Maryland Institute for
Emergency Medical Services Systems

2014 – 2015

Annual Report

MIEMSS

The Maryland Institute for Emergency Medical Services Systems (MIEMSS) oversees and coordinates all components of the statewide EMS system (including planning, operations, evaluation, and research), provides leadership and medical direction, conducts and/or supports EMS educational programs, operates and maintains a statewide communications system, designates trauma and specialty centers, licenses and regulates commercial ambulance services, and participates in EMS-related public education and prevention programs.

MIEMSS provides the executive support for the EMS Board in reviewing and approving the budgets for agencies receiving funds from the EMS Operations Fund, developing and promulgating regulations and protocols, proposing EMS system legislation, licensing/certifying and disciplining EMS 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.

2014–2015 ANNUAL REPORT

CONTENTS

MISSION

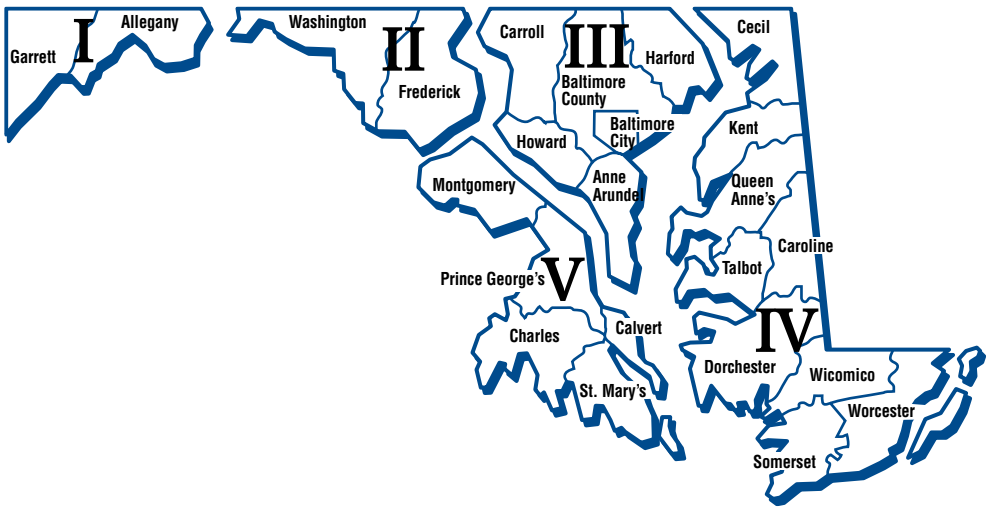
Consistent with Maryland law and guided by the EMS Plan, to provide the resources (communications, infrastructure, grants, and training), leadership (vision, expertise, and coordination), and oversight (medical, regulatory, and administrative) necessary for Maryland's statewide emergency medical services (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.



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

FROM THE EMS BOARD CHAIRMAN

Since its creation over two decades ago, Maryland's EMS system has continued to evolve and grow to meet the high expectations of those whom we serve and to keep our system the best in the nation. On behalf of the State EMS Board, I am pleased to share with you this 2014-2015 Annual Report and to highlight some noteworthy events over the past year.

Maryland's EMS system is now under new leadership with the appointment of Dr. Kevin G. Seaman to be the MIEMSS Executive Director. Dr. Seaman is only the second person to fill the position of Executive Director since the agency was established, succeeding Dr. Robert R. Bass, who retired after serving nearly 20 years in that position. Dr. Seaman brings with him a wealth of EMS experience, having served as Medical Director of the Howard County Department of Fire and Rescue Services. It is clear that he is an excellent fit for our system, and the EMS Board and I look forward to working with Dr. Seaman for many years to come.

During the 2014-2015 year, we completed our transition to the new National EMS Education Standards for providers and educational programs. Close collaboration with all of our partners has helped us meet this challenge and has led to two noteworthy achievements. All Advanced Life Support educational programs in Maryland have now or are nearing achievement of national accreditation. Further, candidates for Maryland certification as Emergency Medical Technician (EMT) and Emergency Medical Responder (EMR) now must successfully complete the National Registry for Emergency Medical Technicians (NREMT) examination, as Maryland has joined some 40 other states that require this testing for Basic Life Support providers. Even while instituting these requirements, Maryland has maintained its strong commitment to increase recruitment of EMS providers and, as a result, the state pays for the cost of an NREMT test for each eligible candidate.

Also in May of this past year, after many years of planning, we completed the first phase of improvements to our statewide EMS Communications System. Renovations and upgrades to improve infrastructure and technical capabilities at the Emergency Medical Resource Center (EMRC) and Systems Communications (SYSCOM) at MIEMSS' central office were completed within days of the 40th anniversary of the first call ever made to the EMRC. We are now focusing on the next phases of the project, which will upgrade the remaining components of the statewide communications network and integrate with the Maryland FiRST 700 MHz radio initiative.

In another noteworthy event, all public safety jurisdictions in Maryland have now adopted the use of eMEDS®, our prehospital electronic patient care information system. With statewide usage, Maryland has even greater potential to improve patient care, increase quality assurance effectiveness, and support outcomes research.

Finally, during the year we focused increased attention on the effects of health care reform and Maryland's unique health care reimbursement initiatives on EMS. Although these initiatives are targeted primarily to hospitals and physicians, their implementation will have increasingly significant effects on EMS and will require that we be prepared to identify new models and mechanisms for providing prehospital care to the ill and injured. Our project to explore EMS Mobile Integrated Healthcare is likely the first of many ventures in this regard.

Our statewide EMS system has a record of achievement that spans decades and is based on the dedication and devotion to service embodied in Maryland's volunteer and career EMS providers and firefighters; emergency, trauma, and specialty care physicians, emergency nurses, and hospitals; and state and local agencies. Our system will continue to provide the outstanding quality of life-saving care that has set Maryland apart through the demonstrated leadership and cooperative excellence that will ensure that our future is as bright as our past.

Kevin G. Seaman, MD, FACEP
Executive Director, MIEMSS

MIEMSS
FROM THE EXECUTIVE DIRECTOR

Maryland's EMS system is a highly integrated and well-coordinated emergency care network that operates statewide to ensure that critically ill and injured patients receive rapid and effective treatment. This system incorporates and benefits from the work of thousands of volunteer and career EMS providers, medical and nursing personnel, county and local governments throughout the state, sophisticated communication and transportation systems, and emergency departments and specialty care hospitals designated to treat life-threatening and time-critical emergency conditions. The success of our system is the result of decades of hard work by these entities and individuals. I am honored to be serving as the MIEMSS Executive Director and look forward to continuing to ensure that Maryland EMS is the best in the nation.

I would like to highlight several of our initiatives and achievements over this past year. MIEMSS partnered with state agencies and entities to devise solutions to address the increase in the number of fatal and non-fatal drug overdoses. MIEMSS is serving as a member of the Governor's Overdose Prevention Council and, during the year, we implemented protocols for Basic Life Support use of naloxone for opioid overdoses. Also, MIEMSS worked with our partners to increase EMS readiness to respond to potential cases of Ebola—a rare disease, but one that is highly contagious and often fatal. Lessons learned during this effort will be useful in dealing with other highly contagious diseases.

MIEMSS continued work to monitor the implementation of the National EMS Educational Standards in our state and to implement National Registry for Emergency Medical Technicians (NREMT) testing for Maryland certification of Basic Life Support providers. Moving to NREMT testing means that Maryland Emergency Medical Technicians and Emergency Medical Responders will meet national certification standards. This testing, which is required in more than 40 states, will ensure that Maryland's providers are best able and best prepared to provide the highest quality care to all our emergency patients. The transition to NREMT testing has been a significant undertaking, and we sincerely appreciate the all hard work and support that our partners have devoted to make this change.

Also, during the year, we increased our focus on initiatives to improve outcome from cardiac arrest. MIEMSS began participating in the Cardiac Arrest Registry to Enhance Survival (CARES). CARES is a nationwide, confidential registry that allows comparison of EMS and system performance to de-identified aggregate statistics at the local, state, or national level and identifies practices that could improve emergency and cardiac care. Further, we continued our work to promote the use of high-performance CPR and to support the efforts of the Maryland Resuscitation Academy, which helps jurisdictions implement programs that maximize patient survival after cardiac arrest.

Sadly, during the year, MIEMSS lost a friend and colleague with the passing of Maxine Dougherty in February. Max served as an Administrative Officer who worked at MIEMSS headquarters for 19 years in our accounting and administrative department. Max was hard-working and kind, and we are grateful to have had the opportunity to know and work with her.

On behalf of MIEMSS, I want to thank Maryland's EMS providers for their commitment and unselfish dedication that has made our statewide emergency medical system effective not only in meeting the needs of our citizens, but also in providing a model for the entire country. We look forward to continuing to work with all our partners as we further develop Maryland's exemplary emergency medical care system.

MIEMSS

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.

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.

The Personnel Unit coordinates all areas of human resources for MIEMSS. This includes setting policy and procedural guidelines to ensure compliance with state personnel laws and regulations. The staff of this unit is responsible for recruitment and hiring, salary determination, position classification and promotion, benefits and retirement coordination, employee assistance, ADA compliance, and the employee evaluation process.

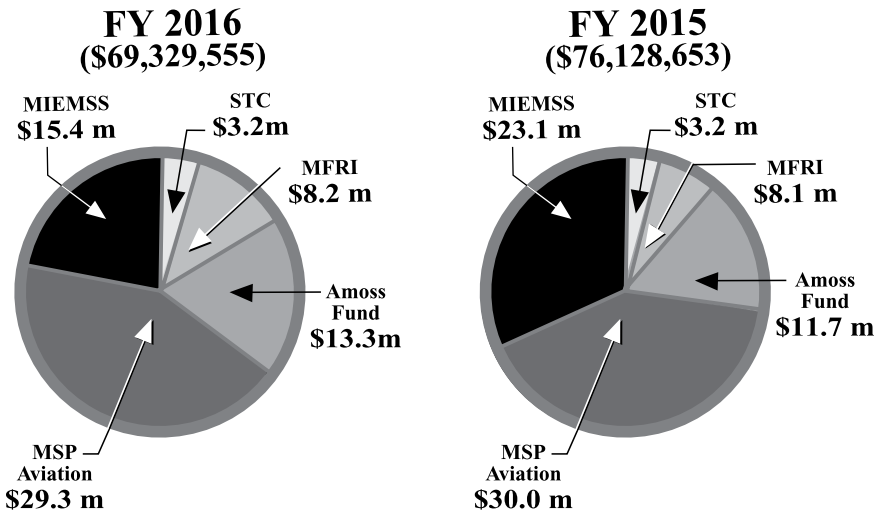
Administration is also responsible for inventory control, fleet management, travel services, and building operations and maintenance.

MIEMSS budget information is displayed by state object code in the charts below.

MIEMSS FY 2015 Expenditure by Object Code (Includes All Funds)

FY 2015	Actual
Salaries and Wages	$9,056,628
Technical/Special Fees	1,151,032
Communication	1,394,873
Travel	393,026
Fuel and Utilities	131,114
Motor Vehicle Operations and Maintenance	236,545
Contractual Services	2,412,037
Supplies and Materials	165,552
Equipment—Replacement	370,245
Equipment—Additional	95,450
Fixed Charges	107,377
Grants	828,592
Total Expenditure	$16,342,471

EMS Operations Fund



MFRI = Maryland Fire & 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 in order to meet the emergency helicopter needs of Maryland's citizens. The State Aeromedical Director is actively involved in ongoing training and verification of skill proficiency for State Police flight paramedics. He 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 2015 there were 2,194 patients transported by the Maryland State Police Aviation Command (MSPAC). Of these patients, 2,171 (99%) were transported from the scene at the request of the local emergency services and 23 (1%) were transported between hospitals to a higher level of care.

Types of calls include the following:

- Motor vehicle crashes 896
- Falls 592
- Pedestrians 108
- Assaults 71
- Gunshot wounds 45
- Stabbings 36
- Industrial accidents 32
- Burns 28

Fiscal Year 2015 was a very exciting year for MSPAC as the transition process was completed from the aging fleet of Dauphin helicopters to the newly purchased AgustaWestland 139 (AW-139) helicopters. These new 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. With the transition comes the addition of a copilot and a second medical provider to the crew. Five of the seven MSPAC bases had completed the transition to the new aircraft during FY 2014, with the remaining two bases successfully transitioning on schedule during FY 2015.

MSPAC continued its participation in the Adult and Pediatric Rapid Sequence Intubation (RSI) pilot programs. Designed to address the needs of patients with severe head injuries, these RSI pilot protocols allow MSP flight paramedics to use neuromuscular blocking agents in the field to provide endotracheal intubation for patients who are not breathing adequately. Scenario-based simulation training was utilized for MSP flight paramedics in verification of advanced skill proficiency. These exercises, also used for recertification in Pediatric Advanced Life Support (PALS), allowed life-like simulation of patient care situations as would be faced by 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.

The Attorney General's Office reviewed and prosecuted 31 cases of alleged prohibited acts by EMS providers and applicants. The office staff also provided legal advice and support to the State Office of Commercial Ambulance Licensing and Regulation in all compliance matters, including contested cases. In addition, responses were prepared to 28 public information act requests, 4 subpoenas, and 7 research requests. The Attorney General's Office represented MIEMSS in one employment case.

In FY 2015 the Assistant Attorneys General worked with MIEMSS to review and revise various regulations—including EMS protocols and data dictionaries, specialty care and neonatal transport regulations for commercial ambulance services—and provided support to MIEMSS during the legislative session. The Assistant Attorneys General also provided support to the

Perinatal Advisory Committee in updating the perinatal standards for Maryland and the perinatal specialty referral reverification process, the Commercial Ambulance Advisory Committee, and the Pediatric Emergency Medical Advisory Committee. The Assistant Attorneys General also supported 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 office participated in drafting several information technology procurements, including agreements to add features to the electronic Maryland EMS Data System (eMEDS®), software maintenance agreements, EMRC/SYSCOM facility upgrade agreements, and several business associate agreements under the Health Insurance Portability and Accountability Act (HIPAA). Other tasks completed in FY 2015 included providing advice on MIEMSS' social media policy, various intellectual property issues, drafting agreements for designation of out-of-state medical facilities, reviewing interagency memoranda of understanding, and reviewing and providing advice concerning designation of trauma and specialty centers.

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.

In FY 2015 the Assistant Attorneys General made educational presentations at several venues, including EMS Care, and served on the Maryland Health Information Exchange Policy Board and the Air Medical Committee of the National Association of State EMS Officials. The Assistant Attorneys General continued to support the Maryland Orders for Life Sustaining Treatment (MOLST) program and wrote an article for the EMS newsletter about MOLST for EMS providers.

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.

Fiscal year 2015 saw the successful completion of the first two phases of the physical renovation of the EMRC and SYSCOM facility located in downtown Baltimore. The renovation is a small part of a multi-year plan to transform the EMS communications system statewide from outdated analog technologies to modern Voice-over Internet Protocol (VoIP) technologies. One of the challenging aspects of the renovation was remaining operational continuously around-the-clock while the renovations took place. This required establishing an area for temporary operations that contained all the electrical, fire protection, and connectivity needs of the existing center. The next crucial step was relocating operators to the new temporary operations space without interrupting any missions or call requests. Once the relocation was completed, the equipment and furniture from the original operations room was removed and the space was turned over for reconstruction. The renovation included upgrades to our electrical systems; heating, ventilation, and air conditioning systems; flooring systems; fiber and structured cabling systems; fire protection systems; and lighting systems. Once the original room renovations were completed, ergonomic furniture for housing a new Motorola MCC7500 console system and new computers utilized for patching and other operational functions were installed.

The addition of the MCC7500 console introduced the ability for EMRC/SYSCOM to natively work with the new statewide radio system known as Maryland First Responders Interoperable Radio System Team (MFiRST), a 700 MHz Project 25 public safety radio system designed to support first responders throughout Maryland. The addition of this console equipment also eliminated one of the identified vulnerabilities in the current EMS system, namely the Motorola Centracom II console that served us reliably for the last 17 years but is now unsupported by Motorola.

On May 27, 2015, operations were transferred back to the newly renovated EMRC/SYSCOM facility. For the next 30 days we were required to run dual operations of both the old and new consoles. The temporary operations space was dismantled on June 29 after successful operation for 30 days.

The success of the EMRC/SYSCOM renovation, without any downtime, would not have been possible without the skills our communications staff, especially EMS Engineer Robert Chamberlin, who served as the

Project Manager overseeing the contractors. Also of special note was Sherry Alban, who served as the procurement specialist, and Dave Balthis, who supervised the contracts with the construction company.

Also during FY 2015, MIEMSS was able to integrate MFiRST connectivity into the Region IV EMRC, located at the Talbot County public-safety answering point (PSAP). This connectivity allows MFiRST users the ability to receive medical consultations directly on MFiRST talkgroups. This feature is especially beneficial to Kent County, which relies solely on MFiRST for their radio communications and prepares the way for other Eastern Shore counties that will be joining MFiRST in the future.

MIEMSS remains an active partner in MFiRST. After the successful completion of Phase 2 (Eastern Shore) of the project in December 2013, MIEMSS has been involved in the design and planning of Phase 4, which is expected to be completed in 2016. MIEMSS personnel were key players in site surveys conducted in Western Maryland that are necessary to allow the design phase of Phase 4 to proceed. Because MIEMSS operates the Western EMRC in the Phase 4 design area, the department has been active in the specific technical design needed to interface these EMS communications systems into MFiRST. These interfaces will allow MIEMSS to directly interoperate with MFiRST in support of field providers operating on this system and allow all field providers in the Western EMRC serving area to obtain medical direction via the EMRC.

Communications Engineering Services continues to lead in the design, implementation, and maintenance of the Statewide Public Safety Microwave System, which supports all the state agencies and many of the county radio systems. The department has continued its partnership role with other state agencies by designing and implementing communication circuits in support of MIEMSS, the Maryland State Police (MSP), the Maryland Department of Natural Resources (DNR), Maryland State Highway Administration (SHA), county radio systems, and many other state and federal partners including MFiRST. MIEMSS continues to play a leadership role in the day-to-day maintenance of the Public Safety Microwave System. MIEMSS microwave assets made it possible to bring the Maryland Emergency Management Agency's (MEMA) consoles online one year ahead of deployed fiber assets. It was due to efforts by MIEMSS that enabled MEMA to go live with the MFiRST system prior to the protests in Baltimore City in April 2015.

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 supporting critical data and voice communications managed by MIEMSS. It is a network deployed to MSP barracks, MIEMSS regional operating centers, jurisdictional emergency operations centers (EOCs) and primary/backup PSAPs/9-1-1, state and jurisdictional health departments, hospitals, and other allied agencies. Funding sources have included Public Safety Interoperable Communications (PSIC) grants, Urban Area Security Initiative (UASI) grants, MIEMSS operating funds, the MFiRST project, the Maryland Department of Health and Mental Hygiene, and local interoperability project funds. Interoperability applications that currently operate on PSInet include: MFiRST, 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), and systems monitoring/controlling the state's public safety microwave network and tower infrastructure.

Although grant funding sources have ceased, MIEMSS has continued to expand PSInet and DEMSTEL to targeted key public safety locations. This year we have seen the greatest expansion in the number of MSP barracks connected to DEMSTEL. The department continues to seek funding sources to complete connectivity to all the identified public safety assets in Maryland.

In late FY 2014, Communications Engineering Services began to address new services and security concerns on PSInet with the addition of Cisco® secure servers, new geographically diverse Cisco ASA firewalls, PSInet domain name DNS services, and a Cisco configuration archive server. These updated systems became operational in FY 2015.

MIEMSS has continued to expand its network monitoring and alarm monitoring system, which has enabled our staff to be more efficient and to respond to system repairs more decisively. We have continued to work to integrate the MFiRST system alarms into the MIEMSS master alarm system, providing daily insight into maintenance and performance issues. This leverages the state's investment in the master alarm system and allows a global view of the MFiRST radio infrastructure and the MIEMSS microwave system to be shared among our partner agencies, allowing quicker diagnosis of system problems.

We began FY 2015 with two unfilled radio technician positions. After two long-term employees retired, who had a total of 35 years of experience with the EMS system, we were able to hire two highly skilled individuals. Because of their rich levels of experience, the

new hires were able to quickly come up to speed. Our ability to keep the communications systems operational and restore service quickly is due in no small part to our dedicated staff of maintenance technicians, managers, and support staff.

Many other notable system enhancements and projects were completed in FY 2015:

- MFiRST talkgroup integration into Regions III, IV, and V EMRCs
- Prince George's County Combined Communications Facility relocation
- Assisted the Maryland DNR with their Area 8 radio system microwave backhaul design and construction
- Provided the FBI microwave backhaul circuits from several areas of the state
- Belair to Tollgate microwave path enhancement
- Removal of the old Douglas Point tower and restoration of the historic property in cooperation with the Bureau of Land Management
- Expanded our propane monitoring system at key sites in Western Maryland that were identified as great risk after Superstorm Sandy
- Added seven new hospital resources to the Region V EMRC; one in Maryland and six in Washington, DC
- Worked with Prince George's County to transition our circuits from their old microwave system to a replacement system
- Worked with MFiRST in the design and implementation of the new EMRC/SYSCOM consoles
- Completed a National Capital Region site survey grant
- Assisted Allegany County with land at Dans Rock to facilitate a new replacement tower for public safety use
- Supported 9-1-1 centers through participation on the Emergency Number Systems Board
- Expand MIEMSS radio programming to include Dorchester, Washington, Charles, Carroll, and Wicomico Counties
- Designed network changes and implemented them in support of Carroll County's new microwave system
- Participated in the newly formed Radio Control Board as a member agency
- Ordered replacement microwave equipment for Hagerstown SHA in support of relocating to a new transmitter shelter
- Assisted Harford County with their radio system and Region III EMRC integration as they implemented their new PSAP
- Worked extensively with MFiRST on an air-to-ground solution for MSP helicopters
- Worked with Talbot County on the early phase of their PSAP expansion
- Implemented a new voice logger as part of our system upgrade that provides the ability to record all of our key systems (analog, VoIP, and MFiRST talkgroups)
- Eliminated an outdated backup phone system by integrating key phone line capabilities into our DEMSTEL system

Despite the initial work force shortages and the complex renovation project in Baltimore, the department was successful in completing many important projects while managing constantly changing priorities statewide. We look ahead to the future as we continue to migrate our systems to new technologies that allow them to be more resilient and enhance the services we provide to the EMS community.

COMPLIANCE OFFICE

Mission: To ensure the health, safety, and welfare of the public as it relates to the delivery of emergency medical services (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 Office of the Attorney General, the Incident Review Committee (IRC), and the Provider Review Panel (PRP). The PRP is a 13-member panel comprised of physicians representing the Maryland Board of Physicians, Maryland Medical Chirurgical Society, and EMS Operational Program Medical Directors; all levels of EMS providers are also represented. The PRP reviews complaints, as well as the results of the investigations conducted by the Compliance Office, and recommends to the EMS Board any further action. The State EMS Medical Director and MIEMSS' Executive Director serve as ex-officio members on the PRP.

Compliance Office Activity in FY 2015

- EMS Operational Program Reverification Applications Reviewed 26
- Criminal Background Investigations Completed.....5,554
- Incidents Reported to IRC 230
- IRC Investigations Initiated.....188
- IRC Investigations Conducted.....158
- IRC Investigations (FY 2014) Continued.....42
- IRC Complaints Forwarded to PRP.....31
- Complaints Dismissed by PRP 1
- Complaints Forwarded to EMS Board 30
- Complaints Requiring Service.....10

EMS Board Action

- Reprimands....4
- Probation....15
- Suspensions....3
- Revocations....4
- Remedial Training....1
- Surrenders....3
- Evaluations....1
- Applications Denied....2
- Case Resolution Conferences....5
- Dismissed....1
- Counseling....1
- Rehab....4
- Random Testing....18
- OAH Hearings Requested....5
- OAH Hearings Conducted....0
- OAH Hearings Defaulted....1
- Settlement Agreements....4

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 office develops, designs, and produces instructional training modules and informative programs that are distributed statewide.

This office is responsible for the design, photography, and editorial content of the MIEMSS Annual Report, MIEMSS website, and the *Maryland EMS News* monthly newsletter, which is currently sent out in an electronic format and can be downloaded from MIEMSS' website. 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. Recent topics included updates on Maryland events such as the annual EMS Stars of Life Awards, EMS Week, and updated protocol and medical issues. MIEMSS continues to contribute information to the *Maryland Fire Dispatch*, which is an additional outlet for the dissemination of information to Maryland's emergency services community. As another way of communicating our messages, MIEMSS has a social media presence. MIEMSS can be found on Facebook, Twitter, and YouTube.

In FY 2015 Educational Support Services completed the 2015 update to *The Maryland Medical Protocols for EMS Providers*, including editing, layout, and design. This document can be found on the MIEMSS website. The 2015 pocket version of *The Maryland Medical Protocols for EMS Providers* was also edited, designed, and printed by Educational Support Services and copies were distributed to EMS providers statewide. The popular spiral-bound edition of the protocols was also printed.

In May 2015, during EMS Week, the annual Stars of Life Awards Ceremony was held in the Miller Senate Office Building in Annapolis. Both EMS for Children Right Care When It Counts Awards and Stars of Life Awards were presented, as were Governor's proclamations in recognition of EMS for Children Day and EMS Week. This year, Lieutenant Governor Boyd K. Rutherford joined MIEMSS Executive Director Dr. Kevin Seaman and EMS Board Chair Donald L. DeVries in presenting the awards. Press releases were distributed statewide and media coverage was obtained on the award winners.

Media events and press releases were produced during the year on many EMS-related issues. Press releases regarding high-risk dangers to infants and young children, such as hyperthermia resulting from being left alone in a vehicle, helped get the word out to the public and reduce preventable incidents. Several tours of MIEMSS were conducted for local, national, and international visitors. Visitors from Egypt, China, England, Japan, Korea, and Ireland were among the international audience that came to learn about Maryland's trauma and EMS system.

Educational Support Services assists with conference planning and provides technical and audiovisual support to MIEMSS-sponsored continuing education programs. Office staff also designed and produced printed materials, photographs, computer programs, and video productions that assist with the continuing education learning process. This office provided assistance and support with in-house web conferencing, video conferencing, and teleconferencing, which were done in collaboration with other MIEMSS departments, including EMS for Children.

MIEMSS exhibits are designed to disseminate information about the EMS system and topics in injury and illness prevention. In FY 2015 many MIEMSS exhibits, such as those on display at the Maryland State Firemen's Association (MSFA) Convention, the annual Maryland Association of Counties Convention, and various EMS conferences and open houses, were created with the assistance of Educational Support Services.

In FY 2015 MIEMSS produced an updated version of the EMS video "Meet the Protocols" to explain the changes and additions to *The Maryland Medical Protocols for EMS Providers* for 2015. The production was placed on MIEMSS' Online Training Center, which allows EMS providers to acquire continuing education through the MIEMSS website. DVD versions were also produced for company drill distribution. Educational Support Services produced the video and graphics to augment both the online and DVD training.

Several other training modules were produced by Educational Support Services during the past year. Other video projects completed this year included documenting various multi-casualty disaster drills throughout the state. Car seat messages were produced in collaboration with EMS for Children. Other productions included the Mid-Atlantic Life Safety Conference opening video; the annual Memorial Service program, video eulogies, and slide show for the MSFA Convention; and an EMS Week "thank you" message to providers from Dr. Seaman. Educational Support Services produced a commemorative video, *A Night for Stars*, to recognize award winning EMS cases in MIEMSS Region I. Two cases were chosen and recreated through interviews with actual providers from the scenes. This video was shown during an awards ceremony held at the annual Miltenberger Emergency Services Seminar in McHenry, Maryland, in April 2015.

Statewide prevention initiatives were developed through partnerships with other state and local government agencies. Social media messages were distributed on multiple prevention topics. Educational Support Services worked collaboratively on multiple prevention projects with the Occupant Protection Task Force, the Motorcycle Safety Task Force, the Pedestrian Safety Task Force, the Impaired Drivers Coalition, 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 HEALTH SERVICES DEPARTMENT UNIVERSITY OF MARYLAND, BALTIMORE COUNTY

Mission: To provide leadership in the field of emergency health services through excellence in education, supported by an active research agenda, service to the University and EMS communities, and provision of professional continuing education. The Emergency Health Services Department recognizes as constituents the University of Maryland, Baltimore County; MIEMSS; and the Maryland, national, and international EMS communities.

The Emergency Health Services Department at University of Maryland, Baltimore County (UMBC) had another successful year of providing undergraduate and graduate education to emergency services responders. Interest in the undergraduate paramedic program remains strong with a mix of local, national, and international students. The program continues to attract a large number of students from Saudi Arabia. The undergraduate management track continues to enroll both students new to EMS as well as transfer students from community college EMS clinical programs. At the graduate level, enrollment also remains strong with the continuing trend of attracting international students.

The department received approval to conduct a search for a senior faculty member in FY 2015. A search committee consisting of department faculty and staff, other UMBC faculty, former MIEMSS Executive Director Dr. Robert R. Bass, and program alumni conducted an international search, reviewed and vetted applications, and conducted candidate interviews. The committee submitted its recommendation to the dean and it is anticipated that a new faculty member will join the department in early 2016.

Like all university programs, the department faced the challenge of static funding levels due to decreased state funding of higher education. This primarily impacted the paramedic program, given the need to replace worn-out training manikins and other disposable training items. Thankfully, income generated by the department's Professional and Continuing Education (PACE) program, as well as donations to the department by alumni and others, was available to cover basic replacement costs, eliminating the need to consider increasing student lab fees. Adequate operational funding for the department, however, remains a concern.

Curriculum development activities were conducted by the paramedic program and, as a result, a new curriculum will be implemented for juniors entering the program in fall 2015. The changes, the result of accreditation and National Registry requirements as well as faculty input, include the return of two semesters of chemistry as a preparatory requirement. All curriculum changes were reviewed and approved by Dr. Matt Levy, the program's medical director.

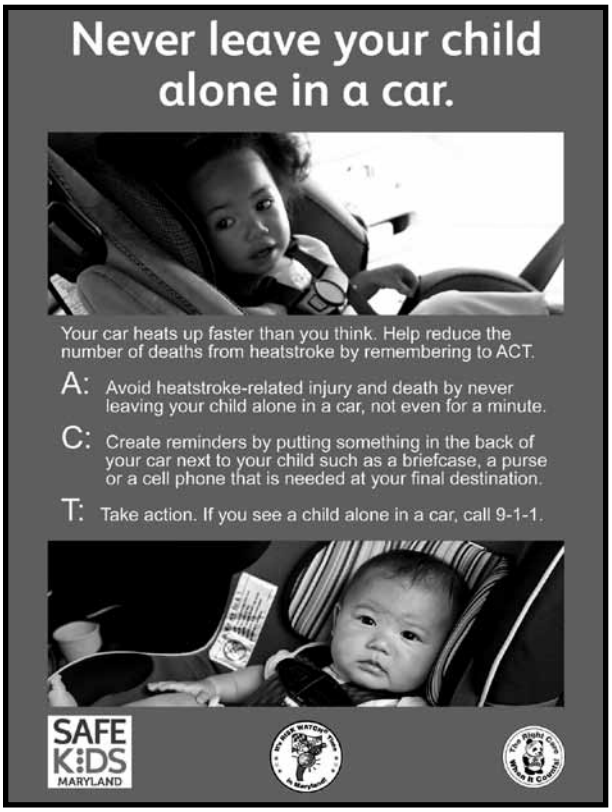
Given the increasing emphasis on community paramedicine, the department recognized the need to address this area both in terms of paramedic preparation and program management. Clinical Assistant Professor Diane Flint is heading the department's work in this area.

The department continues to work with the Maryland Department of Health and Mental Hygiene in areas related to public health and emergency response. Professor Richard Bissell is the principal investigator on an ongoing grant titled *Public Health Risk Assessment Tool*.

The department's PACE operation continues to provide continuing and professional education opportunities to local, regional, and national EMS responders. PACE's signature program, Critical Care Emergency Medical Transport Program (CCEMTP), continues to grow having now reached 14,399 students through 790 courses offered at 56 sites nationwide. Pediatric and Neonatal Critical Care Transport Program (PNCCT), the pediatric equivalent of CCEMTP, has reached 912 students through 67 courses and 12 sites. Revision of the PNCCT curriculum, utilizing experts from Johns Hopkins, University of Maryland Medical System, and Children's National Health System, has been completed.

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 wellbeing of children, youth, and their families in Maryland.



The Emergency Medical Services for Children (EMS for Children) Department is responsible for the development of statewide guidelines, regulations, and resources for pediatric care; quality review of pediatric emergency care and implementing pediatric facility regulations and designation; coordination of pediatric education programs; and collaboration with other agencies and organizations focused on childhood health and illness and injury prevention. The EMS for Children Department coordinates the state Pediatric Emergency Medical Advisory Committee (PEMAC) and its subcommittees; the State Pediatric Quality Improvement Committee (QIC) and the Pediatric Data Analysis and Research Team; Pediatric Base Stations; pediatric trauma and burn programs; and the pediatric activities within the five Regional EMS Advisory Councils. Grants related to children and families in EMS are coordinated through EMS for Children, including a federal EMS for Children Partnership grant, continuously funded since 1994; EMS for Children-related research activities in Maryland; and the Child Passenger Safety and Occupant Protection Health Care grant project, continuously funded since 2001. MIEMSS, and EMS for Children in particular, is the lead agency for the Safe Kids Maryland state coalition, with eight local coalitions and three local community partners, and for the Maryland RISK WATCH® community with 14 local communities in partnership with the Maryland State Firemen's Association (MSFA) and its Ladies Auxiliary.

EMS for Children Program Activities

The State PEMAC meets on a bimonthly basis using web-based meeting technology for those unable to attend in person. The PEMAC website includes meeting handouts, state and federal resources for EMS for Children, and relevant publications for committee members. PEMAC has three standing subcommittees: Pediatric Protocol Development, Pediatric Education, and Prevention and Life Safety. Maryland's EMS for Children Department has a Family Advisory Network (FAN) Council that reviews the "Right Care When It Counts" award nominations and promotes the public messaging for this initiative. The FAN Council also plays a key role in the injury prevention activities at the annual MSFA convention and recruits youth from across Maryland to teach children and families (see RISK WATCH discussion on page 14). Working task forces meet on a regular basis as documents and procedures are updated for the Voluntary Ambulance Inspection Program (VAIP), interfacility transport and transfer, and pediatric facility recognition. Bimonthly forums are held in conjunction with PEMAC meetings with specific focuses: March and September are joint meetings with Safe Kids Maryland and the Partnership for Safer Maryland, May is Family-Centered Care, July is Protocol, and November is Pediatric Research. Through the Maryland EMS Protocol review process, current state-of-the-art clinical approaches to managing childhood emergencies continue to be developed and implemented. Dr. Allen Walker, Associate State EMS Medical Director for Pediatrics, lead a focused review of the entire Maryland EMS Protocols this year in an effort to standardize the age parameters for procedures and medications and to update the newly born resuscitation sections. Recommendations for revisions and additions are based on a comprehensive evidence review and expert consensus process of the PEMAC.

EMS for Children Day was celebrated on May 19, 2015, at an annual awards ceremony that recognized children and youth in Maryland who had demonstrated one of the "10 Steps to Take in an Emergency" or one of the "10 Ways to Be Better Prepared for an Emergency." Four children in Maryland received awards for their actions that ensured another person would receive "The Right Care When It Counts." This year the 10 Right Care Steps were the main attraction at the MSFA convention in Ocean City, where the EMS for Children panda bear mascot and his escorts reached out to children and families to encourage them to learn safety at home and in the community. A 2014 public service announcement on the 10 Steps, created by children and youth, is viewable on MIEMSS' YouTube channel (www.youtube.com/MarylandEMS). Also on May 19, Captain Holly Trego received the Maryland EMS for Children Award in recognition of her leadership in developing a training DVD for children and adults. "What to Expect When You Call 9-1-1" is a series of three short videos that look behind the scenes of emergency medical dispatching "through the eyes of the dispatcher." Capt. Trego presented this DVD to the Emergency Number Systems Board, the MSFA and its Ladies Auxiliary, and trained volunteers to use the DVD in conjunction with phone simulation.

The Pediatric QIC continues to coordinate training for pediatric transport teams and for pediatric Base Stations. Two pediatric Base Stations, at Children's National Health System and Johns Hopkins Children's Center, provide statewide coverage for online and offline pediatric medical direction. Their primary focus is on prehospital communication and education and on a dual commitment to consultation for community hospitals and adult trauma center emergency departments across Maryland. 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 Pediatric QIC and Data Analysis and Research Team (DART) have established a bimonthly meeting schedule and have three ongoing data projects: (1) a descriptive report of a ten-year experience with pediatric rapid sequence induction (RSI) done by public safety aeromedical teams (Maryland State Police and US Park Police) in partnership with Johns Hopkins and Children's National Health System; (2) pediatric burn outpatient data reporting with a newly expanded Burn TRACS software; and (3) a review of pediatric trauma patient triage and transport decisions by EMS providers through both eMEDS® review and the use of Audience Response System technology during EMS conference lectures.

EMS for Children Grant Activities

Federal EMS for Children grants are coordinated through MIEMSS' EMS for Children Department and involve statewide projects, targeted issues, projects, and research initiatives at academic universities. MIEMSS is in the tenth year of an EMS for Children state partnership grant from the Maternal and Child Health Bureau (MCHB)/Heath Resources Services Administration of the US Department of Health and Human Services. The 2014-2017 EMS for Children partnership grant focuses on the continued integration of EMS for Children into the statewide EMS system utilizing both the federal Maternal Child Health Core Performance Measures and the federal EMS for Children Performance Measures as targeted projects. The specific grant goals remain the same as the 2009-2013 Partnership Grant (see MIEMSS 2012-2013 Annual Report).

