Maryland Institute for Emergency Medical Services Systems

2013–2014
Annual Report

MARYLAND

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.

2013–2014 ANNUAL REPORT

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Mission/Vision/Key Goals

MISSION

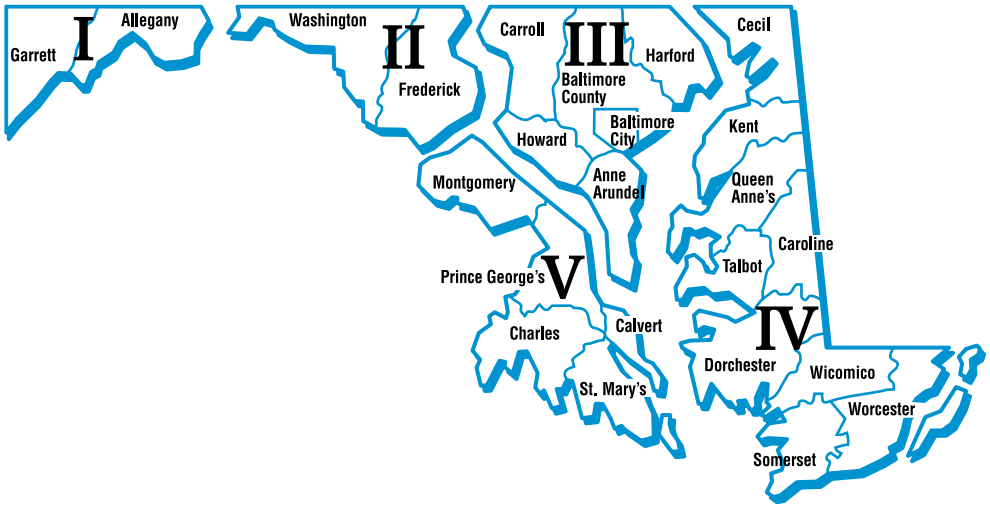
Consistent with Maryland law and guided by the EMS Plan, to provide the resources (communications, infrastructure, grants, and training), leadership (vision, expertise, and coordination), and oversight (medical, regulatory, and administrative) necessary for Maryland's statewide emergency medical services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

VISION

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

KEY GOALS

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



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

FROM THE EMS BOARD CHAIRMAN

This 2013-2014 Annual Report marks a transition point for our statewide EMS system. Following last year's milestone 20th anniversary since the creation of the system of governance, oversight, and coordination for Maryland's statewide EMS system, this year we have witnessed significant progress on major initiatives that are critical to our continuing success as we move forward. On behalf of the State EMS Board, I am pleased to share these achievements with you.

During the year, we began the massive task of improving the statewide EMS Communications System, the largest medical communications system in Maryland. This system links all components of prehospital care and encompasses communications towers, microwave radios, EMS and helicopter communications, and hospital consoles. The work that began this year first focused on renovating and upgrading the Emergency Medical Resource Center (EMRC) and Systems Communications (SYSCOM) at MIEMSS' central office to improve infrastructure and technical capabilities. This work must be completed while EMRC/SYSCOM continues to be an active 24/7 emergency communications hub. After completion of these improvements, the next phases of the project will involve upgrading the remaining components of the statewide system and integrating with the Maryland FiRST 700 MHz radio initiative.

Also a milestone, the final components are firmly in place to complete Maryland's transition to the new national EMS education standards for providers and educational programs. At this point, Advanced Life Support educational programs in Maryland have either achieved national accreditation or will complete the process of accreditation in the next several months. Successful completion of National Registry for Emergency Medical Technicians (NREMT) testing is now required for the cognitive portion of the State examination process for initial Emergency Medical Technician (EMT) and Emergency Medical Responder (EMR) certification, and we have secured the funding necessary to cover the cost of one test for each candidate eligible to take the Basic Life Support test.

We are in the final stages of achieving a complete statewide transition to our new electronic patient care recording program, "eMEDS®." During the year, additional jurisdictions successfully implemented eMEDS®, and achievement of full statewide use is anticipated to occur.

Also noteworthy is the near-complete transition by the Maryland State Police Aviation Command (MSPAC) to the new AgustaWestland 139 helicopters and their significant strides in pursuit of FAA Part 135 certification for their medevac operations. When fully completed, the operation of these new helicopters will enhance MSPAC's operational capabilities to the benefit of our EMS system and all citizens of Maryland.

This year also saw the designation of the second Comprehensive Stroke Center in Maryland, as well as the designation of the first freestanding emergency facility as a Base Station. We completed re-designation of all of Maryland's Cardiac Interventional Centers and Perinatal Referral Centers, as well as all of our Adult Trauma Centers and a number of Trauma Specialty Centers.

All of these milestones have been achieved because of the hard work and dedication from the many individuals and entities that are so critical to day-to-day operations, as well as from the leadership that has so ably guided the development of our EMS System and brought it to where it is today. The central figure in that leadership for the past 20 years has been Dr. Robert Bass, MD, FACEP, who took the helm in the early 1990s as MIEMSS was transitioning to an independent state agency. He structured the framework for the agency's operations that encompassed all components of the EMS System—from provider education, licensing/certification, and medical direction—to designation of trauma and specialty centers—to quality improvement—to communications. His work serves as the foundation on which our system is built. Dr. Bass retired in January 2014 after serving nearly 20 years as Executive Director of MIEMSS. As Chairman, I had the great good fortune to work with him throughout this time, and I, along with the EMS Board and the entire EMS System, will miss him greatly.

On behalf of all the members of the State EMS Board, I want to convey our gratitude to Maryland's volunteer and career EMS providers and firefighters; emergency, trauma, and specialty care physicians, emergency nurses, and hospitals; and state and local agencies. These individuals and entities embody the hallmark of cooperative excellence that will help ensure that our future is as bright as our past.

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.

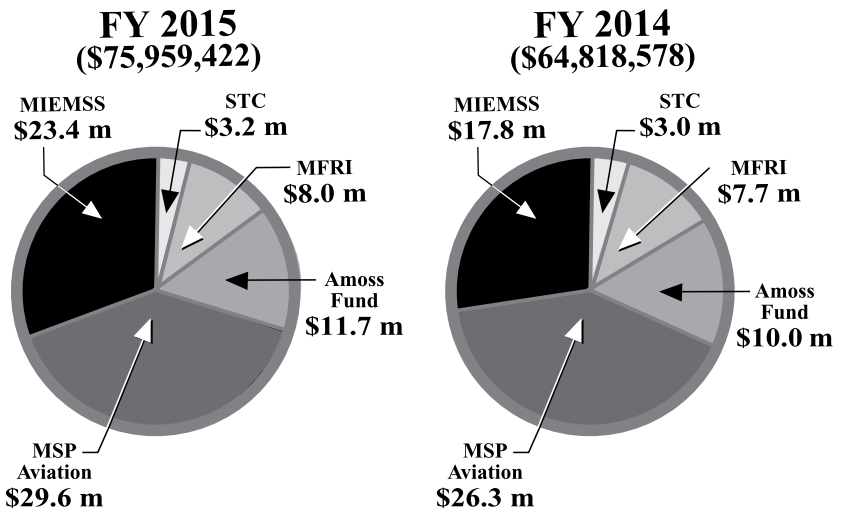
Administration is also responsible for inventory control, fleet management, travel services, and building operations and maintenance.

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

MIEMSS FY 2014 Expenditure by Object Code (Includes All Funds)

FY 2014	Actual
Salaries and Wages	$8,358,688
Technical/Special Fees	761,193
Communication	1,149,620
Travel	311,244
Fuel and Utilities	125,145
Motor Vehicle Operations and Maintenance	258,163
Contractual Services	3,685,681
Supplies and Materials	173,990
Equipment—Replacement	131,444
Equipment—Additional	52,269
Fixed Charges	109,744
Grants	1,263,136
Total Expenditure	$16,380,317

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 Systems Communications (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 2014 there were 2,145 patients transported by the Maryland State Police (MSP) Aviation Command. Of these patients, 2,108 (98%) were transported from the scene at the request of the local emergency services and 37 (2%) were transported between hospitals to a higher level of care. Patients transported directly from the injury/medical scene represent the following distribution:

- Motor Vehicle Crashes 43.2%
- Falls 26.1%
- Medical Emergencies 7.7%
- Assault-Related Incidents 6.2%
- Pedestrians 5.9%
- Sports 3.7%
- Other Injuries 2.9%
- Burns 2.9%
- Hand Injuries 1.4%

Fiscal Year 2014 was a very exciting year for the Aviation Command as they began the transition process 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 Aviation Command bases completed the transition to the new aircraft during FY 2014, with the remaining two bases on track for completion during the first half of FY 2015.

The Aviation Command 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.

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 42 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 37 public information act requests, 4 subpoenas, and 5 research requests. The Attorney General's Office represented MIEMSS in two employment cases.

In FY 2014 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 regulations to comply with the Veterans Full Employment Act of 2013, and provided support to MIEMSS during the legislative session. The Assistant Attorneys General also provided support to the Perinatal Advisory Committee and the perinatal specialty referral re-verification process, the Commercial Ambulance Service Advisory Committee, and the Pediatric Emergency Medical Advisory Committee.

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, creation of a state automated external defibrillator (AED) registry, redesign and update of the EMRC/SYSCOM facility, and several business associate agreements under the Health Insurance Portability and Accountability Act (HIPAA). Other tasks completed in FY 2014 included providing advice on MIEMSS' social media policy, various intellectual property issues, drafting agreements for designation of out-of-state medical facilities, 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 mobile integrated health programs.

In FY 2014 the Assistant Attorneys General made educational presentations at several venues, including the Medical Directors' Symposium, MIEMSS employee meetings, Advanced Disaster Life Support™ (ADLS) training, Quality Assurance Officer's Training, the Pyramid Conference, and MOLST educational forums; wrote several articles for *Maryland EMS News*, MIEMSS' EMS newsletter; and served on the Maryland Health Information Exchange Policy Board.

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 2014 saw the successful completion of the Miller Avenue tower located in the Harpers Ferry area of Washington County. The absence of this tower had left a large hole in radio coverage for the Washington County's UHF trunked radio system and State agencies' radio systems. The Miller Avenue tower is critical for Washington County and State agencies due to the abundance of crashes along nearby roadways. Upon completion of the tower by Washington County, Communications Engineering Services was able to complete a microwave hop to the Lambs Knoll tower and a microwave hop to the Marlu Ridge tower from the new tower. These microwave links provide the connectivity needed for the county's radio system, benefit the Maryland First Responders Interoperable Radio System Team (FiRST) radio system, and increase the coverage for EMS units operating in the area.

The department was also able to fill a gap in connectivity between the Martin Mountain tower and the Allegany public safety answering point (PSAP) tower in the Cumberland area. The addition of the microwave link has eliminated dependency on less reliable connectivity from this tower site and has completed a redundant path to our fiber link from the State Highway Administration (SHA) in Hagerstown to the Allegany PSAP.

As part of a roof renovation on the main campus at The Johns Hopkins Hospital, the department installed new microwave dishes on the building structure, eliminating the roof top mounts that have been problematic during heavy winds. The elimination of the mounts also ensures that future roof repairs and renovations will not impact service to our hospital microwave system.

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), the Maryland SHA, county radio systems, and many other state and federal partners including the Maryland FiRST 700 MHz radio project. MIEMSS continues to play a leadership role in the day-to-day maintenance of the Public Safety Microwave System.

MIEMSS continues to be an active partner in the State's 700 MHz statewide radio system project. 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 of the Maryland FiRST system, which is expected to be completed in 2015. 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 the 700 MHz system. These interfaces will allow MIEMSS to directly interoperate with the 700 MHz system in support of field providers operating on the Maryland FiRST system and allow all field providers the ability to obtain medical direction.

MIEMSS has programmed and deployed new dual-band Motorola APX 7000 portable and Motorola APX 7500 mobile radios that operate natively on the Maryland FiRST system, the conventional UHF Med Channel system, and other compatible county trunked

radio systems for agency staff. This gives MIEMSS field personnel the ability to operate with state and local first responders on a level that was not obtainable with our older radios.

MIEMSS has also received new console electronics that will allow the agency to fully operate on the Maryland FiRST radios system once the equipment is fully installed in October 2014. The installation of the console electronics will be a major step toward full integration with Maryland FiRST and will maximize the capabilities available of the new portable and mobile radios.

