury research. In addition, Gordon S. Smith, MB, ChB, MPH, has relocated to West Virginia University to pursue other research endeavors.

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 (MDOT) Highway Safety Office (HSO). The NSC was one of six centers awarded the CIREN project on an annually renewable basis. It was funded through May 2016, and the NSC applied for additional project funds during the 2016-2017 contract year, approval for which is currently pending.

During the 2015-2016 contract year, 45 cases were enrolled into CIREN and a comprehensive investigation was conducted for each. (Case enrollment for the project ceased in December 2015.) Case reviews were held monthly and the NSC hosted NHTSA administrators on several occasions. Case review meetings have also been attended by representatives from the automotive industry and from other CIREN centers. 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, 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.

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),

MDOT 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 SHSP Implementation and Emphasis Area Teams as data coordinators, the National Traffic Records Advisory Committee, the Association of Transportation Safety Information Professionals Executive Board, the ANSI D.16 Update Panel, and Maryland's Partnership for a Safer Maryland. 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 study, NSC staff conducted a comprehensive analysis of pedestrian crashes in Maryland and presented the findings to the HSO. NSC staff members also completed an analysis of the ignition interlock program in preparation for the 2017 legislative session, and continue to support efforts related to the Maryland Drunk Driving Reduction Act of 2016, also known as Noah's Law. A senior staff member of the NSC completed his doctoral dissertation by examining the effectiveness of Maryland's ignition interlock program on preventing repeat impaired driving offenses, and other NSC staff members have 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.

The NSC partners with the Centers for Disease Control and Prevention 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 Office of the Chief Medical Examiner. A second partnership with the Maryland Department of Health focuses on comparing differences in ICD-9 and ICD-10 medical coding for persons treated at the STC as the result of an intentional injury. Final reports for both projects are expected in fall 2017.

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

Alcohol-Related Injuries

The NSC has two grants funded by the National Institutes of Health (NIH) to study the role that alcohol use and alcohol hangovers play in trauma and subsequent mortality. Each of the two grants is awarded for five years, and together they represent over $4.7 million in NIH funding.

The first project, Alcohol Involvement in a Cohort of Trauma Patients: Trends and Future Mortality, is innovative because it links unique longitudinal data on alcohol consumption by STC patients with National Death Index data to identify patients who die after discharge. The main objective of the study is to determine how an elevated blood alcohol concentration (BAC) on admission relates to subsequent mortality risk. The underlying hypothesis is that patients with a BAC above a certain level have such a high risk of dying of another injury, that a tiered approach to treatment can be developed based on the patient's BAC and other characteristics.

Data collected during this project has been used in a number of research studies and publications. "Trauma Recidivism Predicts Long-term Mortality: Missed Opportunities for Prevention," published in the *Annals of Surgery*, incorporated data from this study. Project data is also currently being utilized by a doctoral student to further investigate drug overdose death risk, adjusting for age, race, and sex, among trauma patients compared to the rest of the Maryland population. Results from data collected in NSC's grant-funded project were presented at the Congress of Epidemiology in June 2016.

The NSC has expanded STC patient research by evaluating drug involvement in injuries, including studies of injuries sustained by patients on methadone therapy who were trauma admissions and drug overdoses among patients who were discharged from the STC. Other analyses underway include: 1) long-term follow-up of patients with head injuries and those who experienced falls, 2) linkage to Medicare data to study outcomes in the elderly, and 3) subsequent drug overdose death risk factors for trauma patients who are discharged alive. 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.

The second project, Hangovers and Traffic Injuries: Is Alcohol's Influence Greater Than Expected?, identifies and quantifies the role of residual effects of alcohol in traffic injuries by assessing biomarkers of recent alcohol consumption in motor vehicle crash drivers admitted to the STC. The study includes collecting urine samples from participants to evaluate biomarkers of recent alcohol consumption.

Training Activities

The NSC actively trains epidemiologists and other health professionals on research topics related to injuries and EMS. There were five epidemiology doctoral students working with NSC faculty on research projects as part of their training, with topics ranging from drug overdose deaths, triage criteria in the elderly, and the effect of statins on traumatic brain injury outcomes. In addition, members of the faculty teach courses on injury epidemiology and prevention and sit on dissertation committees for other doctoral students in the Department of Epidemiology and Public Health who study injury-related topics.

Technical Support

In addition to in-house preparation of peer-reviewed research papers, NSC staff offers 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 14 manuscripts by University of Maryland, Baltimore, researchers between June 2016 and May 2017. At least two additional papers have been accepted for publication and three are still in various stages of critical review.

The NSC continues to maintain its existing website, making many data products available to the public.[1] 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.[2]

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.

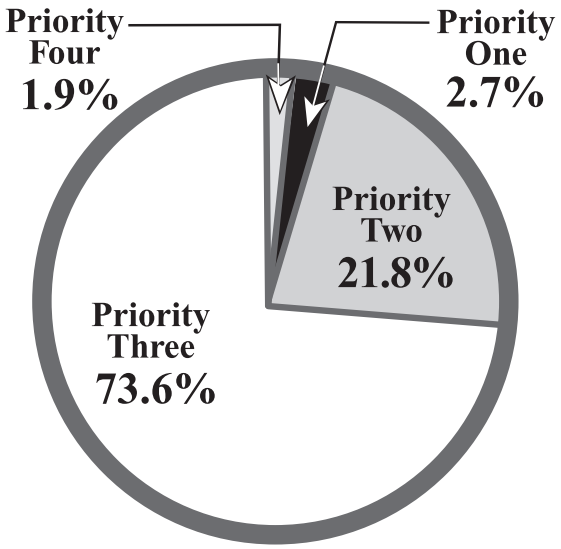
[1] *http://www.law.umaryland.edu/programs/publichealth/injury/index.html*
[2] *https://somvweb.som.umaryland.edu/NSCTrauma/NSCData.aspx*

MARYLAND EMS STATISTICS

Types of EMS Calls

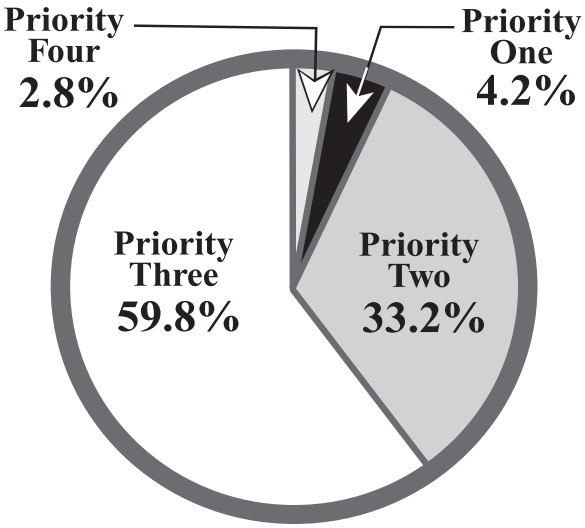
Patient Priority For Injury Transports

Fiscal Year 2017



Patient Priority For Medical Transports

Fiscal Year 2017



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 3rd 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. eMEDS was launched in the winter of 2011 with implementation of a pilot program in three jurisdictions (Cecil, Harford, and Queen Anne's Counties). As of June 2015, all 24 jurisdictional EMS Operational Programs (EMSOPs) in Maryland used 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 2017.