Pediatric Emergency Care Education across Maryland

Month and Location	Conference Title	Pediatric Components
August 2014 Baltimore, MD	Neonatal Resuscitation Program	Developed by the AAP and AHA with a focus on newborn stabilization; offered jointly with SOCALR
September 2014 Ocean City, MD	PRMC Trauma Conference	**Display:** Medication Safety in the Home – Safe Kids Maryland educational display for families
September 2014 Laurel, MD	Mid-Atlantic Life Safety Conference	**Display:** CPS and OP Health Care Project
October 2014 Cheverly, MD	ENA Barbara Proctor Conference	**Displays:** CPS and OP Health Care Project; Medication Safety in the Home (Safe Kids)
October 2014 Baltimore, MD	APLS: The Pediatric Emergency Medicine Resource Course	Physician hybrid course developed by AAP and ACEP – course offered in Region III at MIEMSS
January 2015 Tilghman Island, MD	Winterfest Conference 2015	**Preconference:** BLS PEPP Course **Workshops:** Pediatric Respiratory Illness – The Old and the New; Destination Dilemma – Determining Where to Take My Pediatric Trauma Patient **Display:** Medication Safety in the Home (Safe Kids)
January 2015 Salisbury and Chestertown, MD	APLS: The Pediatric Emergency Medicine Resource Course	Physician hybrid course developed by AAP and ACEP – course offered in Region IV hosted by PRMC and University of Maryland Shore Medical Center at Chestertown hospitals
February 2015 Frederick, MD	APLS: The Pediatric Emergency Medicine Resource Course	Physician hybrid course developed by AAP and ACEP – course offered in Region II with Frederick County Fire and Rescue hosting
February 2015 Clinton, MD	APLS: The Pediatric Emergency Medicine Resource Course	Physician hybrid course developed by AAP and ACEP – course offered in Region V hosted by Medstar Southern Maryland Hospital Center
March 2015 College Park, MD	Public Fire and Life Safety Educator Seminar	**Workshop:** "BeTween" Age Groups: Working with Pre-Drivers
April 2015 Baltimore, MD	Neonatal Resuscitation Program	Developed by the AAP and AHA with a focus on newborn stabilization; offered jointly with SOCALR
April 2015 McHenry, MD	Miltenberger Emergency Services Seminar 2015	**Preconference:** BLS PEPP Course **Workshops:** What's Hot and What's Not – Pediatric Burn Case Reviews; Tracheostomy Tubes: More Than BVM and Suction; Family Presence: Positive Impact of Parents in Ambulances and Code Rooms; Sticks and Stones and Broken Bones: Pediatric Injuries; Pediatric Sepsis
April 2015 Chicago, IL	Lifesavers National Conference	**Panel Presentation:** Challenges Associated with the Safe Transport of Children in Ambulances
May 2015 Ocean City, MD	EMS Care 2015	**Preconference:** PEPP-3 **Workshops:** Do You See What I See? Battered, Broken and Burned; Ouch – It Hurts! Pediatric Pain Assessment and Management in the Field; Destination Dilemma – Determining Where to Take My Pediatric Trauma Patient; What's Hot and What's Not – Pediatric Burn Case Reviews; Pediatric Sepsis; Pediatric Assessment – From Tots to Teens **Displays:** Medication Safety in the Home (Safe Kids); CPS and OP Health Care Project; Ambulance Safety
May 2015 Linthicum, MD	ENA by the Bay 2015	**Preconference:** CPEN Review Course supported in part by EMS for Children State Partnership Grant. **Poster:** Challenges Associated with the Safe Transport of Children in Ambulances **Displays:** Medication Safety in the Home (Safe Kids); CPS and OP Health Care Project
June 2015 Ocean City, MD	MSFA Convention	**Child and Family Interactive Stations:** RISK WATCH and Safe Kids: Steps to Safety – Make the Right Call: 9-1-1 Access, Home Fire Safety, CPS Safety, Home Falls and Tip-overs, Water Safety, and BeTween Driver Awareness **Display:** Building Prevention Resources at Your Home

During FY 2015 the Maryland EMS for Children team focused on specific performance measures where development and implementation is still needed. This department continues to advocate for the adoption of the VAIP Seal of Excellence and minimum equipment standards (based upon the recommendations of the national EMS for Children Program and professional organizations) for all ground ambulances used for patient assessment and treatment. Maryland EMS for Children Department continued to provide leadership in the coordination of the ten states/territories in the Atlantic EMS for Children Region. These EMS for Children coordinators meet annually in December to share resources as all states work on the Federal EMS for Children Performance Measures and continue to promote pediatric educational programs within state and local conferences. The December 2014 meeting focused on hospital and EMS pediatric recognition programs, a discussion that will continue during the August 2015 EMS for Children Regional Symposium.

Emergency Medical Services for Children continues to support the Maryland Emergency Nurses Association (ENA) Council and three local ENA chapters by providing meeting logistics for the Pediatric Committee of ENA and the Emergency Nurse Pediatric Course instructor updates. MIEMSS also hosted the annual ENA delegate preparation meeting prior to the national General Assembly. EMS for Children Director Cynthia Wright Johnson serves on the Institute for Quality Safety and Injury Prevention (IQSIP) at the national level and chairs the Maryland IQSIP committee. A Maryland EMS for Children State Partnership Grant supported the CPEN review course held at the state ENA annual conference in May.

Pediatric EMS and Hospital Education

During each of the EMS and emergency nursing educational seminars and conferences in Maryland in FY 2015, pediatric displays and/or pediatric topics, listed in the annual continuing education chart on page 12, were presented to highlight both protocol changes and the Pediatric DART trauma triage decision project. Each conference also included a Pediatric Education for Prehospital Professionals BLS course as part of the 2014 new curriculum rollout.

In the past year, EMS for Children, in partnership with the State Office of Commercial Ambulance Licensing and Regulation, offered Neonatal Resuscitation Program skills courses for EMS providers on transport teams. It is through these courses that the need for changes in the Maryland EMS Protocols was identified. Maryland, Iowa, and New Jersey EMS for Children programs presented an educational poster session at the annual National Association of State EMS Officials conference entitled "Challenges Associated with the Safe Transport of Children in Ambulances." Cynthia Wright Johnson also presented this topic at the April 2015 Lifesavers National Conference on a panel of specialty topics in child passenger safety.

In partnership with the Maryland American Academy of Pediatrics, Maryland EMS for Children took the Advanced Pediatric Life Support (APLS) course on the road to reach community hospital physicians, nurse practitioners, and physician assistants on the Eastern Shore, Southern Maryland, and Central Maryland. APLS is offered in Maryland in a hybrid format with precourse work completed online and one-day in-person training that includes three essential lectures, high fidelity cases and mock codes, and specific low-volume high-risk case scenarios. The evaluations have been very positive and the attendees braved snow and traffic to attend the courses. A core group of physician faculty will continue to offer this course at MIEMSS and in Western and Southern Maryland during the remainder of 2015.

Child Passenger Safety and Occupant Protection Health Care Project

In 2014, 442 Marylanders lost their lives due to motor vehicle crashes. While this is the lowest number since 1948, every life counts and more can be done to prevent motor vehicle crashes and the resulting deaths, injuries, and costs involved. Recognizing this, the Maryland Highway Safety Office renewed its funding of EMS for Children's Child Passenger Safety and Occupant Protection Health Care Project for the 14th year.

The goals of the project are to disseminate up-to-date and culturally-relevant child passenger safety (CPS) and occupant protection (OP) information and best practice through training health care providers and creating and distributing educational materials. The project focuses on Maryland hospitals, emergency medical providers, pediatricians, health departments,

and nurses, but it works closely with Maryland Kids in Safety Seats (KISS), Maryland Safe Kids Coalition, and others to meet the emerging needs of all state citizens.

This year the project distributed CPS and OP educational materials to approximately 132 health care agencies, and reached over 2,000 EMS or emergency nurse-providers through seven interactive exhibits on CPS. New reference cards were created and distributed to all 46 EMS Base Stations to guide them in properly restraining children on ambulances. Three skills trainings sessions, reaching 34 providers, were held on this topic to teach emergency medical providers to use child restraint devices on ambulance stretchers. Nine training sessions on CPS were conducted for hospital staff over the year, reaching 35 providers from ten different hospitals. Educational materials were continuously updated or created to reflect the needs of target audiences. This year the car seat tolerance screen (car seat challenge) handout was translated into Spanish and distributed to all neonatal intensive care units statewide. Two webinars were conducted, reaching more than 50 health care providers and child passenger safety technicians, on the newest car seat technology and safely transporting children in wheelchairs. This program also aims to improve pre-driver safety in cars. Eleven new nurses and other safety advocates were trained to use the "BeTween Riding & Driving" curriculum developed by CPS and OP in their local communities to educate youth on buckling up, air bag safety, and knowing what to do if riding with a dangerous driver.

Child passenger safety technicians (CPST) are recruited and trained in order to meet Maryland families' individual needs on CPS and spread the CPS message. This project provided five scholarships to health care providers to take the certification course, and the project coordinator helped teach 12 certification or renewal classes across the state, reaching 122 technician-candidates. The coordinator also helped at thirteen safety seat check-up events across the state, assisting with the education and instruction of 129 families.

This year marked the 30th anniversary of the Maryland Child Passenger Safety Law. To commemorate this, the project worked with other injury prevention advocacy groups to create and release a 30-second public service announcement: "Do Your Part: Buckle Up" (available on YouTube) and to hold a press event during National Child Passenger Safety Week. The event featured car crash survivors, exhibits, and a networking opportunity for safety advocates who have been involved in the CPS law during the last 30 years. The event was covered by several media outlets.

Another focus of this project's efforts to reach the media was on the subject of hyperthermia in kids left in cars. Several children in Maryland have died this way in the last several years and so the project worked closely with Maryland Safe Kids to create materials and media messages to alert parents and providers to the risks and prevention strategies. The "ACT" poster (Avoid heatstroke, Create reminders, Take action) was distributed to EMS and fire stations in Southern Maryland after a tragic death in September 2014 and reprinted in 2015 for distribution statewide. In June 2015 another child died in Baltimore City from being left in a car. Subsequently, over 1,000 ACT posters were distributed through the MSFA convention, by direct mailing to 49 hospitals, and on request.

Injury Prevention and Life Safety

The staff participates in national, state, and local Safe Kids coalitions, the Maryland division of the American Trauma Society (ATS), the Maryland Occupant Task Force, and the Child Passenger Safety Board coordinated by Maryland KISS. This collaboration provides a consistent flow of information to the five Regional Councils and the state PEMAC on injury prevention resources and initiatives. EMS for Children continues to liaison with the Child Fatality Review Committee in collaboration with the state MCHB and the Partnership for a Safer Maryland (led by the DHMH and funded by a Centers for Disease Control and Prevention (CDC) grant). In September 2014 PEMAC, Safe Kids Maryland, and the Partnership jointly held a prevention forum with three program updates: Safe Kids medication grant project and rollout, "What to Expect When You Call 9-1-1" training DVD, and the 30th anniversary of the Maryland CPS law.

The Maryland RISK WATCH community is led by EMS for Children Department in collaboration with the Office of the State Fire Marshal and the MSFA Fire

Prevention and Life Safety Committee, along with the Maryland and local Safe Kids coalitions. Other partners in RISK WATCH include the Cecil County Department of Emergency Services, Johns Hopkins Pediatric Emergency Department, Peninsula Regional Medical Center (PRMC), the Maryland and National Capital Poison Centers, the Maryland Chapter of the ATS, and the Maryland Department of Natural Resources. The 2015 convention program reached more children on the first day than during the week. The addition of two mascots (EMS for Children Panda and ATS TraumaRoo) led children (sometimes dragging their parents) to the interactive skill stations. The stations were also strategically placed in the exhibit hall—midway through the vendors—which increased visibility and traffic. Again, the response from youth and young adults was strong this year, providing the mentors with the ability to rotate these volunteers through a number of different risk areas and to provide coaching. These fire and injury prevention interactive stations are designed for the entire family and provided information to different audiences. Families who completed the "Steps to Safety" and EMS/fire learning stations are provided with reference material to recreate the stations for their local activities.

During the eighteen years of the RISK WATCH program in Maryland, communities have placed it into classrooms, before and after-school programs, summer camps, child and parent educational programs in hospitals, and injury prevention programs. Currently, there are 14 communities, which are listed on the MIEMSS and MSFA websites, working with RISK WATCH materials.

Emergency Medical Services for Children at MIEMSS is the lead organization of the Safe Kids Maryland Coalition and holds spring and fall meetings. The state coalition website (www.safekidsmd.org) has been expanded to include a variety of online resources. Coalition meetings have added the capabilities for conference call-in and a GoToMeeting® web-based platform to enable more participation. Again in FY 2015, the Maryland Safe Kids programs dedicated their websites and various press releases to high-risk injuries. The medication safety display, funded by the Safe Kids Worldwide grant in 2014, was featured at the PRMC's Annual Trauma Conference, the ENA chapter and state conferences, and each EMS conference during 2014-2015. Each local coalition and community partner received a medication safety traveling kit to disseminate the teaching resources.

Maryland EMS for Children has been very active with the CDC-funded Core Violence and Injury Prevention Program. The lead agency for this program is DHMH, which maintains both the Base Integration

Component and a Regional Network Leader. MIEMSS Hospital Programs and EMS for Children directors are both involved with the Partnership for Safer Maryland, providing liaison to the trauma centers and state ENA. In fall 2014 Maryland EMS for Children joined the Children's Safety Network Community of Practice on Teen Distracted Driving and continues to participate in these monthly webinars focused on preteen and teen driving safety.

EMRC/SYSCOM

Mission: The Maryland EMS Communications Center is a statewide coordination and operation center for Maryland's EMS system, which functions 24 hours, 365 days a year. The Communications Center has two integrated components: Systems Communications (SYSCOM) and Emergency Medical Resource Center (EMRC).

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

EMRC has a three-fold mission:

1. *Providing communications linkages and facilitating medical consultations between prehospital EMS providers and emergency departments, trauma centers, and specialty centers*
2. *Maintaining and sharing situational awareness of the activities, capabilities, and capacities of the prehospital system and hospitals*
3. *Providing initial alerting and coordination of resources and the distribution of patients during major medical incidents*

In FY 2015 the Emergency Medical Resource Center (EMRC) handled 225,316 telephone calls and 181,706 radio calls. Of these 407,022 calls, 145,365 were communications involving a patient or incidents with multiple patients, while 11,370 of these calls involved on-line medical direction.

In FY 2015 the Systems Communications (SYSCOM) center handled 23,143 telephone calls and 1,514 radio calls. Of these 24,657 calls, the majority were related to requests for medevac helicopters.

As part of a cooperative agreement, EMRC/SYSCOM answered over 800 calls for the Maryland Department of Health and Mental Hygiene 24-hour Duty Officer. Many of these calls were related to Ebola Virus Disease monitoring.

EMRC/SYSCOM 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. The FRED system is also utilized by EMRC/SYSCOM in support of local emergencies and exercises conducted statewide. From September 2014 through May 2015, the EMRC/SYSCOM communications center was renovated. During the renovation, operations were moved to temporary quarters in the EMRC/SYSCOM administrative offices. EMRC/SYSCOM moved operations into the renovated center on May 27. A detailed description of the updates to the equipment is described in the Communications Engineering Services report on page 5.

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.

EMS-related legislation that was passed during the 2015 session of the Maryland General Assembly included the following:

- As of October 1, 2015, it will be a felony to intentionally cause physical injury to a firefighter, an EMS provider, a rescue squad member, or any other first responder engaged in firefighting or providing emergency medical care or rescue services.
- The recent increased number of opioid overdoses in Maryland led to passage of several laws to help deal with the effects of these overdoses. Specific to EMS, civil immunity protections were extended to cover administration of medications or treatment in response to an apparent drug overdose if the person administering the medication or treatment is licensed/certified as an EMS provider and authorized to administer medications/treatment under *The Maryland Medical Protocols for EMS Providers* or certified to administer medications/treatment under protocols established by the Maryland Department of Health and Mental Hygiene (DHMH).
- By December 31, 2017, multiple-line telephone systems, such as those found in hotels, must ensure that their telephone system allows an individual to dial 9-1-1 in an emergency without requiring the individual to dial any other number or set of numbers before dialing 9-1-1.
- Insurers, health maintenance organizations (HMOs), and nonprofit health service plans will continue to be required to reimburse certain ambulance service providers directly for covered services provided.
- Beginning in 2015, maximum speed limits on certain highways in Maryland may increase from 65 miles an hour to 70 miles an hour.
- An Emergency and Allergy Treatment Program was established to permit youth camps that meet certain requirements to administer auto-injectable epinephrine to an individual determined to be, or believed to be, experiencing anaphylaxis. Liability protections for these participating programs were also established, and participating programs must report certain incidents to the DHMH.

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.

Primary and Comprehensive Stroke Centers

More than seven years since the initial implementation of a statewide regional system approach to stroke care, the system continues to evolve. This stroke system of care approach helps to ensure prompt and appropriate care of the acute stroke patient. Maryland's Primary and Comprehensive Stroke Centers have been instrumental in addressing system changes in stroke prevention and coordination of the delivery of care to the acute stroke patient. This statewide regional approach to stroke care has led to the designation of 34 Primary Stroke Centers and 2 Comprehensive Stroke Centers in Maryland. (See page 39 for a complete list of Primary and Comprehensive Stroke Centers.) During FY 2015 one hospital submitted an application for initial designation as a Primary Stroke Center and was designated. All Stroke Centers are redesignated every five years to assure that each continues to meet regulations and performance standards for stroke care.

The Primary and Comprehensive Stroke Centers submit data monthly to the American Heart Association (AHA) Get With The Guidelines®-Stroke (GWTG) registry. MIEMSS accesses the registry each month and monitors for compliance with the core performance measures established by the AHA and American Stroke Association (ASA) (see page 18 for list of the core performance measures). Data from the Stroke Registry also allows MIEMSS to benchmark Maryland's compliance rate with the established core measures for standard of care for the stroke patient to national compliance rates. Compliance with the core performance measures has been shown to improve patient outcomes. The AHA/ASA has set a minimal compliance rate of 80% for each of the ten core performance measures. The annual state aggregate data for CY 2014 revealed Maryland had a compliance rate of 88% or greater for each of the core performance measures.

The Stroke Quality Improvement Committee (QIC), supported by MIEMSS' Office of Hospital Programs, is an advisory body to MIEMSS for quality improvement issues affecting the care of patients with acute stroke. The Stroke QIC is comprised of representatives from each designated stroke center. In FY 2015 the QIC continued to focus on improving 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 and improve their response times and share best practices and processes with each other. It has been well established that the sooner a patient is treated with the fibrinolytic t-PA, the better his or her outcome. The AHA/ASA Target: Stroke℠ program has established a minimal compliance rate of 50% of stroke patients—those who are eligible to receive the clot busting drug t-PA—to have a time from hospital arrival to initiation of drug (door to needle) of 60 minutes or less. For CY 2014, 68.7% of eligible stroke patients in Maryland had a door to needle time of 60 minutes or less. In comparison, the national average for hospitals meeting this metric was 65.4% in CY 2014.

EMS Base Stations

Hospital Programs staff continued to collaborate with the Medical Director's Office on EMS Base Station reverifications. Management activities included issuing certifications to emergency department (ED) personnel completing the Base Station Communications Course as well as monitoring and certifying new Base Station instructors. In FY 2015, 21 hospitals applied and were approved for redesignation as a MIEMSS-approved Base Station. The hospitals complete an application and a self-assessment survey, which are reviewed by MIEMSS and followed by a site visit. The survey team was composed of MIEMSS staff, a MIEMSS Regional Medical Director, and a MIEMSS Regional Administrator.

Trauma System

Maryland citizens are served with a trauma system accessible to all regions of the state. The Maryland trauma system is regionalized and tiered, which ensures prompt and appropriate care of the trauma patient. Studies have shown that having the trauma patient at the most appropriate trauma center for treatment has been shown to improve patient mortality and morbidity and decrease complications.

Under COMAR 30.08, MIEMSS is responsible for oversight of the Maryland trauma system. Five-year reverification of designated trauma and specialty referral centers was ongoing throughout FY 2015. The trauma system is built around the nine trauma centers and five specialty referral centers (pediatric, burn, neurotrauma, eye, and hand). This balance of designated trauma centers of all levels provides for appropriate resources necessary for the care of the injured around the state.

Stroke Core Measures (5-Year Comparison)

Core Measure	CY 2010	CY 2011	CY 2012	CY 2013	CY 2014
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	80.9%	86.5%	88.5%	86.9%	90.9%
Percent of patients with ischemic stroke or TIA who receive antithrombotic therapy by the end of hospital day two	97.0%	97.2%	97.6%	98.0%	98.5%
Percent of patients with an ischemic stroke, or hemorrhagic stroke, who receive VTE prophylaxis the day of or the day after hospital admission	71.9%	74.9%	90.2%	96.2%	98.1%
Percent of patients with an ischemic stroke or TIA prescribed antithrombotic therapy at discharge	97.5%	97.9%	98.4%	98.7%	98.9%
Percent of patients with an ischemic stroke or TIA with atrial fibrillation/flutter discharged on anticoagulation therapy	94.2%	96.0%	94.6%	95.6%	97.2%
Percent of patients with ischemic or hemorrhagic stroke, or TIA with a history of smoking cigarettes, who are, or whose caregivers are, given smoking cessation advice or counseling during hospital stay	96.9%	96.6%	97.7%	98.8%	97.7%
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	88.7%	90.8%	93.3%	96.0%	97.1%
Percent of stroke patients who undergo screening for dysphagia (difficulty swallowing) with an evidence-based bedside testing protocol approved by the hospital before being given any food, fluids, or medication by mouth	82.6%	84.7%	85.9%	89.5%	87.6%
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	85.0%	89.5%	91.7%	93.6%	95.8%
Percent of patients with stroke who were assessed for rehabilitation services	97.4%	97.5%	98.0%	98.5%	98.7%

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

The Maryland trauma and specialty referral centers by region are:

Region I	**Western Maryland Regional Medical Center** - Adult Level III Trauma Center
Region II	**Meritus Medical Center** - Adult Level III Trauma Center
Region III	**R Adams Cowley Shock Trauma Center (UM)** - Primary Adult Resource Center (PARC) and Neurotrauma Center **The Johns Hopkins Hospital** - Adult Level I Trauma Center, Pediatric Level I Trauma Center, Pediatric Burn Center, and Wilmer Eye Trauma Center **Johns Hopkins Bayview Medical Center** - Adult Level II Trauma Center and Adult Burn Center **Union Memorial Hospital (MedStar)** - Hand and Upper Extremity Trauma Center **Sinai Hospital** - Adult Level II Trauma Center
Region IV	**Peninsula Regional Medical Center** - Adult Level III Trauma Center
Region V	**Prince George's Hospital Center** - Adult Level II Trauma Center **Suburban Hospital (JHM)** - Adult Level II Trauma Center

Memoranda of Understanding (MOU) are in place with out-of-state hospitals to facilitate trauma services for the injured patient requiring a higher level of care in outlying areas of the state. The out-of-state hospitals include:

Newark, Delaware	**Christiana Care Health System** - Adult Level I Trauma Center
Washington, DC	**Children's National Health System** - Pediatric Level I Trauma Center and Pediatric Burn Center **MedStar Washington Hospital Center** - Adult Level I Trauma and Adult Burn Center

The conversion of the Maryland Trauma Registry (MTR) to a web-based platform was ongoing throughout FY 2015. Currently, MIEMSS is working with Digital Innovations on converting legacy data (data dating back to CY 2005) into the web MTR. The goal is to have this final process and conversion completed by December 2015. The conversion of the MTR to a web-based platform will allow both MIEMSS and the trauma centers access to the data in an updated format. Within the MRT are up-to-date data collection tools and programs that will facilitate monitoring and trending injury care data for appropriateness, complications, and outcomes. Beginning in CY 2014 the trauma and specialty referral centers began accessing the trauma patient EMS care information for inclusion into the MTR via eMEDS®. Additionally, the ICD 10 Code (medical reference) sets have been added to the MTR with the necessary mapping to better identify a patient's injury and subsequent treatment.

During FY 2015 the Trauma Quality Improvement Committee (TQIC) and the Maryland Trauma, Education, and Research (MTREP) Committee were combined into one, facilitating a more collaborative and robust TQIC. Representation on the TQIC consists of Trauma Program Coordinators/Manager/Directors, Trauma Performance Improvement staff, Trauma Registrars, and Injury Prevention and Education staff. The committee developed and implemented a Trauma Quality Improvement Scorecard. This scorecard allows the trauma or specialty referral center the ability to review, monitor, and trend compliance with the quality metrics (see below).

TQIC Scorecard – FY 2015 Metrics:

- ED documentation of patient's temperature
- ED documentation of patient's Glasgow Coma Scale
- ED documentation of patient's pain assessment
- Hourly patient vital sign documentation
- The patient required re-intubation within 48 hours of extubation
- The patient had an unplanned visit to the ICU
- The patient had an unplanned visit to a critical care area
- 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

An Adult Trauma Center Standards Workgroup was convened to review and align the current COMAR 30.08.05 Trauma and Specialty Referral Center Standards with the American College of Surgeons' Committee on Trauma report, "Resources for Optimal Care of the Injured Patient." Through consensus of all adult trauma centers, areas for revision will be vetted by stakeholders and proposed for acceptance by the end of CY 2015.

Perinatal Referral Centers

MIEMSS has the statutory authority for designation of hospitals as specialty referral centers. MIEMSS promulgated regulations in COMAR 30.08 that include the designation of perinatal referral centers. During FY 2015 the Department of Health and Mental Hygiene (DHMH) Perinatal Clinical Advisory Committee (PCAC) convened to update the perinatal standards. MIEMSS Perinatal Advisory Committee (PAC) approved and adopted the standards for use in the perinatal referral center designation process. The standards

have been promulgated as MIEMSS regulations, and MIEMSS has proceeded with the perinatal referral center designation process using these standards. (See page 39 for a complete list of perinatal centers.)

Hospitals participating in the Maryland perinatal system submit patient care data to the DHMH and MIEMSS, as appropriate, for system and quality management. All Level III 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.

New in FY 2015 was the development and implementation of the MIEMSS perinatal database. Perinatal centers will now have the ability to upload their annual perinatal report data directly into the database, which is designed to give hospitals and MIEMSS timely access to data for quality improvement. This data will provide information on the current status of perinatal care and perinatal health outcomes of the Level III centers. The MIEMSS PAC will use this database to identify and focus on areas common to all centers that indicate a need for improvement, as well as to highlight and share best practices. Defined data elements/indicators will include variables related to maternal and infant health. Defined maternal and neonatal indicators include:

Maternal Indicators:

1. Total number of live births
2. Number of transport admissions:
   a. to a higher level of care
   b. from a non–obstetrics-providing facility
3. Number of transports out
4. Number of maternal deaths
5. Number of uterine ruptures
6. Number of cesarean hysterectomies and postpartum hysterectomies
   a. Planned/anticipated due to known placental implantation abnormality or uterine invasive disease process
   b. Unplanned/unanticipated (all others)
7. Number of eclampsia
8. Number of maternal admissions to ICU
9. Number of inpatients returned for a complication to OR/L&D following delivery (ie, not a sterilization or a cerclage) during the hospitalization for childbirth/delivery
10. Number requiring blood transfusions
11. Number of 3rd/4th degree episiotomies
12. Number of neonatal birth traumas
    a. Including subgaleal hematoma, fracture of any bone excluding clavicles, subdural/epidural hematoma (exclude subarachnoid), intracerebral hematoma in any infant > 33 weeks, brachial plexus injury unresolved at time of discharge, facila palsy unresolved at time of discharge, lacerations requiring medical attention including Steri-Strips™, Dermabond™, or suturing. The hematomas and fractures to be included are those confirmed by imaging studies.
    b. Clavicular fractures
13. Number of fetal deaths:
    a. of 20 weeks or greater
    b. of 37 completed weeks of gestation or greater
14. Number of intrapartum deaths > 500 g
15. Number of neonatal deaths in the delivery room
    a. < 1500 g
       i. Those who received comfort measures
       ii. Resuscitation was unsuccessful
    b. > 1500 g
       i. Those who received comfort measures
       ii. Resuscitation was unsuccessful
16. Number of primary C/S deliveries
17. Number of repeat C/S deliveries
18. Number of VBAC deliveries
19. Number of total deliveries
20. Number of maternal re-admission patients returned to OR (same facility) within 30 days after discharge following childbirth
21. Number of maternal re-admissions (to the same facility) within 30 days after discharge following childbirth
22. Number with HIV diagnosed and/or treated intrapartum as well as prenatally
23. Number that have not received any prenatal care

Neonatal Indicators:

1. Very Low Birth Weight (VLBW) infants (as defined by the Vermont Oxford Network (VON) Reporting System)
   - All VLBW infants
   - Each hospital will generate and submit this report for Inborn, All Outborn, and All Infants
     a. Mortality
     b. Mortality excluding early deaths
     c. CLD
     d. Pneumothorax
     e. Severe IVH
     f. Severe ROP
     g. NEC
     h. Late Bacterial Infection
     i. Any late infection (including CONS)
     j. Human Milk on Discharge
     k. CLABSI
2. Infants with BW > 1500 g (basic volume and mortality data)
   - Data
     a. Total NICU Admissions
     b. Deaths
   - Location
     a. Inborn
     b. All Outborn
     c. All Infants

MIEMSS continues to work closely with DHMH in supporting all perinatal centers that have the ability to participate in the VON. This system provides each perinatal center the ability to benchmark their center's data to data from all group centers.

Office of Cardiac and Special Programs

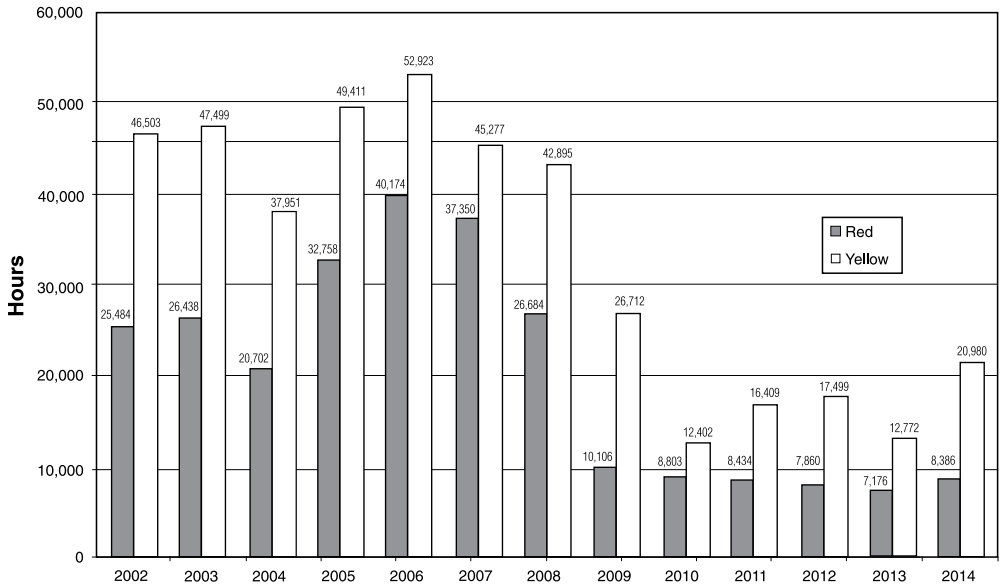
Mission: To develop and implement policies, regulations, and programs for the enhancement and improvement of the statewide EMS system and the community.

Hospital Alert Utilization/Emergency Department Overcrowding

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 alert utilization volumes. Real-time CHATS screens showing hospital alert activity in all regions and online reports containing individual hospital alert activity are available on the MIEMSS website. Additionally, MIEMSS is able to monitor EMS "release of patient care" times (from EMS arrival at the ED until the patient is moved to a hospital stretcher) and "return-to-service" times (length provider is at an ED with a patient before returning to service) recorded in the EMS patient care record. These times are helpful indicators of the impact of ED crowding on the EMS system.

CHATS includes several categories of alerts that indicate whether a hospital ED is temporarily unable to accept certain ambulance-transported patients. Yellow alert, indicating ED overload, is the most frequently utilized alert category and has the most significant impact on EMS providers transporting patients. After peaking in 2006, yellow alerts then declined over the next several years. In CY 2011 and again in CY 2012, a slight increase in yellow alerts occurred. After decreases in

State Diversion Alert Totals (Calendar Years 2002 to 2014)



yellow and red alerts in CY 2013, yellow alert utilization increased to the highest it has been since 2009 and red alert utilization also increased slightly in CY 2014. During the flu season, MIEMSS monitors alert activity on a daily basis and provides reports to EMS regions as necessary to assist them in deciding whether to implement strategies from the Maryland Hospital and EMS Emergency Department Overload Mitigation Plan. The 2014-2015 flu season was particularly severe and many EDs were overcrowded and on yellow alert for days at a time, resulting in lengthy delays for EMS providers returning to service. MIEMSS and DHMH jointly sent a letter to hospitals advising of the situation and requesting implementation of select measures from the mitigation plan.

Public Access Automated External Defibrillator Program

The Maryland Public Access Automated External Defibrillator (AED) Program continues to grow throughout the state. The program permits facilities that do not provide health care, but meet certain requirements including registration with MIEMSS, to have an AED onsite for use in the event of a sudden cardiac arrest (SCA) until EMS arrives. With the exception of public high schools, middle schools, and county or municipality-owned or operated swimming pools, which are required to have AEDs, Maryland's Public Access Defibrillation (PAD) Program is 100% voluntary. Additionally, some counties have passed local ordinances requiring AEDs at public and semi-public pools. Montgomery County also requires AEDs at health clubs.

In FY 2015 MIEMSS launched a new online AED registry and processed a total of 824 paper and electronic PAD Program applications. Beginning in FY 2016, MIEMSS will no longer accept paper applications and will require PAD Program registration using the online AED registry. The registry provides automated notifications regarding battery and electrode expirations, program renewals, and AED recalls. The program also allows for the connection to an application called "AED link" that, for a fee, would allow interested EMS operational programs to see all the PAD locations within their jurisdiction without having to manually enter the AED site addresses into the 9-1-1 center database. The new registry link is www.marylandaedregistry.com and may also be accessed from the MIEMSS website.

Currently, there are 4,146 actively registered PAD locations with AEDs onsite, with thousands of individuals trained in cardiopulmonary resuscitation (CPR) and AED use. A list of PAD-participating facilities and program information is available on the MIEMSS website.

The PAD Program has had 154 (24.1%) successful AED uses out of 640 reported incidents. Success is measured by the patient having a return of pulse at EMS arrival, during EMS arrival, or during EMS transport. Of the overall arrests, 375 were witnessed, and 112 of those witnessed arrests regained a pulse at the time of EMS arrival for a 29.9% save rate for witnessed cardiac arrests.

Cardiac Arrest Steering Committee

In October 2012 MIEMSS reorganized the former AED Task Force into the Cardiac Arrest Steering Committee and broadened the focus to address multiple components including 9-1-1 dispatch, prehospital provider treatment, community response, and data collection and reporting. While some of the membership from the AED Task Force is the same, there are many new members. The committee is chaired by MIEMSS Executive Director Dr. Kevin Seaman, who has been working diligently to model efforts that have been successful in Seattle, Washington, through the National Resuscitation Academy. Howard County Department of Fire and Rescue Services also worked with MIEMSS to establish the Maryland Resuscitation Academy, which holds two training sessions annually. Using a multi-focused approach to address out-of-hospital cardiac arrest, the Cardiac Arrest Steering Committee has established three subcommittees: Emergency Medical Dispatch (EMD), EMS, and Public. The EMD subcommittee is focusing 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 is promoting high-performance CPR to all EMS Operational Programs in Maryland. The Public subcommittee educates and encourages the public to learn CPR and how to use an AED. Communities that have incorporated all of these elements have improved rates of survival from SCA. Many of the initiatives of the Cardiac Arrest Steering Committee are consistent with recommendations from a recently published report, "Strategies to Improve Cardiac Arrest: A Time to Act," by the Institute of Medicine.

Maryland STEMI System

More than three years since the designation of Maryland's 23 Cardiac Interventional Centers and 4 out-of-state centers, the statewide system continues to evolve. (See page 39 for a complete list of Cardiac Interventional Centers.) All Cardiac Interventional Centers had site surveys and were redesignated by MIEMSS in 2014.

Designation as a Cardiac Interventional Center indicates that a hospital complies with state standards to receive patients transported by EMS who are experiencing the most common type of heart attack called an ST-elevation myocardial infarction, or STEMI. For

these patients, primary percutaneous coronary intervention (pPCI) (also known as balloon angioplasty) 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. Reducing the time from the onset of symptoms to treatment requires that there be a high degree of coordination and integration of care between EMS providers in the field and medical staff in the hospital.

EMS providers who have identified a STEMI patient may now transport that patient to the closest designated Cardiac Interventional Center, bypassing non-designated hospitals in accordance with *The Maryland Medical Protocols for EMS Providers*. In instances, however, when a Cardiac Interventional Center is not within an additional 45-minute drive time, patients may be transported to the closest ED for rapid assessment and treatment, and then transferred to a Cardiac Interventional Center. In these instances, consideration of thrombolytic administration may also be appropriate.