MIEMSS has worked to integrate the Maryland FiRST alarming system into the MIEMSS master alarm system. This leverages the state's investment in the master alarm system and allows a global view of the Maryland FiRST radio infrastructure and the MIEMSS microwave system to be shared, allowing quicker diagnosing of system problems.

Communications Engineering Services continues to lead in the deployment, administration, and maintenance of 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. Funding sources have included Public Safety Interoperable Communications (PSIC) grants, Urban Area Security Initiative (UASI) grants, MIEMSS operating funds, the Maryland FiRST project, the Maryland Department of Health and Mental Hygiene, and local interoperability project funds. It is a network deployed to MSP Barracks, MIEMSS regional operating centers, jurisdictional emergency operations centers (EOCs) and primary/back-up PSAPs/9-1-1, state and jurisdictional health departments, hospitals, and other allied agencies. Interoperability applications that currently are operating on PSInet include: Maryland FiRST, 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 has 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. To date the department has deployed DEMSTEL and PSInet to 77 hospital locations, 35 law enforcement locations, 57 health locations, 60 emergency management locations, and 3 transportation locations. MIEMSS has also secured a contractor to perform detailed microwave site surveys at 16 identified locations. MIEMSS will utilize the site surveys to seek further funding to expand PSInet and DEMSTEL to these facilities.

In 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. We will further enhance these services as we move into the next fiscal year.

Many other notable system enhancements and projects were completed in FY 2014:

- Established an EMRC connection to the R Adams Cowley Shock Trauma Center Critical Care Resuscitation Unit (CCRU).
- Worked with a consultant on developing the renovation plans for the EMRC/SYSCOM room and developed contingency preparations in support of the commencement of the renovation. Installed DEMSTEL phones in the Maryland Emergency Management Agency (MEMA) Backup EOC during the renovation of the EOC, and then reinstalled DEMSTEL into the renovated MEMA EOC.
- Assisted in the relocation of DEMSTEL and MESIN during the Caroline County PSAP move.
- Assisted the Maryland DNR by providing microwave circuits for their Area 8 radio system deployment.
- Assisted MSP Electronic Services Division by providing microwave circuit connectivity for their Western Region radio system deployment.
- Deployed a SONET Ring in cooperation with Maryland FiRST to protect the Region IV EMRC and Talbot PSAP.
- Installed remote propane monitoring at many tower sites deemed difficult to access during inclement weather.
- Designed and provided oversight of changes and upgrades to the Uninterruptible Power System (UPS) at the Talbot 9-1-1 PSAP. The process was designed to avoid any loss of power to critical systems during replacement of the UPS and generator transfer switches.
- Established ten EMRC to DEMSTEL patches that allow DEMSTEL connectivity to be used during outages with traditional leased connectivity to area hospitals.

Fiscal year 2014 presented many challenges to Communications Engineering Services and to our communications infrastructure and our ability to respond to simultaneous outages across the state. Our ability to keep the systems operational and restore service quickly is due in no small part to our dedicated staff of maintenance technicians, managers, and support staff. The department lost two key technicians this January; one was a senior technician with 35 years of experience whose skills and experience is truly missed. Another technician has moved on after 18 months with MIEMSS. After two years of searching, we were able to fill our Network Specialist position. This employee will play a critical part as we move the EMS system over to IP-based technologies. Despite the work force shortages, the department was successful in completing many important projects. 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 Report in FY 2014

- Criminal Background Investigations Completed....9,814
- Incidents Reported to IRC....202
- IRC Investigations Initiated....160
- IRC Investigations Conducted....180
- IRC Investigations (FY 2013) Continued....23
- IRC Complaints Forwarded to PRP....42
- Complaints Dismissed by PRP....2
- Complaints Forwarded to EMS Board....42
- Complaints Requiring Service....8

EMS Board Action

- Reprimands....10
- Probation....18
- Suspensions....3
- Revocations....6
- Remedial Training....1
- Surrenders....3
- Evaluations....1
- Applications Denied....5
- Case Resolution Conferences....4
- Dismissed....2
- Counseling....1
- Rehab....1
- Random Testing....8
- OAH Hearings Requested....4
- OAH Hearings Conducted....1
- OAH Hearings Defaulted....0
- Settlement Agreements....3

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 the 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 and updated protocol and medical issues. In FY 2014 Educational Support Services staff digitized and archived all of MIEMSS' newsletters, from the first issue in 1974 to the present. 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 developed a social media presence. MIEMSS can be found on Facebook, Twitter, and YouTube.

In FY 2014 Educational Support Services completed the 2014 update to *The Maryland Medical Protocols for EMS Providers*, including editing, layout, and design. This document can be found on the MIEMSS website. The 2014 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. For the second year, a spiral-bound edition of the Protocols was also developed by this office and printed.

This year the annual Stars of Life Awards Ceremony was held in the Miller Senate Office Building in Annapolis during EMS Week in May. 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. 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. Tour participants viewed the Maryland EMS System overview video, visited Systems Communications (SYSCOM) and the Regions III and V Emergency Medical Resource Centers (EMRCs), and listened to overviews of the statewide system presented by various MIEMSS personnel. Visitors from Italy, China, England, India, Japan, Korea, and Ireland were among the international audience that came to learn about Maryland's 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-assisted 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 the EMS for Children (EMSC) Program.

MIEMSS exhibits are designed to disseminate information about the EMS system and topics in injury and illness prevention. In FY 2014 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 2014 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 2014. Each provider was able to receive the updated information specifically related to his or her level of certification. 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. In collaboration with the Maryland Fire and Rescue Institute (MFRI), office staff videotaped the educational film *Dealing with the Death of Your Patient*. Other video projects completed this year included documenting various multi-casualty disaster drills throughout the State. Car seat updates and Right Care When It Counts messages with youth talent were produced in collaboration with EMSC. Other productions included the Mid-Atlantic Life Safety Conference opening video and the annual MSFA Convention's Memorial Service program, video eulogies, and slide show. Educational Support Services produced a commemorative video, *A Night for Stars*, to recognize award winning cases in MIEMSS Region I. After reviewing a number of nominations, 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 2014.

Statewide prevention initiatives were developed through partnerships with other state and local government agencies. A texting while driving prevention

video program was produced with the Talbot County Department of Emergency Services and featured one of their former patients. Participation 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 enabled Educational Support Services to work collaboratively on multiple projects.

EMERGENCY HEALTH SERVICES DEPARTMENT UNIVERSITY OF MARYLAND, BALTIMORE COUNTY

Mission: To provide leadership in the field of emergency health services through excellence in education. This educational excellence is 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 paramedic program continues to thrive, including a large cohort of international students who come to Maryland, and the University of Maryland, Baltimore County in particular, seeking excellence in EMS education. Program faculty are exploring ways to integrate the community paramedic concept into the curriculum.

The Emergency Health Services (EHS) management program also continues to grow with more students interested in local and federal employment opportunities entering the field. Student interns continue to be placed in excellent internship sites such as MIEMSS, Maryland Emergency Management Agency, American Red Cross, and other regional locations. Faculty are working in coordination with the department's paramedic program to develop a management curriculum geared to delivery of community paramedic and integrated health care programs.

The EHS Graduate Program continues to provide master's degree education in the areas of EMS system design, development and management, public health issues in EHS, education of EMS providers, and emergency management. The makeup of students is gradually changing from domestic students coming directly out of undergraduate studies toward older, mid-career students, many of whom already have physician or other graduate-level degrees. There has also been an increase in the number of international students in the program. Such students are moving into impressive positions throughout the United States and abroad.

The department's Critical Care Emergency Medical Transport Program continues to expand, now having served over 13,000 students through approximately 800 courses offered nationwide and internationally. The program has grown to 54 educational sites across the country with additional sites being negotiated monthly.

The Pediatric and Neonatal Critical Care Transport (PNCCT) program is expanding nationwide and is endorsed by the International Association of Flight Paramedics (IAFP). The PNCCT has now served more than 900 students; it is offered at 11 sites across the country and is currently being revamped to meet the needs of the providers. Experts from Johns Hopkins, University of Maryland, and Children's National Health System are currently reconstructing the curriculum.

The Professional and Continuing Education (PACE) program strives to promote critical-care–related education while meeting the needs of the EMS provider and other affiliated health care professions. The program has continued to strengthen its relationship with the University of Maryland, Department of Emergency Medicine by partnering with the residents to review course materials and serve as guest lecturers.

Additionally, the PACE program continues to expand its paramedic training with refreshers and workshops, as well as the traditional certification level courses. The program draws participants from places as far as Trinidad and Canada and is becoming nationally renowned with support from the IAFP and national trade publications.

EMERGENCY MEDICAL SERVICES FOR CHILDREN DEPARTMENT

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 (EMSC) 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 EMSC 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 burn programs; and the pediatric activities within the five Regional EMS Advisory Councils. Grants related to children and families in EMS are coordinated through EMSC, including a federal EMSC Partnership grant, continuously funded since 1994; EMSC-related research activities in Maryland; and the Child Passenger Safety and Occupant Protection Health Care grant project, continuously funded since 2001. MIEMSS, and EMSC in particular, is the lead agency for the Safe Kids Maryland state coalition, with eight local coalitions and four local chapters, and for the Maryland RISK WATCH® community with 14 local communities in partnership with the Maryland State Firemen's Association (MSFA) and the Ladies Auxiliary.

EMS for Children Program Activities

The State PEMAC Committee 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 EMSC, and relevant publications for Committee members. PEMAC has three standing subcommittees: Pediatric Protocol Development, Pediatric Education, and Prevention and Life Safety. Maryland's EMSC Department has created a Family Advisory Network (FAN) Council that has reviewed the "Right Care When It Counts" award nominations for past three years. The FAN Council also plays a key role in the injury prevention activities at the MSFA Convention and recruited youth from across Maryland to teach children and families (see RISK WATCH® discussion below). 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 Emergency Department Facility Recognition (http://bit.ly/VCnD32). Bimonthly forums are held in conjunction with PEMAC meetings with specific focuses: January is Education with updates on the Pediatric Advanced Life Support course for physicians, 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 Medical Protocol review process, current state-of-the-art clinical approaches to managing childhood emergencies continue to be developed and implemented. Protocol revisions in FY 2014 were based on a comprehensive evidence review and expert consensus process of the PEMAC.

EMS for Children Day was celebrated on May 21, 2014, 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 and one teenager received awards for their actions that ensured another person would receive "The Right Care When It Counts." This year three new public service announcements were produced that featured children and youth from across Maryland: Right Care, Poison Control Number, and CPR/AED. Maryland EMS for Children Day posters are available in English and Spanish to promote messages of injury prevention, family preparedness, and appropriate emergency actions. More information can be found at http://bit.ly/1pFyrcG. Also on May 21, Joseph L. Wright, MD, received the Maryland EMS for Children Award in recognition for his eighteen years of service to EMSC as the MIEMSS Associate EMS Medical Director for Pediatrics. Dr. Wright resigned from MIEMSS in spring 2014 to become Chair of Pediatrics at Howard University in Washington, DC. He will remain a strong advocate for the health and safety of children and youth in Maryland as a resident of Prince George's County.

The Pediatric QIC continues to coordinate the 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.

EMS for Children Grant Activities

Federal EMSC grants are coordinated through MIEMSS' EMSC and involve statewide projects, specialized targeted issues, projects, and research initiatives at academic universities. MIEMSS is in the ninth year of an EMSC 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 EMSC Partnership Grant focuses on the continued integration of EMSC into the Statewide EMS System utilizing both the federal Maternal and Child Health Core Performance Measures and the federal EMSC Performance Measures as targeted projects. The specific grant goals remain the same as the 2009-2013 Partnership Grant (see MIEMSS' 2012-2013 Annual Report).

During FY 2014 the Maryland EMSC team focused on specific Performance Measures where development and implementation is still needed. This department continues to work with both public safety and commercial providers for the adoption of all patient assessment and treatment equipment for Ambulance Transport Vehicles that are recommended by the national EMSC program and professional organizations. Maryland EMSC continued to provide leadership in the coordination of the Atlantic EMS for Children Region. These EMSC coordinators meet in May and December to share resources as all states work on the federal EMSC Performance Measures and continue to promote pediatric educational programs within state and local conferences. The December 2013 meeting focused on innovative educational programs for EMS providers and competency-based simulation for hospitals.