eMEDS Records Submitted to MIEMSS per Fiscal Year 2017 Quarter[1]

Reporting Between: 7/1/2016 - 06/30/2017

Jurisdiction	1st Qtr. FY 2017	2nd Qtr. FY 2017	3rd Qtr. FY 2017	4th Qtr. FY 2017	Total
Allegany County	3,585	3,379	3,542	3,569	14,075
Anne Arundel County*	21,250	20,674	20,484	21,402	83,810
Baltimore City	63,836	59,088	63,033	74,242	260,199
Baltimore County*	33,081	34,666	34,802	34,264	136,813
Calvert County	4,703	4,356	4,269	4,533	17,861
Caroline County	1,694	1,573	1,839	1,759	6,865
Carroll County	5,076	5,334	5,138	5,376	20,924
Cecil County	6,761	6,368	6,380	7,046	26,555
Charles County	7,201	6,926	6,812	7,312	28,251
Dorchester County	1,803	1,556	1,553	1,683	6,595
Frederick County	11,087	11,243	10,991	11,267	44,588
Garrett County	1,003	979	1,096	1,146	4,224
Harford County*	8,635	8,731	8,456	8,719	34,541
Howard County	7,071	7,452	7,346	7,807	29,676
Kent County	1,435	1,246	1,293	1,235	5,209
Montgomery County	21,149	21,222	21,173	21,273	84,817
Prince George's County	60,251	59,148	59,229	62,502	241,130
Queen Anne's County	1,999	1,900	1,754	1,749	7,402
Somerset County	835	879	847	910	3,471
St. Mary's County	5,372	5,477	5,420	5,827	22,096
Talbot County	1,839	1,916	1,690	1,752	7,197
Washington County	8,027	8,265	7,950	9,162	33,404
Wicomico County	3,856	3,765	3,918	4,020	15,559
Worcester County*	4,062	2,350	2,196	3,277	11,885
Jurisdictional Total	285,611	278,493	281,211	301,832	1,147,147

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

[1]The number of records submitted to MIEMSS does not necessarily represent the number of individual patients treated. Duplicate records can be submitted for the same patient if more than one EMS company responds to treat that patient.

Cardiac Arrest Registry to Enhance Survival (CARES)
CY 2016 Registry Data[1]

Non-Traumatic Etiology Survival Rates*	Maryland	National
Overall	10.1%	10.8%
Bystander Witnessed	16.9%	16.8%
Unwitnessed	4.3%	4.7%
Utstein	35.7%	33.9%
Utstein Bystander	41.5%	38.2%

Bystander Intervention Rates**	Maryland	National
CPR	38.6%	39.9%
Public AED Use	13.8%	11.7%

Demographic Information	Maryland	National
Mean Age (years)	60.4	62.2
% Males	39.4%	38.3%
% Females	60.6%	61.7%

Location of Arrest	Maryland	National
Home/Residence	76.2%	68.5%
Nursing Home	8.0%	10.5%
Public Setting	15.8%	21.0%

Arrest Witnessed?	Maryland	National
Witnessed by Bystander	31.8%	37.3%
Witnessed by 9-1-1 Provider	13.1%	12.1%
Unwitnessed	55.1%	50.6%

Who Initiated CPR?	Maryland	National
Not Applicable	0.1%	0.1%
Bystander	38.3%	40.7%
First Responder	21.7%	28.4%
Emergency Medical Services (EMS)	39.9%	30.8%

Who First Defibrillated the Patient?	Maryland	National
Not Applicable	70.9%	66.2%
Bystander	1.4%	1.7%
First Responder	2.7%	6.2%
Emergency Medical Services (EMS)	25.0%	25.9 %

[1] The Cardiac Arrest Registry to Enhance Survival Maryland data represents nine EMS Operational Programs and the hospitals within those jurisdictions for CY 2016; statewide data will not be available for a full calendar year until December 2017.

* See page 71 for survival rate formulas.

** See page 71 for intervention rate formulas.

Cardiac Arrest Registry to Enhance Survival (CARES)
CY 2016 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
	Inservice	Reserve Prestocked	Inservice	Reserve Prestocked	20 + Pts	10 - 19 Pts	< 10 Pts
Region I	0	0	35	0	0	0	0
Region II	36	2	24	0	0	0	0
Region III	30	0	170	11	0	2	0
Region IV	18	3	117	22	0	1	0
Region V	134	9	33	11	3	0	0
STATEWIDE TOTAL	218	14	379	44	3	3	0

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 CRT or Paramedic Protocols

- ***Inservice:*** Fully stocked and staffed unit ready to be dispatched
- ***Reserve Prestocked:*** Fully stocked, but not staffed, unit. Could replace an Inservice unit or be added to Inservice fleet by calling in additional personnel.

Ambu Bus: A passenger bus configured or modified to transport as many as 20 patients on stretchers

Public Safety/Non-Transportation Vehicles

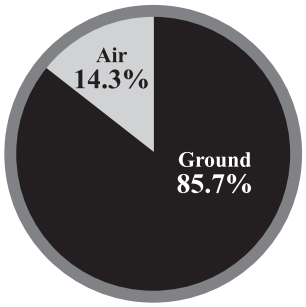
Region	Non-Transport Support					Disaster Supplies*		
	BLS First Response	Suppression BLS First Response	ALS Chase			MCSU Type I (100+ Pts)	MCSU Type II (50 Pts)	MCSU Type III (25 Pts)
			Non-Supervisory	Supervisory	ALS Engines			
Region I	0	17	8	1	3	0	4	0
Region II	22	35	13	6	0	0	2	1
Region III	14	287	16	25	74	8	0	2
Region IV	32	68	25	25	2	1	3	5
Region V	33	160	21	7	37	2	3	4
STATEWIDE TOTAL	101	567	83	64	116	11	12	12

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

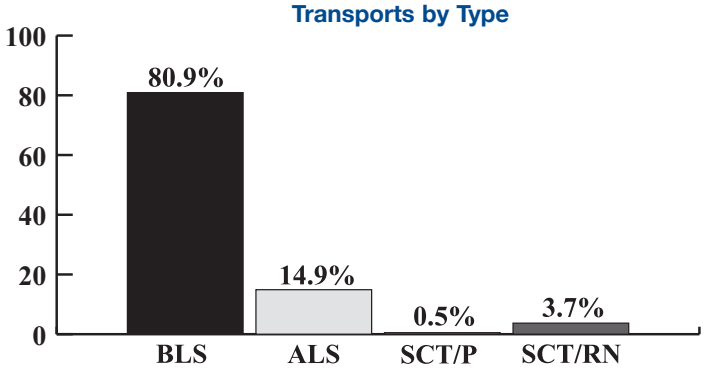
Maryland-Licensed Commercial Ambulance FY 2017 Statistics