All Cardiac Interventional Centers submit data quarterly to the American College of Cardiology Foundation's National Cardiovascular Data Registry ACTION Registry®-GWTG™. MIEMSS is able to measure care for STEMI patients in Maryland as compared to national data by obtaining the Mission Lifeline® regional reports that are created by Duke Clinical Research Institute from the data entered into ACTION Registry-GWTG. The goal for first medical contact (FMC) to intervention in the cardiac catheterization lab, referred to as FMC to device time, is 90 minutes or less. In the most recent Mission Lifeline System Report for Maryland, the median FMC to device time for Maryland's Cardiac Interventional Centers was 81 minutes, just slightly above the national median FMC to device time of 80 minutes, which includes all hospitals in the nation that submit data to ACTION Registry-GWTG and participate in Mission Lifeline.

Regional STEMI Committees were formed and continue to meet regularly to address the treatment of STEMI patients in Maryland. Regional Committees were originally charged to address the following 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 Medical Protocols for EMS Providers* and COMAR Title 30.
3. Continue to meet on a regular basis, as necessary, to monitor data and the implementation of the plan.

Based on the data reported in one Maryland region, the original plan for treatment and transport of STEMI patients was modified to provide better care. The process is an excellent example of an evidence-based approach to planning and collaboration among prehospital and hospital providers to achieve the optimal plan of care for STEMI patients. The regional STEMI plans are available under the Hospitals tab on the MIEMSS website.

INFORMATION TECHNOLOGY

Mission: The MIEMSS Information Technology and Data Departments strive 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.

The IT and Data Departments worked on several areas of growth and improvement in FY 2015 to improve services and resources for the EMS community and for MIEMSS and to make those services more reliable and secure.

eMEDS® - The electronic Maryland EMS Data System

A major focus for the MIEMSS IT Department in FY 2015 was finalizing the statewide deployment of the electronic Maryland EMS Data System (eMEDS®), a state-of-the-art system used to collect patient care reports from EMS providers. By the end of FY 2015, all counties, many special services, and most commercial services in Maryland were active on eMEDS®. As of July 2015, over 4 million patient care reports had been collected by eMEDS®. Going forward, MIEMSS expects to collect about 1.5 million records per year. This makes Maryland one of the few states that have a single, comprehensive statewide EMS patient care reporting system.

eMEDS® is commercial-off-the-shelf software provided by ImageTrend, Inc. of Lakeville, Minnesota. ImageTrend is the industry leader for this type of software, currently providing statewide patient care reporting systems to 36 states and hundreds of local counties and fire departments. MIEMSS selected ImageTrend from a competitive bid process in 2010. The acquisition of eMEDS® was made possible by a Maryland Highway Safety Office (MHSO) grant and agency funds. The system is licensed for statewide use, permitting EMS Operational Programs (EMSOPs) to use eMEDS® at no cost and no additional burden on local funding.

The goals of eMEDS® are (1) to improve data collection and reporting on prehospital medical care provided by emergency medical personnel; (2) to become compliant with reporting to the National EMS Information System (NEMSIS); (3) to support research and improvements to medical care by analysis of better data; and (4) to support quality improvement of emergency medical care by EMSOPs by allowing medical directors and local leadership to analyze EMS response data.

MIEMSS is beginning a year-long project to upgrade eMEDS® to ImageTrend's Elite Platform, a modern new software system that will make eMEDS® NEMSIS 3 compliant, pave the way toward HL7 compatibility, allow functionality on electronic tablets, and add many new and enhanced features requested by EMS services.

Expanding Capabilities

CARES Program

In FY 2015 MIEMSS worked with Howard County Fire and Rescue Services and Howard County General Hospital to implement a pilot with the Cardiac Arrest Registry to Enhance Survival (CARES) program. CARES is an Out-of-Hospital Cardiac Arrest (OHCA) registry developed in 2004 by collaboration between the Centers for Disease Control and Prevention (CDC) and Emory University School of Medicine's Department of Emergency Medicine. The goal of CARES is to help communities increase OHCA survival rates. CARES has been integrated with eMEDS®, enabling Maryland EMS services and hospitals to participate in CARES data reporting. MIEMSS has designated a program coordinator to implement the CARES program with EMS services and hospitals.

National Study Center Collaboration

The MIEMSS IT and Data Departments continued to advance the agency's ability to analyze and report on collected data by continuing its collaboration with the National Study Center for Trauma and Emergency Medical Systems (NSC). The NSC has assisted MIEMSS in developing EMS system performance reports, GIS maps for evaluating ST-elevation myocardial infarction (STEMI) transport times, reports for producing evidence-based guidelines for EMS care, EMS vehicle crash data, and other important analysis projects.

In FY 2015 the NSC expanded work with MIEMSS to use eMEDS® data to develop baseline performance reports for EMS services, focusing on call run times and other basic metrics of service performance. The NSC worked with MIEMSS to develop mechanisms to securely distribute these reports to jurisdictions.

New Provider Registry

The IT Department worked with MIEMSS Office of Licensure and Certification and ImageTrend to implement a new provider registry to replace the aging Maryland Prehospital Provider Registry system. ImageTrend's License Management software is a hosted on-line product that will automate many processing functions through online forms and email notifications as well as allow Internet-based self-service to EMS services and providers. The system is expected to be completed in FY 2016.

End User Services/Support Improvements

In FY 2015 the IT Department continued to apply project management services to various departmental initiatives. Email service upgrades were begun and will be finished in early FY 2016. Hosting improvements were implemented for the HC Standard patient tracking and hospital resource application to allow testing and training platforms, application upgrades, faster response, and greater reliability.

Ongoing Missions

The IT Department continued to support existing programs in FY 2015, as described below.

electronic Maryland Ambulance Information System

The electronic Maryland Ambulance Information System (eMAIS®) is no longer used to collect patient care reports as of FY 2014. eMAIS® reports will continue to be available from MIEMSS by request to provide legal reports and historical data for analysis.

Maryland Ambulance Information System

In FY 2014 the IT Department completed scanning and archiving the last of the Maryland Ambulance Information System (MAIS) and Commercial Maryland Ambulance Information System (CMAIS) paper patient care report forms submitted by jurisdictions. All jurisdictions are now reporting electronically through data entry or import to eMEDS®. MIEMSS is finishing a project to permanently archive all MAIS and CMAIS data on modern, resilient storage platforms.

electronic Maryland EMS Data System

As described above, MIEMSS continues to monitor and improve eMEDS® while supporting its users. In FY 2016 MIEMSS will complete most of the work required to upgrade eMEDS® to the ImageTrend Elite Platform. The EMS Applications Coordinator continues to improve processes by assisting jurisdictions and hospitals with reports, forms, quality assurance activities, training, and measures to improve data quality. The MIEMSS IT Department provides prompt support

to EMS users statewide to solve problems with user credentials and system use.

County Hospital Alert Tracking System

The County Hospital Alert Tracking System (CHATS), a web-based application provided by Global Emergency Resources, shows health care providers the status of hospitals throughout Maryland and in surrounding jurisdictions. In FY 2010 CHATS was upgraded when MIEMSS moved to HC Standard 3.0, making it more robust and more accessible to health care providers. The IT Department continues to support CHATS for use by hospitals throughout Maryland.

Facility Resource Emergency Database

Facility Resource Emergency Database (FRED), in use since 2004, alerts all health care response partners of an incident and allows them to indicate what resources they have to lend to the response. The number of users has nearly doubled with the addition of long-term care facilities. In FY 2010 FRED was migrated into the HC Standard 3.0 application, making it more robust and more accessible to health care providers and integrating FRED alert messages with HC Standard messaging to hospitals and health care providers. MIEMSS' IT Department continues to support FRED for use by hospitals throughout Maryland.

HC Standard

The IT Department continues to support MIEMSS' emergency operations in the use and deployment of HC Standard, an important electronic tool for Maryland's disaster preparedness that allows instant, on-site data collection in a disaster situation. Data on numerous patients can be tracked and instantly updated so that MIEMSS emergency operations, other agencies, and hospitals are aware of the status and location of patients and various medical resources at all times. During FY 2015 the HC Standard system was expanded to include separate training and test databases and servers. MIEMSS is currently training users on a new version of the system in preparation for a major system upgrade in fall 2015.

Trauma Registries

There are three registries currently included under the Maryland State Trauma Registry reporting process: (1) the Maryland Trauma Registry, used by 16 facilities including 9 adult and 2 pediatric designated trauma centers (including 1 out of state); (2) the Maryland Eye Registry for our single designated eye trauma center; and (3) the National Trauma Registry American College of Surgeons (TRACS) American Burn Association Registry, which represents records from the designated adult burn center and will eventually include data from the two designated pediatric burn centers. Data from the registries are forwarded to MIEMSS monthly, quarterly, and annually for reporting purposes. MIEMSS IT continues to support the integration of data from eMEDS® to the Maryland Trauma Registry.

Flight Vector

MIEMSS hosts Flight Vector™, the Maryland State Police Aviation Command's (MSPAC) aviation computer aided dispatch (CAD) system. This application is used by MIEMSS and MSPAC to streamline the process of selecting and assigning aircraft to respond to medevac requests in and around Maryland. Prior to obtaining Flight Vector, both agencies had to access 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 new system also permitted MIEMSS to automate a previously paper-based system used to track Emergency Medical Resource Center (EMRC) consults. Included with the new CAD system is a disaster recovery site located in another facility that enables the system to remain functional in the event of a system failure at the primary location.

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

Level	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	As of 7/6/2015
EMD	1,099	1,088	1,182	1,113	1,163	1,175
EMR	4,594	3,436	3,478	2,821	2,258	2,258

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

EMT	18,325	18,295	18,982	18,847	19,377	19,399
CRT	898	849	824	781	746	745
Paramedic	2,753	2,924	3,055	3,207	3,424	3,424
TOTAL	**21,976**	**22,068**	**22,861**	**22,835**	**23,547**	**23,568**

Help Desk and User Support

A major ongoing mission for the IT Department is support of end users, both agency staff and EMS providers statewide, in using their PC equipment and applications. Objectives of the IT support group are to help customers navigate technology; support MIEMSS' mission, realizing that information technology is a vital tool for the use of data and information; and create, support, maintain, and improve IT infrastructure.

A dedicated and skilled support staff provides quick resolution to PC and application software issues. The IT Department continues to provide technical support to EMRC/SYSCOM in coordination with MIEMSS' Communications Engineering Services.

EMRC/SYSCOM Support

MIEMSS IT provides 24/7 computer support for EMRC and MSPAC functions in SYSCOM. This includes support and maintenance of Flight Vector.

Project Management

MIEMSS IT provides project management (PM) services throughout the agency for consideration and development of needed applications and services. Specific PM efforts planned for FY 2016 include upgrading email services, data center facilities, and off-site backup capability; initiating an enterprise document management and data management program; and upgrading eMEDS® to a new NEMSIS 3 compatible version in order to stay current with NEMSIS national data standards and with ImageTrend features.

Initiatives for FY 2016

Security Improvements

Previously completed information security reviews include a Cyber Security Resilience Review by the US Department of Homeland Security and an assessment of MIEMSS practices in light of the Maryland Information Security Policy. These reviews provide a baseline for the agency's information security status relative to the maturity model presented in those documents and highlighted a number of areas for improvement. The overall conclusion is that MIEMSS' network and its data are secure, but that the systems and processes providing that security need to be documented and clarified in policy and procedure. To that end, MIEMSS implemented a specific staff position for information security that was filled in spring 2015. MIEMSS' new Information Security Officer is leading a program of upgrading and expanding security policies and practices at the agency. He will assist MIEMSS IT with procurement and implementation of vendor security evaluation and testing, training, computer systems, and programs to improve data security.

Continue to develop eMEDS®

MIEMSS IT plans to continue work with EMSOP system managers to improve eMEDS® and make sure it supports local operational and state data analysis needs. MIEMSS is seeking to build on the success of eMEDS® by adding features that will make EMS reporting more effective. In FY 2016 MIEMSS will continue to train and deploy the integration of HC Standard patient tracking data with eMEDS® to facilitate patient care reporting in mass casualty incident situations. MIEMSS is pursuing funding for a project to integrate eMEDS® patient care reports into Chesapeake Regional Information System for our Patients, the statewide health information exchange.

Improve Computer Resources, Network Reliability, and Disaster Preparedness

In FY 2016 the IT Department will continue implementation of computer hardware and software to upgrade VMware and network operations, finish migration of all equipment and services to a new data center, and implement off-site backup capabilities for critical applications and services. This will include a new data backup system, off-site data storage and system restore capability, and additional VMware tools for backing up, restoring, and upgrading computer systems. Upgrades and replacements of legacy end-user computing systems will continue with the goal of upgrading all systems on a phased, scheduled upgrade plan. MIEMSS will complete upgrade of internal email systems and also support some users on Google's Maryland.gov email service.

Strengthen Data Analysis

Data analysis capability will be expanded in FY 2016 by emphasizing reporting, analyzing, and practical applications of EMS data. MIEMSS will also continue to work with the NSC on this effort. New tools in eMEDS® will be available for data analysis and quality assurance. These will be used both in-house and disseminated to EMSOPs and providers statewide to improve quality assurance and the quality of EMS care.

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 implement portions of the *Agenda for the Future: A Systems Approach* by evaluating the National EMS Education

Standards as they apply to both current providers and students attending EMS Education Programs. Licensure and Certification continues to offer courses through the MIEMSS Online Training Center and to build on a new licensure system for implementation in FY 2016.

Licensure and Certification had a steady workload in FY 2015 issuing 1,551 initial prehospital provider certifications and licenses and renewing 5,839 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 1,487 EMT students from 101 courses in FY 2015.

There were 48 EMS Board approved educational programs in Maryland that were available to providers in FY 2015. Additionally, several law enforcement programs have switched from instructing Emergency Medical Responder (EMR) courses to offering the Law Enforcement Emergency Medical Care Course (LEEMCC) for required medical training. There are 14 LEEMCC programs registered with Licensure and Certification. Although LEEMCC does not lead to state EMS certification, Licensure and Certification works closely with the Maryland Police and Correctional Training Commissions on the medical content provided in the course.

During FY 2015 the total number of Maryland EMS providers increased. The number of Emergency Medical Dispatchers (EMDs) remained steady. The total number of EMRs has declined over the past few years as law enforcement agencies move toward adopting LEEMCC. Additionally, the number of EMTs has increased to a level that nearly covers the decrease in EMRs. Although the number of Cardiac Rescue Technicians (CRT) in Maryland has decreased, the number of Paramedics continues to grow. This trend is expected as a result of the elimination of the national I/99 certification level and the incentive to upgrade to the Paramedic level. Although the National Registry of Emergency Medical Technicians (NREMT) will no longer certify I/99 level providers, Maryland will continue to license CRTs. The breakdown of Maryland providers for the last five fiscal years is shown on page 25. Licensure and Certification worked with other MIEMSS departments to supply provider data and trends (eg, prehospital care provider by recruitment and retention and NREMT pass rates) to various statewide committees for analytical purposes.

NREMT Cognitive Examination for Initial BLS Certification

During FY 2015 Licensure and Certification implemented the use of the NREMT for the cognitive examination portion of the Basic Life Support (BLS) provider level initial state certification process (EMR and EMT). This change went into effect for initial courses with classes beginning in fall 2014. This move does not affect current Maryland certified EMR and EMT providers, and the providers who are tested through the NREMT process are not required to maintain NREMT certification to hold Maryland EMR or EMT certification.

Licensure and Certification is closely monitoring this transition to the NREMT cognitive examination and is working closely with EMS stakeholders to seek improvements to the process. One such improvement was the addition of a Pearson VUE test site for the NREMT exam at the Harford Community College. This brings the total number of Pearson VUE test sites for the NREMT exam in Maryland to 12. Another initiative was the formation of the Best Practices Group within the BLS Committee of the Statewide Emergency Medical Services Advisory Council (SEMSAC). The Best Practices Group is devoted to providing best practices guidelines that can be implemented by all EMS education programs in Maryland. The group started by comparing the *National EMS Education Standards* with the current EMT curriculum and *The Maryland Medical Protocols for EMS Providers* and looking at student survey results on the NREMT process. Although formed to identify and address issues with the transition to the NREMT cognitive examination, it is envisioned that the Best Practices Group will continue into the future. A map of the NREMT Pearson VUE Maryland test sites, as well as additional information on the NREMT testing process, can be found on the Licensure and Certification page on the MIEMSS website.

EMS Agenda for the Future: A Systems Approach and Current Provider Transition

Licensure and Certification continues to evaluate the *EMS Agenda for the Future: A Systems Approach*. The *National EMS Education Standards* was implemented on July 1, 2012, for all initial courses. Licensure and Certification adopted the NREMT timeline for transitioning to the *National EMS Education Standards*, which allows multiple licensure and recertification cycles for completion. The BLS level refresher programs for EMR and EMT have been revised for the next three-year cycle starting July 1, 2015. As BLS providers renew their certifications anytime between July 1, 2015, and June 30, 2018, they will continue to meet the requirements for Maryland certification renewal and the objectives of the *National EMS Education Standards*.

At the Advanced Life Support (ALS) level, the core refresher syllabus was also designed to meet the requirements for transitioning. As ALS providers renew their certifications over the next few years by attending a full paramedic refresher program, they will also

automatically meet the transition requirements. Course completion certificates for submission to the NREMT have been made available to the teaching agencies to supply to providers as necessary. All current Maryland BLS providers transitioned by completing refreshers prior to July 1, 2015. Current ALS providers have two renewal cycles to complete the transition. Further details on the transition timeline are available on the MIEMSS website.

MIEMSS Online Training Center

The Online Training Center, MIEMSS' distance learning management system, reached 40,813 registered users in FY 2015, including not only all levels of prehospital care providers, but also other professionals such as nurses, physicians, and administrators who must access the Online Training Center for required training.

In FY 2015 the Online Training Center hosted 20 active courses. Four new courses were made available this fiscal year: 2015 ALS Protocol Update, 2015 BLS Protocol Update, 2015 Base Station Protocol Update, and Active Assailant. Projected courses for the next fiscal year include the 2016 Protocol Updates, additional medication reviews, a 12-lead EKG course, and other courses developed as necessary. Licensure and Certification continues to review software upgrades to the Online Training Center to keep the system in line with the ever-changing educational technologies available to providers.

Maryland Provider Registry for Licensure and Certification

Licensure and Certification worked closely with the IT Department on implementation of the new MIEMSS Provider Registry. The ImageTrend, Inc. licensure product is web-based, allowing providers and teaching agencies more access to the system for updating. Since ImageTrend also provides eMEDS®, the state's electronic patient care reporting system, there will be better integration between the two systems to afford more seamless affiliation updates and current provider certification/licensure status. Several EMS Board approved educational programs piloted the student portion of the system by creating provider profiles and applying for initial EMT programs. Licensure and Certification began internal testing of the system in FY 2015 and will continue to do so in FY 2016.

MARYLAND CRITICAL INCIDENT STRESS MANAGEMENT PROGRAM

Mission: To offer crisis support services to EMS providers, firefighters, police, and other emergency services personnel involved in emergency operations under extreme stress and to help accelerate recovery of those individuals exhibiting symptoms of severe stress reaction.

The Maryland Critical Incident Stress Management (MCISM) 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 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 FY 2015 MIEMSS continued to focus on promoting and enhancing CISM capabilities through increased collaboration between state and local CISM teams and by sponsoring CISM courses. In September 2014 and May 2015 MIEMSS hosted symposiums for CISM coordinators that brought together representatives of CISM and crisis response teams from throughout the state. These symposiums will continue to be held biannually and will continue to focus on enhancing CISM in Maryland, sharing resources, and building collaboration among the many teams in the state. The efforts that have been made to increase collaboration among teams has proven very beneficial, enabling resource sharing and mutual aid to support responders following large critical incidents, such as the protests in Baltimore City in April 2015.

MIEMSS has also continued on-going efforts to sponsor CISM training. Fifty-eight EMS and mental health providers received initial CISM training in a course jointly coordinated by MIEMSS, Dorchester County, and University of Maryland Shore Regional Health. A suicide awareness and prevention course was also offered at the EMS Care Conference in May 2015. The training sessions offered were funded in part through the Maryland Department of Health and Mental Hygiene 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 continue to be on enhancing CISM/peer support capabilities in Maryland through training and collaborative efforts with state teams.

MARYLAND ORDERS FOR LIFE-SUSTAINING TREATMENT

The Do Not Resuscitate (DNR) Program has transitioned to Maryland Orders for Life-Sustaining Treatment (MOLST), which incorporated and replaced the EMS/DNR form.

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. Additionally, MIEMSS routinely responds to phone calls and emails from the public for assistance in obtaining and using the MOLST form.

MIEMSS serves as a resource for health care providers regarding implementing the MOLST. An informative article regarding MOLST was published in the November 2014 issue of the *Maryland EMS News*, MIEMSS' monthly newsletter.

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 20th Annual EMS Medical Directors' Symposium was held at the James N. Robey Public Safety Training Center in Marriottsville, Maryland, on April 8, 2015. 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 speakers were Joseph Ciotola, MD, Queen Anne's County Jurisdictional Medical Director, and Paramedic Jared Smith of Queen Anne's County EMS. They presented an overview of the county's Mobile Integrated Community Health Pilot Program. The mission of this program is to improve health outcomes among citizens of the county through multi-agency, integrated, and intervention-based health care. Their vision is to provide mechanisms for citizens to have better access to health care and to enhance individual health outcomes. Other symposium presentations included:

- "State of the State" presented by MIEMSS Executive Director Kevin Seaman, MD
- "Pediatric RSI in Maryland: A 12-year Review of the Pilot Protocol" presented by Jennifer Anders, MD
- "CARES: Cardiac Arrest Registry to Enhance Survival" presented by Melanie Gertner, BS, and Jason Cantera, EMT
- "Is There a Doc on Board? The EMS Physician in Medicine" presented by Timothy Chizmar, MD
- "Physician Immunities for EMS Support and Hot Topics in Maryland EMS" presented by Sarah Sette, JD, and Richard Alcorta, MD

The representatives of the Washington County EMS Strengths/Weaknesses/Opportunities/Threats (SWOT) Taskforce of Washington County requested the assistance of Richard Alcorta, MD, State EMS Medical Director, in the development and implementation of consistent training and educational processes for the entire county, to include a dedicated training facility.

In Garrett County, The Board of Commissioners asked Dr. Alcorta to assist them by facilitating a reassessment of the 2006 SWOT analysis and to develop updates with both short and long term EMS recommendations. They are interested in solutions that can assure the continued delivery of high quality EMS care for their residents and visitors.

The Kent County Commissioners had requested a SWOT plan in 2014, and its development is ongoing. Dr. Alcorta and the Commissioners are addressing several topics that the EMS Council had identified as essential to improve the delivery of EMS in Kent County.

MIEMSS and the Maryland Regional National Disaster Life Support (NDLS) Coalition continue to provide programs to the health care community. Dr. Alcorta serves as the Medical Director and Course Director. The Maryland Regional NDLS Coalition is comprised of MIEMSS, Johns Hopkins Critical Event Preparedness and Response (CEPAR), the Maryland Fire and Rescue Institute (MFRI), the R Adams Cowley Shock Trauma Center, and the University of Maryland, Baltimore County's Center for Emergency Education and Disaster Research. There were 64 participants who successfully completed the one-day Basic Disaster Life Support Course and 9 who successfully completed the Advanced Disaster Life Support Instructor Course. These courses were provided at no charge to the students. The course textbooks were provided through a Maryland Department of Health and Mental Hygiene (DHMH) grant.

Following approval from the EMS Board in November, a "spinal protection" protocol was added to *The Maryland Medical Protocols for EMS Providers*. Providers in Maryland transitioned from using the backboard in conjunction with a cervical collar for all blunt trauma patients transported to the hospital in favor of the new spinal protection protocol. This model allows providers to decide based on assessment of the patient's

signs and symptoms whether he or she will be transported on a backboard or just strapped to the stretcher with a 30 degree head up angle and a cervical collar. Two groups of trauma patients will be transported on a backboard under the new "spinal immobilization treatment" standard: those patients meeting inclusion criterion for spinal protection displaying a neurological deficit and those who cannot ambulate on their own. Backboards are acceptable for patient transfer from a vehicle or other situations, but patients should spend as little time on the backboard as possible.

The Governor's Active Assailant Task Force developed the "Potentially Volatile Environments–Life Sustaining Interventions" protocol in consultation with MIEMSS, Maryland State Police, FBI and federal law enforcement partners, tactical operators, tactical EMS (TEMS) medics, and EMS operational leadership to address incidents where implementation of standard Maryland Medical Protocols is not practical due to potential or actual hazard threat to provider or victim and the need to maximize survival.

Jurisdictions that participate in the optional supplemental protocol program, "Manual Administration of Epinephrine for BLS Providers," can now administer epinephrine via the intramuscular route manually with a prefilled syringe or a syringe and single dose ampule or vial. This change facilitated a cost saving measure for the local EMS Operational Programs and commercial EMS companies.

In fall 2014 EMS providers encountered 17 patients under investigation (PUI) for exposure to the Ebola Virus Disease. Being informed and having a statewide response and notification process is the best defense for controlling this African outbreak. MIEMSS and DHMH conducted weekly statewide conference calls to provide regular updates, implemented strategies and plans, and provided training, when indicated.

MIEMSS, in collaboration with DHMH and the Governor's Heroin and Opioid Taskforce, has been collecting data and implementing strategies to reduce the number of heroin or opioid related deaths across the state. The EMS Board approved the implementation of intranasal naloxone administration by all EMTs in Maryland as of July 2014 in an effort to make the opioid antagonist available on the first responding BLS transport units.

There are 46 EMS Board designated Base Stations and they require all new physician staff to have successfully completed the MIEMSS-approved Base Station Program and the 2015 Maryland Medical Protocols Update so they can consult with EMS providers and appropriately provide on-line medical consultation and direction. The MIEMSS Base Station Communications Course is taught at multiple hospitals and, as a result, 530 Base Station certificates were issued to emergency department physicians and nurses along with the approval of two new physician Base Station instructors.

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 initiated its quality management implementation through the development of an EMS-specific, Juran-based program. Data analysis and the examination of selected processes form the basis for much of what is done throughout the year. The department supports requests for information, query design, and results interpretation and educates data owners/managers in the specific means for process improvement, which enhances the ability to replicate for improvement in other associated areas.

Managing for Results

For the past 17 years, MIEMSS, like all state agencies, has been required to submit Managing for Results (MFR) updates along with its fiscal year budget requests to the Maryland Department of Budget and Management. This phased-in planning process began with the establishment of the MIEMSS Vision, Mission, and Principles statement through a customer-focused

strategic planning process. MIEMSS has again met those requirements, which include re-evaluation of key goals, establishment of subsequent objectives and strategies, development of associated action plans, and creation and monitoring of performance indicators.

KEY GOALS AND OBJECTIVES

Goal 1. Provide high quality medical care to individuals receiving emergency medical services.
Objective 1.1 Maryland will maintain its trauma patient care performance above the national norm at a 95% or higher statistical level of confidence.
Objective 1.2 Increase by 5% annually the number of prehospital acute ischemic stroke patients receiving t-PA medication upon hospital arrival and within three hours of symptom onset.

Goal 2. Maintain a well-functioning emergency medical services system.
Objective 2.1 Transport at least 89% of seriously injured patients to a designated trauma center throughout 2014.

Team EMS

An innovative approach to quality management education and application in EMS management was developed in collaboration with the MIEMSS Region V administration. The strategy was implemented in 1996 and has been updated to reflect present standards. MIEMSS staff and a cadre of instructors from MIEMSS and the EMS community developed ways for company and jurisdictional managers to plan for, measure, maintain, and improve quality services. Techniques taught range from brainstorming causal relationships to data analysis interpretation; topics include quality improvement (QI) team creation and meeting quality assurance (QA) standards established under state law. Jurisdictions and Regional EMS Advisory Councils have utilized this training for planning purposes, and more than 600 providers have attended statewide and special training sessions for EMS Operational Programs (EMSOPs) on a variety of subjects from indicator development to data interpretation.

Beginning in 2002, and in accordance with COMAR Title 30 regulations, all Maryland jurisdictional programs have implemented their own QA and QI plans. During this evolutionary process, Team EMS has provided the skill sets for effective and continued success in meeting the goals of these plans. Particular interest has focused on the role of jurisdictional and local QA/QI managers and the skills to be an effective quality leader. To help strengthen the role of this

important link to quality services, Title 30 was amended in October 2007 to define and mandate the functions of this officer at the operational program level. The two-day core curriculum was modified and presented this year at four EMSOP educational seminars.

Continued Implementation of electronic Maryland EMS Data System

MIEMSS was awarded annual grants for the past six years from the Maryland Highway Safety Office to implement and upgrade its electronic patient care reporting (ePCR) system known as the electronic Maryland EMS Data System (eMEDS®). The primary goal was to have Maryland's prehospital care data meet the gold compliance standards set forth by the National Emergency Medical Services Information System (NEMSIS). Starting in February 2011, three pilot EMSOPs implemented eMEDS® as their primary ePCR system. All jurisdictional EMSOPs in Maryland are now utilizing eMEDS® for direct prehospital patient care data entry and self-report writing for program monitoring, evaluating, and improving.

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 our online County Hospital Alert Tracking System (CHATS). Monitoring on this system keeps all entities updated on current system response capabilities, as well as historical trends. This monitoring (especially during the winter months and flu season) and hospital strategies that address high demand for emergency department services help improve the availability of this vital service systemwide. Additionally, yellow alert data form one measurement in the Maryland Department

of Health and Mental Hygiene's (DHMH) syndromic surveillance programs.

The Helicopter Utilization Database was created after field protocols were revised for helicopter scene request transports in 2008. This database accounts for all helicopter requests for transport, independent of actual transport mode outcome, and permits the requesting EMS managers/medical directors to conduct case reviews. The primary goal is to utilize this transportation resource for only the most severe, time-critical scene incident patients statewide.

Patient conditions associated with EMS response to heat-related symptoms were monitored daily during the summer of 2014. Updates on these cases were reported every 12 hours to EMS system managers for the geographic monitoring of potential outbreak locations statewide. Overdose cases were retrospectively reviewed for the past three years for both temporal and location characteristics by the Maryland DHMH.

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 over 1,550 data requests have been tracked and facilitated.

REGIONAL PROGRAMS AND EMERGENCY OPERATIONS (FIELD OPERATIONS)

Mission: to provide a liaison between MIEMSS' central office and local EMS agencies; manage MIEMSS programs at the local level; work closely with the local governmental entities, training centers, and EMS providers; and staff regional EMS advisory councils. Regional offices also provide support in the area of planning, coordination, mass casualty events, special events, and response for health and medical preparedness for catastrophic events.

Field Operations consists of Regional Programs and Emergency Operations. There are five regional offices throughout the state. Each office consists of at least one regional administrator and a supporting staff member. They are responsible for monitoring the operation of the regional EMS system, acting as advocates for the services in their region in the development of state policies, and representing MIEMSS in the implementation and maintenance of these policies. Emergency Operations plans for and responds to significant events around Maryland. In the event of a large scale incident, regional administrators are expected to be available to local resources to assist in the response. In many cases, they will be the first state representatives on the scene.

MIEMSS Grant Disbursements (FY 2015) by Region

	SHSGP	50/50 Matching Fund Grant for AEDs, Monitor Defibrillators and Upgrades	ALS Training Funds	Emergency Dispatch Programs	HPP Bioterrorism Grants BT-XI (FFY 2014)	HPP Bioterrorism Grants BT-XII (FFY 2014 - 2015)	Totals By Region
Region I	$6,416	$49,689	$28,000	$2,687	$8,060	$6,448	$101,300
Region II	$64,949	$39,966	$28,000	$5,469	$12,667	$10,134	$161,185
Region III	$65,560	$117,982	$98,000	$13,248	$77,335	$62,067	$434,192
Region IV	$44,286	$96,000	$68,000	$17,753	$36,273	$29,016	$291,328
Region V	$68,789	$101,563	$78,000	$10,843	$31,665	$25,335	$316,195
Total	$250,000	$405,200	$300,000	$50,000	$166,000	$133,000	$1,304,200

Regional EMS Advisory Councils

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

Grant Programs

Regional offices facilitate the distribution of funds to support local programs from several sources. For an accounting of the funds administered through the regional offices, see page 32. Enhancements to local programs that were made as a result of those funds include the following.

Department of Health and Human Services – Hospital Preparedness Program

The Hospital Preparedness Program (HPP) provides funding to local EMS agencies to enhance their emergency preparedness. A complete accounting of expenditures, according to the priorities prescribed by HPP, can be found on page 72. This past fiscal year, funds were used to enhance and expand patient tracking systems, upgrade communications systems, and increase caches of critical equipment required to provide care to special needs patients.

The Region I Office is the contact for HPP grant funding for EMS Operational Programs (EMSOP). The office ensures applications are completed, submitted, and funds are expended appropriately during the fiscal year funding period. This past fiscal year, regional funds from a statewide grant were used to enhance and expand EMS surge capabilities by funding mass casualty supplies, including mobile emergency supply trailers for quick deployment of regional assets. Current funding has also enabled jurisdictions to support their active assailant response personnel with much needed equipment. The equipment will ensure safety measures are in place while first responders train and mitigate incidents within the newly developed guidelines from the Governor's Active Assailant Task Force. MIEMSS-managed projects included Ambulance Strike Team Leader personnel training, first responder mental health, and the upgrade/installation of communications systems.

The Region II Office continues to work with local jurisdictions to obtain grant funding for jurisdictional projects, equipment, and education. Recently both counties in the region were able to secure funding for electronic tablets that will be used for patient tracking.

In Region III, HPP grant funding was utilized to enhance the regional response trailer to serve as a work area for managing patient tracking and system coordination efforts during planned mass gathering events and protracted emergency responses.

The Region IV Office assisted Wicomico County in the purchase and outfitting of a disaster trailer. HPP funds were necessary for purchasing this much needed equipment to augment the resources in the event of a mass casualty in the lower half of Region IV.

Region V utilized HPP funding in coordination with the State Homeland Security Grant Program to begin regionalizing the use of handheld tablets for EMS providers. These tablets will be used for electronic Maryland EMS Data System (eMEDS®) reporting, patient triage and tracking, and overall county situational awareness through the use of jurisdictional computer aided dispatch.

Urban Area Security Initiatives

The Emergency Response System (ERS) of the Maryland-National Capital Region (NCR) is funded by an Urban Areas Security Initiative (UASI) grant through the US Department of Homeland Security. Maryland ERS is made up of fire, rescue, EMS, emergency management, public health, health care facilities, and law enforcement personnel from Montgomery and Prince George's Counties and state agencies. By managing grant funds and projects and facilitating planning, organization, equipping, training, and exercising, Maryland ERS continues to be an integral player in developing and enhancing response capabilities in the NCR. MIEMSS manages both the administrative and contractual components of the projects for ERS. Maryland ERS is coordinating closely with its counterpart programs in Northern Virginia and Washington, DC, to enhance coordinated, standardized emergency response throughout the Maryland-NCR.

A number of individuals were hired this year to support the ERS mission, including a logistician, a critical facilities coordinator, two instructional designers, and two medical reserve corps coordinators. Some of the projects undertaken by ERS in the past year have included establishing Emergency Medical Resource Center (EMRC) lines to receiving facilities in Washington, DC, sustaining the pharmaceutical cache in Montgomery County, providing tactical emergency casualty care kits to all 4,400 police officers in the Maryland-NCR, procuring high fidelity simulators for law enforcement officers to learn how to manage traumatic injuries, purchasing EMS equipment for law enforcement to support active assailant situations,

acquiring tactical ambulances for high-threat scenarios, and continuing to support FirstWatch situational awareness software throughout the region. Other projects include the establishment of distance learning for medical incident command system courses, nursing home evacuation exercises, point of dispensing training and exercises, and hosting a number of specialty professional courses. As the program enters into its next year, its stakeholders have identified a number of capabilities to be built through this same cycle.

Region V has also received 2015 UASI funding to develop a mobile phone application for EMS providers. Features will include County Hospital Alert Tracking System (CHATS) integration, traffic updates, fastest hospital routes, phone directory, and a searchable state protocol.

Through UASI funds, Region III sustained the region's electronic patient tracking capabilities through continued training and support of the HC Standard system.

State Homeland Security Grant Program – MCI Grant Application Program

The Maryland Emergency Management Agency (MEMA) and MIEMSS continued their partnership in meeting federal guidance requiring a percentage of the State Homeland Security Grant Program (SHSGP) funding from the US Department of Homeland Security be allocated to EMS agencies. The competitive program was established to address gaps for EMS response to mass casualties. The program allocated $250,000; however, 13 applications were received totaling $461,768 in requested funding. After review by the Regional EMS Councils and the State EMS Advisory Council Regional Affairs Committee, ten projects were funded. The projects included mass casualty incident (MCI) support trailers and supplies in Annapolis City and Calvert, Frederick, Garrett and Queen Anne's Counties; patient tracking enhancements in Calvert, Kent, and Washington Counties; tourniquets, tactical emergency casualty care kits, and other supplies for the response to active assailant incidents in Cecil County; and support for the new Ambulance Strike Teams in Baltimore City and Baltimore and Charles Counties in the form of go-kits and response supplies. MIEMSS continues to work closely with MEMA to ensure state priorities are met through SHSGP funding allocations.

Other MIEMSS-Funded Grants

MIEMSS provides funding from its budget for several programs. The advanced life support (ALS) training programs provide funds to support initial and continuing education for ALS providers and candidates. The emergency medical dispatch (EMD) program provides funding for similar programs for emergency services dispatchers. A matching fund grant (50/50) supports the purchase of automated external defibrillators (AED), monitor defibrillators, and other diagnostic equipment by local EMS agencies and companies.