Emergency Medical Services for Children continues to support the Maryland Emergency Nurses Association (ENA) Council and 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. EMSC 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.

Pediatric EMS and Hospital Education

During each of the EMS and Emergency Nursing educational seminars and conferences in Maryland in FY 2014, pediatric displays and/or pediatric topics, listed in the annual continuing education chart on page 11, were presented to highlight both protocol changes and findings from ongoing EMSC Pediatric Emergency Care Applied Research Network studies.

In the past year, EMSC, in partnership with faculty from the Maryland Regional Neonatal Transport Program and Children's National Health System, sponsored several S.T.A.B.L.E. (Sugar, Temperature, Airway, Blood pressure, Lab work, and Emotional support) courses across the State. The S.T.A.B.L.E. program is a neonatal education course focusing exclusively on the post-resuscitation/pre-transport stabilization care of sick infants. It is designed for both prehospital and hospital providers who do not routinely work in the NICU setting.

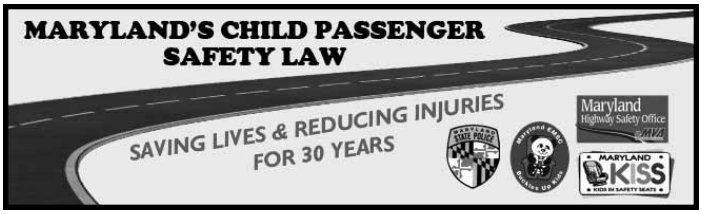
Emergency Medical Services for Children also released an online training program entitled "The Silent Killer." In this course, Children's National Health System's Karen O'Connell, MD, FACEP, the Region V Pediatric Medical Director, discusses the mechanisms of carbon monoxide (CO) poisoning in children and teaches emergency responders how to recognize, evaluate, and treat CO poisoning.

Emergency Medical Services for Children, along with a team of EMS and child passenger safety professionals from across the State, developed "Maryland Reference for the Safe Transport of Children in Ambulances" reference cards to assist EMS providers on the installation and application of several pediatric transport devices that are currently available for use in ambulances. The series of cards was not designed to be a comprehensive resource and providers are encouraged to attend training on their jurisdiction-specific devices and refer to the manufacturer's guidelines. These reference cards and the companion workshops are part of Maryland EMSC's implementation of the 2012 NHTSA Working Group Guidelines on the Safe Transport of Children in Ground Ambulances (www.ems.gov).

Finally, EMSC implemented two continuing education courses on pediatric emergency care. Pediatric Education for Prehospital Professionals 3rd Edition (PEPP-3), released in late 2013 with an instructor rollout held in February 2014, was developed by the American Academy of Pediatrics (AAP) and focuses on improving assessment, treatment, and management skills of prehospital providers when working with pediatric patients. EMSC offered its first PEPP-3 course as a preconference workshop for EMS Care 2014. APLS: The Pediatric Emergency Medicine Resource, also developed by the AAP in conjunction with the American College of Emergency Physicians (ACEP), was presented by EMSC to a core group of physicians from across Maryland. The course is designed to provide physicians and other advanced practice providers with the information needed to assess and treat pediatric patients arriving at emergency departments. In FY 2015 EMSC will work with the core group of physician faculty to offer the course across the State.

Pediatric Emergency Care Education across Maryland

Month and Location	Conference Title	Pediatric Components
July 2013 Baltimore, MD	The S.T.A.B.L.E. Program	Focus on newborn stabilization and preparation for transport; offered jointly with SOCALR
September 2013 Ocean City, MD	PRMC Trauma Conference	**Display:** Sports Safety in Children
September 2013 Laurel, MD	Mid-Atlantic Life Safety Conference	**Display:** CPS and OP Health Care Project
October 2013 Cheverly, MD	ENA Barbara Proctor Conference	**Display:** CPS and OP Health Care Project
October 2013 Baltimore, MD	APLS: The Pediatric Emergency Medicine Resource Course	Physician hybrid course developed by AAP and ACEP
November 2013 Marriottsville, MD	Maryland Ambulance Safety Summit	Update on Maryland vehicle crash data and reports from the Task Force subcommittees
November 2013 Bowie, MD	Pyramid 2013	**Preconference:** S.T.A.B.L.E. Program **Workshops:** When Sugar Isn't Sweet – Managing Diabetes in Children, The Killer Bed – Falls in Children, Family Presence: Debunking the Myth **Display:** Sports Safety in Children
January 2014 Baltimore, MD	The S.T.A.B.L.E. Program	Focus on newborn stabilization and preparation for transport; offered jointly with SOCALR
January 2014 Tilghman Island, MD	Winterfest Conference 2013	**Preconference:** Pediatric Vascular Access Workshop **Workshops:** The Killer Bed – Falls in Children, Pediatric Seizures **Display:** Family Disaster Preparedness
February 2014 Baltimore, MD	PEPP-3 Course	Two-day EMS course developed by AAP addressing both medical and trauma prehospital care for infants, children, and adolescents
March 2014 College Park, MD	Public Fire and Life Safety Educator Seminar	**Workshops:** Elements of Fire & Life Safety in Your Community (Earth, Wind, and Fire) **Display:** Family Disaster Preparedness
April 2014 McHenry, MD	Miltenberger Emergency Services Seminar 2013	**Preconference:** When the Stork Dials 911 – Managing OB & Newborn Emergencies **Workshops:** Pediatric CVA; Oh Baby! Difficult Labor Presentations; Destination Dilemma – Determining Where to Take my Pediatric Trauma Patient; Bananas, Buttons, Batteries and Booze: Things Children Swallow **Display:** Family Disaster Preparedness
May 2014 Ocean City, MD	EMS Care 2014	**Preconferences:** PEPP-3 **Workshops:** Oh Baby! Difficult Labor Presentations, When Children Fall Off the Trauma Decision Tree, Generation XXL: Dealing with Childhood Obesity, SCORE: Concussion Evaluation and Management for EMS, Critical Pathways in Asthma **Displays:** Family Disaster Preparedness, CPS and OP Health Care Project
May 2014 Linthicum, MD	ENA by the Bay 2014	**Workshops:** Maryland's Results from the National Pediatric Readiness Project – How Ready Are Emergency Departments to Care for Our Children?, Kids Can't Fly – Children and Windows Don't Mix **Display:** CPS and OP Health Care Project
June 2014 Ocean City, MD	MSFA Convention	**Child and Family Interactive Displays:** RISK WATCH® and Safe Kids: Steps to Safety – Make the Right Call: 9-1-1 Access, Home Fire Safety, Medication Safety, Pedestrian Safety, and Teen Driver Awareness



Child Passenger Safety and Occupant Protection Health Care Project

Over the past five years in Maryland, the number of motor vehicle crashes has decreased and the proportion of those crashes resulting in injuries has dropped. However, deaths and injuries from traffic crashes continue to be a significant problem in this state. In 2012 nearly 500 Marylanders lost their lives in traffic crashes and more than 44,000 were injured (Maryland Motor Vehicle Administration/Maryland Highway Safety Office (MHSO), August 2013). Over 30,000 people are injured in Maryland each year in crashes attributed to distracted driving and 62% of those killed in all crashes were not restrained, were speeding, or were impaired. Among Maryland's children, motor vehicle crashes continue to be a leading cause of death and injury; in 2012 there were 29 deaths and 4,574 injuries to children age 20 and younger.

The Child Passenger Safety and Occupant Protection (CPS and OP) Health Care Project is in its thirteenth year of funding from the MHSO. The project's goals are to improve car safety seat use among children, seat belt use among youth and adults, and occupant protection measures taken by health care and EMS personnel. The primary strategy is dissemination of up-to-date and culturally-relevant CPS and OP information by educating primary and acute care providers.

Educational materials developed by CPS and OP are always available to Maryland hospitals free of charge. More than 60 hospitals received material this year including the updated "Prescription for Your Child's Safety" tear-off pad and a DVD of short videos on CPS. Fourteen hospitals included these videos on their in-hospital closed-circuit TV systems, greatly increasing the availability of CPS education in hospitals.

This year the CPS and OP Project Coordinator participated in MIEMSS' site visits of neonatal intensive care units (NICUs) across Maryland. This has been particularly effective at raising the importance of child passenger safety education and the Infant Car Seat Challenge Test to NICU staff, as their policies, materials, and procedures are scrutinized as part of the NICU review. These visits have also allowed the Coordinator to meet with key staff to provide materials, policy advice, and training. The Project Coordinator also collaborated with Dr. Natalie Davis at the University of Maryland Medical Center and with the State Perinatal Advisory Committee to update best practice guidelines and patient materials on the Infant Car Seat Challenge Test, which is conducted on premature infants to test for breathing or cardiac problems while in their car seat. The guidelines were then disseminated to all Maryland NICUs.

New in 2014 the program's efforts to increase knowledge and practice OP among emergency care providers included the addition of a car seat skill exercise at two S.T.A.B.L.E. courses and holding interactive displays on car seats and seat belts at the EMS Care and the ENA statewide conferences. Several Maryland hospitals were provided with car seats, training dolls, or special needs transport equipment to enhance their CPS services. As misuse of car safety seats exceeds 80% nationally, there is a great need to have more certified child passenger safety technicians (CPSTs). This project continues to offer several scholarships for hospital and EMS providers to take the 3-4 day course, and the Project Coordinator regularly assists with teaching the course in Maryland. Three providers received approval to take the national Child Passenger Safety Technician course on scholarship this year.

To keep health care providers and CPSTs up-to-date on new and hot topics in CPS and OP, several webinars were offered this year. "Happy Children in Safe Seats: Not as Easy as it Seems" focused on special needs kids. "LATCH 2014: Best Practice for Technicians" informed listeners of federal changes that affect installing car seats with the LATCH system. "An Update on the Infant Car Seat Challenge Test" shared the latest research on testing infants in car seats and gave tips to providers for conducting the test. More than 150 health care providers and CPSTs participated in these webinars, which are archived on the EMSC website.

This program also aims to improve pre-driver safety in cars. Nurses and other safety advocates are 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. A webinar was also produced to recruit and train new facilitators. This year the curriculum was used in four different communities and also adapted for use in summer camps.

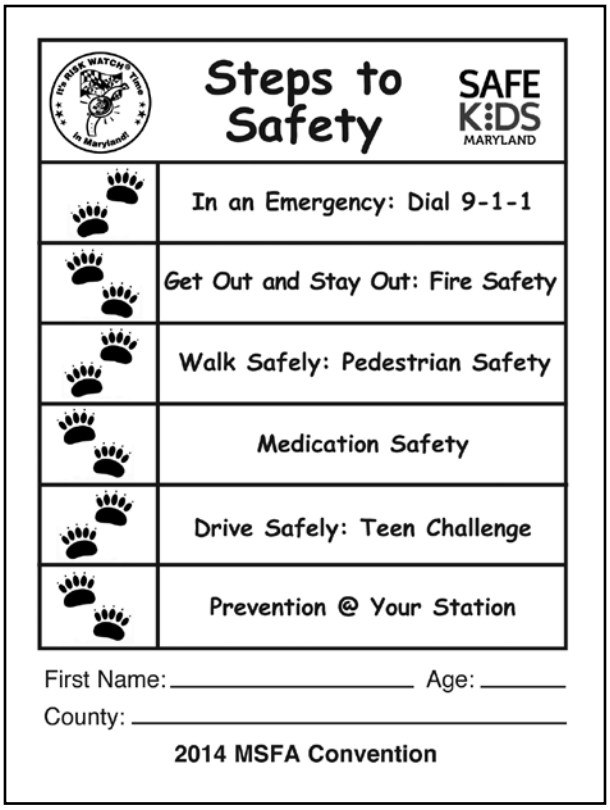
In February 2014 the MHSO hosted a Traffic Safety Summit featuring an exhibit, created by the CPS and OP Health Care Project along with partner agency Maryland Kids in Safety Seats, illustrating 30 years of child passenger safety law in Maryland. Over 300 participants viewed the exhibit and attended the sessions to help develop the next Strategic Highway Safety Plan.

Emergency Medical Services for Children continues to educate emergency providers on properly buckling up their patients and themselves. Interactive exhibits on CPS were held at each regional EMS conference, the EMS Care Conference, and at several ENA conferences. "Buckle Up – Day & Night" banners continue to be promoted during national Click It or Ticket (CIOT) campaigns in May and November and also at other opportune times, such as after a much-publicized local crash. EMS vehicle safety is also emphasized with both interactive displays (SECURE[1]) and a statewide campaign to "Buckle Up – Every Ride Every Time" that promotes education for providers and the public. All of these educational programs provide best practices for securing children, their families, EMS and hospital providers, and equipment within EMS transport vehicles.