Source: MIEMSS Commercial Ambulance Licensing System

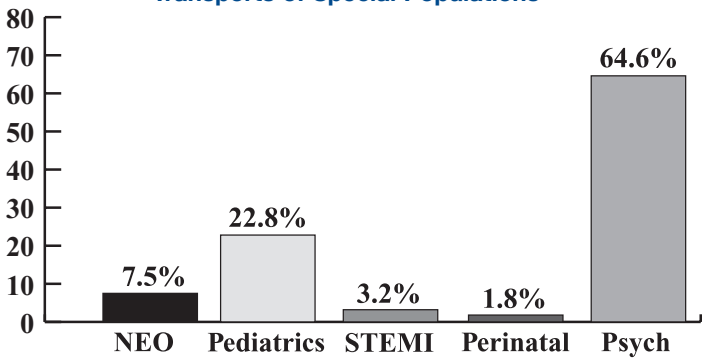
Total Number of Services



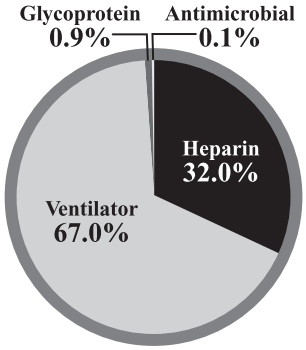
Transports by Type



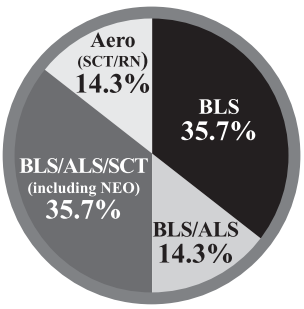
Transports of Special Populations



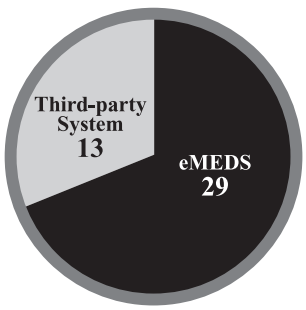
Optional Protocol Transports



Services by Type



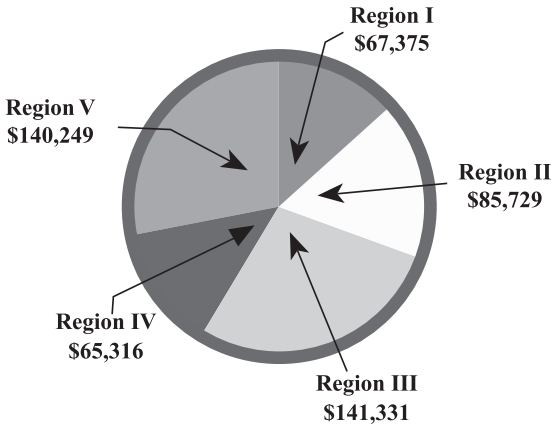
ePCR Reporting Software



State Homeland Security Grant Funding for Maryland EMS

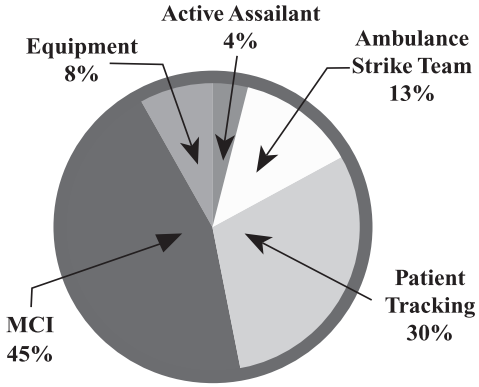
Grant Funding Distribution by Region

(FY 2013 and FY 2014)



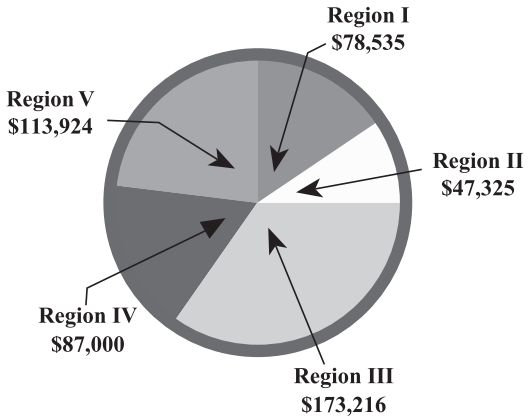
Grant Funding by Project Activity

(FY 2013 and FY 2014)



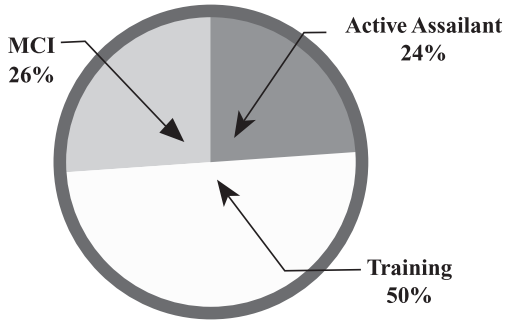
Grant Funding Distribution by Region

(FY 2015 and FY 2016)



Grant Funding by Project Activity

(FY 2015 and FY 2016)



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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Under 1 year	200	276	285
1 to 4 years	497	521	508
5 to 9 years	617	645	600
10 to 14 years	652	621	543
15 to 24 years	3,965	4,012	4,079
25 to 44 years	6,244	6,816	6,998
45 to 64 years	5,050	5,164	5,352
65+ years	4,023	4,157	4,942
Unknown	1	5	10
TOTAL	21,249	22,217	23,317

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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Johns Hopkins Bayview Medical Center	2,281	2,449	2,838
The Johns Hopkins Hospital	1,674	2,052	1,864
Meritus Medical Center	1,061	1,245	1,362
Peninsula Regional Medical Center	1,280	1,219	1,397
Prince George's Hospital Center	3,334	3,403	3,769
R Adams Cowley Shock Trauma Center	6,027	6,077	6,095
Sinai Hospital	1,805	2,038	2,114
Suburban Hospital – Johns Hopkins Medicine	1,473	1,314	1,632
Western Maryland Regional Medical Center	592	590	626
TOTAL	19,527	20,387	21,697

**** Maryland Trauma Statistics are based on patient discharge data from June 2016 to May 2017.***

Occurrence of Injury by County: Scene Origin Cases Only

(June 2016 to May 2017)
Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	373
Anne Arundel County	792
Baltimore County	3,026
Calvert County	154
Caroline County	70
Carroll County	278
Cecil County	77
Charles County	218
Dorchester County	71
Frederick County	400
Garrett County	34
Harford County	710
Howard County	330
Kent County	27
Montgomery County	1,495
Prince George's County	2,563
Queen Anne's County	85
St. Mary's County	216
Somerset County	104
Talbot County	43
Washington County	933
Wicomico County	426
Worcester County	246
Baltimore City	4,422
Virginia	59
West Virginia	148
Pennsylvania	184
Washington, DC	259
Delaware	95
Other	9
Not Indicated	730
TOTAL	18,577

Note: Scene origin cases represent 85.6% of the total trauma cases treated statewide.