Inventory and Administration

Each regional office is responsible for tracking the activity and progress of all grants that it receives. 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. This also includes an annual inventory of assets on loan to local jurisdictions and the inventory of equipment obtained from previous grants.

Medical Direction

STEMI Designation and Planning

All of the regional ST-elevation myocardial infarction (STEMI) committees throughout the state continue to meet. Each region is collecting data on STEMI patients and focusing on enhancing EMS-to-balloon times as well as quality assurance (QA) and quality improvement (QI). 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 cooperation with the Medical Director's Office, regional offices assist with site visits required to approve hospitals that provide physicians' orders to prehospital providers. The regional offices have also taken the lead in coordinating scheduling and supporting the Base Station Course, which is required for the physicians and hospitals already designated as Base Stations.

Quality Assurance Committee – MIEMSS

MIEMSS staff have been meeting on a regular basis and also continue to provide instruction for QA classes. The QA course has been streamlined and the initial training was shortened to a one and a half day program. After review of the course outline, the lesson plans were amended to enhance the learning experience for students. Classes were conducted at MIEMSS and in the regions this year. The first company level QA officer pilot program was hosted by Kent County. A template has been developed to assist other jurisdictions that want to pursue this type of QA review at the company level.

Quality Improvement

Allegany and Garrett Counties, in Region I, have continued work on their QA and QI committees and have been meeting regularly to ensure proper EMS coverage in the region. Both counties continue to implement strengths, weaknesses, opportunities, and threats (SWOT) initiatives. The continued leadership and direction provided by their respective Emergency Services Boards is a testament to the SWOT initiative. Garrett County recently revisited past SWOT recommendations facilitated by Dr. Richard L. Alcorta, the State EMS Medical Director, and will release the updated findings and goals in FY 2016.

In Region IV Kent County is also conducting a SWOT analysis to determine how to ensure timely arrival of EMS and transport throughout the county. Kent County officials are updating memoranda of understanding with volunteer EMS/fire departments and reviewing funding needs for the improvement of the EMS system.

Communications Systems

The regional offices continue monthly testing of the DEMSTEL phones in their respective regions, including those in hospital emergency rooms and hospital command centers. Testing of these devices has identified technical failures, which are then able to be repaired, and made operational personnel more aware of their existence and purpose.

Six hospitals in the DC area have been provided EMRC phone lines, purchased through a UASI grant, in response to the increased traffic to these facilities from Maryland providers: Providence Hospital, Sibley Memorial, Washington DC VA Hospital, George Washington University Hospital, MedStar Georgetown University Hospital, and MedStar Washington Hospital Center.

electronic Maryland EMS Data System

All jurisdictions in Maryland are currently utilizing eMEDS® with support from the regional offices, enabling MIEMSS to collect statewide patient care data.

Voluntary Ambulance Inspection Program

The regional offices continue to perform ambulance inspections under the Voluntary Ambulance Inspection Program (VAIP). These inspections ensure that each unit is stocked with specific equipment and meets the newly revised standards, effective July 2014, 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 a consistent assessment of the units. Statewide, 343 units were inspected this year. The inspections are valid for two years.

Region I and Region II counties actively participate in the VAIP process. BWI Airport, Anne Arundel, Carroll, Harford, and Howard Counties in Region III are fully VAIP certified. In Region IV full participation has expanded to four counties. Three jurisdictions in Region V have met requirements for the VAIP countywide. While not mandated, inspections in all jurisdictions are on the rise.

Conferences and Training

EMS Care 2015 was held April 29 through May 3 in Ocean City, Maryland. The event offered three days of preconference programs, followed by the two-day full conference. Over 300 participants attended for an extended weekend full of quality educational and networking opportunities.

The 13th Annual Miltenberger Emergency Services Seminar, held in April 2015, was another success. Teamwork among the Region I Office, local hospitals,

and other local agencies and institutions has developed a supportive learning environment for prehospital providers, fire/rescue, law enforcement, and nurses. The 3rd Annual Night for Stars program, held at the Friday preconference, recognized emergency services providers and health care workers for their efforts in saving two citizens who experienced severe cardiac events leading to cardiac arrest. Work has already begun on the 14th annual program for 2016.

In Region IV the Peninsula Regional Medical Center hosted its 24th Annual Trauma Conference in Ocean City in September 2014. The conference once again provided an outstanding opportunity for physicians, nurses, and prehospital providers to network and listen to speakers on current critical issues in the field of trauma care. The Region IV office also assisted Talbot County Department of Emergency Services with its annual Winterfest Conference held on Tilghman Island in January 2015. Preconference programs included presentations by the EMS for Children Program, a 12-hour Emergency Medical Technician (EMT) Skills class, and 12 hours of continuing education needed for BLS recertification.

Support for Educational Programs

In addition to conferences, the regional offices support many other innovative educational programs intended to address issues specific to a particular region. Some arise from needs identified through QI processes. Many regional offices also support protocol rollout classes.

The regional offices act as resources for local educational programs and institutions, ensuring there are always adequate resources and basic training programs available. They often coordinate courses with community colleges, fire academies, and local hospital and association programs. Education committees and councils staffed by the regional offices bring the program coordinators together and identify priorities for training. Regional offices staff continues to assist with and comply with all National Incident Management System Capability Assessment Support Tool (NIMSCAST) requirements.

The regional offices are also responsible for conducting written certification and licensure examinations. In FY 2015 the regional offices conducted 354 individual certification exams in their offices. (See report for Licensure and Certification on page 26 for more information on testing.)

Illness and Injury Prevention

All regional offices continue to support a variety of education and prevention activities through their EMS Advisory Councils.

Health and Medical Emergency Preparedness

Response and Activations

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 drafted to improve the notification of the regional offices, the Field Operations Support Team (FOST), MIEMSS leadership, and key support agencies of an incident.

Health and Medical Preparedness Coalitions

Staff of the Region I Office support local jurisdictions by serving on numerous committees related to the coordination of health and medical activities within the region, ensuring timely and effective communication of relevant EMS health and medical preparedness issues.

The Region II Administrator is currently coordinating with health and medical partners on several important issues, one of which is the establishment of a countywide training program, a collaboration between Hagerstown Community College and Washington County, that will be partially funded by grant funds.

The Region III Health and Medical Coalition (formerly the Health and Medical Taskforce) is a subcommittee of the Baltimore Urban Area Working Group (BUAWG), and is chaired by Christina Hughes of MedStar Franklin Square Medical Center. The coalition continued their work throughout FY 2015 to enhance Region III's emergency preparedness and response capabilities. The group continues to refine operational plans for the Region III Alternate Care Site and Training Center and is working to enhance the region's patient tracking system.

The Delmarva Regional Healthcare Mutual Aid Group (DRHMAG), chaired by MIEMSS Region IV Associate Administrator Anna Sierra, continues to provide much needed training and resources to Region IV health care partners. In FY 2015 the group sponsored an Alternate Care Site Workshop, drafted a Regional Medical Surge Plan, and submitted a concept of operations for the Regional Medical Station to Maryland Department of Health and Mental Hygiene for approval. Through coordination with the Maryland EMS for Children office, significant gaps in regional pediatric readiness were identified by Region IV acute care partners. As such, DRHMAG membership voted to provide Peninsula Regional Medical Center and University of Maryland Shore Regional Health funding for a variety of pediatric medical equipment and training that will fill identified pediatric medical readiness gaps. In addition, DRHMAG developed a concept of operations for coalition and partner assistance for Emergency Support Function (ESF) #8 during regional emergencies. Lastly, DRHMAG leadership continues to work with other

regional coalition chairs in order to build consistency in structure and operations across the state.

The Region V Diversion Task Force submitted its final recommendations on best practices and future data review to the Region V EMS Advisory Council. The region continues to work to improve hospital cycle times and reduce the use of diversion hours. MIEMSS also collaborates closely with the Metropolitan Washington Council of Governments to coordinate activities across the NCR. This includes participation in multiple regional exercises, coordination of emergency communications procedures, and the expansion and integration of HC Standard and patient tracking across the NCR.

Emergency Response and Exercises

Field Operations supports numerous exercises and planned mass gatherings throughout the state. Some of the more notable activities in FY 2015 included:

- ICF Canoe Slalom World Championship at Deep Creek Lake
- Governor's Inauguration
- Baltimore City protests
- Preakness Stakes
- Soccerplex Exercise (Six-Flags)
- Region V Hospital Exercise
- Star-Spangled Spectacular
- Region IV Alternate Care Site Workshop
- Somerset County Mass Casualty Tabletop Exercise
- Upper Shore Long-term Care Emergency Response Tabletop Exercise

CHEMPACK

MIEMSS continues to coordinate the CHEMPACK portion of the Strategic National Stockpile in Maryland. This includes monitoring access to the sites and coordinating the Centers for Disease Control and Prevention site visits to update medications and inspect facilities. The CHEMPACK program places chemical agent antidotes into forward locations to ensure rapid deployment should there be an exposure to a large group of people. This year MIEMSS and Maryland State Police Aviation Command (MSPAC) conducted four CHEMPACK loading exercises. During these unannounced drills, duty crews were alerted and asked to access and load the training version of the CHEMPACK for transport to a specific site. Each exercise was monitored and timed by MSPAC and the EMRC to document the process and recommend improvements in the time it requires to deploy the asset.

Health and Medical Monitoring Application

The regional offices made great strides in enhancing participation in the online use of CHATS. Nearly all hospitals and 9-1-1 centers are using CHATS to change their own statuses and get alerts about other status changes. The use of the patient tracking portion of HC Standard continues to be expanded and utilized. This year it supported the evacuation of nursing homes and hospitals. The Facility Resource Emergency Database (FRED) function of the system was activated numerous times to alert health and medical response partners of incidents and exercises and was used to assess resource availability for beds, medications, and other supplies needed for the response. The system underwent a major upgrade this year to improve its capabilities. System monitoring software was added and the hosting hardware was upgraded. Additionally, MIEMSS contracted with the University of Maryland Center for Health and Homeland Security to conduct mentoring/training sessions with individual hospitals in an effort to increase the response to alerts. Region IV visits were complete and the response rate increased from about 70% in the previous year to 100% for the last two alerts.

Preparedness Planning

After Superstorm Sandy in 2012, MIEMSS began participating in the Eastern States EMS Mutual Aid Group, which continues to meet regularly. The group maintains an up-to-date emergency contact list for each of the participating states and convenes status calls during area wide emergencies. They are beginning to catalog emergency resources available in each state, and are exploring how to coordinate EMS resources from surrounding states through special EMS teams.

MIEMSS and MEMA continue to lead the Interdisciplinary Workgroup on the Response to Active Assailant Incidents. This year the group finalized and published *Guidance for First Responders for the Active Assailant Incident* and has made presentations around the state to increase awareness of the resource. In cooperation with the Maryland Fire and Rescue Institute (MFRI), an active assailant awareness training video was published on the MFRI website and the MIEMSS Online Training Center. As recommended by this workgroup, the Potentially Volatile Environments—Life Sustaining Interventions Protocol was approved by the Protocol Review Committee and the EMS Board for implementation on July 1, 2015. Members of the workgroup participated in a workshop by the federal InterAgency Board to begin establishing national response guidelines and standards. The workgroup will continue to assist local jurisdictions to establish their own plans for the active assailant and to investigate how communities can be better prepared to handle these tragic events.

STATE OFFICE OF COMMERCIAL AMBULANCE LICENSING AND REGULATION

MISSION: : To provide leadership and direction regarding the commercial (private) ambulance industry in Maryland to protect the health, safety, and welfare of persons utilizing these services. This includes 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.

In 2015 SOCALR issued 45 licenses to commercial ambulance services and inspected and licensed 484 vehicles. See page 71 for more information about commercial ambulance licensing in 2015.

Even with the ever-changing dynamic of the commercial ambulance industry and its trending growth, the State Office of Commercial Ambulance Licensing and Regulation (SOCALR) remains committed to continuing its mission of ensuring patient and provider health, safety, and welfare along with maintaining the mission and vision of MIEMSS.

SOCALR is committed to expanding and enlarging its responsibilities by developing strategies and implementing plans that demonstrate the positive impact of this office on the Maryland EMS system. We are currently analyzing and assessing fixed-wing aircraft, both domestic and international, for patient transports. SOCALR will ensure compliance with state regulations and medical oversight for quality assurance purposes in order to maintain alignment with our mission.

Beyond licensing, SOCALR continues to play a vital role in the EMS community. Regular duties include compliance with federal, state, and local laws; quality assurance and quality improvement; and ambulance safety.

SOCALR has developed a strong partnership with the EMS for Children Program by promoting ambulance transport safety and committing to providing pediatric educational opportunities such as the S.T.A.B.L.E. Program and the Neonatal Resuscitation Program (more information can be found in the EMS for Children report on page 10). These trainings will help fulfill the new COMAR requirements for training for neonatal and specialty care transport teams.

The SOCALR team also remains committed to serving with the Field Operations Support Team (FOST), assisting with emergency operation efforts throughout the state and coordinating commercial resources when disasters strike. SOCALR also supports regional programs by assisting with their voluntary ambulance inspections.

This office has been working closely with MIEMSS' Information Technology Department for the implementation and management of the eMEDS® electronic patient care reporting system as it pertains to commercial services. Currently 29 out of the 45 commercial services are utilizing eMEDS® as their primary method of patient care documentation. SOCALR has created a dynamic run form template for use by the commercial services that is specific to interfacility and commercial service transports; this template is currently in demo status and being reviewed. We anticipate that using the template will increase productivity and make patient care reporting easier for users.

In an upcoming project, SOCALR will replace its current service and vehicle licensing management system database. At this time, SOCALR uses a significantly antiquated Microsoft Access database system, developed in-house, for service and vehicle license management. The system currently requires manual processing of all licensing aspects of vehicle and service management, which also requires significant amounts of time. SOCALR is on track to transition to a new electronic format of vehicle and service licensing through License Management, an ImageTrend, Inc. product. This project also comes at the request of the services that we license in order to help improve our customer service, as well as make the licensing process easier by converting to an electronic format that incorporates self-service features. License Management is a comprehensive solution that covers all the bases of license processing. It offers the capability to save time and reduce costs associated with service management, vehicle management, and the licensing processes, and will streamline our workflow. System administrators will be able to track every step of an applicant's process, including payment and delivery and the automation and self-service features will augment customer service and increase department productivity. The system will able to:

1. Accept applications online and keep applicants updated automatically.
2. Process payments online.
3. Reduce overhead costs and improve processing efficiency.
4. Eliminate transcription errors from illegible handwriting.
5. Customize and build our own workflow to better monitor processing.
6. Generate email correspondence and produce detailed reports automatically.
7. Manage public expectations with a public portal for verifying licensed services and vehicles.
8. Maintain service and vehicle inspection records.
9. Track all investigations, complaints, and compliance issues.

MARYLAND TRAUMA & SPECIALTY REFERRAL CENTERS

Injured patients need treatment at the hospital best staffed and equipped to meet their special needs. Maryland's system of care ensures that patients promptly get to the most appropriate hospital in an effort to decrease morbidity and mortality. (For differences in standards in the levels of trauma centers, see the Trauma Center Categorization chart on page 40.) The trauma and specialty referral centers within the Maryland EMS System are:

TRAUMA CENTERS

Primary Adult Resource Center
- R Adams Cowley Shock Trauma Center/University of Maryland Medical Center, Baltimore City

Level I Trauma Center
- The Johns Hopkins Hospital Adult Trauma Center, Baltimore City

Level II Trauma Centers
- Johns Hopkins Bayview Medical Center, Baltimore City
- Prince George's Hospital Center, Cheverly
- Sinai Hospital, Baltimore City
- Suburban Hospital, Johns Hopkins Medicine (JHM), Bethesda

Level III Trauma Centers
- Meritus Medical Center, Hagerstown
- Peninsula Regional Medical Center, Salisbury
- Western Maryland Regional Medical Center, Cumberland

SPECIALTY REFERRAL CENTERS

Burns
- Baltimore Regional Burn Center/ Johns Hopkins Bayview Medical Center, Baltimore City
- Burn Center/MedStar Washington Hospital Center, Washington, DC
- Pediatric Burn Center at Children's National Health System, Washington, DC
- Pediatric Burn Service at The Johns Hopkins Children's Center

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

Hyperbaric Medicine
- Center for Hyperbaric Medicine/ R Adams Cowley Shock Trauma Center/University of Maryland Medical Center, Baltimore City

Neurotrauma (Head and Spinal Cord Injuries)
- 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
- Pediatric Trauma Center/Children's National Health System, Washington, DC

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

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

Designated Primary Stroke Centers
- Anne Arundel Medical Center
- Atlantic General Hospital
- Calvert Memorial Hospital
- Carroll Hospital Center
- Frederick Memorial Hospital
- Greater Baltimore Medical Center
- Holy Cross Hospital
- Howard County General Hospital, JHM
- Johns Hopkins Bayview Medical Center
- Mercy Hospital Center
- Meritus Medical Center
- MedStar Franklin Square Medical Center
- MedStar Good Samaritan Hospital
- MedStar Harbor Hospital
- MedStar Montgomery Medical Center
- MedStar Southern Maryland Hospital Center
- MedStar St. Mary's Hospital
- MedStar Union Memorial Hospital
- Northwest Hospital
- Peninsula Regional Medical Center
- Shady Grove Adventist Hospital
- Sinai Hospital
- St. Agnes Hospital
- Suburban Hospital, JHM
- University of Maryland 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

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

ADULT TRAUMA CENTERS

Primary Adult Resource Center

R Adams Cowley Shock Trauma Center, University of Maryland Medical Center

Located in Baltimore City, the R Adams Cowley Shock Trauma Center, serving as the state's Primary Adult Resource Center (PARC), reported receiving 6,022 primary trauma patients from June 2014 to May 2015, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data in various categories.) During the same time period, the Shock Trauma Center had a 96% survival rate of the 9,486 patients received (including those admitted to the Critical Care Resuscitation Unit). Over this 12-month period, 79% of patients admitted to the Shock Trauma Center arrived by ground transportation and 21% arrived by air. Demographic data obtained indicate that the majority of admissions were male (65%) and aged 15-35 years (40%), followed by patients aged 56 or older (32%) and 36-55 (28%). Thomas M. Scalea, MD, FACS, MCCM, serves as the Physician-in-Chief for the Program in Trauma. Karen E. Doyle, MBA, MS, RN, NEA-BC, is the Vice-President of Nursing and Operations. James V. O'Connor, MD, FACS, FACC, FCCP, is the Chief of Trauma Critical Care, and Deborah Stein, MD, MPH, FACS, FCCM, is the Chief of Trauma.

As the nation's first and only integrated trauma hospital, the R Adams Cowley Shock Trauma Center is dedicated to treating the critically ill and severely injured, and employs groundbreaking research and innovative medical procedures with one goal in mind—saving lives. As one of the highest volume trauma centers in the United States, teams of providers stand by 24/7 to receive, resuscitate, stabilize, and treat those whose lives are threatened by time-sensitive injury and illness including thoracic, intra-abdominal, and facial trauma; spinal cord and column injuries; brain injury; and acute complex orthopedic injury. In addition, patients who develop life-threatening respiratory failure, multiple organ dysfunction, soft tissue infection, and sepsis may be transferred to the Shock Trauma Center where expert clinicians and sophisticated technology such as advanced hemodynamic monitoring, continuous renal replacement therapy, and extracorporeal membrane oxygenation are readily available.

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.

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	

Shock Trauma Center's physical footprint covers 340,000 square feet, including the newly expanded Critical Care Tower. It is designed to ensure immediate diagnostic and therapeutic access for critically injured and ill patients. Key features include:

- Dedicated, highly trained, and experienced multidisciplinary clinical staff
- Dedicated ground entrance for ambulances
- Rooftop helipad capable of handling four helicopters simultaneously
- Dedicated trauma resuscitation unit with 13 resuscitation/stabilization bays
- 10 state-of-the-art operating rooms and 12 post-anesthesia recovery beds
- 24 critical care/intensive care beds, 24 intermediate care beds, and 12 acute care beds with the capacity for additional beds on an as-needed basis in the adjacent University of Maryland Medical Center (UMMC)
- Neurotrauma unit consisting of 14 critical care beds and 20 intermediate care beds
- Critical Care Resuscitation Unit with eight dedicated beds
- Comprehensive radiology services and the Mirmiran Foundation Diagnostic Imaging Suite with two dedicated high-speed computed tomography (CT) scanners and trauma angiography suite, all accessible 24 hours
- State-of-the-art, automated 24-hour STAT lab
- Sophisticated technological monitoring and clinical computer capability at the bedside
- Multi-patient hyperbaric chamber
- Trauma and specialty care ambulatory center with 14 exam rooms
- Respiratory, physical, occupational, and speech therapy services; case management; pain management; integrative medicine; nutritional services; social work and pastoral care staff; designated patient advocate; and substance abuse program
- Trauma Survivors Network
- Center for Injury Prevention and Policy

The Shock Trauma Center continues to be the nation's premier trauma center, advancing care and developing new life-saving techniques. It serves as a referral center for Maryland in neurotrauma and hyperbaric medicine. The Shock Trauma Center is available to develop individualized disaster or tactical response plans for regional EMS agencies or jurisdictions with specialized medical or rescue needs.

The Critical Care Resuscitation Unit

The 6-bed Critical Care Resuscitation Unit (CCRU) is designed for non-trauma critically ill patients transferred to UMMC for time-sensitive specialty care. The multidisciplinary CCRU health care team provides rapid clinical evaluation, diagnostic procedures, and emergent resuscitative interventions in collaboration with specialty consultation services. Diagnoses include acute care surgical or soft tissue problems, severe respiratory failure, cardiothoracic and vascular emergencies, as well as neurological and neurosurgical emergencies.

The Lung Rescue Unit

The Lung Rescue Unit (LRU) is the clinical arm of the system-wide Program in Lung Healing, led by the University of Maryland School of Medicine, specializing in advanced pulmonary care and research. The 4-bed LRU is designed for patients who need innovative therapies and access to the latest clinical trials to manage their conditions. The LRU team is staffed by a multidisciplinary team of lung failure experts who work to provide care in an organized, integrated way through clinical leadership within Shock Trauma, Pulmonology, Critical Care, and Cardiac Surgery.

The LRU treats adults ages 18 and older in need of total critical care for (1) end-stage respiratory failure in need of bridge to transplant and/or transplant and (2) acute lung injury with need for V-V ECMO.

Training

Training is central to the mission of the Shock Trauma Center. The Surgical Critical Care (SCC) Fellowship Program is the largest Accreditation Council for Graduate Medical Education (ACGME) training program in the country. The program continues to experience a surge in the number of applicants. Over the past six years, the number of filled positions has more than doubled (from 66 to 139). The program remains at the forefront of approximately 100 SCC programs offered; it has matched the top eight or nine ranked fellow candidates for the third consecutive year.

Approximately 6% of new SCC physicians released into the national workforce are "Shock Trauma" trained. The fellowship programs are considered among the best in the world. Currently, the Shock Trauma Center offers fellowships in SCC (8 positions), Anesthesiology (4), Orthopedic Surgery (5), Emergency Medicine (4), and Acute Care (3).

The ACGME-accredited University of Maryland Orthopaedic Traumatology Fellowship is considered by many to be the foremost orthopedic trauma fellowship worldwide. Alumni of the Fellowship currently lead trauma care and orthopedic education at centers around

the world. The primary goal of the Fellowship is to educate orthopedic surgeons to become clinically proficient in managing the musculoskeletal injuries of the severely or multiply injured patient in an interdisciplinary environment. Additional goals include educating fellows in the associated research and teaching skills to become leaders in their field.

The American College of Surgeons (ACS) 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. A strong collaboration has been forged with the University of Maryland School of Medicine to offer advanced training in critical care and trauma care to medical students.

Advanced Trauma Life Support® (ATLS®), developed by ACS, and Advanced Trauma Care in Nursing (ATCN), developed by the Society of Trauma Nurses (STN), along with the Society of Critical Care Medicine's Fundamental Critical Care Support, continue to be the cornerstone courses of the curriculum. ATCN, taught concurrently with ATLS, is a course designed for the registered nurse interested in increasing his or her knowledge in the management of patients with multiple injuries. The ATCN program has been operational for over 15 years and has an excellent record of offering a superb trauma educational program. In collaboration with The Johns Hopkins Hospital, the Shock Trauma Center is one of the few facilities to hold monthly ATCN courses.

Surgical skills courses are offered throughout the calendar year, including Advanced Trauma Operative Management (ATOM®) and Advanced Surgical Skills for Exposure in Trauma (ASSET®). Disaster Management and Emergency Preparedness courses are offered on a regular basis to all partners in patient care from first responders to advanced clinicians. Basic Endovascular Skills for Trauma was added to the line of surgical skills training courses in 2014 and will be conducted bimonthly. The Second Annual Resident Day, an eight-hour program of didactic sessions with a focus on physician in-training education, was held in FY 2015.

Annual events such as the Trauma Resident Paper Competition and the Trauma Care Conference serve as forums for contemporary innovations and current subject matter and issues that impact the trauma community; these events are open to all colleagues.

The medical center held the inaugural Game Changers: Innovations in Critical Care Conference in September 2014, highlighting current topics in critical care medicine for 250 attendees.

In 2014 the Center for Critical Care and Trauma Education opened a 10,000 square foot medical simulation area. The center houses four reconfigurable labs and three adjacent classrooms and debriefing areas where basic individual skills training as well as multiple team-based courses focused on inter-professional education throughout the hospital system can be accommodated. It supports the development, implementation, and continuous evaluation of many courses related to trauma and critical care management.

Center for the Sustainment of Trauma and Readiness Skills

Since 2001 US Air Force Medical Service personnel, including surgeons, nurses, and medical technicians, 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. This location is one of three C-STARS sites in the country, each specifically chosen for trauma patient volume, mechanisms of injury, and clinical expertise. These civilian-military partnerships are crucial in keeping military medics constantly ready for wartime casualty care. The C-STARS program provides military personnel with a real-world platform for intense, state-of-the-art training in trauma skills for the care of the critically injured soldier. This relationship is mutually beneficial as the Shock Trauma Center team learns skills and maintenance techniques and identifies patient throughput strategies that improve the delivery of definitive care. This relationship further creates an environment conducive to collaborative research supported by the US Department of Defense to benefit both military and civilian trauma patients.

Membership in Regional and National Organizations and Leadership Roles

Many of the faculty and staff at the Shock Trauma Center are members of and/or hold leadership positions in national, regional, and state organizations.

Dr. Thomas Scalea is the President of the American Association for the Surgery of Trauma (AAST); holds positions on its Membership, Program, Scholarship and Awards, International Relations, and Nominating Committees; and is a member of the AAST Board of Managers. Dr. Scalea is also the current President of the Western Trauma Association (WTA). Dr. Deborah Stein has a role on the Ad Hoc Acute Care Surgery Committee for the Eastern Association for the Surgery of Trauma (EAST) and the Ad Hoc Geriatric Trauma Committee for AAST. Dr. William Chiu is a member of the Board of Directors for EAST as well as Chairman for the Careers in Trauma Committee and Ex Officio for the Program Committee. Dr. Jose Diaz is on the Ad Hoc Acute Care Surgery Committee for EAST. Dr. Raymond Fang is the Vice-Chair of the Military Liaison Committee for EAST. Dr. Andrew Pollak is the Past President of the Ortho-

paedic Trauma Association. Dr. Robert O'Toole is the Co-Chair of the Program Committee for the Orthopaedic Trauma Association.

Karen Doyle, MBA, MS, RN, NEA-BC, completed her year as the President for the STN and is a member of the State Emergency Medical Services Advisory Council (SEMSAC). Karen McQuillan, MS, RN, CSN-BC, CCRN, CNRN, FAAN, serves on the American Association of Critical-Care Nurses (AACN) Board of Directors and is the President of the organization. She also serves on the AACN Certification Corporation. Tara Reed Carlson, MS, RN, is the Chair for the Maryland Trauma Center's Network (TraumaNet), holds a board position on the Partnership for a Safer Maryland, and is the Injury Prevention Chair for the Trauma Centers Association of America. Karen Memphis, RN, is a Board Member of the Brain Injury Association of Maryland.

Global Outreach

Because of the large number of trauma patients with a variety of injuries treated each year, a wealth of clinical and research experience has been accumulated at the Shock Trauma Center. Staff expertise is shared with other health care providers through presentations at regional, national, and international professional meetings and publications in peer-reviewed journals and books. Shock Trauma Center staff are also frequently called upon as consultants to develop or improve trauma centers and systems in the United States and around the world.

The Trauma Observation Program provides health care professionals an opportunity to advance their knowledge and skills under the tutelage of world-renowned leaders in trauma and critical care medicine. The goal of this program is to provide observers with a current understanding of the many areas of trauma and trauma systems and, more specifically, their particular area of interest through clinical interactions, meetings and lectures, rounds, and observation of operational procedures. Program participants have included pre-med students, military medics, nurses, high school trainers, nurse practitioners, physicians, and surgeons. From June 2014 through May 2015 the Trauma Observation Program hosted 137 individuals from the United States and other countries. Overall, the Trauma Observation Program has hosted students, nurses, and medical personnel from over 50 countries. Additionally, the Shock Trauma team has provided on-the-ground health care and consulting services in Haiti, China, India, Italy, Qatar, and Brazil.

EMS Outreach

The Shock Trauma Center has an active prehospital outreach program, which includes both in-hospital and out-of-hospital training for prehospital providers. The EMS Office offers Maryland prehospital providers the opportunity to accompany a trauma nurse for eight hours in two different clinical settings: the Trauma Resuscitation Unit (TRU) and a critical care unit. The primary objective of this program, available throughout the year, is to give prehospital providers a better understanding of the relationship between prehospital procedures and definitive treatment in the hospital. In FY 2015 the program provided experiences for 171 EMS providers in the TRU and 127 EMS providers in a critical care unit.

The EMS Office also offers ongoing educational opportunities for prehospital providers. In FY 2015, 10 evening educational programs open to prehospital and hospital care providers were held and could be linked via live broadcasts to 24 remote sites across the state. Tours were given to 28 groups of EMS providers, for a total of 260 participants. In addition to the local and regional EMS conferences and planning teams, the Shock Trauma Center continued its collaboration with the *Journal of EMS* to provide speakers, courses, observations, and tours for the EMS Today Conference. The EMS Office maintains a relationship with the conference and is an integral part of the planning committee.

Nursing staff of the Shock Trauma Center and the EMS Office have partnered with the Baltimore City Fire Department to create a new curriculum for their in-house paramedic refresher. These partners have also provided specific education and case reviews with Baltimore County and will host Frederick County this fall.

With the collaboration of the Anesthesiology Department, Maryland State Police Aviation Command, EMS educators from across the state, and the EMS Office, the Shock Trauma Center offers an all-day Advanced Life Support (ALS) airway training program with rapid sequence intubation training. This educational opportunity is coordinated through the EMS Office and provides online, classroom, and hands-on training in a cadaver lab supervised by Shock Trauma clinical staff and educators. The course was augmented with the use of high fidelity simulation.

Center for Injury Prevention and Policy

As an adult trauma center, the Shock Trauma Center primarily focuses on trauma prevention for individuals over the age of 14. The University of Maryland Children's Hospital is the lead agency for Safe Kids Baltimore, a coalition dedicated to the prevention of unintentional childhood injuries and deaths for children age 14 and under.

In a proactive effort to combat preventable injury, the Center for Injury Prevention and Policy (CIPP), led by Mayur Narayan, MD, MPH, MBA, FACS, and Tara Reed Carlson, was established in 2011 to research, evaluate, and implement trauma prevention programs on a community, regional, and national level. The established mission of the CIPP is to reduce preventable injuries and violence and to reduce the consequences while establishing a culture of injury prevention in Maryland. CIPP initiatives use high school forums in trauma education with the primary focus on impaired and distracted driving to reduce preventable injuries that affect teens and young adults. This initiative is part of a defined partnership with the community-at-large; public and private school systems; state, local, and county legislators; National Highway Traffic Safety Administration; the National Study Center for Trauma and EMS; and private businesses to keep all citizens safe from preventable injury.

The CIPP team was recognized in 2015 by the Governor's office and given an award for Outstanding Victim Services. They also received a Senatorial Award in 2015 from Senator Barbara Mikulski recognizing them for providing a positive impact on the lives of troubled youth in Frederick County.

The Center for Injury Prevention and Policy offers multiple prevention programs. A detailed look at these programs follows.

The Violence Prevention Program consists of three elements.

1. **The Violence Intervention Project (VIP)** identifies patients who are victims of personal violence in an effort to intervene and disrupt the cycle of violence. The program utilizes a multidisciplinary approach including social workers, caseworkers, nurses, physicians, and pastoral care to provide resources and services to these patients. It is one of the few hospital-initiated violence intervention programs in the country, with compelling data to support its effectiveness. The objectives of the program are to teach non-violent coping strategies, connect clients to community providers, reduce risk-taking behavior, reduce criminal behavior, and prevent further injury from violence and criminal activity. The VIP has been sustained over the past 15 years through partnerships with the Baltimore City Police Department, the Mayor's Task Force on Community Collaboration to Overcome Violence, the Baltimore Health Commissioner, and the Governor's Office on Crime Control and Prevention (GOCCP). Showing a strong commitment to the community, the program engaged over 1,200 individuals in the past year by direct intervention as well as community education and outreach.
2. **The Bridge Project** is a domestic violence initiative aimed at breaking the cycle of intimate partner abuse by intervening at the bedside of the Shock Trauma Center and the University of Maryland Medical Center's Adult Emergency Department. The Bridge Project mirrors the VIP model by providing direct care using a multidisciplinary team and community resources to intervene and support victims of domestic violence to make positive changes and break the cycle of abuse. This project also focuses on community and campus-wide education to raise awareness of this prevalent issue and make a positive change in the community. The team participates in several councils and boards including the Baltimore City Criminal Justice Coordinating Council on Domestic Violence and the Maryland Health Care Network Against Domestic Violence. This program is supported through grants from the GOCCP and Verizon Wireless.
3. **Promoting Healthy Alternatives for Teens (PHAT)** currently operates as a single session workshop designed to expose youth to the consequences associated with poor decision-making by providing testimonials of victims and perpetrators of violence, as well as creative self-expression through spoken word poetry, theater, and role-playing exercises. PHAT programs are interactive in nature as the youth are introduced to a variety of hospital careers and are encouraged to ask about the professions. The program encourages participants to think about their futures, set goals, and identify healthy outlets for managing their feelings. The PHAT program is designed to be held on-site (eg, school, youth center, church) or be held at the UMMC campus. Four programs were held this year.

The Trauma Prevention Program holds assemblies at high schools throughout Maryland that focus on impaired and/or distracted driving, during which one of three distracted driving videos produced by the CIPP team is shown. Following the video, a team of nurses engage students in a discussion about alternatives to dangerous decision making. The program is augmented by a young trauma survivor who shares his or her powerful and inspirational story. In FY 2015 the CIPP presented 98 programs reaching 12,960 high school students and community members with important prevention messages.

Maryland Motor Vehicle Administration (MVA) driver education instructors dedicate a portion of the curriculum to teach students the dangers of distracted driving. In 2012 the CIPP-produced "Get the Message" video, which illustrates the fatal impact of a single text message on a young driver and her friends, became a mandatory part of the distracted driving curriculum and is shown to all new drivers in Maryland, demonstrating how CIPP is helping to drive public health policy in the state.

The Saving Maryland's At Risk Teens (SMART) Program, which began in 1979 and has continually expanded, targets high school students with dangerous behaviors related to drug and/or alcohol abuse. The program consists of a partnership with seven counties and Baltimore City, and works in coordination with the Department of Juvenile Services, Family Court, the States Attorney's Office, and the Office of Substance Abuse. In FY 2015 more than 260 teens attended the weekly two-hour program.

Adult Court-Ordered Drinking and Driving Monitoring Program focuses on adults charged with a DUI/DWI who are referred to the Shock Trauma Center for an educational experience as part of the Drinking and Driving Monitoring Program. Participants discuss poor decisions and the consequences they faced. The curriculum also reviews skills to make better decisions going forward. In FY 2015, 590 adults were served by the two-hour program, which is offered once a month.

The Minds of the Future Program at the Shock Trauma Center is a three-hour educational session designed to meet the needs of junior and senior high school students interested in a health care career. The program introduces students to various careers in the hospital setting with both didactic and hands-on approaches including presentations from a physician, nurse, and rehabilitation therapist, a tour of the hospital, and hands-on experiences in the simulation laboratory. In addition, students participate in breakout sessions with Rehabilitation Services and Trauma Prevention Programs. In FY 2015 the program presented 10 courses serving 185 high school students.

Trauma Survivors Network (TSN) is a unique program started 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.

The TSN and the Shock Trauma Center recognize that the patient is at the center of the recovery process, and are committed to providing trauma patients and their families with tools to better manage their recovery and improve their lives. In FY 2015 the TSN coordinated/presented 200 in-person programs that served 3,521 individuals and raised program awareness and participation through 1,034 in-patient contacts.

Level I

The Johns Hopkins Hospital, Adult Trauma Center

Located in Baltimore City, The Johns Hopkins Hospital Adult Trauma Center received 1,656 trauma patients from June 2014 to May 2015, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data.) David T. Efron, MD, FACS, serves as Director of Adult Trauma and Chief of Acute Care Surgery and Kathy Noll, MSN, is the Trauma Program Manager. Ingrid Reynolds, BSN, RN, is the Trauma PI Coordinator. Elliott R. Haut, MD, PhD; Kent A. Stevens, MD, MPH; Albert Chi, MD; and Catherine Velopulos, MD, MHS, are the division's full-time trauma surgeons. Mario Rueda, MD, is the Trauma/Acute Care Surgery Clinical Fellow. Two full-time nurse practitioners, Patricia Freeman, CRNP, and Suzette Heptinstall, CRNP, further enhance the continuum of care.