Injury Prevention and Life Safety

The EMSC 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 the State Highway Administration. This collaboration provides a consistent flow of information to the five Regional Councils and the state PEMAC on injury prevention resources and initiatives. EMSC continues to liaison with the Child Fatality Review Committee in collaboration with the MCHB and the Partnership for a Safer Maryland led by the Department of Health and Mental Hygiene and funded by a Centers for Disease Control and Prevention grant. In September 2013 PEMAC and the Partnership jointly held a prevention forum focused on three successful local programs: Pediatric Window Falls – Data and Outreach from Children's National Health System, Bike Helmet Outreach into the ED from Johns Hopkins Children's Center, and Inspector Detector School-Based Fire Prevention lead by Safe Kids Baltimore, University of Maryland Children's Hospital, and Baltimore City Fire Department.

The Maryland RISK WATCH® Community is led by the MIEMSS' EMSC 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. Again this year the RISK WATCH® team served as many adults seeking new information, tools, and resources on teaching fire and injury prevention to children as they did families and young children. The response from youth and young adults increased significantly this year, providing the mentors with the ability to rotate these volunteers through a number of different risk areas and to provide coaching.



During the 16 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.

At the 2014 MSFA Convention, fire and injury prevention interactive stations designed for the entire family provided information to different audiences. Families visited each station to complete a "Steps to Safety" checklist (above) and received information on implementing safety practices to take home.

Emergency Medical Services for Children at MIEMSS is the lead organization of the Safe Kids Maryland Coalition and holds quarterly 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. In spring 2014 Safe Kids Maryland received a grant from Safe Kids Worldwide

[1] *SECURE messaging: **S**tretcher with three safety straps and two over-shoulder harnesses; **E**quipment is secured with straps in working order; **C**abinets are closed and latched/locked; **U**se age and size appropriate restraints for patients; Oxygen is **R**estrained in crash-stable brackets; **E**veryone is secured in a restraint—patient, providers, and family*

to implement training for adults on Medication Safety. The pilot was conducted at the 2014 MSFA Convention. Again in FY 2014, the Maryland and National Safe Kids programs dedicated their websites and various press releases to a very important and high risk danger to infants and young children: hyperthermia secondary to being left alone in a vehicle. Again this year the campaign slogan was: "Never Leave Your Child Alone" and the NHTSA campaign was "Where is Baby – Look Before You Lock." The overall goal of the ongoing campaigns is to make family members and child care providers aware of the deadly risks to children when they are left unattended in a vehicle. More information is available on the state coalition website. An educational webcast was held in June 2011 and remains available for viewing on MIEMSS' CPS and OP website.

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, a partnership between and jointly staffed by MIEMSS and the Maryland State Police (MSP), receives requests for, dispatches the most appropriate, and coordinates helicopter resources for missions including medevac, search and rescue, law enforcement, homeland security, and disaster assessment.

EMRC is staffed by MIEMSS and has a threefold 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 2014 the Emergency Medical Resource Center (EMRC) handled 203,616 telephone calls and 156,105 radio calls. Of these 359,721 calls, 125,501 were communications involving a patient or incidents with multiple patients, while 10,553 of these calls involved on-line medical direction.

In FY 2014 the Systems Communications (SYSCOM) center handled 21,308 telephone calls and 1,185 radio calls. Of these 22,493 calls, the majority were related to requests for medevac helicopters.

EMRC/SYSCOM continued to participate in the National Disaster Medical System. Utilizing the Facility Resource Emergency Database (FRED), EMRC/SYSCOM obtained hospital bed status information for several events and routine quarterly exercises.

The FRED system was also utilized by EMRC/SYSCOM in support of local emergencies and exercises conducted statewide.

As part of a cooperative agreement, EMRC/SYSCOM answered over 380 calls for the Maryland Department of Health and Mental Hygiene 24-hour Duty Officer.

GOVERNMENT AFFAIRS

The MIEMSS Office of Government Affairs is the agency's liaison with the Executive and Legislative branches of State government tasked with developing effective statutory and regulatory approaches and solutions to a variety of emergency care needs. 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 during the 2014 Legislative Session included the following bills passed by the General Assembly:

- A Statewide Interoperability Radio Control Board was established to coordinate the operation and maintenance of the Statewide Public Safety Interoperability Radio System (Maryland FiRST). MIEMSS is a named member of the new Board.
- The William H. Amoss Fire, Rescue, and Ambulance Fund was modified to expand the allowable uses of Fund monies.
- Each county Board of Education must provide, as part of the health or physical education curriculum, instruction in CPR that includes hands-only CPR and use of an AED in every public school in a county that enrolls students in grades 9 through 12.
- All middle schools must meet the requirements of the high school AED programs, ie, to have an AED on-site and an individual trained in the operation and use of an AED present at all middle school-sponsored athletic events.

- The State Department of Education is to develop and implement a program to provide sudden cardiac arrest awareness to coaches, school personnel, student athletes, and parents.
- During a declared state of emergency, the Governor may authorize the use of alternate care sites by a licensed health care facility to provide medical, nursing, or other services.
- Hospitals that provide emergency medical services must have a protocol to provide timely access to a sexual assault medical forensic examination by a physician or forensic nurse examiner for a victim of an alleged rape who arrives at the hospital for treatment.
- An occupational disease presumption was extended to all paid rescue squad members and paid advanced life support members for heart disease, hypertension, or lung disease that results in partial/total disability or death and for specified cancers caused by contact with toxic substances encountered in the line of duty.

HEALTH CARE FACILITIES AND SPECIAL PROGRAMS

Office of Hospital Programs

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

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 35 Primary Stroke Centers and 2 Comprehensive Stroke Centers in Maryland and continues to evolve. (See page 39 for a complete list of Primary and Comprehensive Stroke Centers.)

The designation of both Primary and Comprehensive Stroke Centers provides Maryland with an inclusive regional tiered stroke system of care approach. This approach helps to ensure having the right patient at the right center at the right time. Stroke centers are re-designated every five years to assure that each continues to meet regulations and performance standards for stroke care. During FY 2014 three Primary Stroke Centers submitted applications for re-designation and all three applicants were re-designated. Additionally, one Comprehensive Stroke Center submitted an initial application for designation and was designated.

All Primary and Comprehensive Stroke Centers submit data monthly to the American Heart Association Get With The Guidelines®-Stroke Registry. MIEMSS accesses the registry monthly and monitors both Primary and Comprehensive Stroke Centers for compliance with the core performance measures established by the American Heart Association and American Stroke Association (see page 16 for list of the core performance measures). Data from the Stroke Registry also allow 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 American Heart/American Stroke Association has set a minimal compliance rate of 80% or greater for each of the ten core performance measures. The annual State aggregate data for CY 2013 revealed Maryland had a compliance rate of 87% 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 representation from each designated stroke center. In FY 2014 the QIC focused on improving door to IV t-PA times utilizing the Get With the Guidelines®-Stroke Registry data. The Stroke Centers used this data to support changes to their stroke alert protocols and improve their response times. It has been well established that the sooner a patient is treated with the fibrinolytic t-PA, the better his or her outcome.

EMS Base Stations

Hospital Programs staff continued to collaborate with the Medical Director's Office on EMS Base Station verification in FY 2014. Management activities included issuing certifications to emergency department personnel completing the Base Station Communications course as well as monitoring and certifying new Base Station instructors. In FY 2014 one hospital applied and was approved for re-designation as a MIEMSS-approved Base Station. The hospital completed an application and a self-assessment survey. MIEMSS reviewed both the assessment and application and then conducted a Base Station site visit. The survey team was composed of MIEMSS staff, a MIEMSS Regional Medical Director, and a MIEMSS Regional Administrator.

In FY 2014 changes to the COMAR Regulations for Freestanding Emergency Medical Facilities en-

Stroke Core Measures (5-Year Comparison)

Core Measure	CY 2009	CY 2010	CY 2011	CY 2012	CY 2013
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	73.9%	80.9%	86.5%	88.5%	86.9%
Percent of patients with ischemic stroke or TIA who receive antithrombotic therapy by the end of hospital day two	97.0%	97.0%	97.2%	97.6%	98.0%
Percent of patients with an ischemic stroke, or hemorrhagic stroke, who receive VTE prophylaxis the day of or the day after hospital admission	15.2%	71.9%	74.9%	90.2%	96.2%
Percent of patients with an ischemic stroke or TIA prescribed antithrombotic therapy at discharge	97.3%	97.5%	97.9%	98.4%	98.7%
Percent of patients with an ischemic stroke or TIA with atrial fibrillation/flutter discharged on anticoagulation therapy	92.8%	94.2%	96.0%	94.6%	95.6%
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	96.7%	96.9%	96.6%	97.7%	98.8%
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	86.9%	88.7%	90.8%	93.3%	96.0%
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	79.8%	82.6%	84.7%	85.9%	89.5%
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	78.7%	85.0%	89.5%	91.7%	93.6%
Percent of patients with stroke who were assessed for rehabilitation services	96.8%	97.4%	97.5%	98.0%	98.5%

Source: Get With the Guidelines®-Stroke Registry

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

abled the centers to become MIEMSS-approved Base Stations. One Freestanding Center applied and was approved for initial designation as a MIEMSS-approved Base Station. The Center completed an application and a self-assessment survey. A MIEMSS survey team, consisting of the State EMS Medical Director, MIEMSS staff, MIEMSS Regional Medical Director, and MIEMSS Regional Administrator, completed an on-site survey.

Trauma System

Maryland benefits from a robust Trauma System accessible in 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 enhances patient outcomes and decreases patient mortality and morbidity.

Under COMAR 30.08, MIEMSS is responsible for oversight of the Maryland Trauma System. Five-year re-verification of designated trauma and specialty referral centers has continued throughout the year. The Trauma System is built around the nine Trauma Centers and five Specialty Referral Centers (Pediatric, Burn, Neurotrauma, Eye, and Hand).

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 Referral 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

In FY 2014 an MOU with MedStar Washington Hospital Center Adult Level I Trauma and Burn Center was renewed. Additionally, Children's National Health System completed verification as a recognized Maryland Pediatric Burn Center. The out-of-state Trauma Centers provide patient outcome data for state review.

The conversion of the Maryland Trauma Registry (MTR) to a web-based platform is ongoing. This conversion will enable the State to have robust data regarding the care of the injured patients treated at a Maryland Trauma or Specialty Referral Center. Within the MTR are up-to-date data collection tools and programs that will facilitate the monitoring and trending of injury care for appropriateness and complications.

The Trauma Quality Improvement Committee (TQIC), consisting of the Trauma Program Coordinators/Managers from the Maryland Trauma Centers, provides confidential oversight of State data results. The TQIC is in the process of developing a State Quality Scorecard to monitor specific indicators for focus, education, and compliance enhancement. The TQIC assisted in developing the Universal Interhospital Transfer Hand-off form for standardization of referring hospital verbal report and hand-off to the receiving center.

The Maryland Trauma, Education, and Research (MTREP) Committee has identified the 2013 Trauma Injury Prevention activities and best practices from around the State. These activities focus on topics such as: Distracted Driving, Helmet and Seat Belt Use, Violence Prevention, Boating Safety, Home Safety for the Elderly, and Distracted Driving (Drinking, Drugging, and Texting).

Perinatal Referral Centers

MIEMSS works closely with the Maryland Department of Health and Mental Hygiene (DHMH) regarding the designation of perinatal centers in Maryland. The DHMH provides grant funds to support a full-time position at MIEMSS to coordinate the perinatal programs in the Office of Hospital Programs.

In FY 2014 MIEMSS completed the second five-year cycle for the re-designation of Level III Perinatal Referral Centers. (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. 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 post-partum 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 Intensive Care Unit
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" and "return-to-service" times recorded in the EMS patient care record. The "release of patient care" time is the amount of time from EMS arrival at the emergency department until the patient is moved to a hospital stretcher. The "return-to-service" time is the length of time a provider is at an emergency department with a patient before returning to service. These times are helpful indicators of the impact of emergency department crowding on the EMS system.