Residence of Patients by County: Scene Origin Cases Only

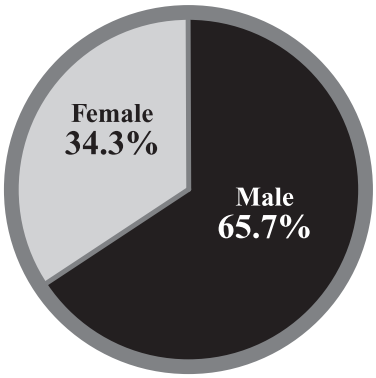
(June 2016 to May 2017)
Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	340
Anne Arundel County	838
Baltimore County	3,085
Calvert County	173
Caroline County	66
Carroll County	283
Cecil County	75
Charles County	293
Dorchester County	64
Frederick County	381
Garrett County	22
Harford County	758
Howard County	309
Kent County	28
Montgomery County	1,449
Prince George's County	2,290
Queen Anne's County	66
St. Mary's County	146
Somerset County	93
Talbot County	42
Washington County	783
Wicomico County	389
Worcester County	172
Baltimore City	4,204
Virginia	341
West Virginia	242
Pennsylvania	441
Washington, DC	581
Delaware	168
Other	398
Not Indicated	57
TOTAL	18,577

Note: Scene origin cases represent 85.6% of the total trauma cases treated statewide.

Gender Profile: Primary Admissions Only

(June 2016 to May 2017)
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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
None	19.9%	20.6%	18.9%
Seatbelt	25.4%	22.1%	16.7%
Airbag and Seatbelt	28.1%	32.4%	36.8%
Airbag Only	6.1%	7.0%	11.4%
Infant/Child Seat	0.2%	0.2%	0.0%
Protective Helmet	15.2%	15.5%	14.7%
Padding/Protective Clothing	0.2%	0.1%	0.1%
Other Protective Device	0.0%	0.6%	0.4%
Unknown	4.9%	1.5%	1.0%
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 2016 to May 2017)
Source: Maryland State Trauma Registry

Modality Type	BVMC	JHH	MMC	PEN	PGH	SH	STC	SUB	WMRMC	TOTAL
Ground Ambulance	94.2%	85.0%	80.4%	92.3%	86.7%	87.6%	77.9%	95.2%	77.6%	86.0%
Helicopter	0.0%	1.3%	0.5%	3.5%	10.0%	0.0%	21.1%	0.6%	5.2%	7.3%
Other	5.8%	13.7%	19.1%	4.2%	3.3%	12.4%	1.0%	4.2%	17.2%	6.7%
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.

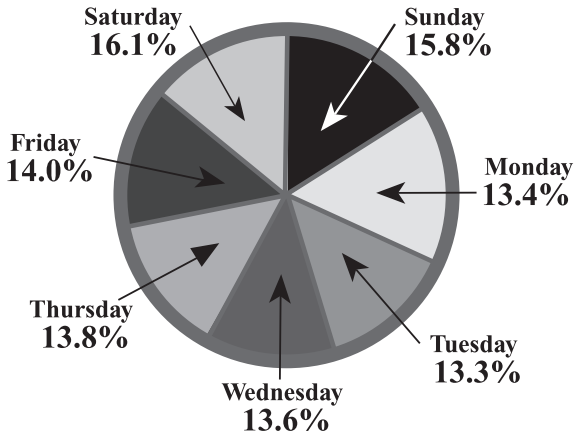
Origin of Patient Transport to Trauma Centers

(June 2016 to May 2017)
Source: Maryland State Trauma Registry

Origin Type	BVMC	JHH	MMC	PEN	PGH	SH	STC	SUB	WMRMC	TOTAL
Scene of Injury	95.6%	81.3%	98.4%	71.8%	93.0%	96.1%	70.5%	95.9%	97.8%	85.7%
Hospital Transfer	0.1%	7.6%	0.9%	2.9%	3.4%	3.7%	29.5%	3.7%	0.0%	10.4%
Other	4.3%	11.1%	0.7%	25.3%	3.6%	0.2%	0.0%	0.4%	2.2%	3.9%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

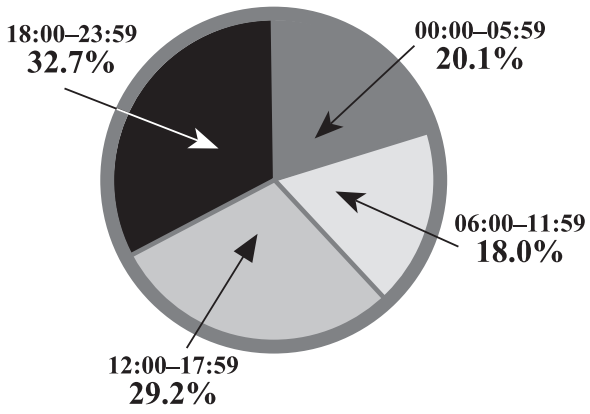
Emergency Department Arrivals by Day of Week: Primary Admissions Only

(June 2016 to May 2017)
Source: Maryland State Trauma Registry



Emergency Department Arrivals by Time of Day: Primary Admissions Only

(June 2016 to May 2017)
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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Under 1 year	0	2	0
1 to 4 years	6	1	1
5 to 14 years	3	2	3
15 to 24 years	108	162	147
25 to 44 years	189	243	255
45 to 64 years	135	160	152
65+ years	220	194	267
Unknown	0	3	6
TOTAL	661	767	831
Deaths Overall as a Percentage of the Total Injuries Treated	3.4%	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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Under 1 year	34	60	61
1 to 4 years	77	92	104
5 to 14 years	239	192	235
15 to 24 years	3,859	3,901	3,995
25 to 44 years	6,244	6,816	6,998
45 to 64 years	5,050	5,164	5,352
65+ years	4,023	4,157	4,942
Unknown	1	5	10
TOTAL	19,527	20,387	21,697

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 2016 to May 2017)

Source: Maryland State Trauma Registry

	Number of Injured Patients		Number of Deaths	
Age	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	61	54	0	0
1 to 4 years	104	85	1	0
5 to 14 years	235	175	3	3
15 to 24 years	3,995	3,470	147	124
25 to 44 years	6,998	6,088	255	220
45 to 64 years	5,352	4,733	152	130
65+ years	4,942	4,483	267	236
Unknown	10	10	6	5
TOTAL	21,697	19,098	831	718

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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Motor Vehicle Crash	27.5%	26.0%	27.2%
Motorcycle Crash	5.3%	5.4%	4.5%
Pedestrian Incident	5.2%	5.3%	5.8%
Fall	33.2%	32.8%	35.2%
Gunshot Wound	5.9%	7.8%	7.7%
Stab Wound	6.2%	6.5%	5.9%
Other	16.7%	16.2%	13.7%
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.