The Johns Hopkins Hospital ranked number three in the nation and number one in Maryland according to *U.S. News & World Report* "Best Hospitals Rankings" for 2014-2015. The Johns Hopkins Hospital Level I Adult Trauma Center in the new Sheikh Zayed Adult Patient Care Tower, which opened three years ago, includes 6 state-of-the-art trauma rooms; a radiology suite with CT, MRI, and ultrasound; 96 intensive care beds; and 33 new operating rooms.

The Level I Adult Trauma Center at The Johns Hopkins Hospital continues to provide 24/7 in-house trauma-attending surgeon coverage. A core group of ten trauma/surgical intensivists maintain responsibility for clinical pathways and processes of care. Improved survival, triage time, and length of stay among critically injured patients have been documented with this approach.

True to the mission of Johns Hopkins School of Medicine, the Trauma Division is dedicated to research that will improve access to care and outcomes for trauma patients. The Trauma Division maintains a unique relationship with Johns Hopkins Bloomberg School of Public Health (JHSPH), encompassing all facets of ongoing research. In addition to its standing interest in violence and injury prevention, the Trauma Division has broadened its academic focus to identify ethnic and gender disparities in outcomes among critically injured patients. Specific faculty interests include deep vein thrombosis prevention; benchmarking of population-based outcomes related to trauma care; quality of care studies; violence and injury prevention, both domestically and internationally; and evaluation, improvement, and implementation of trauma care systems in the developing world.

Dr. Albert Chi continues his work with the Johns Hopkins University Applied Physics Lab (JHU/APL), Walter Reed Army Medical Center, and the Washington, DC, National Rehabilitation Hospital to evaluate the performance, usability, and patient/clinician acceptance of the JHU/APL Modular Prosthetic Limb (MPL) in patients who have undergone targeted muscle reinnervation (TMR) surgery, a procedure that reassigns nerves that once controlled the arm and the hand. By reassigning existing nerves, it is possible for people who have had upper-arm amputations to control their prosthetic devices by merely thinking about the action they want to perform.

Developed through funding provided by the Defense Advanced Research Projects Agency, the MPL supports intuitive, non-invasive control schemes for commanding up to 17 independent joints in a robotic prosthetic arm. The MPL arm includes 3 degrees of freedom (DOF) in the wrist, 10 DOF in the hand, and 4 DOF in the upper arm. It is modular in both its physical and control figurations, accommodating the full range of amputation levels from wrist to shoulder. Currently Dr. Chi is working with the JHU/APL to design control schemes that will be derived from advanced electromyography-based pattern recognition algorithms designed for patients after TMR.

The TMR program has also developed a virtual reality rehabilitation program that ensures a patient's success with his or her advanced prosthetic. Recently, the world's first MPL fitting for a bilateral shoulder disarticulation patient was completed, enabling complete function of the shoulder, elbow, wrist, and hand with intuitive control.

In a parallel effort to provide prosthetics for children, Dr. Chi has partnered with Kennedy Krieger Institute. Through Dr. Chi's Motor Control Lab, children with congenital hand loss have been fitted with body-powered hands created with a 3D printer at virtually no cost. The lab also participates in a global initiative to enable the non-profit organization to provide a prosthetic hand for anyone in need, free of charge.

The burden of injury and injury prevention in the developing world has been the research focus of Dr. Kent Stevens. As the Associate Director for Clinical Services and Trauma Care in the International Injury Research Unit at JHSPH, Dr. Stevens oversees the ongoing efforts to define, prevent, and treat injury in the developing world. In collaboration with the World Health Organization (WHO), Dr. Stevens participates in the Bloomberg Philanthropies Global Road Safety Program to help reduce injury and death associated with road traffic injuries in ten low- to middle-income countries. As part of the program, Dr. Stevens works in Kenya to improve the care of injured patients both in prehospital and hospital settings. Additional projects include trauma registry development in India and South Africa; training of trauma care practitioners in Uganda, Russia, India, and United Arab Emirates; and participation in the WHO Global Alliance for Care of the Injured.

Dr. Elliott R. Haut completed his PhD in Clinical Investigation at JHSPH and is currently the Principal Investigator of a large research contract from the congressionally-funded Patient Centered Outcomes Research Institute (PCORI) for a study entitled *Preventing Venous Thromboembolism: Empowering Patients and Enabling Patient-Centered Care via Health Information Technology*. His group is studying methods to engage patients in efforts to improve prevention of venous thromboembolism (VTE) after trauma, after surgery, and during medical admissions.[1] Dr. Haut leads the multidisciplinary VTE collaborative within the Armstrong Institute for Patient Safety and Quality at Johns Hopkins School of Medicine. He has published numerous articles related to his work on public reporting and prevention of deep vein thrombosis in trauma and other patient populations and recently spoke on the topic at the national American College of Surgeons (ACS) Trauma Quality Improvement Program Annual Meeting and National Surgical Quality Improvement Program Conference.

Dr. Catherine Velopulos joined the faculty in July 2013 after having completed a year as the Trauma/Acute Care Surgery Research Fellow and simultaneously earning a Master's Degree in the Graduate Training Program in Clinical Investigation at JHSPH with an additional Certificate in Health Finance and Management. Dr. Velopulos focuses on addressing violence recidivism through programs to build identity and self-efficacy. She is also interested in cost-effectiveness and outcomes research aimed at improving surgical care delivery. She currently serves as a member of the Eastern Association for the Surgery of Trauma (EAST) Practice Management Guidelines Committee and the Association of Academic Surgeons Publication Committee. In FY 2013 Drs. Haut and Velopulos successfully sponsored an amendment to *The Maryland Medical Protocols for EMS Providers* regarding transport of penetrating trauma patients without spinal immobilization.

Members of the Trauma Center faculty aspire to advance the science of trauma care education throughout the country. Dr. Haut is a member of the Board of Directors of the Eastern Association for the Society of Trauma (EAST), the premier organization publishing guidelines of trauma care. He recently served as the chair of the Guidelines Committee, and is currently the

[1] *http://bit.ly/PCORI-VTE and http://www.pcori.org/funding-opportunities/pfa-awards/pilot-projects/improving-patient-nurse-communication-to-prevent-a-life-threatening-complication/*

Secretary of EAST. These guidelines are freely available to all interested in trauma care. Dr. David Efron currently serves as the Vice Chair of the Maryland Committee on Trauma of the ACS. He is a Course Director for Advanced Trauma Life Support® (ATLS®), Advanced Trauma Operative Management (ATOM®), Advanced Surgical Skills for Exposure in Trauma (ASSET®), and the Rural Trauma Team Development Course (RTTDC®), all of which are ACS Committee on Trauma curricula. These courses are taught in conjunction with the faculty at the University of Maryland.

Community outreach and prevention efforts at The Johns Hopkins Hospital have supported the development of an Alcohol Screening and Brief Intervention (ASBI) program. The relevance of ASBI in trauma centers was originally identified by Gentilello, et al. (1999) in *Annals of Surgery* who published that 50% of trauma patients screen positive for alcohol use and ASBI is an effective means to decrease trauma recidivism.[2] In 2005 the ACS mandated inclusion of ASBI in trauma centers. The ASBI program for the Adult Trauma Service, although not currently mandated by the State of Maryland, provides a professional staff member who interviews and educates patients using personalized information to identify the need for ongoing resources and/or additional counseling. Ingrid Reynolds, in combination with our Adult Trauma Service social worker, provides leadership for the ASBI program. The program has been highlighted as a part of the curriculum of the JHSPH's Summer Institute on Injury Prevention. Additionally, a hospital-wide, multidisciplinary group that includes the Adult Trauma Service developed an alcohol withdrawal syndrome protocol that is currently utilized in the intermediate and intensive care units.

The Johns Hopkins Hospital launched its Safe Streets Hospital Initiative on August 1, 2009. Since that time, the Adult Trauma Service, in collaboration with the Baltimore City Health Department and the Departments of Social Work, Pastoral Care, and Emergency Medicine, has worked to formalize this initiative aimed at reducing shootings and homicides in East Baltimore. Safe Streets utilizes conflict mediation, outreach, and community mobilization as its core elements to target high-risk individuals. Hospital Safe Streets responders are notified when a shooting victim arrives in the emergency department and respond to the hospital within 30 minutes to discuss alternatives to retaliation with the patient and family. The program is based on the successful Chicago "Cease-Fire" program and has been receiving ongoing evaluation by JHSPH.

The Johns Hopkins Hospital has a vast and far reaching role in the community, both in the Baltimore area and statewide. Dr. Efron sits on the Board of the American Trauma Society and is the immediate past Chair of the Maryland Trauma Center Network (TraumaNet). Kathy Noll serves as Treasurer of TraumaNet, and was Chair of the Maryland Trauma Registry/Education/Prevention Committee through December 2014. She is also the Maryland State Chair for the Society of Trauma Nurses.

Level II

Johns Hopkins Bayview Medical Center Trauma Center

The Trauma Program at Johns Hopkins Bayview Medical Center (JHBMC) is designated by MIEMSS as a Level II adult trauma center. It serves the citizens of eastern Baltimore City, eastern Baltimore County, and southern Harford County. The Trauma Program entered 2,270 trauma patients into the Maryland State Trauma Registry from June 2014 to May 2015, a 30% increase from the previous year. (See pages 73 to 78 for additional patient data.)

Nathaniel McQuay Jr, MD, FACS, is the Clinical Medical Director for the Trauma Program and Co-Director of Surgical Critical Care. Marie Dieter, MSN, MBA, RN, CEN, the Trauma Program Manager, works with four trauma registrars to ensure the program continues to run smoothly. Diane Schwartz, MD, Trauma Attending Faculty, and Michael Cooley, CRNP, Lead Surgical NP, are members the Trauma Division. The JHBMC Trauma Program continues to grow and we are actively recruiting additional faculty members to meet this patient care need.

The JHBMC Trauma Program is committed to providing access to emergency surgical care for acutely injured patients with time-sensitive injuries. The Trauma Program provides patient-centered comprehensive care to all trauma patients utilizing a team-oriented, multidisciplinary approach. Under the collaborative leadership of specialized physicians, nurses, and members of the health care team, the Trauma Program continues to advance with implementation of protocols to address patient, community, and institutional needs.

The ultimate goal of the Trauma Program is to optimize care of the acutely injured patient through collaborative research and the application of evidence-based practices. To achieve this goal, the JHBMC Trauma Program utilizes a multidisciplinary approach to the management of the adult trauma patient and the community with dedicated support from emergency medicine, anesthesia, orthopedics, neurosurgery, plastic surgery, rehabilitation, nursing, and support staff.

[2]*Gentilello LM, Rivara FP, Donovan DM, et al. Alcohol interventions in a trauma center as a means of reducing the risk of injury recurrence.* Annals of Surgery. *1999;230:473-480.*

The JHBMC Trauma Program submits records annually to the American College of Surgeons' National Trauma Data Bank® (NTDB), the largest aggregation of US trauma registry data ever assembled. JHBMC's participation in the NTDB is required by MIEMSS, and allows the trauma program to benchmark against national norms and to participate in trauma-related research. This type of self-assessment facilitates performance improvement opportunities and contributed to JHBMC's annual trauma patient survival rate of 97% or greater for the past five years.

The Trauma Program realizes the importance of community outreach and injury prevention, as well as clinical education for acute care professionals and prehospital providers throughout the region. Many existing programs continue to serve these health care colleagues and the community at large. Examples of these programs include:

- Topics in Emergency Medicine (course offered twice a year for prehospital providers to obtain continuing education credits)
- Trauma education seminars for nurses
- Trauma education for resident physicians

Johns Hopkins Bayview Medical Center has chosen community-based fall prevention as a strategic initiative for FY 2016. Key hospital departments, such as Executive Leadership, Geriatrics, and Trauma Program have developed strategies and tactics to implement a comprehensive plan in our community. The Fall Prevention Strategic Initiative has three arms that focus on fall prevention: community, inpatient population, and health care provider.

The Trauma Program identified the ability to screen patients seen in our ambulatory clinics for fall risk in the EPIC electronic medical record. A collaborative committee implemented the process to screen and identify patients at risk of falling in our Geriatric Outpatient clinic in May 2014 and has expanded to the Neurosurgery Clinic. To date over 7,000 patients have been screened. Those patients identified as a fall risk receive fall prevention education during their clinic visit. In addition, all inpatients receive the CDC sponsored education pamphlet *"What YOU Can Do to Prevent Falls"* standard in their discharge instruction packets. This pamphlet was distributed to over 18,000 inpatients discharged from JHBMC in the past year. In addition to the inpatient pamphlet, The Fall Prevention Strategic Initiative Committee has developed a brochure that is distributed to the community at health fairs and other venues.

Pedestrian safety and motor vehicle safety were other areas of injury prevention focus during FY 2015. The Trauma Program participated in the campus-wide "700 Pedestrians" campaign that was spearheaded by JHBMC Safety and Environmental Health Services. This initiative focused on both pedestrian and driver awareness of each other on the roadway and the many crosswalks on campus.

Level II

Prince George's Hospital Center

Located in Cheverly, Maryland, the Prince George's Hospital Center's Trauma Center continues to provide a high level of quality trauma care to the ever increasing volume of trauma patients it receives. It serves as the primary adult trauma center for Prince George's, Calvert, Charles, St. Mary's, and Southern Anne Arundel Counties, as well as several areas within Montgomery and Howard Counties and the eastern parts of Washington, DC.

According to the Maryland State Trauma Registry, Prince George's Hospital Center (PGHC) received 3,347 trauma patients from June 2014 through May 2015. (See pages 73 to 78 for additional patient data.) More than 10% of those patients arrived by Maryland State Police Aviation Command medevac.

The Trauma Center at Prince George's Hospital Center is staffed by Trauma Medical Director R. Sean Benoit, MD, MBA, FACS, and Assistant Medical Director Gabriel Ryb, MD, MPH, FACS, both whom hold clinical appointments at the University of Maryland School of Medicine. The Trauma Center is also supported by several board-certified general surgeons who are all Advanced Trauma Life Support certified.

Dawn Moreland, BSN, RN, is our new Trauma Program Manager, and Kenyatta Hazlewood, BSN, RN, MPH, is our new Trauma Prevention and Outreach Coordinator/Trauma Educator. Data collection is supported by two Trauma Registrars, Lisa Kriner and Betty Fields, and our new Registered Nurse Trauma Registry Coordinator, Jody Shirley.

The Trauma Center at Prince George's Hospital Center (PGHC) continues to improve on efforts initiated by the Trauma Multidisciplinary Committee, which includes the involvement of EMS from Prince George's County, Washington, DC, and the Maryland State Police Aviation Command. Some initiatives aim to improve patient throughput and efficiency, decrease recidivism due to violent trauma, prevent youth violence due to firearms, and reduce falls in the elderly. The Trauma Center is integral to the entire health system and is involved in improving the patient experience and overall

patient and guest satisfaction. Our trauma team also includes orthopedic traumatologists, neurosurgeons, fourth-year postgraduate residents, physician assistants, and medical students.

Prince George's Hospital Center trauma volumes remain steady. As the only verified trauma center in Prince George's County, and the second busiest trauma center in Maryland, we continue to see a rise in the number of citizens sustaining injuries, especially from falls, motor vehicle crashes, and violence. As a result, and to reduce recidivism and readmissions, new injury prevention efforts are being made by extending our reach to area nursing homes and assisted living facilities, schools, community meetings, and local EMS and police stations.

Along with local agencies, we have partnered with the Trauma Injury Prevention Coordinators Collaborative in area trauma centers such as MedStar Washington Hospital Center and INOVA Fairfax to provide injury prevention education at outreach events for residents in the Washington Metropolitan area.

In addition to the care we provide within the hospital, a new focus has been placed on providing holistic care to respond to the changing health care environment in Maryland. Population health extends beyond our doors, and we have responded by reaching out to community providers to include clinics, individual physicians, and the Prince George's County Health Department.

Moving forward, the Prince George's Hospital Center's Trauma Center remains excited about the continued growth in our relationship with the University of Maryland Medical System to bring comprehensive and responsive health care to Prince George's County.

Level II

Sinai Hospital Trauma Center

Located in Baltimore City and serving the northwest corridor of the Greater Baltimore Metropolitan area, Sinai Hospital reported receiving 1,789 trauma patients from June 2014 through May 2015, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data.)

The trauma program resides within the Department of Surgery under the continued leadership of Mark Katlic, MD, Chairman, Department of Surgery and Surgeon-in-Chief. Hashim Hesham, MD, has been the Trauma Medical Director since 2013. Lauren Smith, MSN, ACNP, continues as the Trauma Program Manager. This year we say goodbye and congratulations to Thomas Genuit, MD, our former Division Head of Acute Care Surgery. Dr. Genuit moved on to an exciting opportunity as Chair of the Department of Surgery, Program Director of General Surgery Residency Program, and Professor of Clinical Biomedical Science at the Charles E. Schmidt College of Medicine, Florida Atlantic University.

Our trauma center continues to have trauma/critical care trained and board certified or eligible surgeons available 24/7. In addition to Dr. Hesham, our other full time trauma staff currently includes Marcie Feinman, MD; Habeeba Park, MD; Lingxiang Ye, MD; and Denis Foretia, MD. Dr. Foretia joins us this year from Emory University in Atlanta, Georgia, where he did his general surgery residency. During his time there, he had extensive training in trauma at the Grady Memorial Hospital, and developed a special interest in quality improvement. The additions of Christopher Kwon, MD, and Charles Sheih, MD, enhance the trauma program with their expertise in cardiac and thoracic surgery. The trauma program is also supported by Karen Sweeney, BSN, our clinical systems coordinator, as well as two trauma registrars, John David Morris and Carolyn Reeves.

Quality of care continues to drive the Trauma Program at Sinai Hospital. Our goal is to provide the highest level of trauma care while utilizing the most current research and technologies. Our center has a multidisciplinary approach to quality management as provided through weekly trauma case reviews and quality rounds, a monthly continuing medical education (category I CME-approved) Trauma Morbidity and Mortality Conference, the Trauma Multidisciplinary Committee, and the monthly attending level peer-review meetings. Trauma Surgery, Emergency Medicine, Neurosurgery, Orthopedics, Anesthesia, Respiratory, Radiology, and Nursing are all involved in our performance improvement efforts. Our surgical residents also participate in hospital-wide multidisciplinary quality improvement efforts. The Department of Surgery has submitted winning projects each year, the most recent one focusing on deep vein thrombosis (DVT) prevention. Initial results of this project have shown an improvement in our DVT rates, which has a direct positive effect on our trauma population. Other trauma-specific quality projects are ongoing.

The hospital continues its active participation in regional and national initiatives to improve patient care, including the Maryland Trauma Quality Improvement Council, the National Surgical Quality Improvement Program by the American College of Surgeons, and the Centers for Disease Control and Prevention/Centers for Medicare and Medicaid Services National Surgi-

cal Infection Prevention Program. The Trauma Center maintains active involvement in the Maryland Trauma Center Network (TraumaNet) to advance all aspects of trauma care. Sinai and its Trauma Center place a high value on maintaining an excellent working relationship and open communication with EMS and its providers in the Greater Baltimore Metropolitan area.

Over the past fiscal year, the Trauma Center at Sinai has seen a 13.5% increase in the number of patients treated. Our leading cause of injury continues to be elderly falls, followed closely by motor vehicle crashes. Sinai Hospital boasts an internationally recognized Center for Geriatric Surgery that supports our team in giving the best possible care to our aging trauma population.

Injury prevention was a focus of our program this year. In response to the increase in elderly falls, members of our trauma staff and the Department of Surgery teamed up with the Maryland Department of Health and Mental Hygiene to implement Stepping On, a fall prevention program, here in our communities. Stepping On is a well-researched program with results published in the *Journal of the American Geriatrics Society*. It has been shown to improve confidence, build relationships, and improve the awareness of fall hazards in people who have a history of falls, or have a fear of falling.

The Trauma Center begins with our Emergency Department (ER-7). Within the past year, Sinai ER-7 has expanded to include a 13-bed rapid evaluation area, as well as a 13-bed transitional care unit. We are also anticipating the opening of a brand new observation unit. We are updating our radiology equipment to include two state-of-the-art CT scanners and new X-Ray equipment. In an effort to stay current with new technologies, our monitors are now equipped with CARE-ware software and VITAlink® cables to ensure seamless communication with our electronic medical records (EMR). The addition of Chesapeake Regional Information System for our Patients (CRISP) to our EMR allows us to exchange health information statewide. We have increased our case management staff and created the role of patient navigator in an effort to help connect our patients to the appropriate medical resources within the community prior to discharge.

The trauma team and emergency department staff are utilizing the simulation lab here at Sinai to replicate trauma patient scenarios with the goal of optimizing our resuscitations and adding to our quality of care. Quality efforts are also ongoing in our intensive care unit. Daily multidisciplinary rounds focus on evidence-based protocols such as the ABCDEF bundle, which is aimed at reducing oversedation, immobility, and the development of delirium. These rounds also allow for effective communication and a culture of safety among the critical care physicians, nurses, educators, and other allied health and administrative staff.

The surgical residency program approved by the Accreditation Council for Graduate Medical Education (ACGME) is in its tenth year, with full accreditation. We currently have a total of 18 surgical residents, with three residents for each level of training. All residents and physician assistants/nurse practitioners maintain current certification in Advanced Trauma Life Support® (ATLS®) and Advanced Cardiovascular Life Support (ACLS). All residents receive additional training in Advanced Trauma Operative Management (ATOM®), Focused Abdominal Sonography in Trauma (FAST), Advanced Surgical Skills for Exposure in Trauma (ASSET®), and an eight-week rotation at the R Adams Cowley Shock Trauma Center during their post-graduate III-V years.

We are proud to welcome Carroll Hospital Center to the LifeBridge Health System, offering new services and expanded care for the people of Carroll County and the greater Baltimore region. Surgical services and trauma care are a few of the many specialty services that will be improved due to this partnership. Under the leadership of Neal Meltzer, CEO of LifeBridge Health, and Amy Perry, President of Sinai Hospital and Executive Vice President of LifeBridge Health, the institution continues its commitment to all injured patients in the communities we serve.

Level II

Suburban Hospital – Johns Hopkins Medicine

Located in Bethesda, Maryland, the Suburban Hospital Trauma Center is the only designated trauma center in Montgomery County, serving the residents of Bethesda, Potomac, Kensington, Rockville, Silver Spring, Germantown, and Gaithersburg. It also provides backup support to Frederick, Washington, and Prince George's Counties. From June 2014 through May 2015, 1,473 trauma patients were treated at Suburban, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data.) Dany Westerband, MD, FACS, is the Medical Director of Suburban Hospital's Trauma Services. Melissa Meyers, RN, BSN, MBA, is its full-time Trauma Program Director. The trauma program staff also includes Trauma Data Analyst Kirsten Lasley, MS, and two Trauma Nurse Case Reviewers, Patricia Baker, RN, and Taryn Giza, RN, BSN, CEN.

The Suburban Hospital Trauma Center continues to strive in the provision of the highest level of quality trauma care. A driving force in the quality management program at Suburban is the daily concurrent and retrospective review of trauma care. Through a careful process that involves a thorough review of all records, clinical and system issues are rapidly identified, addressed timely, and further discussed at monthly multidisciplinary and intradepartmental meetings, which often lead to the development of new policies and treatment guidelines. Furthermore, significant complications and management challenges are also brought up for discussion at monthly morbidity and mortality conferences, which serve as educational forums for the trauma surgeons, emergency department physicians, intensivists, surgical residents, nurse practitioners, physician assistants, registered nurses, and many other clinicians involved in trauma care. In addition, case presentations of interest are also held frequently, within and outside the trauma center, to further enhance trauma continuing education in the region.

As a leader in emergency preparedness, Suburban Hospital continues to partner with a number of regional emergency preparedness collaborations such as the Montgomery County Collaborative on Emergency Preparedness, the Region V Emergency Preparedness Coalition, the Johns Hopkins Center for Preparedness and Emergency Response, and the Bethesda Hospitals' Emergency Preparedness Partnership. Each of these partnerships was established out of an identified need for coordinated community collaboration in response to man-made or natural disasters. Through these solid alliances and expanded participation in local, state, and national disaster drills, Suburban Hospital, a member of Johns Hopkins Medicine, remains one of the most "highly prepared" trauma centers in the nation, proudly representing MIEMSS Region V in Emergency Support Function (ESF) #8 activities for the National Capital Region (NCR).

In addition to participation in Region V and the NCR emergency preparedness exercises, Suburban sponsors a two-day First Receiver Operator Training annually that is open to other Region V partners. Participants extend beyond the emergency department with representation of multiple disciplines including doctors, nurses, patient care technicians, security personnel, municipal police officers, and respiratory therapists.

Suburban Hospital is also a state-designated Cardiac Interventional Center, and as such has maintained the national benchmark of 90-minute "door to balloon" time 100% of the time. With strong support from the Heart, Lung, and Blood Institute of the National Institutes of Health (NIH) and Johns Hopkins Medicine, the hospital continues to offer easy access to cardiac surgery and other advanced cardiovascular treatment.

Suburban Hospital maintains its designation as a Primary Stroke Center. It's partnership with NIH has allowed Suburban to be involved in cutting edge research in the field of stroke management. It is due to the NIH research partnership that Suburban is one of only four facilities in the world that uses MRI as the stroke screening tool.

To ensure that trauma and other vital health care services are available to the community at all times, Suburban Hospital administration has remained fully committed to maintaining hospital diversion hours to a minimum. One initiative implemented to minimize diversion hours, Suburban has shifted the primary focus of the 24/7 Nursing Supervisor role to optimizing patient flow issues and appropriate bed utilization, thus facilitating patient throughput, minimizing the need to divert patients.

In spring 2015 Suburban participated in the "Every 15 Minutes" program at Walter Johnson High School. This program highlights the consequences associated with driving while impaired and texting. Other activities related to injury prevention include yearly presentations to high school seniors enrolled in Suburban's Medical Venture's program, tours of the trauma bays to teenagers, lectures to the Girl Scouts of the USA, and the hospital's "Fall Prevention and Balance" programs organized by the Physical Medicine Department and presented at Montgomery County senior centers. These programs include trained physical therapists from Suburban Hospital who initiate fall-risk screenings and ensure community education on same-level falls by offering diverse lectures and classes on balance exercises and safety strategies to seniors.

Dany Westerband, MD, FACS, Medical Director of Trauma Services and Surgical Residency Liaison Director for Suburban Hospital, remains heavily committed to trauma education. As the current Chair of the Maryland Committee on Trauma of the American College of Surgeons (ACS), he is closely involved in the dissemination and teaching of all ACS-sponsored trauma courses, including Advanced Trauma Life Support® (ATLS®), Advanced Trauma Operative Management (ATOM®), Advanced Surgical Skills for Exposure in Trauma (ASSET®), and Disaster Management and Emergency Preparedness (DMEP®), as well as the Trauma Outcomes and Performance Improvement Course (TOPIC) developed by the Society of Trauma Nurses. In addition, Dr. Westerband continues to serve on the 12-member State EMS Board and is an active member the American Association for the Surgery of Trauma and the Eastern Association for the Surgery of Trauma. Melissa Meyers, RN, BSN, MBA, the Trauma Program Director, is an active Instructor of Advanced Trauma Nursing. She is also an active board member of the Maryland Division of the American Trauma Society.

In addition, Ms. Meyers continues to serve on the State Emergency Medical Services Advisory Council (SEMSAC) and other state-level trauma committees and is an active member of the Society of Trauma Nurses.

Both Dr. Westerband and Ms. Meyers are often invited to participate in specific EMS education programs held at county fire stations and the Montgomery County Fire and Rescue Training Academy. Suburban's emergency department is also a training site for prehospital care providers through an agreement with Montgomery County Community College and the Montgomery County Training Academy. The hospital sponsors an emergency medical technician to certified nursing assistant bridge program, free of charge, for prehospital care providers interested in working as emergency department technicians.

In June 2015 a four-hour seminar, "Critical Issues in Trauma," was sponsored by Suburban Hospital Trauma Center at the Johns Hopkins University Montgomery County Campus. This program, which included speakers from other academic medical centers, was offered free of charge to the region's trauma community. The conference was attended by approximately 250 trauma care providers including physicians, registered nurses, physician assistants, and EMS providers.

Level III

Meritus Medical Center Trauma Center

Located in Hagerstown, Maryland, Trauma Services at Meritus Medical Center serves the residents of Washington and Frederick Counties, Southern Pennsylvania, and the Eastern Panhandle of West Virginia. From June 2014 to May 2015, Trauma Services received 1,050 trauma patients, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data.) Vehicle crashes and injuries among the elderly account for the majority of trauma in the tri-state area; however, the incidence of penetrating injuries is increasing. More than 95% of the trauma patients treated at Meritus Medical Center arrived via ground EMS. Key staff includes Karl P. Riggle, MD, FACS, Director; Marc E. Kross, MD, PhD, FACS, Surgeon-in-Chief; Susie Burleson, MSN, MBA, RN, Trauma/EMS Manager; and Corey Thomas, LPN, Trauma Registrar.

Our EMS Partners

Trauma Services values its working relationship with EMS providers throughout the region. It serves as a clinical site for paramedic programs in Maryland by providing opportunities for prehospital education through case presentations and other educational opportunities. In addition, the staff regularly attends EMS jurisdictional and MIEMSS Region II EMS Advisory Council meetings.

Community Impact

The dedicated staff of Meritus Medical Center's Trauma Services continues to advocate for injury prevention throughout the community. In coordination with the Safe Kids Washington County Coalition, safety events focusing on child passenger safety, bicycle safety, and injury prevention were held at the Children's Safety Village of Washington County and in targeted neighborhoods. Trauma Services has taken on the leadership role for Safe Kids Washington County, including conducting monthly car seat safety installation checks and operating a child safety seat loaner program. Trauma Services has also partnered with the Washington County Health Department to provide Stepping On classes to the elderly in Washington County to help prevent falls. Each community has made an investment to ensure that it is a safe place to live, work, and visit.

Following the state and national trend, Washington County saw an increase in injuries related to distracted driving. *Stay Alive! Don't Text and Drive* was created as an injury prevention and public awareness campaign targeted at teens and their families to increase the awareness of the devastating effects of distracted driving, especially texting and driving. This campaign won an injury prevention award in June 2012 from The Partnership for a Safer Maryland, a 2012 Communicator Award, and the 2013 American Trauma Society Distinguished Service Award and continues to be supported by our EMS partners, regional businesses, public school systems, law enforcement, and community leaders.

Education and Outreach

Trauma Services hosted two multidisciplinary trauma conferences for direct-care providers. Plans are in place to continue this semiannual event in upcoming years. Members of the staff, such as Surgeon-in-Chief Dr. Marc E. Kross, have spoken on trauma-related topics to local health care and community groups.

The W. L. Riggle Memorial Trauma Nurse Education Fund continues to provide scholarship money for trauma nurses who are continuing their education.

Trauma Services staff celebrated Trauma Awareness Month (May) with an art contest for Washington County elementary school students on pedestrian safety. To further celebrate the contributions and dedication of the staff, the hospital held an annual Trauma Team Recognition Day and recognized a trauma nurse for providing exceptional care.

Level III

Peninsula Regional Medical Center Trauma Center

Located in Salisbury, 30 miles west of Ocean City, Peninsula Regional Medical Center (PRMC) Trauma Center is the only Trauma Center located on the Eastern Shore of Maryland. PRMC received 1,309 trauma patients from June 2014 to May 2015, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data.) In addition to being designated as a Level III Trauma Center, PRMC is also an Acute Myocardial Infarction (AMI) and Stroke Center certified by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) as well as a Maryland-designated Primary Stroke Center and Cardiac Interventional Center. Brion McCutcheon, MD, serves as the Trauma Medical Director and Kari Cheezum, RN, BSN, CEN, serves as the Trauma Program Manager. Trauma Department staff also includes Trauma Registrar Tonya Craft, EMT, and EMS Nurse Liaison, and AHA Faculty Coordinator Doug Walters, RN, EMT-I.

The Peninsula Regional Medical Center (PRMC) Trauma Center continues to coordinate and participate in community-based injury prevention initiatives. During the prom season of spring 2015, 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 addition, Trauma Center staff continue to work together to participate in venues with the Maryland Division of the American Trauma Society; Safe Kids Lower Shore Coalition; and the Worcester, Wicomico, and Somerset Highway Advisory Committees, as well as local community wellness events. For the past three years, the Trauma Center staff, along with TraumaRoo, the American Trauma Society's children's safety program, provided injury prevention education to children at the Maryland State Firemen's Association's Annual Convention and Conference in Ocean City. Trauma Center staff have also attended the Critical Care Symposium and American Association of Critical-Care Nurses (AACN) Conference to help increase awareness of PRMC with local hospitals and EMS companies in Region IV. In 2012 PRMC Trauma Center staff joined the Ocean City Pedestrian Safety Task Force, which focuses on improving pedestrian safety in Worcester County, including Ocean City.

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-fifth 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. In 2015 the Trauma Program Manager and EMS Nurse Liaison became certified Trauma Nurse Core Course Instructors.

Educational classes for EMS providers from Worcester, Wicomico, and Somerset counties continued to be provided by PRMC in FY 2015. Classes for Pediatric Education for Prehospital Providers (PEPP), Prehospital Basic Trauma Life Support (PHBTLS), Advanced Life Support (ALS) Paramedic Recertifications/Refreshers, 12-lead EKG interpretation classes for prehospital providers, and ALS Skills are just a few of the classes offered. PRMC continues to support Wor-Wic Community College EMS programs as a clinical site for students.

We continue to promote open communication between PRMC and the surrounding EMS community. Our EMS Nurse Liaison, Doug Walters, RN, EMT-I, attends EMS jurisdiction, MIEMSS Region IV EMS Advisory Council, and Quality Assurance meetings on a regular basis to offer feedback to the EMS populations we serve. The liaison also serves on the Wor-Wic Community College EMS Council, Wicomico County Highway Safety Advisory Council, Worcester County Pedestrian Safety Council, and several EMS advisory councils local to the area served by PRMC.

Level III

Western Maryland Regional Medical Center

Located in Cumberland, the Trauma Center at Western Maryland Health System Regional Medical Center (WMHS) is the only Maryland designated Trauma Center in Allegany and Garrett Counties. WMHS received 593 patients from June 2014 to May 2015, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data.) Juan Arrisueno, MD, serves as the Trauma Director; Elizabeth Wooster, PhD, RN, MS, MsEM, is the Trauma Services Program Manager; Kathy Witt is the Trauma Services Registrar; William Hardy is the Prehospital Care Coordinator; and Debi Wolford and Fawn Gerhard are the Forensic Nurse Examiners. In addition to being designated as a Maryland Level III Trauma Center, Maryland Primary Stroke Center, and Cardiac Interventional Center, WMHS is also certified by the Joint Commission on Accreditation of Healthcare Organizations.

In FY 2015 Western Maryland Health System Regional Medical Center Emergency Department welcomed nearly 53,555 patients through its doors; of these patients 593 met criteria to be placed in the trauma registry. Western Maryland Health System (WMHS) is committed to providing the most comprehensive care possible to the citizens of MIEMSS Region I, which includes Allegany and Garrett Counties. WMHS also serves the bordering states of West Virginia and Pennsylvania.

The system actively participates in providing community health education and prevention activities. WMHS Foundation allows multiple small groups an opportunity to tour the trauma center. This tour is organized by hospital administration and is conducted by the Trauma Program Manager. At the conclusion of the tour, attendees are invited to view a video of a former patient and her family that expresses the forethought of the trauma system and the capabilities of the trauma center at WMHS. This inside look at the trauma center has met with rave reviews from those attending, many of whom are former trauma patients.

Injury prevention is of high priority in Region I. Trauma services presents programs at health fairs and school programs (primary, secondary, tertiary) and delivers individual lectures. We pull data from the trauma registry to focus injury prevention activities on the injuries most seen and the issues specific to our region such as all-terrain vehicle safety, motor vehicle safety, child passenger safety, hunter safety, fall prevention for the elderly, exposure prevention, and boating and camping safety. A recent example of this community awareness on trauma is a coordinated initiative for an "Arrive Alive" event that took place on May 1, 2015. Participating in this event along with WMHS were Allegany College of Maryland, Maryland State Highway Administration, multiple law-enforcement agencies, and others. Information regarding impaired driving, with an emphasis on alcohol, was presented in a hands-on event that was well attended and had positive reviews. The Trauma Program Manager, along with TraumaRoo, the American Trauma Society's mascot for childhood injury prevention programs, has made many appearances at local health fairs, parades, schools, and other venues. In addition to helping younger students, the Trauma Program Manager has lectured at many colleges and universities on topics such as injury prevention and injury-specific physiology, treatment, and outcomes.

Dr. Elizabeth Wooster delivers the lecture series "Trauma Nurses Talk Tough" to high school students in Western Maryland, West Virginia, Pennsylvania, and Virginia and has reached more than 37,000 students since its inception. "Watch Your Step" is an injury prevention lecture that is focused on our senior citizen population and was presented to 4,382 seniors in Western Maryland, West Virginia, and Pennsylvania during FY 2015.

Every year, members of Emergency Department and Trauma Services staff volunteer to triage and treat injuries at local sporting such as the Mountain Maryland Marathon and the Queen City Marathon.