CHATS includes several categories of alerts that indicate whether a hospital emergency department is temporarily unable to accept certain ambulance-transported patients. Yellow Alert, indicating emergency department overload, is the most frequently utilized alert category and has the most significant impact on EMS providers transporting patients. 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; however, in CY 2013 Yellow Alert utilization decreased nearly as low as it was in CY 2010 and Red Alert utilization dropped to its lowest level since 2002. MIEMSS continues to work with individual hospitals to determine the cause for the increased alert utilization and develop a plan to decrease Yellow Alerts.

MIEMSS provides weekly Yellow Alert utilization reports to DHMH throughout the year. Additionally, 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. No strategies from this plan were required to be implemented during the 2013-2014 flu season, which was not as severe as the previous year.

Public Access Automated External Defibrillator Program

The Maryland Public Access Automated External Defibrillator (AED) Program continues to grow throughout the State. The program permits non–health care facilities that meet certain requirements to have an AED onsite to be used 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 2014 MIEMSS processed 646 new PAD Program applications and 293 renewal applications for a total of 939 PAD Program approvals; this was a 17.4% increase from FY 2013. Currently, there are 5,532 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 can be viewed in the public information section of the MIEMSS website.

The PAD Program has had 139 (24.5%) successful AED uses out of 568 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, 329 were witnessed, and 99 of those witnessed arrests regained a pulse at the time of EMS arrival for a 30.1% 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 Dr. Kevin Seaman, the EMS Medical Director for Howard County, who has been working diligently to model efforts that have been successful in Seattle, Washington, through the National Resuscitation Academy. Dr. Seaman has also worked with MIEMSS to establish the Maryland Resuscitation Academy. Using a multi-focused approach to address out-of-hospital cardiac arrest, the 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 is educating the public about cardiac arrest and encouraging the public to learn CPR and how to use an AED. A Hands-Only™ CPR training event was held at IronBirds Stadium in Aberdeen, Maryland, in June 2014. There were nearly 2,400 fans in attendance at the game and nearly 400 individuals were trained in Hands-only™ CPR.

Communities that have incorporated all of these elements into responding to SCA have improved rates of survival from SCA.

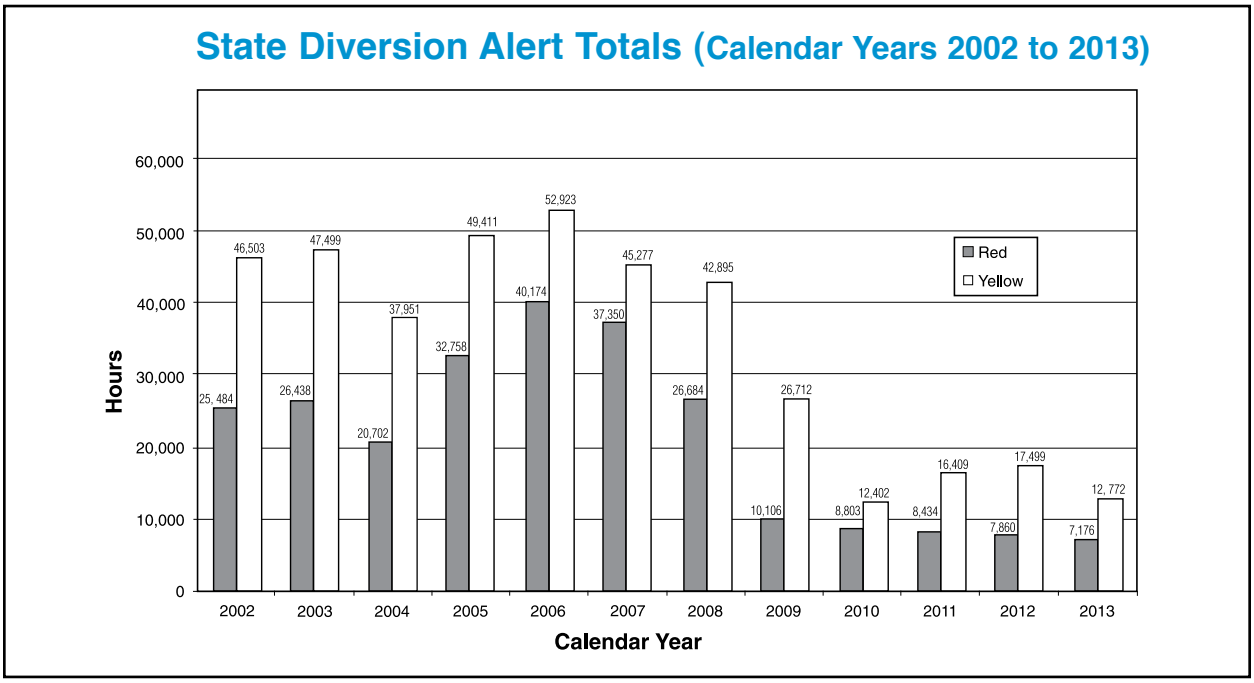
Maryland STEMI System

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.)

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 American Heart Association 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 emergency department 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 on a quarterly basis 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 the 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 Quarter 1 2014 Mission Lifeline® Maryland System Report, the median FMC to Device time for Maryland's Cardiac Interventional Centers was 81 minutes and just slightly below the national median FMC to Device time of 82 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 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 link on the MIEMSS website.

INFORMATION TECHNOLOGY

Mission: The MIEMSS Information Technology Department strives to improve Maryland's EMS systems by providing leadership, support, and guidance to the Institute and Maryland's EMS community regarding the use of information technology and the meaning of collected EMS data.

The Information Technology (IT) Department worked on four major areas of growth and improvement in FY 2014. The aim of these efforts was 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 2014 was the continued statewide deployment of the electronic Maryland EMS Data System (eMEDS®), a modern, state-of-the-art system used to collect patient care reports from EMS providers. It replaces the electronic Maryland Ambulance Information System (eMAIS®) system that was deployed in 2004.

eMEDS® is commercial-off-the-shelf software provided by ImageTrend, Inc. of Lakeville, Minnesota. ImageTrend, Inc. is the industry leader for this type of software, currently providing statewide patient care reporting systems to 30 states and hundreds of local counties and fire departments. MIEMSS initiated the selection process for the system in 2009, receiving bids from five vendors in early 2010. ImageTrend, Inc. proved to be both technically superior and the lowest bidder. The Maryland Board of Public Works approved a contract with ImageTrend, Inc. on June 9, 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.

eMEDS® is a web-based program available to providers statewide at all times. There is also a client version called "Field Bridge" that runs on laptops, allowing data collection even when no Internet connection is available. For reliability, the system is hosted in a secure, professional data center in Minneapolis, with a copy of the data, refreshed daily, stored at MIEMSS. Data entered into the system is available to the EMSOP, the receiving hospital, and MIEMSS immediately after it is entered.

The user interface of the system incorporates intuitive design, automatic entry of answers when possible (eg, automatic time-stamping of medical procedures), and context-sensitive appearance of forms and data fields based on the type of case being treated. These features aim to improve the ease and speed of data entry so that EMS providers can focus on patient care and get back in service quickly.

MIEMSS implemented eMEDS® in February 2011 by conducting a 30-day pilot with Harford, Queen Anne's, and Cecil Counties. MIEMSS utilized a train-the-trainer model to prepare the pilot counties. This training worked very well and has been repeated statewide. The pilot phase results were excellent, with no major problems or interruptions of service. Provid-

ers and commanders were very satisfied with the new system. The pilot jurisdictions successfully collected reports for over 35,000 ambulance calls with eMEDS®.

In spring 2011 MIEMSS began the statewide deployment of eMEDS®. That effort continued in earnest through FY 2014. At this time most counties, special services, and commercial services in Maryland are active on eMEDS®. As of July 2014 over 2.9 million patient care reports had been collected by eMEDS®. Going forward MIEMSS expects to collect about 1.5 million records per year.

MIEMSS continues to expand the capabilities of eMEDS®. Using MHSO grant funding, MIEMSS has been able to assist many jurisdictions in implementing Computer Aided Dispatch (CAD) integration with eMEDS® so that the CAD system is able to supply accurate times, incident number, and vehicle information to eMEDS®. This integration increases the accuracy of records and makes it easier for providers to enter that information. In FY 2015 most, if not all, EMS services in Maryland will be using integrated CAD data in eMEDS®. In FY 2014 MIEMSS procured the improvements to the Hospital Dashboard, which allows trauma and specialty care hospitals to access all prehospital care records for a patient so that they have a complete view of the patient's care prior to arrival at their facility. MIEMSS integrated its own data with the Maryland Trauma Registry so that prehospital care data, including trauma records, are available. MIEMSS also completed substantial work on a data integration with the Cardiac Arrest Registry to Enhance Survival (CARES) program to enable Maryland EMS services and hospitals to begin participating in CARES data reporting.

Expanding Capabilities

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 2014 the NSC worked 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.

New Provider Registry

The IT Department worked with the MIEMSS' Office of Licensure and Certification and ImageTrend, Inc. to implement a new provider registry to replace the aging Maryland Prehospital Provider Registry (MPPR) system. ImageTrend, Inc.'s License Management System 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 services and providers. The system is expected to be completed by the end of CY 2014.

End User Services/Support Improvements

In FY 2014 the IT Department continued to apply project management services to various departmental initiatives. Help desk services were consolidated and improved through implementation of an automated online help desk system. MIEMSS also implemented new VMware servers, core network switches, and firewalls during FY 2014. A new high-resilience storage system was implemented to store photo and video assets as well as scanned documents and other data archives. Hosting improvements were implemented for the HC Standard patient tracking and hospital resource application to allow application upgrades, faster response, and greater reliability.

Ongoing Missions

The IT Department continued to support existing programs in FY 2014. Highlights include:

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 by request from MIEMSS to provide legal reports and historical data for analysis.

Maryland Ambulance Information System

In FY 2014 the IT Department continued to scan and archive the last of the Maryland Ambulance Information System (MAIS) and Commercial Maryland Ambulance Information System (CMAIS) paper patient care report forms submitted by jurisdictions before their transition to electronic patient care reporting. MIEMSS expects to finish archiving the paper forms by the end of CY 2014.

electronic Maryland EMS Data System

As described above, MIEMSS continues to monitor and improve eMEDS® while supporting its users and deploying the system to all jurisdictions in the state.

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) 2.0, 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 Department in the use and deployment of HC Standard, a patient and resource tracking system. HC Standard is an important electronic tool for Maryland's disaster preparedness, allowing instant, on-site 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 2014 the HC Standard system was upgraded to a more recent version, adding functionality for users. MIEMSS IT Department improved the hosting of the HC Standard system to improve system resiliency.

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.

In FY 2014 the Maryland Trauma Registry was integrated with eMEDS® to effect the inclusion of prehospital patient reports from eMEDS® and update patient outcome information back into eMEDS®.

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. A major accomplishment in FY 2014 was to upgrade all MIEMSS desktop PCs and laptops away from Windows XP, which is no longer supported by Microsoft and represents a significant security risk.

EMRC/SYSCOM Support

MIEMSS IT provides 24/7 computer support for EMRC/SYSCOM and Maryland State Police Aviation Command functions in SYSCOM. This includes support and maintenance of the Flight Vector CAD system for MSP helicopters.

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 2015 include completing an upgrade of VMware and networking services, developing off-site back-up 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, Inc. features.

Initiatives for FY 2015

Security Improvements

In April 2013 MIEMSS completed a Cyber Security Resilience Review by the US Department of Homeland Security. In conjunction with the Maryland Information Security Policy, this review has established 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 is refocusing some staff duties on the area of cyber security. In FY 2015 MIEMSS will implement a specific staff position for information security and continue to develop and implement a Security Improvement Plan. Agency staff, as well as one or more vendor engagements and support from the Maryland Department of Information Technology and the new Maryland Director of Cyber Security, may be utilized in this effort.

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. Through the MHSO, grant funds have been awarded to counties to facilitate CAD integration so that 9-1-1 data and call times are automatically imported into patient care reports. In FY 2015 eMEDS® will be integrated with MIEMSS' HC Standard Patient Tracking System to facilitate patient care reporting in Mass Casualty Incident situations. MIEMSS implemented and will continue deployment of ImageTrend, Inc.'s STAR system for eMEDS®, which will enable automatic statewide alerting from eMEDS® based on unusual trends in illness or injury.