Blood Alcohol Concentration of Patients by Injury Type: Primary Admissions Only

(June 2016 to May 2017)

Source: Maryland State Trauma Registry

Blood Alcohol Concentration	Motor Vehicle Crash	Assault	Fall	Other	Total
Negative	28.9%	21.5%	17.8%	22.2%	23.0%
Positive	16.8%	23.5%	13.3%	8.8%	16.3%
Undetermined	54.3%	55.0%	68.9%	69.0%	60.7%
TOTAL	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.

Etiology of Injuries by Age: Primary Admissions Only

(June 2016 to May 2017)
Source: Maryland State Trauma Registry

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Stab Wound	Other	Total
Under 1 year	0.1%	0.0%	0.0%	0.3%	0.1%	0.0%	0.3%	0.2%
1 to 4 years	0.1%	0.0%	0.3%	0.4%	0.0%	0.0%	0.7%	0.3%
5 to 14 years	0.6%	0.4%	0.9%	0.5%	0.3%	0.1%	1.2%	0.6%
15 to 24 years	21.3%	16.3%	18.2%	4.5%	37.7%	22.2%	19.2%	16.0%
25 to 44 years	37.4%	43.5%	33.8%	12.4%	49.9%	54.8%	40.7%	31.1%
45 to 64 years	24.9%	32.9%	34.2%	27.3%	9.8%	19.8%	29.4%	25.8%
65+ years	15.6%	6.9%	12.6%	54.6%	2.2%	3.1%	8.5%	26.0%
TOTAL	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 2016 to May 2017)
Source: Maryland State Trauma Registry

Etiology	Percentage
Motor Vehicle Crash	32.0%
Motorcycle Crash	5.3%
Pedestrian Incident	6.8%
Stabbing	0.1%
Fall	41.5%
Other	13.9%
Unknown	0.4%
TOTAL	100.0%

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

Etiology Distribution for Patients with Penetrating Injuries: Primary Admissions Only

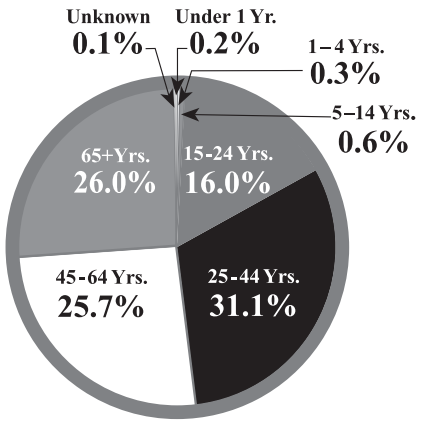
(June 2016 to May 2017)
Source: Maryland State Trauma Registry

Etiology	Percentage
Motor Vehicle Crash	0.3%
Gunshot Wound	53.5%
Stabbing	40.1%
Fall	1.3%
Other	4.0%
Unknown	0.8%
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

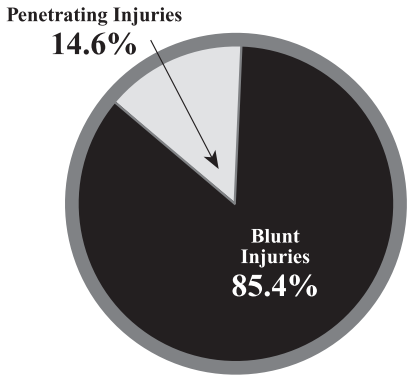
(June 2016 to May 2017)
Source: Maryland State Trauma Registry



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 2016 to May 2017)
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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Inpatient Rehab Facility	13.9%	13.0%	11.2%
Skilled Nursing Facility	4.5%	4.3%	6.2%
Residential Facility	1.0%	1.0%	1.3%
Specialty Referral Center	3.3%	4.0%	3.7%
Home with Services	3.8%	3.7%	3.8%
Home	61.5%	60.9%	59.0%
Acute Care Hospital	2.8%	2.4%	3.4%
Against Medical Advice	1.6%	2.1%	2.7%
Morgue/Died	4.5%	5.0%	5.4%
Left without Treatment	0.4%	0.2%	0.1%
Hospice Care	0.4%	0.3%	0.5%
Jail	1.2%	1.6%	1.4%
Psychiatric Hospital	0.9%	0.9%	0.9%
Other	0.2%	0.6%	0.4%
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 Penetrating Injuries: Primary Admissions Only

(3-Year Comparison)

Source: Maryland State Trauma Registry

ISS	June 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
1 to 12	78.6%	76.1%	74.1%
13 to 19	10.1%	10.6%	10.3%
20 to 35	8.6%	8.4%	11.6%
36 to 75	2.7%	4.9%	4.0%
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 2016 to May 2017)

Source: Maryland State Trauma Registry

ISS	Blunt	Penetrating	Total
1 to 12	79.7%	74.1%	78.9%
13 to 19	12.7%	10.3%	12.3%
20 to 35	6.6%	11.6%	7.3%
36 to 75	1.0%	4.0%	1.5%
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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
1 to 12	80.1%	79.9%	79.7%
13 to 19	11.7%	12.6%	12.7%
20 to 35	7.1%	6.5%	6.6%
36 to 75	1.1%	1.0%	1.0%
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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
1 to 12	79.9%	79.3%	78.9%
13 to 19	11.5%	12.3%	12.3%
20 to 35	7.3%	6.8%	7.3%
36 to 75	1.3%	1.6%	1.5%
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.

MARYLAND ADULT BURN STATISTICS

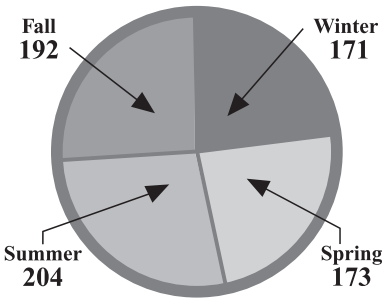
Total Number of Adult Burn Cases

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

Institution	June 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Johns Hopkins Burn Center at Bayview	826	735	740

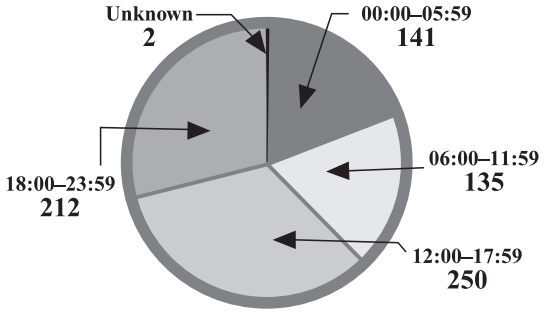
Season of Year Distribution

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
Source: Maryland State Trauma Registry



Time of Arrival Distribution

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
Source: Maryland State Trauma Registry



Place of Injury

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
Source: Maryland State Trauma Registry

Place of Injury	Number
Non-Institutional Private Residence	452
Institutional Private Residence	12
School	7
Sports and Athletic Area	5
Street/Highway	41
Trade and Service Area	46
Industrial and Construction Area	36
Farm	3
Other Places	29
Unspecified Place	109
TOTAL	740