A new partnership among law enforcement, EMS, and WMHS provides educational lectures for citizens and other stakeholders in the community on the growing problems of "bath salts," synthetic "marijuana," and heroin use, as well as the increase in gang violence. Many of the victims of these expanding problems have been evaluated by the trauma team.

Western Maryland Health System employs full-time and part-time Forensic Nurse Examiners who work very closely with local law enforcement and the Domestic Violence Advocate at the local District Attorney's office. They also act as a resource for all employees and patients of WMHS on domestic violence issues. The Forensic Nurse Examiner provides not only system employee education on domestic violence and forensics, but is active in presenting to a wide range of community organizations.

The emergency department staff coordinates activities for the observance of EMS Week. In addition to recognition of prehospital care providers for the critical role they play in the chain of survival, the staff uses this dedicated week as a forum to educate the public on the appropriate use of the 9-1-1 and emergency care system. Other duties of the Trauma Program Manager are to facilitate communication between hospital and prehospital personnel (as the Base Station Coordinator), serve as the specialty care transport coordinator, and hold positions on the Miltenberger Emergency Services Seminar planning committee and on the Region I EMS Advisory Council. Dr. Wooster serves as the Vice-Chair of TraumaNet for the State of Maryland. Drs. Wooster and Juan Arrisueno both serve as committee members on MIEMSS' Adult Trauma Standards Workgroup.

Moving forward into 2016, with the selfless commitment of our staff, Western Maryland Health System will continue to provide superior care to our citizens and continue to meet the challenge of health care change.

Adult Burns

Johns Hopkins Burn Center, Johns Hopkins Bayview Medical Center

The Johns Hopkins Burn Center, located on the campus of Johns Hopkins Bayview Medical Center, is verified by the American Burn Association and the only adult burn center in Maryland. The Burn Center not only serves the citizens of Maryland but also receives patients from surrounding states. The Burn Center submits data to the National Burn Repository (NBR) annually. The NBR is a comprehensive overview of cumulative burn-related data from 2004 through 2015 from both national and international burn centers. (See pages 79 to 81 for patient data.)

The Johns Hopkins Burn Center provides critical, acute, and sub-acute care to burn and wound patients 15 years of age and older. The Burn Center is comprised of two units, the Burn Intensive Care Unit (BICU) and the Burn Wound Unit (BWU), totaling 20 beds. Higher acuity patients are treated in the BICU, while patients needing rehabilitative and sub-acute care are treated in the BWU. Stephen Milner, MD, DDS, is the director of the Burn Center. Dr. Milner is a professor of plastic surgery, Chief of the Division of Burns and Plastic Surgery, and Director of the Michael D. Hendrix Burn Research Center. Julie Caffrey, DO, MS, is an Assistant Professor of Plastic and Reconstructive Surgery for the Burn Center. Kelly Krout, DNP, MS, RN, is the Patient Care Manager for the Burn Center and the Surgical Intensive Care Unit.

The Johns Hopkins Burn Center realizes the importance of community outreach and burn prevention, as well as clinical education for health care professionals who may come into contact with burn patients throughout the region. Carrie Cox, MS, RN, is the Community Outreach and Clinical Education Coordinator for the Burn Center. Many programs currently exist to serve our burn survivors, the community, and our fellow health care colleagues. Examples of these community outreach efforts include:

- Fire Safety and Burn Program for adults and senior citizens
- Kiwanis Community Burn Prevention Program for school-age children
- Safe Babies Program for newborns and their parents
- Juvenile Fire-setter Program for at-risk youth
- New Life Burn Society Survivor Support Group
- School Re-entry Program for burn survivor children
- Image Enhancement Program for burn survivors
- Survivors Offering Assistance in Recovery (SOAR) Program
- Annual participation in numerous statewide health and safety fairs
- Providing lectures for nursing schools, EMS programs, trauma conferences, and continuing education seminars throughout the region

Examples of the clinical education programs currently provided by the Burn Center include:

- Advanced Burn Life Support (ABLS) provider certification courses
- Emergency Department Burn Poster Program
- Military Burn Education Program
- EMS/Firefighter Burn Course
- On-site clinical training for medical, nursing, rehabilitation, psychology, and dietician students, as well as EMS providers and firefighters

In keeping with the mission and vision of Johns Hopkins Medicine, laboratory, clinical, and translational research is a key focus for the Johns Hopkins Burn Center. Currently, the Burn Center collaborates on research with many disciplines, including burn nutrition, burn rehabilitation, psychology, critical care service, nursing, and with the physician and fellow staff. The Michael D. Hendrix Research Laboratory actively studies the non-healing wound environment and is looking at ways to improve or speed burn wound healing. The purpose of Burn Center research is to study methods and techniques that may improve patient care, promote patient safety, and reduce morbidity and mortality in the burn patient population.

Adult Burns

The Burn Center at MedStar Washington Hospital Center

The Burn Center at MedStar Washington Hospital Center is the adult regional burn center for Southern Maryland, Northern Virginia, eastern West Virginia, and Washington, DC. The Burn Center is verified by the American Burn Association and the Committee on Trauma of the American College of Surgeons. Jeffrey Shupp, MD, Director of the Burn Center, and Laura Johnson, MD, FACS, FCCP, are board certified general surgeons at the Burn Center.

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. With more than 500 admissions annually, the Burn Center provides care for an array of thermal, electrical, and chemical injuries as well as soft tissue lesions. The Burn Clinic provides outpatient burn care for more than 700 patients annually.

Pediatric Burns

The Johns Hopkins Children's Center

From June 2014 to May 2015, the Pediatric Burn Service at The Johns Hopkins Children's Center treated 412 children with severe burn injuries, with 184 patients admitted. (See pages 86 to 89 for additional pediatric burn data.)

The Pediatric Burn Center at the Bloomberg Children's Center experienced another year of unprecedented growth. Inpatient admissions, complex surgical procedures, and outpatient visits all have significant expansion. Some of this growth comes from the Baltimore region, but we suspect much of the increased volume comes from our outreach to regional pediatric centers and the growing realization that we are a major regional burn resource for children.

The Pediatric Burn Center is part of the Johns Hopkins Regional Burn Center. Dr. Dylan Stewart, FACS, serves as the Director, and Dr. Richard Redett is the Co-Director of the Pediatric Burn Unit at The Johns Hopkins Children's Center (JHCC). Dr. Stewart, a pediatric surgeon, oversees the clinical care, teaching, research activities, and administrative duties related to the Pediatric Burn Program at JHCC. Drs. Stewart and Redett provide all aspects of acute and reconstructive pediatric burn surgery.

Dr. David Hackam, the new Pediatric Surgeon-in-Chief, was hired in September 2014. His official position as pediatric surgeon-in-chief was elevated to a position of shared authority in the overall management of JHCC. He oversees all divisions of children's surgery and is co-functional unit director. Dr. Hackam sits on the Hospital Board of Directors, and in addition to his role as a leader in the burn division, he is committed to providing the best possible care for all injured children.

Pediatric Burn Care at Johns Hopkins is truly a multidisciplinary effort, with multiple subspecialists with specific expertise in children contributing to provide the best care for the burned child. The multidisciplinary team includes pediatric burn surgeons, pediatric intensivists, pediatric plastic and reconstructive surgeons, pediatric infectious disease specialists, dedicated pediatric pain service, nutritionists, pharmacists, social workers, therapists, psychologists, and nurses. This acute care team is capable of taking care of the most severely burned child.

Critically ill burned children are cared for in designated burn beds in the Pediatric Intensive Care Unit, whereas less acute children are managed on the 20-bed unit specifically designated as the burn unit, with highly trained nurse specialists, therapists, and child life specialists.

Susan Ziegfeld is a Master's prepared Nurse Practitioner who serves as the Burn Program Manager. Lisa Puett, BSN, is the Pediatric Burn Quality Improvement Coordinator.

Injury prevention services have expanded this year with the addition of a second coordinator and many volunteers. Led by Lauren Davis, MSW, our burn injury prevention and outreach program offers injury prevention education for patients and families at JHCC and the community.

As well as the expansion of our injury prevention programs, several IRB-approved research studies are underway including a study on parent and child adjustment to pediatric burn injuries and the use of ketamine for pain.

Pediatric Burns

Children's National Health System

From June 2014 to May 2015, Children's National Health System, as a pediatric burn specialty referral center, treated 300 children from Maryland. Forty-one Maryland children with burn injuries were admitted as inpatients. (See pages 86 to 89 for additional pediatric burn data.) The Burn Center is directed by Randall Burd, MD, PhD, Chief of Trauma Burn, and Jennifer Fritzeen, MSN, RN, PCNS-BC, the Trauma Program Manager. The burn clinical staff includes Amy Wright, MSN, RN, the Trauma Program Manager, and a team of five Pediatric Acute Care Nurse Practitioners. Injury Prevention, Education, and Outreach is led by Sally Wilson, BSN, RN, who works in partnership with Safe Kids District of Columbia Manager Chenille Holloman. Yu Yan, MSN, RN, and Rachel Webman, MD, manage the burn registry and research initiatives.

The Children's National Health System has served as a Pediatric Burn Center in Maryland for over three decades. Children's National is dedicated to the care of children in MIEMSS Region V, which includes Montgomery, Prince George's, Calvert, Charles, and St. Mary's Counties, and also to children in the western regions of the state.

An interdisciplinary team of pediatric specialists provides comprehensive emergency, critical, acute, and follow-up care for children who are burned by flames, scalded, or suffering from electrical burns. During the past year, 41 children from Maryland have been admitted to the Burn Center. The number of outpatient burn clinic visits totaled 598. In addition, 159 Maryland children were treated for minor burn injuries and discharged from the Children's National Health System Emergency Department. A child's burn wound can be treated under Non-Operating Room Anesthesia (NORA), significantly reducing pain during the treatment of a burn injury. In FY 2015 there were six Maryland children who received burn wound care utilizing NORA.

In FY 2015 a fractionated CO2 laser was purchased to establish a pediatric laser surgery program for children with traumatic scars. This innovative treatment technology will improve functional and aesthetic outcomes as well as improve the quality of life and self-esteem for children with severe burn scars.

Working jointly with the Safe Kids District of Columbia, Safe Kids Worldwide, the DC RISK WATCH® Champion Management Team, and the Injury Free Coalition for Kids of the District of Columbia, the Pediatric Trauma and Burn Center provides fire and burn safety education to communities in Maryland, Northern Virginia, and Washington, DC. In the past year, burn outreach and education has interacted with over 7,000 families. Additionally, the Pediatric Burn Center staff provides EMS and emergency department education at surrounding hospitals and at EMS conferences.

The Curtis National Hand Center At MedStar Union Memorial Hospital

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 2015, 1,455 patients with traumatic hand injuries were cared for at the Hand Center. The unique nature of the services provided also draws patients from a broad geographic region including Pennsylvania, Delaware, Virginia, West Virginia, and Washington, DC.

The Curtis National Hand Center is known as one of the country's most advanced resources for the care of patients with elbow, forearm, wrist, and hand trauma. Having received Congressional designation as the National Hand Center in 1994, the Hand Center remains one of the world's premier facilities for the clinical care and study of the hand and upper extremity in addition to being an advanced training center of orthopedic, plastic, and general surgeons in the field.

The Curtis National Hand Center and MedStar Union Memorial Hospital remain 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 Hand Center's founder, collaborated with Dr. R Adams Cowley and others during the inception of the Shock Trauma Center and the Maryland EMS system.

The repair of amputated and seriously injured upper extremities requires a coordinated effort of rapid transport, proper handling of injured limbs, precise surgical repair, physical and occupational therapy, and most of all, a motivated patient. Over 30% of traumatic hand cases are transported through the MIEMSS system (public safety ambulance or medevac helicopter) (Chart 1). The addition of an onsite heliport at the Hand Center in 2009 reduced travel time and improved the speed of intervention for the most critically wounded.

The Hand Center's expertise in challenging bone and soft tissue trauma is supplemented by advanced microsurgery skills. The handling of fractures, complex soft tissue coverage problems, and amputations requir-

The Curtis National Hand Center at MedStar Union Memorial Hospital

Chart 1.
Transport Mode

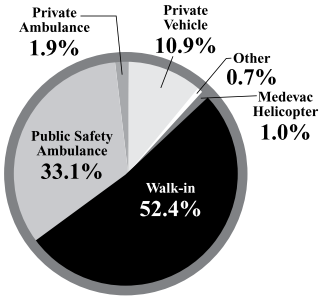


Chart 2.
Injury Type

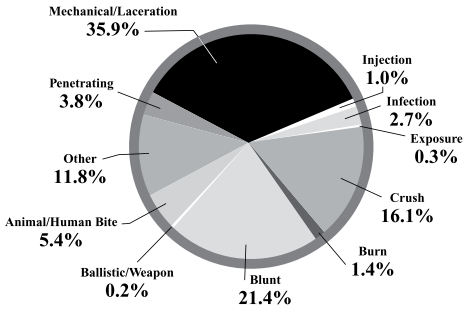


Chart 3.
Injury Location

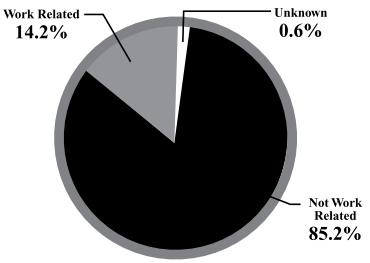
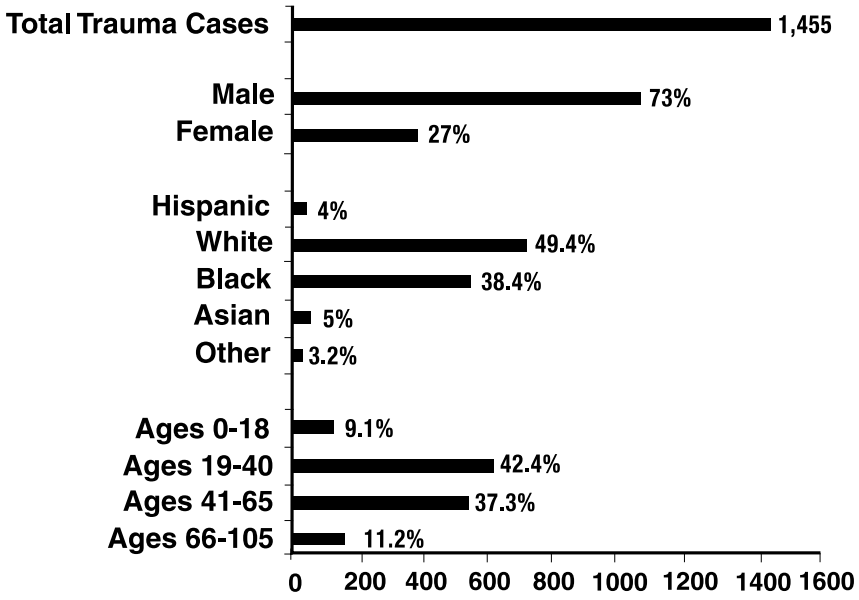


Chart 4.
MedStar Union Memorial Hand Trauma Demographics



ing replantation attempts continues to be the major focus of the Hand Surgery Service at MedStar Union Memorial Hospital.

The acute trauma unit is staffed by specialists in orthopedic and plastic surgery with subspecialty training in hand and upper extremity surgery. The team is available 24/7 to respond to a variety of injuries ranging from severing or crush injuries to infections and animal bites. Most hand injuries treated at the Hand Center are the result of incidents with power saws, lawn mowers, snow blowers, or other machines that can cut, crush, or break hands (Chart 2) and most injuries occur outside of the work place (Chart 3). The majority of patients seeking services are males under the age of 40 (Chart 4).

The Curtis National 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 concerning the care of the injured hand and upper extremity and continue to lecture worldwide about the topic of hand trauma.

Research projects, funded by both internal and external sources, look at a wide range of pertinent questions, including those in microsurgery, surgery of the peripheral nerve, bone and soft tissue problems, and reconstruction after significant trauma. Collaborations with the region's scientists and other investigators promote current thinking and new developments in this vital area.

Maryland maintains the nation's premier network of institutions and physicians for trauma care in part because of the unique capabilities and availability of all trauma providers, including the specialty trauma centers. The Curtis National Hand Center at MedStar Union Memorial Hospital is proud to be part of this network and supports the efforts to provide advanced care for Maryland's citizens.

Center for Hyperbaric Medicine R Adams Cowley Shock Trauma Center

The Center for Hyperbaric Medicine at the R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, is the statewide referral center for individuals who experience diving incidents, carbon monoxide poisoning, smoke inhalation, and/or gas gangrene. In FY 2015, 86 patients received therapeutic hyperbaric oxygen treatment for inhalation injuries. Established in 1965, the Center is able to provide treatment around-the-clock, 365 days a year. Robert Rosenthal, MD, is the Director of the Center for Hyperbaric Medicine.

Located within one of the highest volume trauma centers in the United States, the Center for Hyperbaric Medicine at the R Adams Cowley Shock Trauma Center 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 accommodating 10 stretcher patients or 23 seated patients simultaneously. Used to treat conditions such as decompression sickness, carbon monoxide poisoning, gas gangrene, delayed effects of radiation treatment, and non-healing wounds, 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 attractive alternative for claustrophobic patients who cannot tolerate small monoplace (single individual) chambers.

The chamber is equipped to provide 24/7 critical care under the direct supervision of specially trained critical care nurses. Conditions treated at the Center for Hyperbaric Medicine include:

- Problem wounds
- Delayed effects of radiation
- Central retinal artery occlusion
- Carbon monoxide poisoning and smoke inhalation
- Acute gas embolism
- Decompression illness
- Necrotizing soft tissue infections
- Clostridial and non-clostridial gangrene
- Compromised skin grafts and flaps
- Crush injuries
- Chronic refractory osteomyelitis
- Arterial insufficiencies
- Severe anemia
- Intracranial abscess
- Idiopathic sudden sensorineural hearing loss

At the Shock Trauma Center, physicians, nurses, respiratory therapists, and hyperbaric technologists work closely with referring physicians to ensure patients are evaluated and receive a comprehensive treatment plan including nutrition and appropriate wound care. Many of the conditions responsive to hyperbaric oxygen therapy can be successfully treated on an outpatient basis, including:

- Enhancement of healing in selected wounds, such as non-healing foot ulcers in patients with diabetes or peripheral vascular disease
- Damage to tissues following radiation therapy (radionecrosis)
- Chronic refractory (unresponsive to standard antibiotics) osteomyelitis

All hyperbaric treatments are supervised by Board Certified Emergency Medicine Physicians with special expertise in Hyperbaric Medicine. The clinical staff includes Certified Hyperbaric Registered Nurses with critical care experience, Certified Hyperbaric Technologists, and Certified Respiratory Therapists. Nursing care is provided by the critical care nurses who undergo atmospheric compression within the chamber at the patient's bedside. Because of the chamber's unique design and staffing, critically ill patients can receive hyperbaric treatment without any interruption in care.

In 2015, Dr. Douglas Sward and Dr. Robert Rosenthal of the Center for Hyperbaric Medicine began offering Fitness to Dive medical evaluations. Both physicians have completed the Dive Medical Advisory Committee's Medical Examiner of Divers Course. This international certification allows Dr. Sward and Dr. Rosenthal to perform comprehensive dive physicals for recreational, scientific, public safety, and commercial divers. In addition, return to diving after a decompression illness services are provided. The Fitness to Dive services complement the Center for Hyperbaric Medicine's long standing history of providing hyperbaric treatment for acute decompression illness.

Physicians, nurses, and technical members of the Center for Hyperbaric Medicine regularly lecture on hyperbaric medicine to a variety of health care professionals, both regionally and nationally.

Maryland Eye Trauma Center The Wilmer Eye Institute at Johns Hopkins

The Eye Trauma Center at the Wilmer Eye Institute (WEI) at The Johns Hopkins Hospital is the first statewide eye trauma center in the nation. WEI is located in East Baltimore and carries the mission of The Johns Hopkins Hospital—committed to providing the resources needed for it to remain a leading center for ocular trauma in the country. The main objectives of the eye trauma center are to provide 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 prevention activities. Michael P. Grant, MD, PhD, FACS, is the Director of the Center; Connie Chen, MD, is the Associate Director for FY 2015; and Shailaja Chopde, MSN, RN, is the Eye Trauma Coordinator.

The Wilmer Eye Institute (WEI) has established itself as one of the premier eye care centers in the world; in the past academic year WEI has treated patient from all 50 United States and from 84 foreign countries. With expertise in all aspects of eye disease as they relate to eye trauma, including anterior segment, vitreo-retinal surgery, oculoplastic surgery, neuro-ophthalmology, pediatric ophthalmology, glaucoma, strabismus, uveitis, and eye pathology, the WEI stands ready to provide outstanding care to those who sustain serious ocular or orbital injuries. Although the majority of patients who sustain eye injuries are treated in the East Baltimore campus, there are eight satellite offices throughout Maryland, which assures easy access for acute and follow-up care. The Outpatient Surgical Center – Bendann Surgical Pavilion, which opened in 2009, has further enhanced efficiency and care for adult and pediatric eye trauma patients.

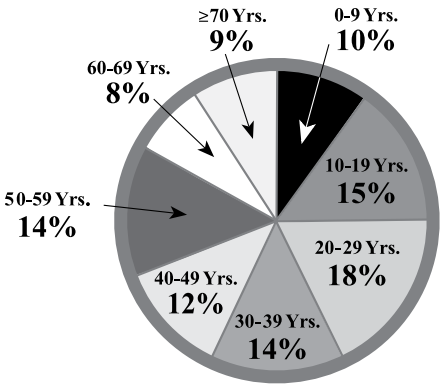
During FY 2015 the WEI treated 292 patients with serious ocular and orbital injures. The mean age was 37 years old, with a range from less than 1 to 94. Males outnumber females by 2.2 to 1, and approximately 50% of the patients self-reported race as African American. The large majority of patients referred for primary evaluation were residents of Maryland (91%); some patients were residents of Pennsylvania (2.5%). Approximately 37% of the patients treated were victims of assault. Injures from a blunt object (46.6%) were ten times more common than injuries by firearm (4.1%).

The physician and nursing staff are committed to educating providers that evaluate and treat eye/orbital trauma patients. In the past year, they have organized programs and courses at the state, national, and international levels. In the past year, WEI Director Dr. Michael Grant has

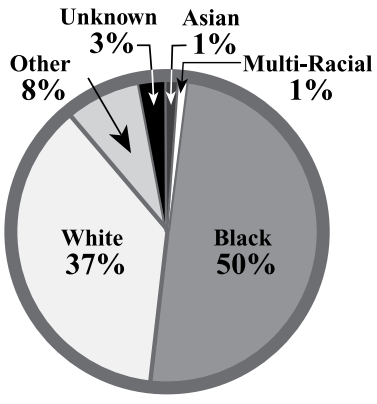
Wilmer Eye Instutute at The Johns Hopkins Hospital Demographics

(July 2014 - March 2015)

Age Distribution



Race Distribution



Note: Total number of patients reflected in demographic statistics is 292.

chaired courses on orbital trauma and reconstruction, and organized an orbital trauma session at the annual American Academy of Ophthalmology meeting in October 2014. At the international level, Dr. Grant delivered keynote addresses at the European Association of Cranio-Maxillo-Facial Surgery in Prague, Czech Republic, and the AO Foundation International Symposium on Facial Deformity in Penang, Malaysia, on topics related to peri-ocular trauma and reconstruction. In addition, multiple peer-reviewed manuscripts have been published over the past 12 months on topics related to ocular and orbital trauma in *Plastic and Reconstructive Surgery, Journal of Craniomaxillofacial Trauma and Reconstruction*, and other journals. In collaboration with the Johns Hopkins University Translational Tissue Engineering Center, a project is underway using tissue engineering techniques to reconstruct the ocular surface to provide new treatments for ocular burns and blast injuries.

Nursing staff at the WEI have organized an eight-hour Ocular Trauma Workshop, offered biannually to nurses within The Johns Hopkins Health Care System, for which participants can earn six hours of CEUs. The core curriculum for this workshop has been approved by MIEMSS. The WEI nurses also continue to coordinate the Wilmer Nursing Conference, which is well attended each year by nurses, technicians, and allied health professionals. The theme of this year's 32nd Wilmer Nursing Conference was "Basics to Bionics: Keeping an Eye on Ophthalmic Trends." The keynote speaker was Neysa P. Ernst, Nurse Manager for the Bio-Containment Unit at The Johns Hopkins Hospital. As an ongoing effort to increase awareness of the importance of vision screening and eye protection to maintain vision health, Ann Roberts, American Society of Ophthalmic Registered Nurses local chapter President, and Shailaja Chopde, the Wilmer Eye Trauma Coordinator, attended a health fair conducted by the Seventh-day Adventist Church on August 24, 2014, which was attended by more than 600 people.

The faculty, nursing staff, and support staff of the Wilmer Eye Institute look forward to continuing to educate providers engaged in the treatment of ocular trauma, provide outstanding patient care, and perform cutting edge research.

Neurotrauma Center R Adams Cowley Shock Trauma Center

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. Bizhan Aarabi, MD, FACS, FACSC, is the Co-Medical Director and Chief of Trauma Neurosurgery. Deborah Stein, MD, MPH, FACS, FCCM, is the Co-Medical Director and Chief of Trauma, and the Medical Director of the Neurotrauma Critical Care Unit.

As the state's designated referral center for head and spinal cord/column injuries, the Neurotrauma Center, located within the Primary Adult Resource Center (PARC), 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.

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 and the Mirmiran Foundation Diagnostic Imaging Suite 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
- 14 critical care/intensive care beds
- 20 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

The Neurotrauma Critical Care and Intermediate Care Units provide multidisciplinary care to patients who have sustained primarily central nervous system injury and may have other associated injuries or organ dysfunction. From June 2014 to May 2015, the Neurotrauma Center provided care to 2,092 patients with traumatic brain injury, 165 patients with spinal column or spinal cord injuries, and 562 patients who suffered from both traumatic brain and spinal column or spinal cord injuries.

Those with severe brain injury receive a multisystem assessment with intracranial pressure and cerebral oxygenation 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.

Studies conducted in the Neurotrauma Critical Care Unit led to the development of evidence-based interventions routinely used by the multidisciplinary team to prevent multisystem complications prevalent in many spinal cord injured patients. Dr. Bizhan Aarabi and Dr. Daniel Gelb, an orthopedic spine surgeon, served as two of the authors on the evidence-based "Guidelines for management of acute cervical spine and spinal cord injuries," published in the March 2013 issue of Neurosurgery. Ongoing multisite studies continue at the Shock Trauma Center focusing on pharmacologic interventions that may improve outcomes of patients with head or spinal cord injury.

The Neurotrauma Center's emphasis on early patient mobilization as the beginning of the rehabilitative process helps to decrease the morbidity associated with neurologic injury. Post-acute inpatient and outpatient services are primarily provided by the University of Maryland Rehabilitation & Orthopaedic Institute and the University of Maryland Medical Center Midtown Campus. 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.

Educational programs are offered for medical students, residents, fellows, and nurses who seek to improve the care and outcome of patients in the aftermath of neurotrauma.

Pediatric Trauma Center at The Johns Hopkins Children's Center

From June 1, 2014, to May 31, 2015, the Pediatric Trauma Center at The Johns Hopkins Children's Center treated 1,067 severely injured children under the age of 15 years. (See pages 82 to 85 for additional pediatric trauma data.)

The Johns Hopkins Pediatric Trauma Center saw another successful year serving the injured children of Maryland in our state-of-the-art pediatric facility. The Charlotte R. Bloomberg Children's Center is now in its third year of operation after the grand opening in April 2012. Our trauma team has settled nicely into the modern hospital, and is taking advantage of all the improvements in trauma care it has facilitated. The extensive planning that went into the building is evident, especially the functionality of the two dedicated pediatric trauma bays and the expansive new pediatric emergency department.

Dr. Dylan Stewart is now in his sixth year as the Director of Pediatric Trauma. Dr. Stewart is a member of the Maryland Committee on Trauma and the American Pediatric Surgical Association's Committee on Trauma. He remains very active in the Advanced Trauma Life Support® (ATLS®) classes offered in Maryland.

Dr. David Hackam, the new Pediatric Surgeon-in-Chief, was hired in September 2014. His official position as pediatric surgeon-in-chief was elevated to a position of shared authority in the overall management of The Johns Hopkins Children's Center (JHCC). He oversees all divisions of children's surgery and is co-functional unit director. Dr. Hackam sits on the Hospital Board of Directors, and in addition to his role as a leader in the burn division, he is committed to providing the best possible care for all injured children.

Susan Ziegfeld is a Master's prepared Nurse Practitioner who serves as the full-time Program Manager. In addition to her administrative duties, she functions as a Pediatric Nurse Practitioner within JHCC, assuming responsibility for the care of both inpatients and outpatients. At the state level, she serves on the Maryland Trauma Registry Education and Prevention (MTREP) Committee, the Executive Committee for the Maryland Trauma Center Network (TraumaNet), and is also the Chair of the Trauma Special Interest Group for the American Pediatric Surgical Nurses Association.

Members of the Pediatric Trauma Team continue to be very active in educational activities in the region providing instructors for the Advanced Trauma Care for Nurses (ATCN) program as well as the ATLS® program.

Lisa Puett, BSN, who serves as our Trauma Coordinator, assumes day-to-day responsibility for process and performance improvement activities.

Lauren Davis, MSW, our Injury Prevention Coordinator, is responsible for planning, evaluating, and maintaining all injury prevention programs.

Pediatric Trauma Center Children's National Health System

From June 2014 to May 2015, the Children's National Health System, as a pediatric specialty referral center, treated 667 Maryland children for trauma injuries. Of these, 319 children had multiple trauma injuries, with 296 of the 319 brought directly to Children's National Health System through the Maryland EMS system. A total of 278 trauma patients were transfers to Children's National after stabilization in another Maryland emergency department. Thirteen Maryland children required inpatient rehabilitation following injury. (See pages 82 to 85 for additional pediatric trauma data.)

The Pediatric Trauma Service is directed by Randall Burd, MD, PhD, Chief of Trauma, and Jennifer Fritzeen, MSN, RN, PCNS-BC, the Trauma Program Manager. The trauma clinical staff includes Amy Wright, MSN, RN, the Trauma Program Manager, and a team of five Pediatric Acute Care Nurse Practitioners. Injury Prevention, Education, and Outreach is led by Sally Wilson, BSN, RN, who works in partnership with Safe Kids District of Columbia Manager Chenille Holloman. Yu Yan, MSN, RN, and Rachel Webman, MD, manage the trauma registry and research initiatives.

Children's National Health System, a Level I Pediatric Trauma Center, serves the pediatric communities of Region V, which includes Montgomery, Prince George's, Calvert, Charles, and St. Mary's Counties, as well as those in the western regions of the state, by caring for children with multiple trauma and burns.

Children's National provides pediatric emergency and trauma education to physicians, nurses, and prehospital providers. Multiple courses in Pediatric Advanced Life Support are offered throughout the year. Advances in Pediatric Emergency Medicine is a course offered annually to community physicians. Numerous pediatric trauma outreach educational programs, including Pediatric Education for Prehospital Professionals, are offered by nurses and specialty physicians to all levels of providers throughout the Maryland EMS system.

The trauma service at Children's National has a robust trauma research program focusing on the care of children and trauma team performance. This year the trauma research team began a four-year grant project, funded by the National Institutes of Health, to investigate the use of various technological devices to monitor team performance and improve patient care in the trauma bay. The Trauma Checklist Tool Kit, the product of a three-year grant funded by federal Emergency Medical Services for Children (EMSC) within the Health Resources and Services Administration, continues to be available on the EMSC National Resource Center's website.

The Pediatric Trauma Service was one of the first pediatric trauma centers in the country to participate in the Pediatric Trauma Quality Improvement Program (TQIP), providing risk-adjusted benchmarking for pediatric trauma centers to track outcomes and improve patient care. Dr. Randall Burd is a member of the Pediatric TQIP leadership and has been a leading physician in the development of the current pediatric benchmarks.

Community education and outreach has continued to expand at Children's National. Through our outreach program we have provided education to thousands of families in Maryland covering various topics including burn prevention, pedestrian safety, abuse prevention, and car seat safety. The car seat safety check stations have expanded days and hours of operation. Car seat inspections are available at main campus and satellite Children's National locations daily. Children's National is currently partnering with The Johns Hopkins Children's Center to develop and launch a prevention campaign to decrease the number of children falling out of windows.

Since its inception in 1987, Safe Kids Worldwide, the injury prevention mission of Children's National, has contributed to a 45% decrease in child fatalities from unintentional injuries to children ages 14 and under by promoting changes in attitudes, behaviors, laws, and the environment. In the United States, this

reduction has saved an estimated 38,000 children's lives. Working through 350 Safe Kids coalitions in the United States and 18 other countries, Safe Kids delivers proven programs at the grassroots level to prevent unintentional injury. By mobilizing communities at the local level, Safe Kids Worldwide provides public education programs, facilitates engineering and environmental modifications, encourages the enforcement of laws and regulations, and conducts research to drive our programs and determine the efficacy of our efforts. Safe Kids activities for Maryland are available on www.safekidsmd.org.

The EMSC National Resource Center was established in 1991 to assist the federal EMSC program in improving the pediatric emergency care infrastructure in the United States and its territories. The program provides funding to implement programs to enhance the quality of medical and trauma care provided to children and youth. Much of the program's focus since 2005 has been on helping states to achieve defined performance measures and reduce gaps in pediatric emergency care. These measures address availability of pediatric on- and off-line medical direction, availability of pediatric equipment on ambulances, hospital facility recognition programs for pediatric emergency and trauma care, hospital pediatric interfacility transport agreements and guidelines, and pediatric educational requirements for the recertification of prehospital emergency care providers. Resources developed for grantees, community leaders, and parents include fact sheets on the program as well as performance measures, the EMSC Program Strategic Plan, a project implementation guide, a Family Advisory Network tool kit, and more. All resources may be found on Children's National's EMSC website at www.childrensnational.org/emsc.

Poison Consultation Center
Maryland Poison Center

The Maryland Poison Center (MPC) is a certified regional poison center that 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. A division of the University of Maryland School of Pharmacy, the MPC is designated by the Maryland Department of Health and Mental Hygiene as a regional poison center for Maryland. MPC also serves as a specialty referral center for MIEMSS. Bruce D. Anderson, PharmD, DABAT, is Director of Operations; Suzanne Doyon, MD, ACMT, is Medical Director; and Wendy Klein-Schwartz, PharmD, MPH, is Coordinator of Research and Education.

The poison specialists who work at the MPC are pharmacists and nurses who are certified as Specialists in Poison Information by the American Association of Poison Control Centers. The 15 specialists at the MPC have over 260 years of combined poison center experience, ensuring that callers have access to experienced, qualified, and well-trained staff.

In CY 2014 the MPC received 48,407 calls. While 31,055 of these calls involved a human exposure, the remaining 17,352 were animal exposures and requests for information where no exposure occurred. Forty-three percent of poison exposures involved children under the age of six. Sixty-four percent of the cases reported to the MPC were managed at a facility site not providing health care, such as the home, school, or workplace. Patients referred by the MPC or already enroute to a physician, clinic, emergency department, or other health care facility numbered 9,904 (32%). Maryland EMS providers consulted with the MPC on 1,829 cases in 2014. In 374 (20%) of those cases, transportation by EMS to a health care facility was deemed unnecessary and avoided based on Poison Center 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 state and national agencies to monitor for possible chemical and bio-

logical 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. MPC and national poison center data was used to identify and address outbreaks from new drugs of abuse (eg, synthetic cannabinoids, aka synthetic "marijuana"), and to increase awareness of the harm from liquid nicotine products, laundry detergent packets, and more.

In 2014 the MPC continued to work with MIEMSS, the Maryland chapter of the American College of Emergency Physicians, the Maryland Department of Health and Mental Hygiene's Behavioral Health Administration, and the Maryland Office of the Chief Medical Examiner to focus on the important issues of heroin and opioid overdose deaths. The MPC expanded its collaboration with local health departments in the area of overdose prevention and fatality review. Of note, the MPC is a vital component of the state's Overdose Response Program, consisting of the distribution of naloxone to bystanders and law enforcement officers. The MPC acts as a data collection agency when naloxone is administered by those who have been trained to recognize and treat opioid overdoses.

Research is conducted by MPC staff to advance the prevention, diagnosis, and treatment of poisonings. Areas of research that resulted in presentations at scientific meetings or publications in 2014 included:

- Guidelines to reduce opioid prescriptions for emergency department dental patients
- Comparison of toxicity of the nonmedical use of benzodiazepines with buprenorphine or methadone
- Expanding access to naloxone in the United States
- Heroin overdose reversed by sublingually-administered buprenorphine/naloxone film
- Comparison of lisdexamfetamine and dextroamphetamine exposures reported to US poison centers
- Analysis of overdose deaths involving methadone and cytochrome P450 inhibitors
- Abuse and intentional misuse of promethazine reported to US poison centers
- Toxicity and clinical outcomes of paliperidone exposures reported to US poison centers
- Evaluation of quetiapine abuse and misuse reported to poison centers
- Poisonings in Israel

The Maryland Poison Center's public education efforts are intended to help prevent poisonings from occurring and to increase awareness of the services of the MPC. Angel Bivens, BS Pharm, MBA, CSPI, is the MPC's Public Education Coordinator. In 2014 the MPC provided speakers and/or materials for 88 programs in 14 Maryland counties, Baltimore City, and Washington, DC, reaching approximately 4,500 people. Several organizations partnered with the MPC to provide education to their patients, customers, clients, and students. These organizations included fire departments, police departments, hospitals, health departments, pharmacies, hospital perinatal education programs, CPR instructors, parish nurses, Red Cross, Head Start, and Healthy Start programs. More than 54,000 pieces of educational material (brochures, magnets, telephone stickers, Mr. Yuk stickers, teacher's kits, and more) were distributed at these programs and by these organizations. Sixteen county school systems and daycare centers used educational materials from the MPC in their classrooms. More than 19,000 pieces of educational material were distributed in schools throughout Maryland. Approximately 63,000 additional materials were mailed upon request.