Improve Computer Resources, Network Reliability, and Disaster Preparedness

In FY 2015 the IT Department will continue implementation of computer hardware and software to upgrade VMware and network operations, migrate all equipment and services to a new, more robust server room, and implement off-site back-up capabilities for critical applications and services. This will include a new data back-up 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 remaining systems from Windows XP to Windows 7. It is also likely that MIEMSS will migrate email and collaboration tools to Maryland.gov, via Google Mail and its associated online applications, in FY 2015.

Strengthen Data Analysis

Data analysis capability will be expanded in FY 2015 by emphasizing reporting, analyzing, and practical applications of EMS data. MIEMSS will also continue to work with the NSC on this effort. New analytics 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.

During FY 2014 Licensure and Certification continued to move forward with projects and implementations related to the *EMS Agenda for the Future: A Systems Approach*. Ground work was laid for the FY 2015 implementation of National Registry of Emergency Medical Technicians (NREMT) testing at the Basic Life Support (BLS) provider level for initial certification. Additionally, working in conjunction with MIEMSS' Information Technology (IT) Department, we continued to build on a new licensure system for implementation in FY 2015.

Licensure and Certification had a steady workload in FY 2014 issuing 2,283 initial prehospital provider certifications and licenses and renewing 5,834 certifications and licenses. Licensure and Certification had 53 registered EMS Board approved Educational Programs in FY 2014. The vast majority of entrants into Maryland EMS are through an Emergency Medical Technician (EMT) initial provider course. Licensure and Certification tested 1,358 EMT students from 102 courses in FY 2014. Licensure and Certification worked with other MIEMSS departments to supply provider data and trends (eg, prehospital care provider recruitment and retention) to various statewide committees for analytical purposes.

During FY 2014 the total number of Maryland Emergency Medical Dispatchers (EMDs) and Emergency Medical Technicians (EMTs) remained steady. The total number of Emergency Medical Responders (EMRs) has declined over the past few years, as law enforcement agencies move toward adopting the Law Enforcement Emergency Medical Care Course (LEEMCC) for required medical training. Although the number of Maryland Cardiac Rescue Technicians (CRTs) 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 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.

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

Licensure and Certification implemented the *EMS Agenda for the Future: A Systems Approach* on July 1, 2012. All initial courses in FY 2014 met the National EMS Education Standards and refresher courses were designed to transition current providers to the new standards. At the BLS level, the EMR and EMT core refresher syllabus meets the requirements for transitioning. As BLS providers renew their certifications anytime between July 1, 2012, and June 30, 2015, they will meet the transition requirements. 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. BLS providers are expected to be transitioned by June 30, 2015, and Paramedics by March 31, 2017. For further details, refer to the MIEMSS Transition Timeline available at bit.ly/TransitionTimeline. Additionally, the BLS Committee of the Statewide Emergency Medical Services Advisory Council (SEMSAC) worked on an EMR to EMT bridge process that will aid current EMS providers by decreasing the hours needed for EMT eligibility. Work on this process will continue into FY 2015.

Move to NREMT Cognitive Examination for Initial BLS Certification

Licensure and Certification began implementing processes to move toward utilizing the NREMT for the cognitive portion of the State certification examination process for EMR and EMT. This change will go into effect for initial courses and certification beginning with classes that start in fall 2014. The move does not affect current EMR and EMT certified Maryland providers, and the providers that are tested through the NREMT process are not required to maintain NREMT certification to hold a Maryland certification at the EMR or EMT level.

Implementation for the move to NREMT cognitive examinations for BLS providers included adding 6 new testing locations to bring the total number of Pearson VUE test sites for the NREMT exam in Maryland to 11. This expansion ensures at least one test site in each of MIEMSS regions. Locations include: Baltimore/Woodlawn, Bethesda, Columbia, Garrett, Anne Arundel/Hanover, Anne Arundel/Arnold, Salisbury, Cecil/Northeast, Cumberland, La Plata, and Hagerstown. Additionally, Licensure and Certification is working to ensure all initial EMR and EMT level EMS Board approved Educational Programs are registered with NREMT for the required course completion verification.

Online Learning Management System

Our distance learning management system, the Online Training Center, reached 38,000 registered users in FY 2014, including not only all levels of prehospital care providers, but also other professionals such as nurses, physicians, and administrators who must access to the Online Training Center for required training.

In FY 2014 the Online Training Center hosted 25 active online courses. Six new courses were made available this fiscal year: 2014 ALS Protocol Update, 2014 EMT Protocol Update, 2014 EMR Protocol Update, 2014 Base Station Protocol Update, eMEDS® Call Disposition Update, EMSC's "Silent Killer" presentation, and the Queen Anne's County Freestanding Medical Facility Pilot Program Orientation. Projected courses for the next fiscal year include the 2015 Protocol Updates, additional medication reviews, a 12-lead EKG course, and other courses developed as necessary. The Online Training Center underwent software upgrades in August 2013 and May 2014 as MIEMSS works to keep the system in line with the ever changing educational technologies available to providers.

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

Level	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	As of 7/1/2014
EMD	1,027	1,099	1,088	1,182	1,113	1,113
EMR	4,795	4,594	3,436	3,478	2,821	2,822

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

EMT	17,241	18,325	18,295	18,982	18,847	18,848
CRT	882	898	849	824	781	781
Paramedic	2,713	2,753	2,924	3,055	3,207	3,207
TOTAL	**20,836**	**21,976**	**22,068**	**22,861**	**22,835**	**22,836**

Provider Database System 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 will be a web-based portal, allowing providers and teaching agencies more access to the system for updating. Since ImageTrend, Inc. 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 will begin implementing portions of the product in early FY 2015.

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 interested in working with 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 SYSCOM, for critical incident stress management.

In FY 2014 MIEMSS focused on enhancing CISM capabilities through increased collaboration between CISM teams across the state and by sponsoring CISM courses. In March 2014 MIEMSS hosted a CISM Coordinators Symposium that brought together representatives of 17 CISM and crisis response teams. This group will continue to meet biannually and will work together to enhance CISM in Maryland and to share resources and build collaboration among teams statewide.

MIEMSS also continued an effort begun in previous years to sponsor CISM training. Over 70 EMS and mental health providers received initial CISM training in a course that was jointly coordinated by MIEMSS and Howard County Department of Fire and Rescue Services. In addition, more than 60 providers received a CISM refresher or other CISM-related training sponsored by MIEMSS. Three training sessions offered this fiscal year were funded 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 be to continue to build on the robust CISM capabilities in the state through increased coordination among the state's teams and through training opportunities.

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, as well as serving as a resource for health care providers regarding implementing the MOLST.

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 19th Annual EMS Medical Directors' Symposium was held at the James N. Robey Public Safety Training Center in Marriottsville, Maryland, on April 9, 2014. It was attended by the Regional, Jurisdictional, and Commercial Ambulance Service Medical Directors, Base Station physicians and coordinators, the highest jurisdictional officials, Quality Assurance officers, and MIEMSS personnel. This year's keynote speaker was Mary G. Ripple, MD, Deputy Chief Medical Examiner, State of Maryland. Dr. Ripple's presentation, "Excited Delirium and Police Custody Deaths Involving Taser® Use," explained the means and quantities of electricity delivered with the Taser®; reported primary and secondary injuries directly associated with Taser®;

defined and explained the pathophysiology of excited delirium cases, which is the leading contribution to Taser®-related deaths; and provided an interesting video showing patients who presented with excited delirium. Other Symposium presentations included:

- "Sidestepping the Road to Yellow Alert: The Medical Duty Officer" presented by Benjamin Lawner, DO, MS, FACEP, Paramedic
- "NREMT: Coming & Going" presented by Rae Oliveira, BS, NREMT-P, RN
- "Drug Testing: Positive and Negative Results. Implications for EMS" presented by Terry Jodrie, MD, Michael Kerr, MD, and Sarah Sette, AAG
- "EMS for Children: Update for Maryland" presented by Cynthia Wright Johnson, MSN, RN
- "Quality Measurement with eMEDS®" presented by John New

The Office of the Medical Director (OMD) dealt with a severe shortage of intravenous fluids across the nation, particularly 0.9% sodium chloride (normal saline), following a report from the Food and Drug Administration (FDA) attributing the shortage to increased demand during flu season compounded by issues with manufacturers. Because many institutions have transitioned to using Lactated Ringer's solution during the shortage, a pervasive nationwide shortage of both solutions is occurring. While the FDA works with major manufacturers to match demand and abate a long-term shortage, it is likely that EMS systems will be impacted until the situation is resolved. The OMD provided recommendations to help guide the use of intravenous solutions until they become more readily accessible.[1]

In October 2013 the EMS Board approved the use of Naloxone by Emergency Medical Responders (EMRs) and Emergency Medical Technicians (EMTs) (Basic Life Support (BLS) providers) for overdose patients with respiratory depression as an optional supplemental protocol. By July 1, 2014, Naloxone administration training was completed and is now required on all Public Safety EMT transport units. It remains an Optional Supplemental Program for EMRs and BLS Commercial Services. Based on legislation passed in 2013, civilians and law enforcement personnel can be trained, certified, and receive a prescription for the administration of Naloxone for suspected opioid overdose through a county-based health department training program approved by the Maryland Alcohol and Drug Abuse Administration.

eMEDS®, the electronic patient care reporting (ePCR) system supplied by ImageTrend, Inc. has now been implemented by 30 jurisdictional EMS Operational Programs (EMSOPs) and 25 commercial companies. With the standardization of the ePCR, the eMEDS® Steering Committee, which analyzes state averages and establishes state EMS, local EMS, and hospital benchmarks, was established. The eMEDS® Steering Committee also provides recommendations for modifications to eMEDS® and the validation rule system.

In 2014 the OMD welcomed Michael Reynolds, Paramedic, as the new Protocol Administrator. Mr. Reynolds will continue the mission of the Protocol Administrator and work with the State EMS Medical Director maintaining the protocols, tracking protocol changes, conducting literature reviews, coordinating the Protocol Review Committee Meetings, and providing a field provider's perspective on issues.

The OMD continues to support the Maryland Regional National Disaster Life Support (NDLS) Coalition (comprised of Johns Hopkins' Critical Event Preparedness and Response, the Maryland Fire and Rescue Institute (MFRI), MIEMSS, the R Adams Cowley Shock Trauma Center, and the University of Maryland, Baltimore County's Center for Emergency Education and Disaster Research). Richard Alcorta, MD, FACEP, is the Medical Director and Course Director. This year courses were held at the Howard County Department of Health, MFRI Headquarters, Washington County Division of Emergency Services, Springfield Hospital Conference Center, and the Easton Volunteer Fire Department. There were five Basic Disaster Life Support™ (BDLS®) classes with a total of 145 students successfully completing the course and one Advanced Disaster Life Support™ (ADLS) class with 20 students successfully completing the two-day, hands-on course. These courses are held at no charge to the students and their textbooks are provided through a Maryland Department of Health and Mental Hygiene grant.

Each Base Station hospital is required to have all new staff successfully complete the MIEMSS-approved Base Station Program so they can consult with EMS providers and the physicians can appropriately provide on-line medical consultation and orders. The MIEMSS Base Station Communications Course was taught at multiple hospitals and, as a result, 448 Base Station certificates were issued to emergency department physicians and nurses with two new Base Station Instructors approved and certified.

The Maryland EMS System is internationally viewed as a premier system. In an effort to share the knowledge and Maryland experience with international visitors, the OMD met with health professionals from Sudan, Egypt, Brazil, and Iran to provide a system overview and tour of MIEMSS.

The 2014 protocol updates and revisions for *The Maryland Medical Protocols for EMS Providers* were implemented statewide on July 1, 2014. Electronic ver-

[1] *Memo dated 2/4/2014 entitled "Shortage of Intravenous Fluids – Best Practices"*
www.miemss.org/home/LinkClick.aspx?fileticket=zWyg6MLxkgw%3D&tabid=211&mid=913

sions of the full protocols, as well as the replacement pages and list of changes are available on the MIEMSS website. The printed half-size (5" x 7") spiral-bound and the abridged pocket version are also available.

At the request of the Governor's Office of Homeland Security, the OMD became part of an interdisciplinary work group co-chaired by MIEMSS and the Maryland State Police to establish a guidance document on Active Assailants (Active Shooters). The core elements of the Active Assailant guidance document is to have law enforcement and local EMS/fire agencies establish a formal integrated response and operation policy, and then exercise that policy in alignment with the guidance provided by the work group. In addition, a new Maryland Medical Protocol, Potentially Volatile Environments with Life-Sustaining Interventions, has been recommended to the OMD and the Protocol Review Committee for implementation in 2015.