Occurrence of Injury by County

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	5
Anne Arundel County	21
Baltimore County	47
Calvert County	1
Carroll County	12
Cecil County	10
Charles County	1
Dorchester County	2
Frederick County	5
Harford County	16
Howard County	11
Kent County	2
Montgomery County	5
Prince George's County	3
Somerset County	1
Talbot County	2
Washington County	8
Wicomico County	6
Worcester County	2
Baltimore City	80
Virginia	3
West Virginia	10
Pennsylvania	10
Washington, DC	1
Delaware	3
Other	1
Not Valued	20
TOTAL	288

Residence of Patients by County

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	7
Anne Arundel County	56
Baltimore County	158
Calvert County	1
Caroline County	3
Carroll County	25
Cecil County	20
Charles County	3
Dorchester County	4
Frederick County	9
Harford County	62
Howard County	33
Kent County	3
Montgomery County	10
Prince George's County	15
Queen Anne's County	3
St. Mary's County	3
Somerset County	1
Talbot County	4
Washington County	18
Wicomico County	11
Worcester County	4
Baltimore City	224
Virginia	11
West Virginia	12
Pennsylvania	25
Washington, DC	2
Delaware	7
Other	5
Not Valued	1
TOTAL	740

Mode of Patient Transport

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
Source: Maryland State Trauma Registry

Modality Type	Number
Ground Ambulance	428
Helicopter	21
Other*	287
Not Valued	4
TOTAL	740

**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 2016 to May 2017)
Source: Maryland State Trauma Registry

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Other Non-Burn	Not Valued	Total
			Flame	Contact	Scald					
15 to 24 years	3	7	36	11	51	2	0	2	0	112
25 to 44 years	8	12	123	35	105	5	3	9	1	301
45 to 64 years	5	13	103	30	69	10	0	6	0	236
65 years and over	0	4	47	12	25	0	0	3	0	91
Total	16	36	309	88	250	17	3	20	1	740

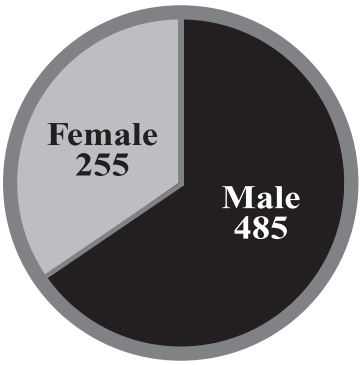
Final Disposition of Patients

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

Final Disposition	June 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Home	726	642	651
Home with Services	39	26	15
Transfer to Another Acute Care Facility	2	2	1
Transfer to Another Service	1	1	0
Discharge to Extended Care Facility	0	2	0
Discharge to Alternate Caregiver	0	1	0
Rehabilitation Facility	8	11	5
Skilled Nursing Facility	26	17	28
Psychiatric Hospital	2	6	7
Morgue/Died	13	15	13
Unable to Complete Treatment	3	4	12
Jail	5	7	1
Other	0	0	4
Not Valued	1	1	3
TOTAL	826	735	740

Gender Profile

Patients Aged 15 and Older Treated at Johns Hopkins Burn Center at Bayview
(June 2016 to May 2017)
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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
15 to 24 years	147	99	112
25 to 44 years	312	296	301
45 to 64 years	284	242	236
65 years and over	83	98	91
TOTAL	826	735	740

MARYLAND PEDIATRIC TRAUMA STATISTICS

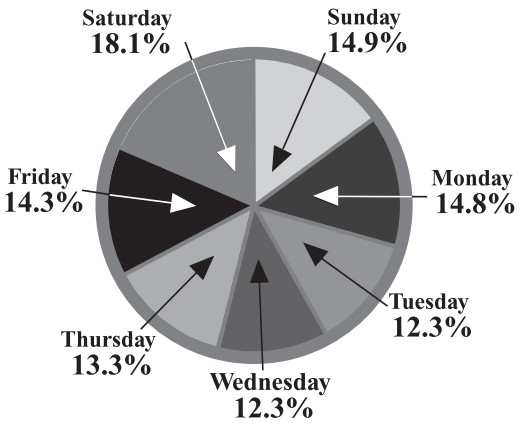
Legend Code	
Children's National Medical Center	CNMC
Johns Hopkins Pediatric Trauma Center	JHP

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

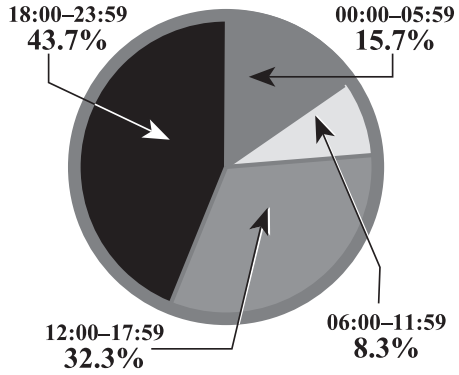
Trauma Center	June 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
CNMC	665	704	708
JHP	1,057	1,126	912
TOTAL	1,722	1,830	1,620

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

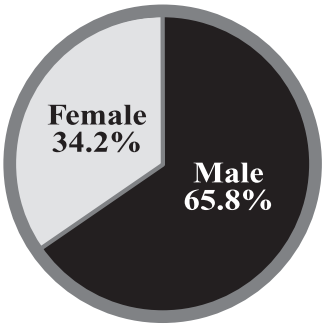
Emergency Department Arrivals by Day of Week: Children Treated at Pediatric Trauma Centers
(June 2016 to May 2017)
Source: Maryland State Trauma Registry



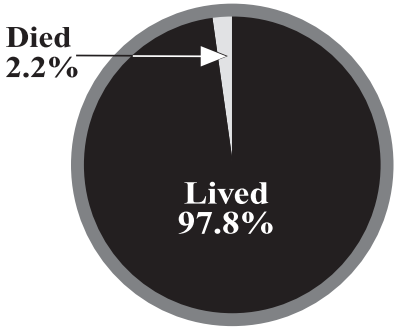
Emergency Department Arrivals by Time of Day: Children Treated at Pediatric Trauma Centers
(June 2016 to May 2017)
Source: Maryland State Trauma Registry



Gender Profile: Children Treated at Pediatric Trauma Centers
(June 2016 to May 2017)
Source: Maryland State Trauma Registry



Outcome Profile: Children Treated at Pediatric Trauma Centers
(June 2016 to May 2017)
Source: Maryland State Trauma Registry



Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Medical Center 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 2016 to May 2017)
Source: Maryland State Trauma Registry

Modality Type	CNMC	JHP	Total
Ground Ambulance	55.3%	76.9%	68.5%
Helicopter	29.3%	15.2%	20.7%
Other	15.4%	7.9%	10.8%
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 Medical Center 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 2016 to May 2017)
Source: Maryland State Trauma Registry

Origin	CNMC	JHP	Total
Scene of Injury	45.0%	54.3%	50.2%
Hospital Transfer	41.4%	42.2%	41.9%
Other	13.6%	3.5%	7.9%
TOTAL	100.0%	100.0%	100.0%

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Medical Center 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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Blunt	92.6%	91.7%	92.9%
Penetrating	4.1%	5.3%	4.1%
Burn	0.0%	0.1%	0.0%
Near Drowning	0.9%	0.9%	1.3%
Hanging	0.1%	0.1%	0.1%
Inhalation	0.1%	0.0%	0.0%
Ingestion	0.1%	0.1%	0.0%
Crush	0.1%	0.1%	0.0%
Snake Bite/Spider Bite	0.1%	0.0%	0.0%
Animal Bite/Human Bite	1.5%	1.3%	1.0%
Other	0.4%	0.4%	0.6%
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 Medical Center 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

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

Etiology	June 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Motor Vehicle Crash	15.9%	15.8%	20.6%
Motorcycle Crash	0.8%	1.2%	1.4%
Pedestrian Incident	8.2%	6.8%	8.5%
Gunshot Wound	1.5%	1.7%	1.8%
Stabbing*	1.5%	1.9%	1.3%
Fall	44.8%	46.4%	47.0%
Other	27.3%	26.2%	19.4%
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 Medical Center 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.