National Poison Prevention Week (March 16–22, 2014) activities included mailings to emergency departments throughout the state and daily Facebook posts providing poison safety tips. The MPC also partnered with Safe Kids Baltimore, Safe Kids Carroll County, Safe Kids Washington County, and Cecil County Department of Emergency Services to offer Poison Prevention Week kits to elementary schools in their areas, reaching more than 9,500 students.

The MPC publishes *Poison Prevention Press*, a bimonthly e-newsletter for the public that highlights poison safety topics for all ages. Articles published in 2014 included "A Day in the Life of a Poison Center," "Top 10 Exposures in Seniors," "Summertime Poison Hazards," "Back-to-School Poison Safety," "Essential Oils," and "Holiday Hazards." The MPC continued to use Facebook as a means of connecting to the community.

Health professional education is coordinated by Lisa Booze, PharmD, CSPI. Programs and materials are designed to help health professionals better manage poisoning and overdose cases. In 2014, 55 programs were presented by MPC staff at hospitals, EMS/fire departments, colleges, professional conferences (state, regional, and national) and on the Internet as webinars. These programs and webinars were attended by more than 13,000 physicians, nurses, EMS providers, pharmacists, physician assistants, and others. Toxicol-

ogy segments were recorded to be included in MedicCast.com and NursingShow.com podcasts for health care providers. The MPC also provided on-site training throughout 2014 for physicians, pharmacists, and EMS providers.

ToxTidbits is a monthly e-newsletter for health professionals, containing important toxicology information, updates, and news. Among the topics addressed in 2014 were hydrogen peroxide ingestions, e-cigarettes and e-liquid nicotine, bupropion, caffeine, expanding access to naloxone in Maryland, and compounded pain creams. *ToxTidbits* is emailed to subscribers and faxed to every emergency department in our service area. Current and past issues of *ToxTidbits* and information on how to subscribe to receive all of the MPC's e-newsletters can be found on www.mdpoison.com. The MPC initiated a Twitter account (@MPCToxTidbits) in 2014 as another tool to keep health professionals up-to-date with toxicology.

Reason for Poisoning (CY 2014)

Circumstance	Number of Patients	Percentage
Unintentional	22,948	73.9
Intentional	6,573	21.2
Adverse Reaction	1,030	3.3
Other and Unknown	504	1.6
TOTAL	31,055	100.0

Medical Outcome of Poisoning (CY 2014)

Medical Outcome	Number of Patients	Percentage
No Effect/Minor Effect	27,277	87.8
Moderate Effect	2,190	7.1
Major Effect	218	0.7
Death	22	0.1
Other and Unknown	1,348	4.3
TOTAL	31,055	100.0

NOTE: The medical outcome is assessed based on the inherent toxicity of the agent and the severity of the clinical manifestations.

Location of Poisoning Exposure by Region (CY 2014)

Region	Number of Exposures	Percentage
Region I (Allegany, Garrett)	741	2.4
Region II (Frederick, Washington)	2,678	8.6
Region III (Anne Arundel, Baltimore City, Baltimore County, Carroll, Harford, Howard,)	19,036	61.3
Region IV (Caroline, Cecil, Dorchester, Kent, Queen Anne's, Somerset, Talbot, Wicomico, Worcester)	3,276	10.5
Region V (Calvert, Charles, Montgomery*, Prince George's*, St. Mary's)	3,026	9.7
Unknown County/ Other state	2,298	7.4
TOTAL	31,055	100.0

**NOTE: Routing for the nationwide telephone number automatically connects callers from Montgomery and Prince George's Counties to the National Capital Poison Center in Washington, DC. Some callers from these counties reach the Maryland Poison Center by dialing local telephone numbers still in service. This report reflects calls to the Maryland Poison Center only. An additional 18,989 human exposures in Maryland were reported to the National Capital Poison Center in 2014.*

Rehabilitation

Maryland's comprehensive system of trauma care includes a continuum from the prehospital phase through the rehabilitation phase. The rehabilitative phase of care serves the traumatically injured individual with the goal of restoration to their pre-injury status or with the best functional outcome possible given the injury sustained. Rehabilitation services are provided in hospitals, acute inpatient rehabilitation hospitals, long term care facilities, in the home (home care), outpatient services, and community-based rehabilitation.

Rehabilitation encompasses a broad range of services designed to meet the needs of the individual who has experienced the effects of trauma. A coordinated approach to providing services appropriate to the person's disability needs is essential in achieving improved health and helping the individual to reach his or her maximum potential. Patients are assessed early in the acute phase of trauma care to align their needs with the appropriate components of therapy. Rehabilitation goals are set with the patient to define the outcomes that will achieve their best potential; motivation goals are required for a successful outcome. Inpatient rehabilitation has a role in accelerating the return of the patient to a community living situation. Functional outcome measurements assist in determining probable outcomes. The rehabilitation team may include a physiatrist, physical therapist, occupational therapist, speech therapist, and others focused on the patient's functional well-being.

During FY 2015 Maryland trauma centers referred 2,054 adult trauma patients (ages 15 and over) to inpatient rehabilitation services and 29 pediatric trauma patients (ages 14 and under) to inpatient rehabilitation services. The ten rehabilitation facilities that received the majority of adult patients are listed to the right. Also listed are the rehabilitation facilities that received pediatric patients.

Top Ten Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Ages 15 & Over) (June 2014 to May 2015)

Source: Maryland State Trauma Registry

Rehabilitation Center	Number
Adventist Health Care	50
Future Care	49
Genesis Health Care	244
HCR Manor Care	37
Health South Chesapeake Rehabilitation Center	55
Lorien Health Systems	38
MedStar Good Samaritan Hospital	45
Meritus Medical Center Comprehensive Inpatient Rehabilitation Services	36
Sinai Rehabilitation Center	93
University of Maryland Rehabilitation & Orthopaedic Institute	625

Note: Total patients age 15 and over that went to rehabilitation centers = 2,054.

Destinations of Patients Who Went to Inpatient Rehabilitation Facilities (Ages 14 & Under) (June 2014 to May 2015)

Source: Maryland State Trauma Registry

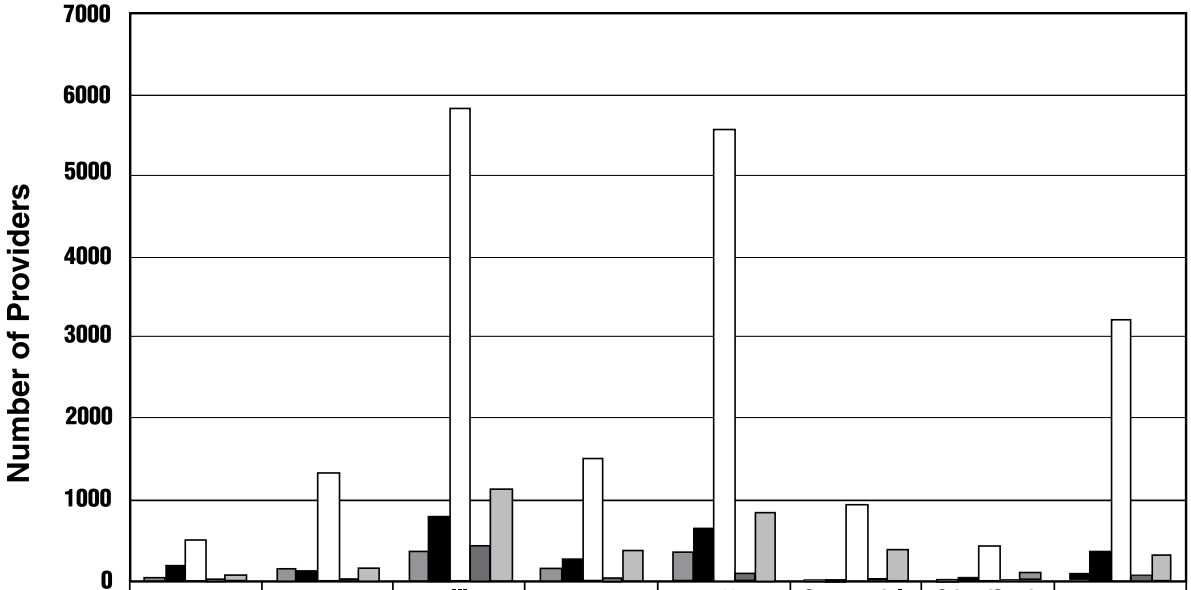
Rehabilitation Center	Number
Hospital for Sick Children	3
Kennedy Krieger Institute	14
Mt. Washington Pediatric Hospital	9
MedStar National Rehabilitation Network	2
Children's Hospital of Pennsylvania	1

Note: Total patients age 14 and under that went to rehabilitation centers = 29.

MARYLAND EMS STATISTICS

Number of EMS Providers (Primary Affiliation) by Region

(As of June 30, 2015)



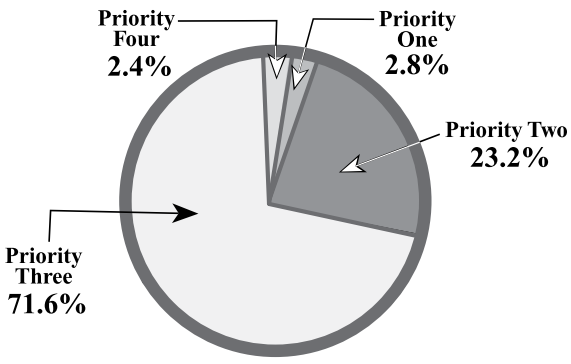
	I	II	III	IV	V	Commercial	Other (Govt)	Inactive
EMD	32	150	383	171	363	4	2	70
EMR	175	120	649	279	649	15	15	356
EMT	493	1,338	5,844	1,518	5,588	981	432	3,205
CRT	17	24	456	47	109	25	1	66
Paramedic	70	163	1,155	394	845	374	101	322

Region

Types of EMS Calls

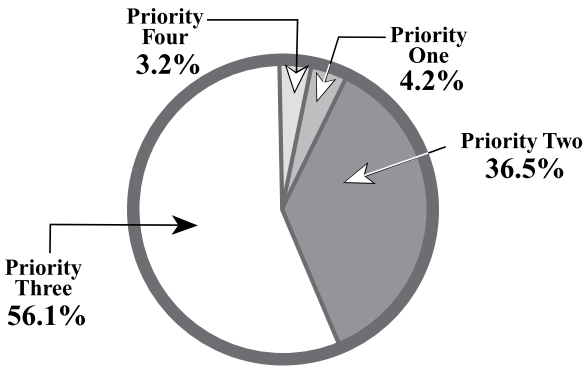
Patient Priority For Injury Transports

Calendar Year 2014



Patient Priority For Medical Transports

Calendar Year 2014



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*

electronic 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 EMSOPs in Maryland use eMEDS® to document their call information. The EMSOPs can enter data either via a local device with Internet connectivity or via a dedicated website. The table below demonstrates jurisdictional participation by date of implementation and quarterly record volume for FY 2015.

ePCR Records Submitted to MIEMSS per Fiscal Year 2015 Quarter

Reporting Between: 7/1/2014 - 06/30/2015

Jurisdiction	eMEDS® Implementation	1st Qtr. FY 2015	2nd Qtr. FY 2015	3rd Qtr. FY 2015	4th Qtr. FY 2015	Total
Allegany County	1-Oct-11	3,465	3,423	3,516	3,589	13,993
Anne Arundel County*	21-Feb-12	26,546	27,416	25,717	24,015	103,694
Baltimore City	1-Nov-11	58,064	58,571	55,086	58,781	230,502
Baltimore County*	22-Feb-12	29,814	30,392	31,191	31,468	122,865
Calvert County	1-Jan-13	4,108	4,173	4,674	4,931	17,886
Caroline County	1-Jun-13	1,831	1,624	1,832	1,662	6,949
Carroll County	1-May-12	4,733	4,896	5,251	5,452	20,332
Cecil County	4-Feb-11	6,420	5,990	5,887	6,149	24,446
Charles County	1-Dec-13	6,635	6,732	4,733	7,156	27,394
Dorchester County	1-Jan-13	1,612	1,488	1,668	1,746	6,514
Frederick County	4-Mar-13	10,141	10,145	10,091	10,269	40,646
Garrett County	1-Oct-11	833	898	963	921	3,615
Harford County*	4-Feb-11	7,974	7,713	7,540	7,995	31,222
Howard County	14-May-13	7,066	7,209	7,115	7,326	28,716
Kent County	1-Mar-12	1,477	1,312	1,333	1,352	5,474
Montgomery County	15-Apr-15	*21,059*	*22,278*	*21,319*	21,731	86,387
Prince George's County	27-Mar-14	46,505	47,283	46,456	54,344	194,588
Queen Anne's County	4-Feb-11	1,948	1,691	1,724	1,904	7,267
Somerset County	1-Dec-12	801	859	846	845	3,351
St. Mary's County	1-Oct-12	4,823	4,833	5,229	5,178	20,063
Talbot County	16-Jan-12	1,391	1,354	1,499	1,634	5,878
Washington County	19-Dec-11	7,498	7,632	7,002	7,996	30,128
Wicomico County	15-Nov-12	3,561	3,518	3,581	3,691	14,351
Worcester County*	1-Jan-13	3,892	2,085	2,222	3,268	11,467
Jurisdictional Total		262,197	263,515	256,475	273,403	1,057,728

Note: Italicized figures represent electronic data submitted via another system and uploaded to eMEDS®.

*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.

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	37	2	24	0	0	0	0
Region III	18	0	164	8	0	15	0
Region IV	8	0	101	12	0	1	0
Region V	129	10	42	3	3	0	0
STATEWIDE TOTAL	192	12	366	23	3	16	0

Source: Vehicle data reported by the Jurisdictional Programs

Patient Transportation Vehicle Definitions

Basic Life Support (BLS) Transport Vehicle: A vehicle equipped to carry and treat a patient per EMT Protocols
Advanced Life Support (ALS) Transport Vehicle: A vehicle equipped to carry and treat a patient per Cardiac Rescue Technician (CRT, CRT99) or Paramedic Protocols

- ***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

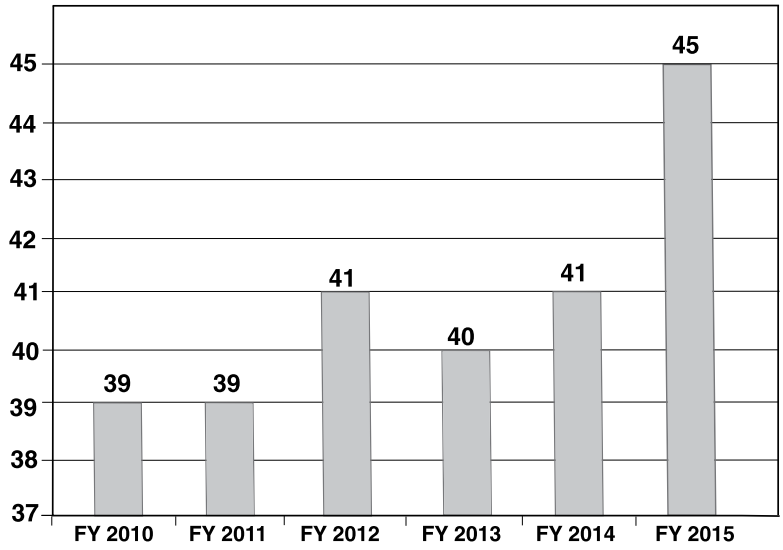
Region	Non-Transport Support					Disaster Supplies*		
	BLS First Response	Suppression BLS First Response	ALS Chase			MCSU Type I (100+ Pts)	MCSU Type II (50 Pts)	MCSU Type III (25 Pts)
			Non-Supervisory	Supervisory	ALS Engines			
Region I	0	21	8	1	4	0	2	2
Region II	25	47	15	8	0	1	2	2
Region III	20	282	15	22	16	6	2	2
Region IV	20	31	19	21	5	1	2	5
Region V	30	173	14	8	34	4	2	3
STATEWIDE TOTAL	95	554	71	60	59	12	10	14

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

Commercial Ambulance Services

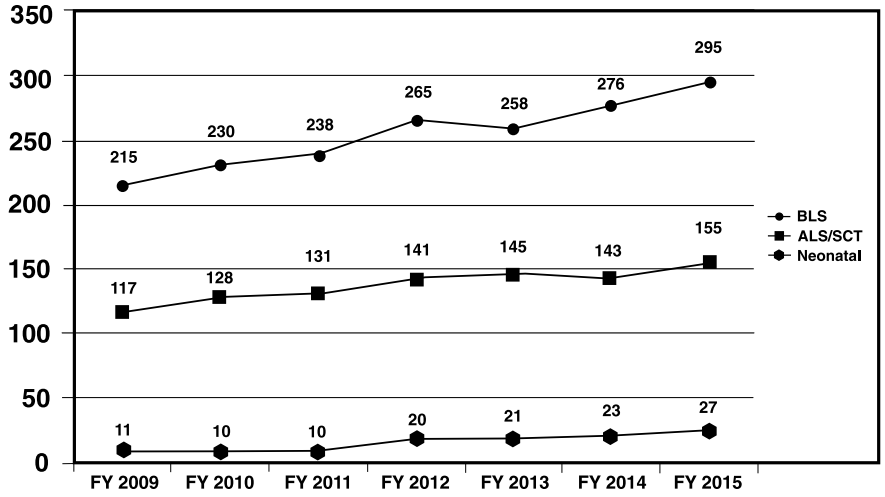
Commercial Ambulance Services (Ground & Air)

(FY 2010 - FY 2015)



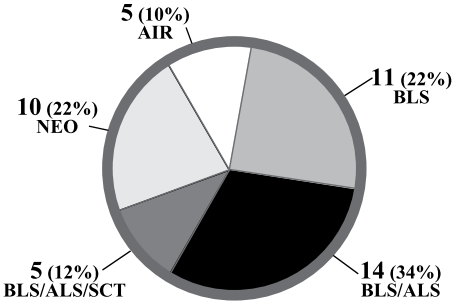
Commercial Ground Ambulance Vehicles by Type

(FY 2009 - FY 2015)



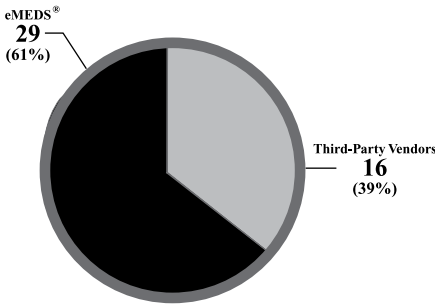
Commercial Services by License Type

(FY 2015)



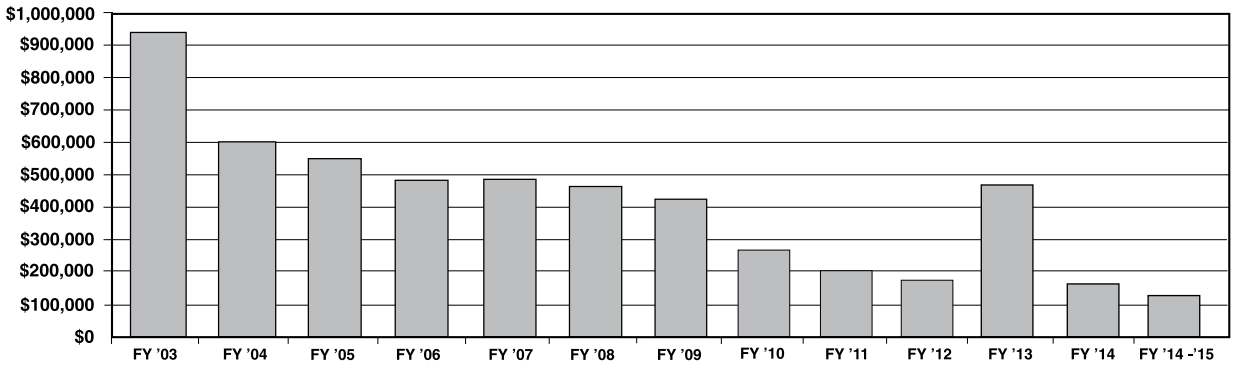
Commercial Services ePCR Reporting Status

(FY 2015)

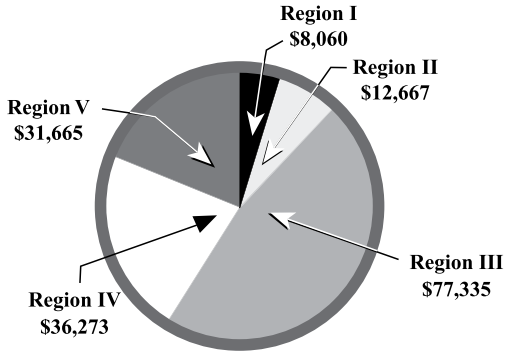


Health Preparedness Program (HPP)
Bioterrorism Funding for Maryland EMS

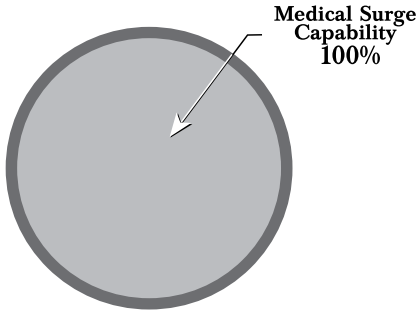
HPP Bioterrorism Funding Totals
(Federal FY 2003 – FY 2015)



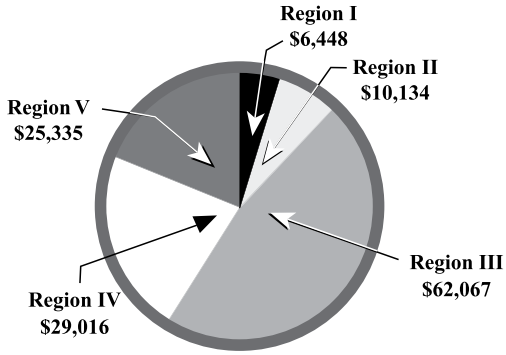
HPP Bioterrorism Funding Allocation By Maryland EMS Region
(Federal FY 2014)
(BT-XI)



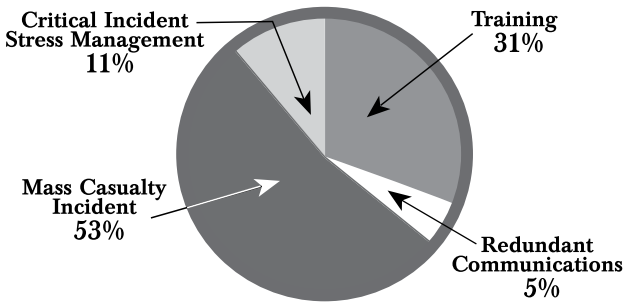
HPP Bioterrorism Funding Categories
(Federal FY 2014)
(BT-XI)



HPP Bioterrorism Funding Allocation By Maryland EMS Region
(Federal FY 2014-2015)
(BT-XII)



HPP Bioterrorism Funding Categories
(Federal FY 2014-2015)
(BT-XII)



MARYLAND TRAUMA STATISTICS*

Age Distribution of Patients Treated at Pediatric or Adult Trauma Centers

(3-Year Comparison)

Source: Maryland State Trauma Registry

Age Range	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Under 1 year	182	211	201
1 to 4 years	547	520	498
5 to 9 years	525	566	619
10 to 14 years	679	578	652
15 to 24 years	4,512	4,096	3,949
25 to 44 years	6,650	6,188	6,217
45 to 64 years	5,323	4,991	5,019
65+ years	3,533	3,497	4,002
Unknown	8	6	2
TOTAL	21,959	20,653	21,159

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

ADULT TRAUMA

Legend Code

Johns Hopkins Bayview Medical Center	BVMC	R Adams Cowley Shock Trauma Center	STC
Johns Hopkins Medical System	JHH	Sinai Hospital of Baltimore	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 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Johns Hopkins Bayview Medical Center	1,483	1,582	2,277
Johns Hopkins Medical System	2,131	1,824	1,672
Meritus Medical Center	1,000	1,109	1,061
Peninsula Regional Medical Center	1,526	1,214	1,278
Prince George's Hospital Center	3,671	3,406	3,331
R Adams Cowley Shock Trauma Center	6,633	6,202	6,022
Sinai Hospital of Baltimore	1,625	1,562	1,805
Suburban Hospital – Johns Hopkins Medicine	1,573	1,488	1,395
Western Maryland Regional Medical Center	724	641	593
TOTAL	20,366	19,028	19,434

**** Maryland Trauma Statistics are based on patient discharge data from June 2014 to May 2015.***

Occurrence of Injury by County: Scene Origin Cases Only

(June 2014 to May 2015)

Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	366
Anne Arundel County	777
Baltimore County	2,579
Calvert County	140
Caroline County	70
Carroll County	304
Cecil County	58
Charles County	215
Dorchester County	92
Frederick County	391
Garrett County	40
Harford County	626
Howard County	323
Kent County	38
Montgomery County	1,273
Prince George's County	2,158
Queen Anne's County	116
St. Mary's County	163
Somerset County	105
Talbot County	47
Washington County	665
Wicomico County	374
Worcester County	265
Baltimore City	3,900
Virginia	61
West Virginia	130
Pennsylvania	174
Washington, DC	259
Delaware	85
Other	10
Not Indicated	667
TOTAL	16,471

Note: Scene origin cases represent 84.8 % of the total trauma cases treated statewide.

Residence of Patients by County: Scene Origin Cases Only

(June 2014 to May 2015)

Source: Maryland State Trauma Registry

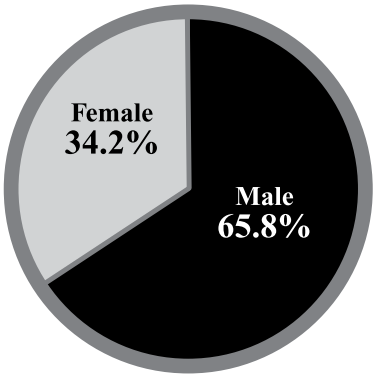
County of Residence	Number
Allegany County	296
Anne Arundel County	712
Baltimore County	2,541
Calvert County	148
Caroline County	77
Carroll County	285
Cecil County	63
Charles County	259
Dorchester County	80
Frederick County	361
Garrett County	32
Harford County	607
Howard County	306
Kent County	48
Montgomery County	1,246
Prince George's County	2,074
Queen Anne's County	70
St. Mary's County	120
Somerset County	98
Talbot County	37
Washington County	592
Wicomico County	349
Worcester County	142
Baltimore City	4,001
Virginia	299
West Virginia	206
Pennsylvania	345
Washington, DC	546
Delaware	151
Other	330
Not Indicated	50
TOTAL	16,471

Note: Scene origin cases represent 84.8 % of the total trauma cases treated statewide.

Gender Profile: Primary Admissions Only

(June 2014 to May 2015)

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 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
None	19.8%	16.7%	20.0%
Seatbelt	24.4%	25.9%	25.4%
Airbag & Seatbelt	22.1%	23.6%	28.0%
Airbag Only	4.3%	5.5%	6.1%
Infant/Child Seat	0.4%	0.2%	0.3%
Protective Helmet	14.8%	15.1%	15.1%
Padding/Protective Clothing	0.1%	0.3%	0.2%
Other Protective Device	0.0%	0.2%	0.0%
Unknown	14.1%	12.5%	4.9%
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 2014 to May 2015)

Source: Maryland State Trauma Registry

Modality Type	BVMC	JHH	MMC	PEN	PGH	SH	STC	SUB	WMRMC	TOTAL
Ground Ambulance	96.9%	81.5%	80.8%	90.4%	82.1%	88.9%	74.8%	98.0%	78.2%	84.4%
Helicopter	0.3%	1.2%	1.1%	7.4%	12.0%	0.0%	24.9%	0.6%	9.0%	9.5%
Other	2.8%	17.3%	18.1%	2.2%	5.9%	11.1%	0.3%	1.4%	12.8%	6.1%
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 2014 to May 2015)

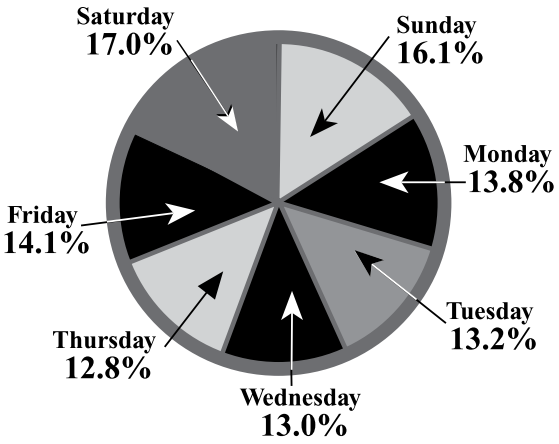
Source: Maryland State Trauma Registry

Origin Type	BVMC	JHH	MMC	PEN	PGH	SH	STC	SUB	WMRMC	TOTAL
Scene of Injury	93.7%	87.6%	98.2%	75.1%	96.5%	97.7%	66.9%	94.2%	93.4%	84.8%
Hospital Transfer	0.3%	7.5%	1.3%	3.1%	2.3%	2.2%	33.1%	2.1%	2.0%	12.0%
Other	6.0%	4.9%	0.5%	21.8%	1.2%	0.1%	0.0%	3.7%	4.6%	3.2%
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 2014 to May 2015)

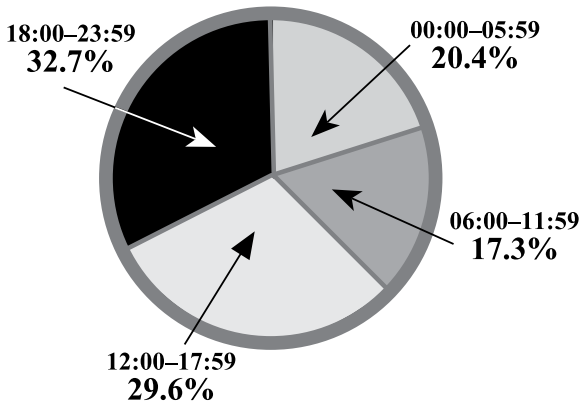
Source: Maryland State Trauma Registry



Emergency Department Arrivals by Time of Day: Primary Admissions Only

(June 2014 to May 2015)

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)

Age	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Under 1 year	0	0	0
1 to 4 years	2	1	6
5 to 14 years	8	2	3
15 to 24 years	122	128	108
25 to 44 years	185	204	189
45 to 64 years	138	148	136
65+ years	209	225	217
Unknown	1	4	0
TOTAL	665	712	659
Deaths Overall as a Percentage of the Total Injuries Treated	3.3%	3.7%	3.4%

Note: Only pediatric patients who were treated at adult trauma centers are included in this table. For patients treated at the pediatric trauma centers, see pediatric trauma center tables and graphs.

Number of Injuries by Age

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

Age	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Under 1 year	36	37	34
1 to 4 years	122	88	77
5 to 14 years	249	215	240
15 to 24 years	4,445	4,006	3,843
25 to 44 years	6,650	6,188	6,217
45 to 64 years	5,323	4,991	5,019
65+ years	3,533	3,497	4,002
Unknown	8	6	2
TOTAL	20,366	19,028	19,434

Note: Only pediatric patients who were treated at adult trauma centers are included in this table. For patients treated at the pediatric trauma centers, see pediatric trauma center tables and graphs.

Number of Injuries and Deaths by Age

(June 2014 to May 2015)
Source: Maryland State Trauma Registry

	Number of Injured Patients		Number of Deaths	
Age	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	34	29	0	0
1 to 4 years	77	64	6	5
5 to 14 years	240	190	3	3
15 to 24 years	3,843	3,395	108	98
25 to 44 years	6,217	5,450	189	166
45 to 64 years	5,019	4,416	136	116
65+ years	4,002	3,682	217	200
Unknown	2	2	0	0
TOTAL	19,434	17,228	659	588

Note: Only pediatric patients who were treated at adult trauma centers are included in this table. For patients treated at the pediatric trauma centers, see pediatric trauma center tables and graphs.

Etiology of Injuries: Primary Admissions Only

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

Etiology	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Motor Vehicle Crash	28.6%	27.0%	27.5%
Motorcycle Crash	6.0%	5.5%	5.3%
Pedestrian Incident	5.1%	4.8%	5.2%
Fall	32.0%	32.6%	33.2%
Gunshot Wound	5.6%	6.0%	5.9%
Stab Wound	6.2%	6.5%	6.2%
Other	16.5%	17.6%	16.7%
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 2014 to May 2015)
Source: Maryland State Trauma Registry

Blood Alcohol Concentration	Motor Vehicle Crash	Assault	Fall	Other	Total
Negative	18.1%	13.2%	9.2%	12.8%	13.7%
Positive	23.8%	30.3%	19.0%	16.2%	22.5%
Undetermined	58.1%	56.5%	71.8%	71.0%	63.8%
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 2014 to May 2015)
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%	0.1%	0.0%	0.0%	0.2%	0.1%
1 to 4 years	0.2%	0.0%	0.8%	0.2%	0.1%	0.1%	0.4%	0.2%
5 to 14 years	0.7%	0.3%	0.7%	0.5%	0.7%	0.2%	1.0%	0.6%
15 to 24 years	21.8%	21.1%	21.1%	5.8%	40.3%	28.2%	19.5%	17.5%
25 to 44 years	37.2%	41.2%	36.9%	13.4%	48.4%	51.0%	37.5%	31.1%
45 to 64 years	26.3%	33.7%	29.1%	29.3%	8.5%	19.1%	30.6%	27.1%
65+ years	13.7%	3.7%	11.4%	50.7%	2.0%	1.4%	10.8%	23.4%
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 the pediatric trauma centers, see pediatric trauma center tables and graphs.

Etiology Distribution for Patients with Blunt Injuries: Primary Admissions Only

(June 2014 to May 2015)
Source: Maryland State Trauma Registry

Etiology	Percentage
Motor Vehicle Crash	32.1%
Motorcycle Crash	6.2%
Pedestrian Incident	6.1%
Stabbing	0.1%
Fall	38.4%
Other	16.9%
Unknown	0.2%
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

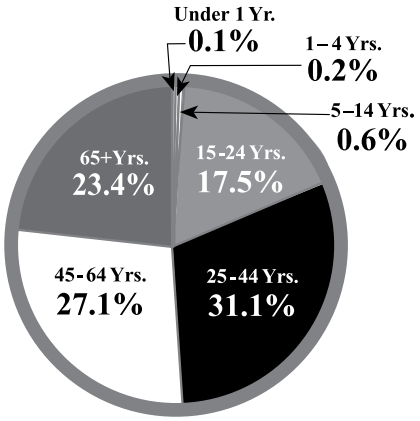
(June 2014 to May 2015)
Source: Maryland State Trauma Registry

Etiology	Percentage
Motor Vehicle Crash	0.1%
Motorcycle Crash	0.1%
Pedestrian Incident	0.1%
Gunshot Wound	44.7%
Stabbing	46.7%
Fall	1.4%
Other	6.5%
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.

Age Distribution of Patients: Primary Admissions Only

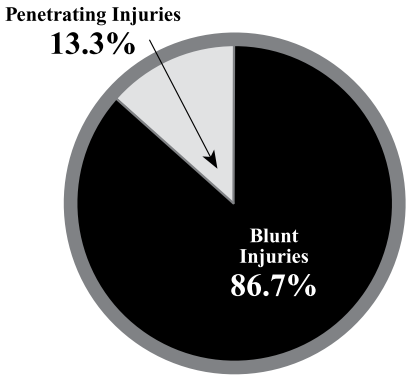
(June 2014 to May 2015)
Source: Maryland State Trauma Registry



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 chart. For patients treated at pediatric trauma centers, see pediatric trauma center tables and graphs.