With the changing medical environment and the focus on patient wellness that followed the enactment of the Affordable Care Act of 2010, the Maryland legislature has asked MIEMSS to generate a report on Mobile Integrated Health. This report will cover the benefits, barriers, challenges, and opportunities in Maryland.

MIEMSS held the biennial Ambulance Safety Summit that was attended by over 80 EMS Medical Directors and the highest EMS officials from across the state, including representation by the Maryland State Firemen's Association. The 2011 key core recommendations were reviewed and enhanced by the Ambulance Task Force work groups subcommittees. The 2013 enhanced six key core recommendations were presented by the work groups to the participants, who unanimously endorsed them:

1) *Ambulance Driver Screening*
   Jurisdictions and companies should implement initial and periodic driver screening to identify ambulance drivers whose driving records, excessive risk-taking, or medical conditions may make them poor candidates for the responsibility of driving an ambulance.
2) *Emergency Vehicle Operation (three-part)*
   - Jurisdictions should implement graduated driving responsibilities
   - Maryland's Emergency Vehicle Operators Course (EVOC) training sites should consider modifying courses to focus on ambulance-specific training
   - Ensure effective initial ambulance driver training and periodic refresher training
3) *Increase use of restraints and safety improvements during ambulance operations*
   Jurisdictions and companies should set, monitor, and enforce policies that require the use of seat belts/restraints for all occupants and patients. Future ambulance purchases should ensure patient compartments are ergonomically structured to increase safety.
4) *Reduce the incidence of excessive ambulance speeds and lights and sirens*
   Jurisdictions and companies should ensure that response and transport policies reinforce the need for safety as the first priority and should tailor practices to the degree of urgency as determined by patient need. Lights and sirens should be used with Priority 2 patients only in exceptional circumstances (eg, the need for time-critical hospital care) and should be prohibited for Priority 3 and 4 patients. Routine use of lights and sirens should be eliminated in both responses and transports.
5) *Improve monitoring of ambulance safety issues and enforcement of safety practices*
   Jurisdictions and companies should develop written policies that foster increased ambulance safety and ensure the availability of accurate data needed for effective monitoring of ambulance safety issues, including formal reviews of ambulance crashes and near-misses.
6) *Continue ongoing statewide forum for ambulance safety issues*
   The Ambulance Safety Task Force should continue to:
   - Promote the advancement of ambulance safety
   - Monitor trends in ambulance crashes
   - Provide a forum for addressing future ambulance safety issues, including a review of the update to NFPA 1917

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. Over the years MIEMSS has taken advantage of state-supported resources and drawn upon other individuals who practice quality management principles within their respective EMS settings or other work settings. These diversified resources

helped define Maryland's EMS community needs and tools for the improvement of services and customer relationships.

Managing for Results

For the past 16 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 reevaluation 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 the real world of 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 volunteer instructors from 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.

electronic Maryland EMS Data System Implementation

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. Presently, there are 30 jurisdictional EMSOPs utilizing eMEDS® for direct prehospital patient care data entry and self-report writing for program monitoring, evaluating, and improving. These programs, plus a majority of commercial EMS services providing interhospital transports, account for over 1.168 million records registered for FY 2014.

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 Maryland Department of Health and Mental Hygiene (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 2013. 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

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 emergency medical services 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 the State. 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.

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 31. 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 Emergency Medical Services Operational Programs (EMSOPs). 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 patient tracking systems, including quick deployment of regional assets. MIEMSS-managed projects included Ambulance Strike Team leader training, first responder mental health, and the upgrade of communications systems.

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

The Region III Office continued the expansion of the region's electronic patient tracking capabilities in FY 2014. HPP and Urban Area Security Initiatives (UASI) grant funding was used to procure additional

hardware necessary to expand the cache, which consists of two additional patient tracking kits and accessories. This enhancement includes a 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. Through HPP and UASI funding, the region was also able to procure a third electronic patient tracking handheld device for each acute care hospital, increasing their tracking capabilities.

The Region IV office assisted Somerset County in the completion and outfitting of a disaster trailer. Administrative identification of standard operating procedures and deployment of the trailer were completed. Training was provided to all departments and the local hospital. The trailer has been placed in service and has already been used several times. Patient tracking capabilities and infrastructure equipment have been enhanced in several jurisdictions.

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 Region V office welcomed Luke Hodgson as the Director for the Emergency Response System (ERS) of the National Capital Region (NCR) of Maryland. The ERS of the NCR of Maryland 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. MIEMSS manages both the administrative and contractual components of the project for ERS. The Region V Office is coordinating closely with the ERS programs in Northern Virginia and Washington, DC to share educational programs, coordinate emergency plans, and conduct mutual aid exercises. During this year MIEMSS assumed responsibilities to support Prince George's County with their ERS-related projects. MIEMSS took this opportunity to merge them with the Montgomery County ERS to have one coordinated program in the NCR area of Maryland. Under the direction of Luke Hodgson, the contracted employees are implanted into local programs to provide support for local grant-funded projects and coordination with regional initiatives. Recent projects included Ambulance Strike Team training, an Advanced Hazmat Life Support class, a Public Information Officers Conference, and the full-scale Montgomery and Prince George's County Exercise held on May 8, 2014.

State Homeland Security Grant Program – MCI Grant Application Program

This year the Maryland Emergency Management Agency (MEMA) approached MIEMSS to assist them in meeting federal guidance requiring that a percentage of the State Homeland Security Grant Program (SHSGP) funding from the US Department of Homeland Security be allocated to EMS agencies. A new competitive program was established to address gaps for EMS response to mass casualties. The program allocated $250,000; however, 15 applications were received totaling $592,746 in requested funding. After review by the Regional EMS Councils and the State EMS Advisory

MIEMSS Grant Disbursements (FY 2014) by Region

	SHSGP	50/50 Matching Fund Grant for AEDs, Monitor Defibrillators and Upgrades	ALS Training Funds	Emergency Dispatch Programs	HPP Bioterrorism Grants BT-X (FFY 2013)	BTX-PT	DOT Highway Safety CAD Interface Grants (FFY 2011-2014 to date)	Totals By Region
Region I	$68,923	$46,790	$30,000	$2,676	$8,484	$18,000	$30,643	$205,516
Region II	$20,780	$51,560	$30,000	$5,410	$13,334	$10,000	$20,950	$152,034
Region III	$75,627	$113,370	$100,000	$15,756	$46,667	$48,000	$47,814	$447,234
Region IV	$21,030	$91,220	$70,000	$14,045	$38,182	$135,000	$62,748	$432,225
Region V	$71,640	$99,060	$80,000	$12,115	$33,333	$89,000	$12,806	$397,954
Total	$258,000	$402,000	$310,000	$50,002	$140,000	$300,000	$174,961	$1,634,963

Council Regional Affairs Committee, 11 projects were funded. The projects included mass casualty incident (MCI) support trailers and supplies in Garrett, Carroll, and Anne Arundel Counties; patient tracking enhancements in Region II and Baltimore and St. Mary's Counties; tourniquets, tactical emergency casualty care kits, and other supplies for the response to Active Assailant incidents in Baltimore City and Baltimore and Cecil Counties; and support for the new Region IV Ambulance Strike Teams in the form of Go-Kits and response supplies. MEMA was pleased with the new competitive process and is considering future funding based on the Federal grant guidance.

Computer Aided Dispatch Grant Program

MIEMSS computer aided dispatch (CAD) interface grants have awarded to 26 EMSOPs. Twenty-two of those EMSOPs are actively exchanging data between eMEDS® and their CAD and four more local interfaces should be complete by the end of 2014. One more EMSOP is expected to apply for the grant and be integrated by the end of 2014.

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. The 50/50 Matching Equipment Grants support the purchase of automated external defibrillators (AEDs) and 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 (E2B) 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

The MIEMSS staff continues to provide instruction for QA classes and has been meeting on a regular basis. As part of these meetings, staff have streamlined the previous course and reduced the initial training to a one and a half day program. They have also reviewed the course outline and changed lesson plans to enhance the learning experience for those in attendance. Classes were conducted at MIEMSS and in the regions this year. In conjunction with Washington County, Howard County hosted a QA Officers Training class with coordination assistance by the Region II Administrator. One session, attended by members from Washington County Department of Emergency Services and Volunteer Corporations, focused on revisions to the Washington County Quality Assurance Plan. As a result, Washington County has a newly implemented QA program for 2014.

Quality Improvement

The Statewide QA/QI Committee will be reconvened and hold its first meeting early next fiscal year. QA Officers from each region will come together to discuss and identify the most important issues facing the jurisdictions and MIEMSS in maintaining and improving consistent QI throughout the state.

In Region I, both Allegany and Garrett counties have continued work on their QA and QI Commit-

tees 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 both Emergency Services Boards is a testament to the SWOT initiative. Garrett County is engaged in reviewing past SWOT recommendations and will request a SWOT revisit facilitated by State EMS Medical Director Dr. Richard L. Alcorta in the coming year.

Communications Systems

The Regional Offices have begun testing the DEMSTEL phones in their respective regions once a month, including those in hospital emergency rooms and hospital command centers. Testing of these devices has identified technical failures, that are then able to be repaired, and made operational personnel more aware of their existence and purpose.

electronic Maryland EMS Data System

At this time 30 of the 31 operational programs are utilizing eMEDS®. Prince George's County went live with eMEDS® in January 2014. All jurisdictions in Regions I, II, III, and IV are currently utilizing eMEDS®. All Regional Offices continue to support their jurisdictions with eMEDS® utilization.

In FY 2014 the Region II Administrator served as the interim eMEDS® Application Coordinator for several months. A new eMEDS® Application Coordinator was hired in July 2014 and the Region II Administrator will continue to provide support to the program and be a technical resource for all the Regional Offices.

Voluntary Ambulance Inspection Program

The Regional Offices continue to perform inspections of ambulances 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, 406 units were inspected this year. The inspections are valid for two years.

Both counties in Region I actively participate in the VAIP and continue to embrace the process. In Region II, both Washington and Frederick counties are actively participating in the VAIP process. 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 of the five jurisdictions in Region V have met requirements for the VAIP countywide. While not mandated, inspections in the all jurisdictions are on the increase.

Conferences and Training

EMS Care 2014 was held April 30 through May 4 in Ocean City, Maryland. The event offered three days of preconference programs, followed by the two-day full conference. Over 300 participants attended for a weekend full of quality educational and networking opportunities.

The 12th Annual Miltenberger Emergency Services Seminar, held in April 2014, was another success. Teamwork between the Region I Office, local hospitals, and other local agencies and institutions has developed a supportive learning environment that offers law enforcement, fire/rescue, EMS, EMD, and nursing topics. The second Region I 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 debilitating traumatic events leading to cardiac arrest. Work has already begun on the 13th annual program for 2015 to be held on April 10 and 11.

In Region IV the Peninsula Regional Medical Center hosted its 22nd Annual Trauma Conference in Ocean City in September 2013. 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 2014. Preconference programs included presentations by the EMS for Children (EMSC) Program, a 12-hour Emergency Medical Technician (EMT) skills class, and 12 hours of continuing education needed for BLS recertification.

In Region V the 2013 Pyramid Conference was held October 30 through November 3 in Bowie, Maryland. The "Ask the Medical Directors" town-hall style panel enabled conference attendees to meet and ask questions of the Region V Medical Directors. Pre-conference programs included the Maryland EMSC's S.T.A.B.L.E. Course and a Tactical Emergency Medical Services Familiarization Workshop. The keynote presentation featured mental health practitioners who discussed topics surrounding the new Termination of Resuscitation protocol including how to deal with grief-stricken family members and first responder psychological first-aid.

Support for Educational Programs

In addition to the conferences described above, 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. Often the Regional Offices 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 2014 the Regional Offices conducted 338 individual certification exams in their offices and administered examinations for 64 classes throughout the state. (See report for Licensure and Certification on page 24 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. This year MIEMSS supported State agencies and local EMS jurisdictional programs during several significant incidents. MIEMSS personnel responded to 18 scenes in FY 2014. Some of the more notable responses include:

- Loss of water/potential patient relocations at University of Maryland Rehabilitation & Orthopaedic Institute
- 54" water main break resulting in water loss to multiple health care facilities in Prince George's County
- A fire in the power feeds to Prince George's Hospital Center requiring an additional generator
- Active Assailant incidents at the Navy Yard in Washington, DC and The Mall in Columbia
- GO-TEAM responses for a trench rescue in Frederick County and an extended auto extrication in Linthicum
- Fire at an assisted living facility in Bel Air resulting in the relocation of 90 residents
- Water line break in Easton affecting several health care facilities
- Multiple State Emergency Operations Center activations for snow and other severe weather events

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 ALS grant funds.