**Stab wounds include both intentional and unintentional piercings and punctures.*

Etiology of Injuries by Age

Children Treated at Pediatric Trauma Centers (June 2016 to May 2017)
Source: Maryland State Trauma Registry

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Stab Wound*	Other	Total
Under 1 year	5.4%	0.0%	0.8%	16.2%	7.4%	5.0%	5.8%	10.1%
1 to 4 years	23.6%	0.0%	15.5%	30.9%	22.2%	25.0%	19.3%	25.2%
5 to 9 years	33.6%	19.0%	37.2%	34.3%	22.2%	20.0%	25.4%	32.1%
10 to 14 years	32.6%	62.0%	42.6%	16.5%	37.1%	45.0%	35.6%	27.1%
15+ years	4.8%	19.0%	3.9%	2.1%	11.1%	5.0%	13.9%	5.5%
TOTAL	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 Medical Center 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.

**Stab wounds include both intentional and unintentional piercings and punctures.*

Number of Injuries and Deaths by Age

Children Treated at Pediatric Trauma Centers
(June 2016 to May 2017)
Source: Maryland State Trauma Registry

Age	Number of Injured Patients		Number of Deaths	
	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	224	219	13	10
1 to 4 years	404	386	8	7
5 to 9 years	493	462	6	6
10 to 14 years	415	393	8	7
15+ years	84	82	1	1
TOTAL	1,620	1,542	36	31

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Medical Center 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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Under 1 year	166	216	224
1 to 4 years	420	429	404
5 to 9 years	532	563	493
10 to 14 years	498	511	415
15+ years	106	111	84
TOTAL	1,722	1,830	1,620

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Medical Center 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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Under 1 year	4	8	13
1 to 4 years	7	10	8
5 to 9 years	2	7	6
10 to 14 years	1	3	8
15+ years	0	0	1
TOTAL	14	28	36

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Medical Center 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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Inpatient Rehab Facility	1.7%	2.2%	2.7%
Skilled Nursing Facility	0.1%	0.0%	0.0%
Residential Facility	0.2%	0.0%	0.0%
Specialty Referral Center	0.0%	0.2%	0.2%
Home with Services	0.9%	0.6%	0.6%
Home	94.7%	94.1%	92.5%
Acute Care Hospital	0.3%	0.2%	0.2%
Morgue/Died	0.8%	1.5%	2.2%
Foster Care	1.2%	1.0%	1.4%
Jail	0.0%	0.1%	0.1%
Psychiatric Hospital	0.0%	0.1%	0.0%
Other	0.1%	0.0%	0.1%
TOTAL	100.0%	100.0%	100.0%

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Medical Center 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 2016 to May 2017)
Source: Maryland State Trauma Registry

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Stab Wound*	Other	Total
Under 1 year	6.3%	0.0%	1.9%	18.2%	10.0%	4.5%	7.4%	11.6%
1 to 4 years	22.2%	0.0%	16.6%	33.3%	20.0%	22.7%	21.7%	26.5%
5 to 9 years	37.0%	27.3%	37.6%	31.9%	20.0%	18.2%	28.0%	32.4%
10 to 14 years	34.5%	72.7%	43.9%	16.6%	50.0%	54.6%	42.9%	29.5%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Children's National Medical Center 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.
**Stab wounds include both intentional and unintentional piercings and punctures.*

Occurrence of Injury by County: Scene Origin Cases Only

Children Treated at Pediatric Trauma Centers
(June 2016 to May 2017)
Source: Maryland State Trauma Registry

County of Injury	Number
Anne Arundel County	51
Baltimore County	118
Calvert County	17
Caroline County	8
Carroll County	18
Cecil County	7
Charles County	27
Dorchester County	7
Frederick County	15
Harford County	26
Howard County	14
Kent County	2
Montgomery County	66
Prince George's County	135
Queen Anne's County	9
St. Mary's County	37
Talbot County	4
Washington County	15
Worcester County	3
Baltimore City	204
Pennsylvania	2
Washington, DC	11
Delaware	2
Other	0
Not Indicated	16
TOTAL	814

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Medical Center data include patients residing in Maryland and/or injured in Maryland. Scene origin cases represent 50.2% 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 2016 to May 2017)
Source: Maryland State Trauma Registry

County of Residence	Number
Anne Arundel County	50
Baltimore County	120
Calvert County	18
Caroline County	8
Carroll County	19
Cecil County	5
Charles County	25
Dorchester County	7
Frederick County	12
Harford County	26
Howard County	17
Kent County	1
Montgomery County	71
Prince George's County	126
Queen Anne's County	5
St. Mary's County	33
Talbot County	3
Washington County	14
Wicomico County	1
Worcester County	2
Baltimore City	201
Virginia	11
West Virginia	2
Pennsylvania	7
Washington, DC	19
Delaware	4
Other	7
TOTAL	814

Note: For children who were treated at Adult Trauma Centers, see Maryland Adult Trauma Statistics. Children's National Medical Center data include patients residing in Maryland and/or injured in Maryland. Scene origin cases represent 50.2% 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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
None	49.5%	48.7%	39.5%
Seatbelt	11.2%	10.6%	10.2%
Airbag & Seatbelt	8.2%	10.6%	17.0%
Airbag Only	2.1%	4.5%	4.7%
Infant/Child Seat	14.0%	14.3%	17.8%
Protective Helmet	12.3%	10.2%	9.9%
Other Protective Device	0.2%	0.0%	0.2%
Padding/Protective Clothing	0.4%	0.9%	0.0%
Unknown	2.1%	0.2%	0.7%
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 Medical Center 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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Children's National Medical Center Pediatric Burn Center	CNMCPBC	211	244	242
Johns Hopkins Pediatric Burn Center	JHPBC	412	394	373
Johns Hopkins Burn Center at Bayview	JHBC	28	16	28
TOTAL		651	654	643

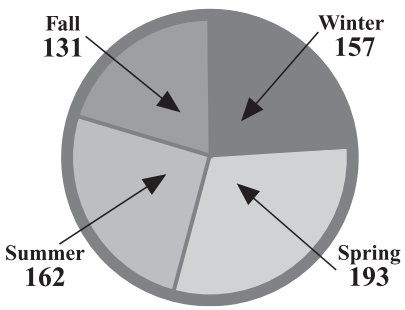
Place of Injury

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
Source: Maryland State Trauma Registry