Injury Type Distribution of Patients: Primary Admissions Only

(June 2014 to May 2015)
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 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Inpatient Rehab Facility	14.9%	13.8%	13.8%
Skilled Nursing Facility	2.6%	3.2%	4.3%
Residential Facility	0.6%	1.1%	1.0%
Specialty Referral Center	3.9%	3.6%	3.2%
Home with Services	2.8%	2.4%	3.7%
Home	64.1%	63.7%	62.3%
Acute Care Hospital	2.5%	2.5%	2.8%
Against Medical Advice	1.9%	1.6%	1.4%
Morgue/Died	4.6%	5.1%	4.4%
Left without Treatment	0.4%	0.4%	0.4%
Hospice Care	0.3%	0.3%	0.4%
Jail	1.2%	1.5%	1.2%
Psychiatric Hospital*	0.0%	0.5%	0.9%
Other	0.2%	0.3%	0.2%
TOTAL	100.0%	100.0%	100.0%

Note: "Primary Admissions" refers to all patients except those treated and released from the emergency department within 6 hours of emergency department arrival.
** "Psychiatric hospital" is a new category that was added in CY 2013. Previously, "psychiatric hospital" was included in "acute care hospital."*

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

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

ISS	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
1 to 12	74.6%	77.2%	78.8%
13 to 19	10.7%	10.4%	10.3%
20 to 35	10.8%	9.8%	8.5%
36 to 75	3.9%	2.6%	2.4%
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 (ISS) by Injury Type: Primary Admissions Only

(June 2014 to May 2015)
Source: Maryland State Trauma Registry

ISS	Blunt	Penetrating	Total
1 to 12	80.8%	78.8%	80.5%
13 to 19	11.4%	10.3%	11.2%
20 to 35	6.8%	8.5%	7.1%
36 to 75	1.0%	2.4%	1.2%
TOTAL	100.0%	100.0%	100.0%

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

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

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

ISS	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
1 to 12	71.1%	78.3%	80.8%
13 to 19	15.5%	12.8%	11.4%
20 to 35	11.0%	7.4%	6.8%
36 to 75	2.4%	1.5%	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 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
1 to 12	71.6%	78.1%	80.5%
13 to 19	14.9%	12.5%	11.2%
20 to 35	10.9%	7.8%	7.1%
36 to 75	2.6%	1.6%	1.2%
TOTAL	100.0%	100.0%	100.0%

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

MARYLAND ADULT BURN STATISTICS

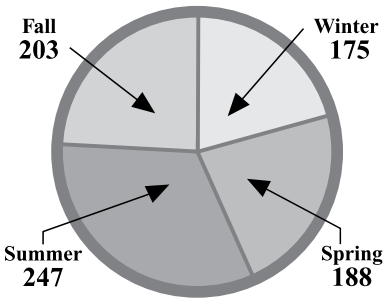
Total Number of Adult Burn Cases

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview
Source: Maryland State Trauma Registry

Institution	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Johns Hopkins Burn Center at Bayview	720	713	813

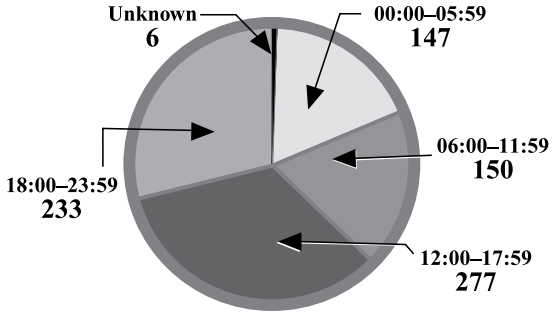
Season of Year Distribution

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)
Source: Maryland State Trauma Registry



Time of Arrival Distribution

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)
Source: Maryland State Trauma Registry



Place of Injury

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)
Source: Maryland State Trauma Registry

Place of Injury	Number
Home	535
Farm	1
Industrial Place	138
Place for Recreation or Sport	24
Street/Highway	28
Public Building	7
Residential Institution	4
Other Specified Place	35
Unspecified Place	41
TOTAL	813

Occurrence of Injury by County

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)

Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	7
Anne Arundel County	73
Baltimore County	166
Calvert County	3
Caroline County	4
Carroll County	25
Cecil County	24
Charles County	2
Dorchester County	2
Frederick County	26
Garrett County	1
Harford County	50
Howard County	24
Kent County	3
Montgomery County	6
Prince George's County	11
Queen Anne's County	2
Talbot County	6
Washington County	25
Wicomico County	8
Worcester County	6
Baltimore City	235
Virginia	7
West Virginia	20
Pennsylvania	20
Washington, DC	1
Delaware	8
Other	5
Not Valued	43
TOTAL	813

Residence of Patients by County

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)

Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	6
Anne Arundel County	72
Baltimore County	183
Calvert County	3
Caroline County	4
Carroll County	28
Cecil County	25
Charles County	2
Dorchester County	1
Frederick County	23
Garrett County	1
Harford County	52
Howard County	26
Kent County	3
Montgomery County	10
Prince George's County	17
Queen Anne's County	3
Somerset County	1
Talbot County	7
Washington County	25
Wicomico County	8
Worcester County	3
Baltimore City	234
Virginia	8
West Virginia	21
Pennsylvania	24
Washington, DC	3
Delaware	7
Other	13
TOTAL	813

Mode of Patient Transport

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)

Source: Maryland State Trauma Registry

Modality Type	Number
Ground Ambulance	428
Helicopter	47
Other*	338
TOTAL	813

**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 Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)

Source: Maryland State Trauma Registry

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Other Non-Burn	Unknown	Total
			Flame	Contact	Scald					
15 to 24 years	2	11	41	12	72	1	2	0	1	142
25 to 44 years	13	23	113	27	122	5	0	4	1	308
45 to 64 years	11	22	111	24	99	3	6	4	1	281
65 years and over	0	0	40	7	27	4	0	4	0	82
Total	26	56	305	70	320	13	8	12	3	813

Final Disposition of Patients

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

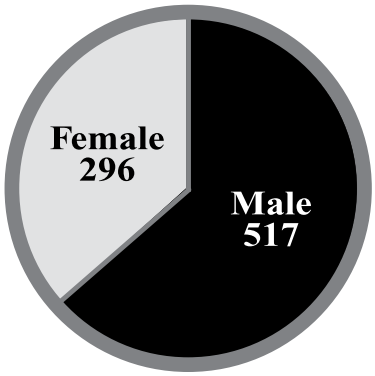
Source: Maryland State Trauma Registry

Final Disposition	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Home	583	597	714
Home with Services	54	41	39
Transfer to Another Acute Care Facility	7	3	2
Transfer to Another Service	2	2	1
Discharge to Extended Care Facility	5	4	0
Discharge to Foster Care	0	1	0
Discharge to Alternate Caregiver	0	2	0
Rehabilitation Facility	26	6	8
Skilled Nursing Facility	16	27	26
Psychiatric Hospital	2	5	2
Morgue/Died	15	13	13
Unable to Complete Treatment	5	6	3
Jail	0	4	4
Not Valued	5	2	1
TOTAL	720	713	813

Gender Profile

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)

Source: Maryland State Trauma Registry



Number of Injuries by Age

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

Source: Maryland State Trauma Registry

Age Range	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
15 to 24 years	140	111	142
25 to 44 years	247	269	308
45 to 64 years	252	237	281
65 years and over	81	96	82
TOTAL	720	713	813

MARYLAND PEDIATRIC TRAUMA STATISTICS

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

Total Cases Treated at Pediatric Trauma Centers

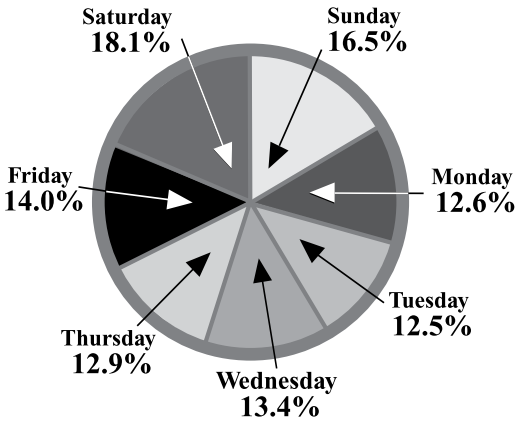
(3-Year Comparison)

Trauma Center	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
CNHS	760	772	668
JHP	833	853	1,057
TOTAL	1,593	1,625	1,725

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

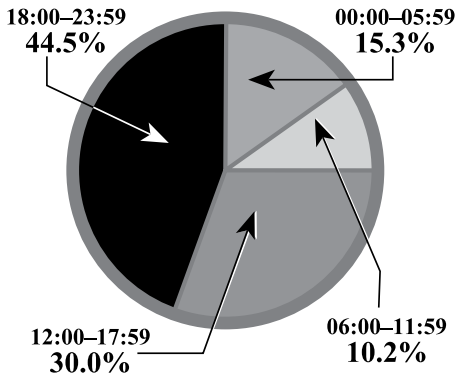
Emergency Department Arrivals by Day of Week: Children Treated at Pediatric Trauma Centers

(June 2014 to May 2015)



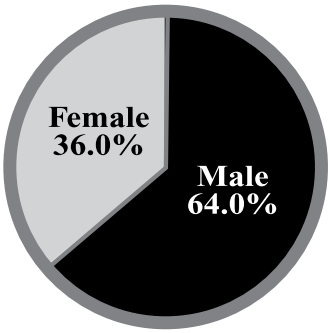
Emergency Department Arrivals by Time of Day: Children Treated at Pediatric Trauma Centers

(June 2014 to May 2015)



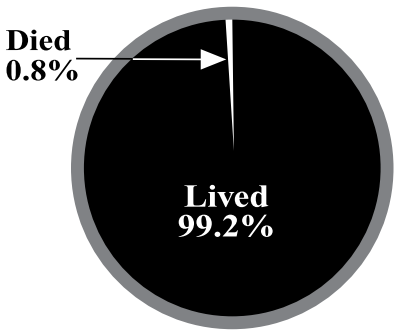
Gender Profile: Children Treated at Pediatric Trauma Centers

(June 2014 to May 2015)



Outcome Profile: Children Treated at Pediatric Trauma Centers

(June 2014 to May 2015)



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

Mode of Patient Transport by Center: Scene Origin Cases Only

Children Treated at Pediatric Trauma Centers (June 2014 to May 2015)

Modality Type	CNHS	JHP	Total
Ground Ambulance	55.7%	69.8%	65.2%
Helicopter	28.5%	17.5%	21.1%
Other	15.8%	12.7%	13.7%
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 Report. Children's National Health System data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Origin of Patient Transport by Center

Children Treated at Pediatric Trauma Centers (June 2014 to May 2015)

Origin	CNHS	JHP	Total
Scene of Injury	44.6%	59.9%	54.0%
Hospital Transfer	43.6%	36.6%	39.3%
Other	11.8%	3.5%	6.7%
TOTAL	100.0%	100.0%	100.0%

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

Injury Type

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

Injury Type	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Blunt	93.4%	94.1%	92.6%
Penetrating	2.4%	2.6%	4.0%
Near Drowning	0.9%	0.4%	0.9%
Hanging	0.3%	0.2%	0.1%
Inhalation	0.1%	0.1%	0.1%
Ingestion	0.1%	0.1%	0.1%
Crush	0.3%	0.4%	0.1%
Snake Bite/Spider Bite	0.0%	0.0%	0.1%
Animal Bite/Human Bite	2.5%	2.0%	1.6%
Other	0.0%	0.1%	0.4%
TOTAL	100.0%	100.0%	100.0%

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

Etiology of Injuries

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

Etiology	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Motor Vehicle Crash	14.9%	16.9%	15.9%
Motorcycle Crash	0.7%	1.3%	0.8%
Pedestrian Incident	9.4%	9.8%	8.1%
Gunshot Wound	0.8%	0.6%	1.5%
Stabbing*	2.2%	2.5%	1.5%
Fall	42.7%	39.2%	44.9%
Other	29.3%	29.7%	27.3%
TOTAL	100.0%	100.0%	100.0%

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

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

Etiology of Injuries by Age

Children Treated at Pediatric Trauma Centers (June 2014 to May 2015)

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Stab Wound*	Other	Total
Under 1 year	7.7%	0.0%	2.2%	12.1%	0.0%	0.0%	10.5%	9.7%
1 to 4 years	26.4%	7.1%	12.9%	31.6%	20.0%	19.2%	15.8%	24.4%
5 to 9 years	32.2%	21.5%	35.3%	33.3%	20.0%	19.2%	26.3%	30.9%
10 to 14 years	26.7%	64.3%	48.2%	19.6%	48.0%	53.9%	36.3%	28.9%
15+ years	7.0%	7.1%	1.4%	3.4%	12.0%	7.7%	11.1%	6.1%
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 Report. Children's National Health System data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

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

Number of Injuries and Deaths by Age

Children Treated at Pediatric Trauma Centers
(June 2014 to May 2015)

Age	Number of Injured Patients		Number of Deaths	
	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	167	162	4	4
1 to 4 years	421	399	7	6
5 to 9 years	533	516	2	2
10 to 14 years	498	470	1	1
15+ years	106	101	0	0
TOTAL	1,725	1,648	14	13

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

Number of Injuries by Age

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

Age	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Under 1 year	146	174	167
1 to 4 years	425	432	421
5 to 9 years	440	478	533
10 to 14 years	515	451	498
15+ years	67	90	106
TOTAL	1,593	1,625	1,725

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

Number of Deaths by Age

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

Age	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Under 1 year	2	2	4
1 to 4 years	8	7	7
5 to 9 years	4	2	2
10 to 14 years	3	1	1
15+ years	1	0	0
TOTAL	18	12	14

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

Final Disposition of Patients

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

Final Disposition	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Inpatient Rehab Facility	3.2%	2.4%	1.7%
Skilled Nursing Facility	0.0%	0.1%	0.1%
Residential Facility	0.1%	0.2%	0.2%
Specialty Referral Center	0.1%	0.0%	0.0%
Home with Services	1.0%	1.7%	0.9%
Home	92.5%	93.1%	94.7%
Acute Care Hospital	0.2%	0.1%	0.3%
Morgue/Died	1.1%	0.7%	0.8%
Foster Care	1.6%	1.7%	1.2%
Jail	0.1%	0.0%	0.0%
Other	0.1%	0.0%	0.1%
TOTAL	100.0%	100.0%	100.0%

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

Etiology of Injuries by Age

Children Treated at Pediatric Trauma Centers or Adult Trauma Centers (June 2014 to May 2015)

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Stab Wound*	Other	Total
Under 1 year	7.3%	0.0%	1.8%	13.4%	0.0%	0.0%	11.0%	10.2%
1 to 4 years	25.0%	6.7%	15.2%	32.5%	20.0%	20.0%	17.4%	25.3%
5 to 9 years	33.3%	26.6%	34.8%	32.5%	20.0%	16.7%	28.8%	31.4%
10 to 14 years	34.4%	66.7%	48.2%	21.6%	60.0%	63.3%	42.8%	33.1%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Children's National Health System data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center 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 2014 to May 2015)

County of Injury	Number
Allegany County	1
Anne Arundel County	53
Baltimore County	138
Calvert County	18
Caroline County	8
Carroll County	27
Cecil County	18
Charles County	24
Dorchester County	10
Frederick County	22
Harford County	38
Howard County	23
Kent County	5
Montgomery County	73
Prince George's County	131
Queen Anne's County	2
St. Mary's County	27
Talbot County	2
Washington County	15
Wicomico County	1
Worcester County	4
Baltimore City	251
West Virginia	1
Pennsylvania	2
Washington, DC	6
Delaware	1
Other	1
Not Indicated	29
TOTAL	931

Note: For children who were treated at adult trauma centers, see Maryland Adult Trauma Report. Children's National Health System data include patients residing in Maryland and/or injured in Maryland. Scene origin cases represent 54.0% of the total cases treated at pediatric trauma centers. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Residence of Patients by County: Scene Origin Cases Only

Children Treated at Pediatric Trauma Centers
(June 2014 to May 2015)

County of Residence	Number
Allegany County	1
Anne Arundel County	63
Baltimore County	133
Calvert County	19
Caroline County	6
Carroll County	25
Cecil County	16
Charles County	26
Dorchester County	8
Frederick County	20
Harford County	40
Howard County	24
Kent County	3
Montgomery County	68
Prince George's County	121
Queen Anne's County	1
St. Mary's County	26
Talbot County	1
Washington County	18
Wicomico County	1
Worcester County	2
Baltimore City	259
Virginia	6
West Virginia	2
Pennsylvania	5
Washington, DC	19
Delaware	5
Other	13
TOTAL	931

Note: For children who were treated at adult trauma centers, see Maryland Adult Trauma Report. Children's National Health System data include patients residing in Maryland and/or injured in Maryland. Scene origin cases represent 54.0% of the total cases treated at pediatric trauma centers. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Children with Protective Devices at Time of Trauma Incident

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

Protective Device	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
None	41.0%	31.0%	49.7%
Seatbelt	21.0%	14.7%	11.2%
Airbag & Seatbelt	3.5%	7.3%	8.2%
Airbag Only	0.8%	2.4%	2.1%
Infant/Child Seat	11.9%	15.7%	13.8%
Protective Helmet	9.7%	14.7%	12.3%
Other Protective Device	0.0%	0.4%	0.2%
Padding/Protective Clothing	0.0%	0.2%	0.4%
Unknown	12.1%	13.6%	2.1%
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 Report. Children's National Health System data include patients residing in Maryland and/or injured in Maryland. For children who were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

MARYLAND PEDIATRIC BURN STATISTICS

Total Number of Pediatric Burn Cases

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

Institution	Legend Code	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Children's National Health System Pediatric Burn Center	CNHSPBC	240	266	211
Johns Hopkins Pediatric Burn Center	JHPBC	279	393	412
Johns Hopkins Burn Center at Bayview	JHBC	13	19	26
TOTAL		532	678	649

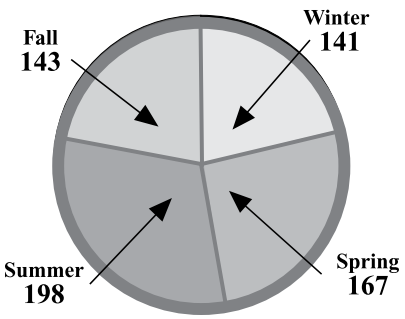
Place of Injury

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)
Source: Maryland State Trauma Registry

Place of Injury	Number
Home	573
Mine and Quarry	1
Industrial Place	1
Place for Recreation or Sport	12
Street/Highway	4
Public Building	16
Residential Institution	3
Other Specified Place	11
Unspecified Place	28
TOTAL	649

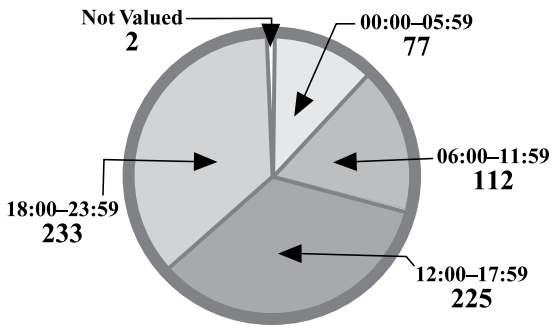
Season of Year Distribution

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)
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 2014 to May 2015)
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 2014 to May 2015)

Source: Maryland State Trauma Registry

County of Injury	Number
Anne Arundel County	35
Baltimore County	95
Calvert County	3
Caroline County	5
Carroll County	5
Cecil County	4
Charles County	7
Dorchester County	4
Frederick County	12
Harford County	22
Howard County	25
Montgomery County	63
Prince George's County	118
St. Mary's County	5
Washington County	10
Wicomico County	4
Worcester County	6
Baltimore City	161
Virginia	1
West Virginia	2
Pennsylvania	5
District of Columbia	2
Other	2
Not Valued	53
TOTAL	649

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 2014 to May 2015)

Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	1
Anne Arundel County	40
Baltimore County	108
Calvert County	3
Caroline County	5
Carroll County	7
Cecil County	5
Charles County	7
Dorchester County	2
Frederick County	16
Harford County	19
Howard County	26
Montgomery County	63
Prince George's County	121
Queen Anne's County	1
St. Mary's County	5
Washington County	10
Wicomico County	4
Worcester County	5
Baltimore City	181
Virginia	3
West Virginia	2
Pennsylvania	6
District of Columbia	3
Other	6
TOTAL	649

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 2014 to May 2015)

Source: Maryland State Trauma Registry

Modality Type	CNHSPBC	JHPBC	JHBC	Total
Ground Ambulance	82	197	1	280
Helicopter	5	18	0	23
Other*	124	187	25	336
Not Valued	0	10	0	10
TOTAL	211	412	26	649

**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 2014 to May 2015)

Source: Maryland State Trauma Registry

Origin Type	CNHSPBC	JHPBC	JHBC	Total
Scene of Injury	160	288	24	472
Hospital Transfer	51	124	2	177
TOTAL	211	412	26	649

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 2014 to May 2015)

Source: Maryland State Trauma Registry

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Other Non-Burn	Unknown	Total
			Flame	Contact	Scald					
Under 1 year	0	4	5	23	51	0	0	1	9	93
1 to 4 years	8	6	8	90	213	2	0	0	8	335
5 to 9 years	3	0	11	19	71	3	1	3	0	111
10 to 14 years	0	0	19	10	40	6	0	2	0	77
15 years and over	1	0	9	6	15	1	0	1	0	33
Total	12	10	52	148	390	12	1	7	17	649

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 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Home	487	640	592
Home with Services	18	10	20
Transfer to an Acute Care Facility	7	10	14
Transfer to Another Service	0	1	0
Rehabilitation Facility	5	7	4
Morgue/Died	3	0	2
Extended Care Facility	0	1	0
Alternate Caregiver	7	5	10
Foster Care	4	2	6
Transfer to Inpatient Psychiatric Facility	1	0	1
Not Valued	0	2	0
TOTAL	532	678	649

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 2014 to May 2015)

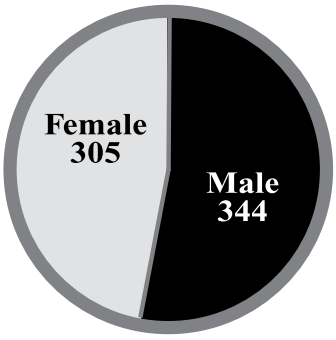
Source: Maryland State Trauma Registry

Length of Stay	Less Than 10% TBSA	10 - 19% TBSA	20% or Greater TBSA	Not Valued	Total
1 Day	451	10	1	62	524
2 - 3 Days	54	7	0	6	67
4 - 7 Days	19	9	0	6	34
8 - 14 Days	10	4	1	0	15
15 - 21 Days	0	2	1	2	5
22 - 28 Days	0	1	0	0	1
Over 28 Days	0	1	2	0	3
TOTAL	534	34	5	76	649

Gender Profile

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2014 to May 2015)

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 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Under 1 year	78	88	93
1 to 4 years	281	344	335
5 to 9 years	110	138	111
10 to 14 years	55	78	77
15 years and over	8	30	33
TOTAL	532	678	649

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

(3-Year Comparison)

Source: Maryland State Trauma Registry

	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Unique Patients	641	643	662
Total Pediatric Burn Clinic Visits	1,338	1,403	1,484

Number of Pediatric Burn Clinic Patients by Age (Patients Treated at Johns Hopkins Pediatric Center and Children's National Health System)

(3-Year Comparison)

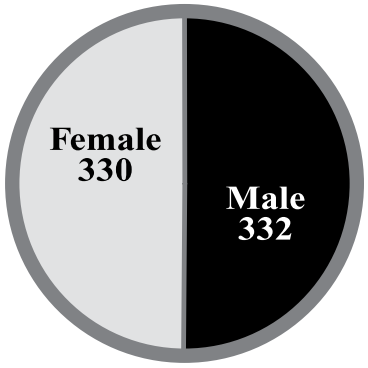
Source: Maryland State Trauma Registry

Age Range	June 2012 to May 2013	June 2013 to May 2014	June 2014 to May 2015
Under 1 year	81	83	81
1 to 4 years	333	330	332
5 to 9 years	135	126	141
10 to 14 years	73	73	77
15 years and over	19	31	31
TOTAL	641	643	662

Gender Profile

Patients Treated at the Pediatric Burn Clinics at Johns Hopkins Pediatric Center and Children's National Health System (May 2014 to June 2015)

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 Health System (June 2014 to May 2015)

Source: Maryland State Trauma Registry

			Thermal						
Age Range	Electrical	Chemical	Flame	Contact	Scald	Other Burn	Other Non-Burn	Unknown	Total
Under 1 year	0	2	3	27	47	0	0	2	81
1 to 4 years	4	2	5	103	212	1	0	5	332
5 to 9 years	2	0	7	34	95	0	1	2	141
10 to 14 years	2	0	13	11	48	1	2	0	77
15 years and over	0	0	9	4	15	0	2	1	31
Total	8	4	37	179	417	2	5	10	662

CHARLES "McC." MATHIAS, JR., NATIONAL STUDY CENTER FOR TRAUMA AND EMERGENCY MEDICAL SYSTEMS

The Charles "McC." Mathias, Jr., National Study Center for Trauma and EMS (NSC) was established at the University of Maryland in 1986 by the US Congress. 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 Organized Research Center (STAR-ORC) is rapidly becoming a world-class, multidisciplinary research and educational center focusing on brain injuries, critical care and organ support, resuscitation, surgical outcomes, patient safety, and injury prevention. The STAR-ORC encompasses the UMSOM's Program in Trauma and Department of Anesthesiology. Along with the existing NSC, the STAR-ORC is led by Alan I. Faden, MD. The Executive Committee of the STAR-ORC is comprised of Dr. Faden; Thomas M. Scalea, MD, R Adams Cowley Shock Trauma Center (STC); and Peter Rock, MD, Department of Anesthesiology.

Research Activities

Motor Vehicle-Related Injuries: The NSC is a leading participant in two multicenter studies of injuries sustained in vehicular crashes: the Crash Injury Research and Engineering Network (CIREN) funded by the National Highway Traffic Safety Administration (NHTSA) and the Crash Outcome Data Evaluation System (CODES) currently funded by the Maryland Highway Safety Office (MHSO). The NSC is one of six centers awarded the CIREN project on an annually renewable basis, currently funded through May 2016. During the 2014-2015 contract year, 55 cases were enrolled into CIREN and a comprehensive investigation conducted for each. Case reviews were held each month and the NSC hosted NHTSA administrators on several occasions; the meetings have also been attended by representatives from the automotive industry and from other CIREN centers. The CIREN center continued partnerships with the following agencies/organizations: Johns Hopkins University Applied Physics Lab, Maryland State Police, Baltimore County Police Department, Office of the Chief Medical Examiner, Maryland Motor Vehicle Administration (MVA), and the MHSO. CIREN cases are frequently used as part of biomechanics presentations at the STC and other local injury prevention programs across the state. CIREN team members gave a presentation entitled "The correlation of hospital charges and injury patterns using statewide hospital discharge data" at the CIREN Annual Meeting in Charlottesville, Virginia, in September 2014. Additionally, the NSC continues its collaborations with MIEMSS, Impact Research, and Frederick County EMS on a CIREN-funded project to improve the collection and use of advanced automatic collision notification data.

As part of CODES, the NSC has compiled information from a variety of statewide databases to enable in-depth analysis of highway safety programs. Data provided by the Maryland CODES program are used for portions of the Maryland Strategic Highway Safety Plan (SHSP), Highway Safety Plan (HSP), and Annual Report compiled by the MHSO and to support a variety of problem identification and program evaluation activities across the state. NSC staff members serve on the Traffic Records Coordinating Committee, the SHSP Implementation and Emphasis Area Teams, the National Traffic Records Advisory Committee, the Association of Transportation Safety Information Professionals Executive Board, and Maryland's Partnership for a Safer Maryland. In addition to these standing committees, the NSC coordinates an Injury Prevention, Trauma, and Emergency Care Research Seminar Series. These lectures are made available to members of the UMSOM, University of Maryland Medical Center, and University of Maryland, Baltimore campus community. The compiled CODES data sets are a valuable resource to Maryland's highway safety and injury prevention community.

Under a contract with the MHSO, the NSC serves as a key data analysis resource and partner for the MHSO and the MVA. During the past year, NSC staff conducted analyses related to nighttime seat belt use, motorcycle safety, older drivers, distracted driving, and pedestrians. The NSC attended a presentation related to Maryland crash data at the Maryland General Assembly in January 2015 and continued to utilize NHTSA guidelines in the implementation of the Maryland Seat Belt Survey for 2015. Data were collected on occupants of vehicles traveling on primary (interstate roadways), secondary (arterial roadways), and local roads. The overall seat belt usage rate for all drivers and front seat passengers, weighted by probability of roadway selection and jurisdictional roadway-specific vehicle miles traveled, was 92.1%. The overall weighted standard error rate was well below the 2.5% threshold required by NHTSA. Further subgroup analyses of observed seat belt usage were presented to the MHSO according to jurisdiction, roadway type, and driver cell phone usage.

In addition, the NSC also realizes that understanding behaviors of drivers is critical information that can help to explain changes (or lack thereof) in crashes and injuries. NSC staff continued a partnership in 2015 with the Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

The NSC continued the dissemination and analysis of the MHSO Maryland Annual Driving Survey, which continues to be used by the MHSO to fulfill a missing gap in data for their annual SHSP and HSP. Survey responses from 2015 found, as in previous years, overall, high and moderate risk respondents were more likely than low risk respondents to report "riskier" behavior for all questions. Young males scored higher on the risk-taking questions, but, regardless of gender, risk-taking declined with increasing age. Continued tracking of such findings will provide the state with additional information to aid efforts in program planning and in supporting legislative agendas.

Throughout 2015 the NSC continued to make enhancements to its website and also partnered with the Carey School of Law Legal Resource Center for Public Health Policy to develop a new website, making many data products available for public use.[1,2] Partner agencies can submit a specific data request to NSC epidemiologists and data analysts using the data request form on NSC's website.[3]

NSC staff also attended and presented at the International and State Traffic Records Forums, MHSO SHSP Implementation Team meeting, the Safe States Conference, and the annual conferences of the American Association for the Surgery of Trauma, State Motorcycle Safety Administrators, and Lifesavers. Topics for presentation 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. 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 objective of this study is to first develop and analyze a comprehensive toxicology database on alcohol involvement in non-fatal injuries, spanning 1983 to 2008, and use these data to evaluate trends in alcohol involvement in non-fatal injuries over time. The second objective 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, which has yet to be determined, 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. Another important aspect of this study is that the death certificate data from the National Death

Index has been linked to all cases discharged from the STC and has been incorporated into the trauma registry. This will provide valuable long-term outcome data on mortality for all patients once discharged. We have expanded this research into also looking at drug involvement in injuries including a study of trauma admissions of patients on methadone therapy and the injuries they sustain. Other analyses underway include long-term follow-up of patients with head injuries and those who experienced falls.

The second project, *Hangovers and Traffic Injuries: Is Alcohol's Influence Greater Than Expected?*, will identify and quantify 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. Each of the two grants is awarded for five years, and together they represent over $4.7 million in NIH funding.

Prehospital and In-Hospital Care: Two studies sponsored by the US Department of Defense (DoD) were completed that collected and analyzed continuous vital signs data in 1,200 trauma patients, both in prehospital and on arrival at the STC, for two hours of resuscitation. Blood transfusion predictive algorithms were developed based on collected vital signs data. Automated (no user input) predictions of blood use and mortality, using only pulse oximeter signal processing, are 87% accurate. When electrocardiogram signals are also used then prediction become 95% accurate. The project has developed a prototype decision aid for military and civilian prehospital providers and the algorithms are being tested to predict transfusion and emergency surgery needs before hospital arrival in new DoD funding.

Retention and Assessment of Surgical Performance Study: A study funded by the US Army has enrolled 95 surgeons from programs in the Northeast and developed surgeon performance metrics and surgical skill retention

[1] *http://medschool.umaryland.edu/NSCforTrauma_MCTSA_data.asp*
[2] *http://law.umaryland.edu/programs/publichealth/injury/index.html*
[3] *http://medschool.umaryland.edu/orc_trauma_anes/data_request.asp*

in vascular control procedures in cadaver and simulated physical models. The performance assessments have been validated before and after Advanced Surgical Skills for Exposure in Trauma (ASSET®) course training to determine criteria to define readiness for deployment. Evaluation is on-going to determine how long the training effects persist before re-training may be required.

Training Activities

Within the United States, the NSC actively trains epidemiologists and other health professionals on research topics related to injuries and EMS. Currently there are five epidemiology doctoral students working with NSC faculty to develop research projects as part of their training. In addition, members of the faculty sit on the dissertation committee for at least six doctoral students studying injury-related topics in the Department of Epidemiology and Public Health. One student was funded by the Robert Wood Johnson Public Health Law Research program to develop a proposal to evaluate the impact of raising sales tax in Maryland on alcohol and its impact on alcohol-related crashes. In addition, an emergency physician clinical research fellow is conducting injury-related research at the NSC while completing a Master in Clinical Research degree.

Continued funding by the Fogarty International Center of the NIH through their International Collaborative Trauma and Injury Research Training Program has provided training in the United States and the Middle East for about 850 health professionals in a number of injury prevention and emergency response–related courses. The material covered in these various courses, the majority of which are taught by NSC faculty and staff members, includes injury epidemiology and biostatistics, emergency preparedness and disaster response, and the clinical care of trauma patients. As a key component of this grant, 35 trainees from the Middle East and East Africa, including Egypt, Iran, Sudan, and Kenya, have come to the United States during most summers since 2007 to increase their knowledge and understanding of injury-related research through classroom training and completion of a research assignment. Nine additional trainees, primarily from Egypt, are scheduled for seven weeks of training at the NSC from July through September of 2015. During winter 2014-2015, we conducted a blended (online/in-person) introductory injury epidemiology course in Egypt and Sudan. Overall, these courses are designed to strengthen injury prevention and control research and practice within Egypt and the Eastern Mediterranean region.

The NSC also began collaboration with the Prince George's Hospital Center to develop and provide instruction to internal medicine students, residents, and other clinicians. The NSC staff members adapted several epidemiology and public health educational resources to meet the needs of that group and provided instruction over the course of approximately four months in 2014-2015. This course was meant to introduce research techniques and processes to clinicians that may not have been exposed to those concepts extensively in medical school.

MIEMSS-NSC Memorandum of Understanding

Through a cooperative Memorandum of Understanding agreement, the NSC continues to support data management and data analysis needs as requested by MIEMSS. The focus of the past year has been on the development of benchmark reports generated from MIEMSS data sources including eMEDS® and Flight Vector™. Ongoing activities also include targeted data analysis efforts.

Additionally, the Maryland Emergency Medical Services Systems Research Interest Group is comprised of members from MIEMSS, University of Maryland, and Johns Hopkins University. The group meets monthly to help further EMS research within Maryland and nationally. This past year, the group submitted three publications and has several manuscripts in preparation for submission. Additionally, NSC members continue to serve on various MIEMSS committees and provide assistance to meet the mission and the vision of MIEMSS.

In addition to in-house preparation of peer-reviewed research papers, NSC staff also 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 at least eight manuscripts by University of Maryland, Baltimore, researchers between June 2014 and May 2015, with at least six additional papers still in various stages of critical review.

GOVERNOR OF MARYLAND

Larry Hogan

LIEUTENANT GOVERNOR

Boyd K. Rutherford

MARYLAND EMS BOARD

Donald L. DeVries, Jr., Esq.
Chairperson
Partner, Goodell, DeVries, Leech and Gray, Attorneys at Law

Victor A. Broccolino
Vice-Chairperson
Past President and CEO, Howard County General Hospital, Inc.

Sherry B. Adams
Director, Office of Preparedness and Response
Department of Health and Mental Hygiene

David A. Hexter, MD, MPH, FACEP
Emergency Department Physician, Harbor Hospital

Kyrle W. Preis, III, NREMT-P
Assistant Chief, Baltimore County Fire Department

E. Albert Reece, MD, PhD, MBA
Vice-President for Medical Affairs, University of Maryland
John Z. and Akiko K. Bowers
Distinguished Professor & Dean, University of Maryland School of Medicine

Sally Showalter, RN
Public at Large

Mary Alice Vanhoy, MSN, RN, CEN, CPEN, NREMT-P
Nurse Manager, Queen Anne's Emergency Center, Grasonville

Dany Westerband, MD, FACS
Medical Director, Trauma Center at Suburban Hospital – Johns Hopkins Medicine

George Alfred Cross, Jr.
Past President, Maryland State Firemen's Association

STATEWIDE EMS ADVISORY COUNCIL

Roland D. Berg, BS, NREMT-P
Chairperson
Representing Region V EMS Advisory Council

James Scheulen, PA-C
Vice-Chairperson
Representing the Maryland Hospital Association

Murray A. Kalish, MD, MBA
Representing Maryland Society of Anesthesiologists

Elliot Ganson, EMT
Representing Volunteer Field Providers

Representing Professional Fire Fighters of Maryland – (Vacant)

Joe Brown, RN, NREMT-P
Representing Metropolitan Fire Chiefs

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

Jonathan Lerner, PA-C, MBA, MPAS
Representing Maryland Board of Physicians

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

Michael W. DeRuggiero
Representing Helicopter Pilots

Linda Dousa, CRT-I
Representing Maryland State Firemen's Association

Karen Doyle, RN
Representing R Adams Cowley Shock Trauma Center

Steven T. Edwards
Representing Maryland Fire & Rescue Institute

Alan Faden, MD
Representing National Study Center for Trauma and Emergency Medical Systems

Jeffery L. Fillmore, MD
Representing the EMS Regional Medical Directors

James S. Fowler, III
Representing Maryland Commercial Ambulance Services

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

Major Frank Lioi
Representing Maryland State Police Aviation Command

Lisa C. Tenney, RN
Representing General Public

Kathleen Grote, NREMT-P
Representing General Public

Scott A. Haas, NREMT-P
Representing Region IV EMS Advisory Council

Nathaniel McQuay, Jr., MD
Representing American College of Surgeons, Maryland Chapter

Thomas J. Gianni
Office of Traffic and Safety of the Maryland Department of Transportation

John E. Markey
Representing State Emergency Number Systems Board

Wayne Tiemersma
Representing EMS Region I Advisory Council

Representing the Maryland Emergency Nurses Association – (Vacant)

Melissa E. Meyers, BSN, RN
Representing Maryland TraumaNet

Marian Muth, RN
Representing American Association of Critical Care Nurses, Maryland Chapter

Chief Roger C. Simonds, Sr.
Representing EMS Region III Advisory Council

Jennifer Anders, MD
Representing American Academy of Pediatrics, Maryland Chapter

Timothy P. Chizmar, MD, FACEP, FAAEM
Representing American College of Emergency Physicians, Maryland Chapter

Maryland Institute for Emergency Medical Services Systems (MIEMSS)

Kevin G. Seaman, MD, FACEP - Executive Director
653 W. Pratt Street, Baltimore, MD 21201-1536

Maryland Institute for Emergency Medical Services Systems
653 W. Pratt Street, Baltimore, MD 21201-1536
www.miemss.org