Place of Injury	Number
Non-Institutional Private Residence	534
Institutional Private Residence	1
School	27
Street/Highway	4
Trade and Service Area	12
Farm	1
Other Places	15
Unspecified Place	49
TOTAL	643

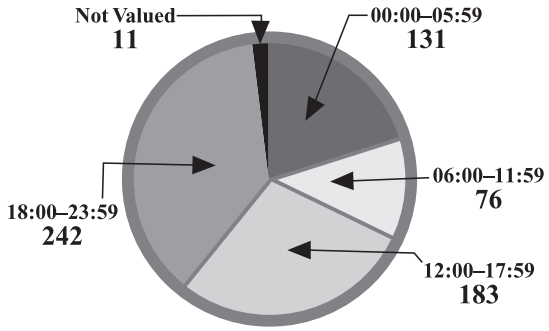
Season of Year Distribution

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
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 2016 to May 2017)
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 2016 to May 2017)
Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	4
Anne Arundel County	5
Baltimore County	32
Calvert County	1
Caroline County	0
Carroll County	2
Cecil County	1
Charles County	2
Frederick County	5
Harford County	8
Howard County	5
Montgomery County	17
Prince George's County	31
Queen Anne's County	1
St. Mary's County	3
Talbot County	1
Washington County	2
Wicomico County	1
Worcester County	2
Baltimore City	46
Virginia	1
West Virginia	4
Pennsylvania	2
Washington, DC	1
Delaware	1
Other	1
Not Valued	12
TOTAL	191

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 2016 to May 2017)
Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	5
Anne Arundel County	25
Baltimore County	96
Calvert County	10
Carroll County	5
Cecil County	5
Charles County	14
Dorchester County	1
Frederick County	12
Harford County	20
Howard County	27
Montgomery County	67
Prince George's County	142
Queen Anne's County	2
St. Mary's County	8
Somerset County	2
Talbot County	3
Washington County	11
Wicomico County	6
Worcester County	3
Baltimore City	158
Virginia	3
West Virginia	8
Pennsylvania	6
Delaware	2
Other	2
TOTAL	643

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 2016 to May 2017)
Source: Maryland State Trauma Registry

Modality Type	CNMCPBC	JHPBC	JHBC	Total
Ground Ambulance	84	194	3	281
Helicopter	7	19	0	26
Other*	151	155	25	331
Not Valued	0	5	0	5
TOTAL	242	373	28	643

**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 2016 to May 2017)
Source: Maryland State Trauma Registry

Origin Type	CNMCPBC	JHPBC	JHBC	Total
Scene of Injury	111	150	19	280
Hospital Transfer	72	157	4	233
Other	50	61	5	116
Not Valued	9	5	0	14
TOTAL	242	373	28	643

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 2016 to May 2017)
Source: Maryland State Trauma Registry

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Unknown	Total
			Flame	Contact	Scald				
Under 1 year	0	0	6	35	48	0	4	2	95
1 to 4 years	7	3	9	126	158	2	8	13	326
5 to 9 years	6	0	8	52	46	3	2	5	122
10 to 14 years	3	0	11	20	34	1	3	0	72
15 years and over	1	0	9	6	8	2	1	1	28
Total	17	3	43	239	294	8	18	21	643

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 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Home	593	597	565
Home with Services	20	20	19
Transfer to an Acute Care Facility	15	9	7
Rehabilitation Facility	4	13	12
Morgue/Died	2	4	0
Skilled Nursing Facility	0	2	1
Alternate Caregiver	10	4	2
Foster Care	6	2	2
Transfer to Inpatient Psychiatric Facility	1	0	0
Unable to Complete Treatment/Left Against Medical Advice	0	2	0
Other	0	0	30
Not Valued	0	1	5
TOTAL	651	654	643

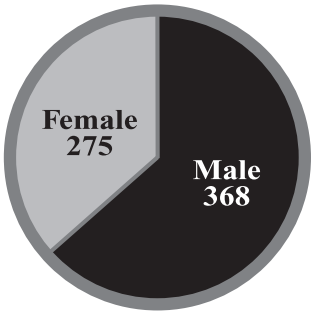
Total Body Surface Area (TBSA) Burned by Length of Stay in Days

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
Source: Maryland State Trauma Registry

Length of Stay	Less Than 10% TBSA	10 - 19% TBSA	20% or Greater TBSA	Not Valued	Total
1 Day	452	3	1	58	514
2 - 3 Days	35	4	0	9	48
4 - 7 Days	11	8	1	4	24
8 - 14 Days	5	2	0	4	11
15 - 21 Days	0	1	0	1	2
22 - 28 Days	1	0	2	0	3
Over 28 Days	2	1	2	0	5
Not Valued	34	0	0	2	36
TOTAL	540	19	6	78	643

Gender Profile

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2016 to May 2017)
Source: Maryland State Trauma Registry



Number of Injuries by Age

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

Age Range	June 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Under 1 year	94	72	95
1 to 4 years	336	357	326
5 to 9 years	111	135	122
10 to 14 years	77	72	72
15 years and over	33	18	28
TOTAL	651	654	643

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

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

	June 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Unique Patients	662	674	720
Total Pediatric Burn Clinic Visits	1,484	1,459	1,566

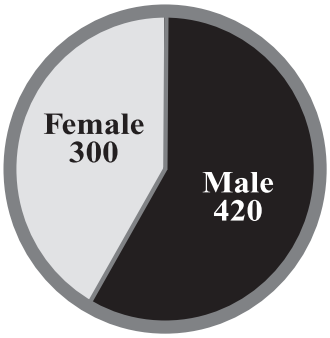
Number of Patients by Age Treated at the Burn Clinics at Johns Hopkins Pediatric Center and Children's National Medical Center

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

Age Range	June 2014 to May 2015	June 2015 to May 2016	June 2016 to May 2017
Under 1 year	81	57	90
1 to 4 years	332	364	377
5 to 9 years	141	154	133
10 to 14 years	77	83	83
15 years and over	31	16	37
TOTAL	662	674	720

Gender Profile

Patients Treated at the Pediatric Burn Clinics at Johns Hopkins Pediatric Center and Children's National Health System (May 2016 to June 2017)
Source: Maryland State Trauma Registry



Etiology of Injuries by Age

Patients Treated at the Pediatric Burn Clinics
At Johns Hopkins Pediatric Center and Children's National Medical Center
(June 2016 to May 2017)
Source: Maryland State Trauma Registry

			Thermal						
Age Range	Electrical	Chemical	Flame	Contact	Scald	Other Burn	Other Non-Burn	Unknown	Total
Under 1 year	0	0	1	37	40	4	0	8	90
1 to 4 years	4	1	11	150	187	5	0	19	377
5 to 9 years	0	0	8	55	61	2	0	7	133
10 to 14 years	0	0	10	24	40	1	1	7	83
15 years and over	0	0	11	10	12	2	0	2	37
Total	4	1	41	276	340	14	1	43	720

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