The Region III Health and Medical Task Force is a subcommittee of the Baltimore Urban Area Working Group (BUAWG), and is chaired by Christina Hughes of MedStar Franklin Square Medical Center. The Task Force continued their work throughout FY 2014 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. In FY 2014 the Health and Medical Task Force began the ground work for establishing the Region III Health Care Coalition.

As one of its health and medical initiatives, the Region IV Office participated in a community needs assessment in Caroline County. This cooperative effort of the Caroline County Commissioners and Shore Health Systems has implications for several areas in the region. The Region IV Office supports and is active in the Delmarva Regional Health Medical Advisory Group. Region IV Associate Administrator Anna Sierra has been elected to serve as its Chairperson.

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

MIEMSS Regional Offices and Emergency Operations support numerous exercises and planned mass gatherings throughout the State. Some of the more notable activities in FY 2014 included:

- Maryland Fire and Rescue Institute Leadership Symposium
- Prince George's County EMS Officers Training Program
- Calvert Cliffs Nuclear Power Plant Biennial FEMA Emergency Preparedness Exercise
- BWI-Marshall Emergency Plan Exercise (EPLEX)
- Montgomery County ERS Family Reunification Center Exercise
- Maryland NCR ERS Full-Scale Emergency Preparedness Exercise
- Hagerstown Airport Full Scale Exercise
- Lower Shore Table Top Exercise
- Delmarva Regional Healthcare Mutual Aid Group Table Top Exercise
- Upper Shore Table Top Exercise
- UM Shore Regional Health at Easton Hazmat Drill
- State of Delaware Emergency Support Function 8 Functional Exercise
- Fort Meade Mass Casualty Exercise
- State of Maryland Integrated Emergency Management Course
- Amtrak Tabletop Exercise
- Region III Department of Health and Mental Hygiene Exercise
- National Disaster Life Support Exercise
- Towson University Operations STAT Exercise
- Hopkins Subway Radiation Detector Exercise
- Baltimore Grand Prix
- Preakness Races

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 multiple site visits of the Centers for Disease Control and Prevention 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 Maryland State Police Aviation Command (MSPAC) and MIEMSS conducted four CHEMPACK loading exercises. During these unannounced drills, duty crews were alerted and requested to access and load the training version of the CHEMPACK and prepare to transport the medications to a specific site. Each exercise was monitored and timed by MSPAC and the Emergency Medical Resource Center 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 the County Hospital Alert Tracking System (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 hardware hosting the system was also upgraded to make it independent for other MIEMSS systems. 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

Due to lessons learned from "Superstorm" Sandy, MIEMSS Emergency Operations began a process of establishing formal Ambulance Strike Teams and EMS Task Forces to respond to requests for assistance rapidly and in the most effective manner possible. A committee representing public safety and commercial EMS resources has established alerting processes and training and equipment requirements and will pre-identify associated costs and expenses. Some strike teams have been identified and equipment purchased. Some formal teams are expected to be prepared for deployment by the 2014 hurricane season. MIEMSS now also participates in an Eastern States EMS Mutual Aid Group to standardize and catalog resources and establish plans to expedite the sharing of resources in the region.

During an after action review conference on the shooting incident at the Navy Yard in September 2013, the Governor's Homeland Security Advisor directed MIEMSS and MEMA to cooperate to develop guidance on planning for and responding to Active Assailant incidents for local jurisdictions in Maryland. An interdisciplinary work group was established, including federal, state, and local representatives of law enforcement, EMS/fire/rescue, and emergency management agencies, to develop "Guidance for First Responders for the Active Assailant Incident." This document provides direction to local jurisdictions on the development of response plans, identifies four levels of interdisciplinary training, provides guidance on levels of ballistic protection equipment, outlines the phases of response, includes a draft update to *The Maryland Medical Protocols for EMS Providers*, and provides a list of recommended patient care equipment to be available in "warm" zones. The ultimate goal is to ensure that the assailant is subdued quickly and patients are cared for expeditiously while keeping all responders safe. The document is near completion and will be presented to the emergency response community regionally. A group of the participants will be available as advisors to local governments as they begin to address their response plans, and online awareness training is expected to be available in November 2014. The next step will be to include schools, colleges, malls, mass gathering venues, and businesses in developing a community response plan.

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.

Operating Statistics:
July 2013–May 2014

4 New Basic Life Support (BLS) Service Licenses Issued
3 New Advanced Life Support (ALS) Service Licenses Issued
2 New Specialty Care Transport (SCT) Service Licenses Issued
3 New Neonatal (NEO) Service Licenses Issued

Since FY 2009 the total number of commercial service licenses issued has increased:

- **80%** increase in BLS
- **63%** increase in SCT
- **200%** increase in NEO

70 Intra-Cycle Vehicle Licenses Issued

- **11** Semi-Annual Vehicle Licenses
  - o **8** BLS
  - o **3** ALS
- **35** New Vehicles Added
  - o **26** BLS
  - o **5** ALS
  - o **4** NEO
- **24** Vehicle License Changes
  - o **21** Licensing Transfers (BLS to BLS, ALS to ALS)
  - o **3** Licensing Upgrades (BLS to ALS, SCT to NEO)

Since FY 2009 the total number of commercial ambulances operating has increased:

- **28%** increase in BLS
- **22%** increase in ALS
- **109%** increase in NEO

Annual Inspections 2013:

41 Commercial Ambulance Licenses Issued (BLS, ALS, SCT, NEO, AIR)

- **37** Ground Ambulance Services
  - o **9** BLS
  - o **14** ALS
  - o **5** SCT
  - o **9** NEO
- **4** Air Ambulance Services

442 Vehicles Inspected and Licensed

- **276** BLS
- **143** ALS
- **23** NEO

Due to the ever-changing dynamic of the commercial ambulance industry and its trending growth, the State Office of Commercial Ambulance Licensing and Regulation (SOCALR) saw the need to bring on additional staffing to continue its mission of ensuring patient and provider health, safety, and welfare along with maintaining the mission and vision of MIEMSS. SOCALR is now staffed with two full-time employees (Director and Licensing Specialist) and four part-time contractual employees (Ambulance Inspectors). In addition, SOCALR, working collaboratively with University of Maryland, Baltimore County, has had the opportunity to add emergency health services interns to our team who have been instrumental in completing various scanning projects and researching potential replacement database systems. They have also been given exposure in inspections during the annual re-licensure process.

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 transports, both domestic and international, for admission to some of Maryland's finest hospital systems. 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 (EMSC) Program by promoting ambulance transport safety and committing to providing pediatric educational opportunities such as the S.T.A.B.L.E. Program (more information can be found in the EMSC report on page 10).

The SOCALR team also remains committed to serving with the Field Operations Support Team (FOST), assisting with the emergency operations effort throughout the state and coordinating commercial resources when required for emergencies 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 25 out of the 41 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.

SOCALR, Commercial Ambulance Service Advisory Committee (CASAC), and its stakeholders recognized the importance and need for a special subcommittee to review existing COMAR regulations that address neonatal (NEO) transports. This committee unanimously approved creation of the NEO Subcommittee, which consists of representatives from neonatal transport teams, designated perinatal centers, and esteemed colleagues with specific knowledge and background regarding neonatal transports. The NEO Subcommittee completed its review of current neonatal regulations and submitted recommendations for changes to CASAC. The recommendations were unanimously approved by CASAC and forwarded to the State EMS Board for final approval. These regulations have been promulgated and will become effective in early September 2014. This process has been a major accomplishment for both CASAC and SOCALR.

In addition, SOCALR, along with the State Board of Nursing, Assistant Attorney General's Office, and other stakeholders developed nursing board regulations pertaining to requirements of transport nurses. These went into effect in March 2014.

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 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/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
- Frederick Memorial Hospital
- Greater Baltimore Medical Center
- Holy Cross Hospital
- Howard County General Hospital, JHM
- Johns Hopkins Bayview Medical Center
- The Johns Hopkins Hospital
- 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
- 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 6,230 primary trauma patients from June 2013 to May 2014, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data in various categories.) During the same time period (June 2013-May 2014) the Center had a 96% survival rate of the 9,390 patients received. Over this 12 month period, 82% of patients admitted to the Shock Trauma Center arrived by ground transportation and 18% arrived by air. Demographic data obtained indicate that the majority of admissions were male (65%) and aged 15-35 years (38%), followed by patients aged 56 or older (32%) and 36-55 (29%). 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, holds the position of Chief of Critical Care and Deborah Stein, MD, MPH, FACS, FCCM, holds the role of 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 are standing by 24/7 to receive, resuscitate, stabilize, and treat those whose lives are threatened by time-sensitive injury and illness including, but not limited to, thoracic, intra-abdominal, and facial trauma; spinal cord and column injuries; brain injury; and acute complex orthopaedic 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

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	

care services, active research, didactic and hands-on clinical education, and prevention programs.

The Trauma Center's physical plant covers 340,000 square feet, including the newly expanded Critical Care Tower. The Trauma Center 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
- Neurotrauma unit consisting of 14 critical care beds and 20 intermediate care beds
- Critical Care Resuscitation Unit with eight dedicated beds
- Comprehensive radiology service 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

Shock Trauma continues to be the nation's premier trauma center, advancing care and developing new life-saving techniques. It also serves as a referral center for Maryland in neurotrauma and hyperbaric medicine.

GO-TEAM

The Trauma Center maintains an advanced resuscitative team capable of responding to the scene of seriously injured patients. This physician-led team complements Maryland's Statewide EMS System by providing critical care and surgical services typically considered beyond the scope of prehospital emergency care providers.

Scene incident commanders may request a GO-TEAM response for patients with suspected life-threatening injuries when extrication times are estimated to exceed one hour. In situations where preliminary reports suggest that a victim's condition may require the GO-TEAM, but the extent of the rescue operation is unknown, a request can be made to put the team on alert so as to reduce the team's eventual response time.

When dispatched, the GO-TEAM serves as a specialized component of Maryland's EMS system. The GO-TEAM is comprised of an attending physician (anesthesiologist, surgeon, or critical care medicine specialist) and a certified registered nurse anesthetist. Team members undergo a core training curriculum that includes field surgical care, State EMS protocols, scene safety, helicopter safety, hazardous materials awareness, radio communications, incident command, vehicular rescue, emergency vehicle operations, and field operations.

The GO-TEAM works closely with on-scene emergency medical and rescue personnel to provide patient care.[1] In an effort to maintain preparedness and an excellent working relationship with our EMS colleagues, the members of the GO-TEAM will be embarking on scene-based extrication training in September 2014.

The Trauma Center is also available to develop individualized disaster or tactical response plans for regional EMS agencies or jurisdictions having specialized medical or rescue needs.

Training

Training is central to the mission of the Shock Trauma Center. The Surgical Critical Care (SCC) Fellowship Program at the R Adams Cowley Shock Trauma Center, University of Maryland, is the largest Accreditation Council for Graduate Medical Education (ACGME) training program in the country. It finishes eight fellows annually, as well as Acute Care Surgery and Emergency Critical Care fellows. The specialty continues to experience a surge in the number of applicants over the past six years, and the number of filled positions has more than doubled (from 66 to 139). The Program remains at the forefront of approximately 100 SCC Programs, as we have matched our 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 Trauma Center offers fellowships in SCC (8 positions), Anesthesiology

[1] *A detailed list of the capabilities of the GO-TEAM is available at www.umm.edu/programs/shock-trauma/professionals/ems/go-team.*

(2), Orthopaedic Surgery (5), Emergency Medicine (4), and Acute Care (1).

The ACGME-accredited University of Maryland Orthopaedic Traumatology Fellowship is considered by many to be the foremost Orthopaedic Trauma Fellowship worldwide. Alumni of the Fellowship currently lead trauma care and orthopaedic education at numerous centers around the world. The primary goal of the Fellowship is to educate orthopaedic 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 Shock Trauma Center as the training site for both students and course instructors for the State of Maryland. Throughout the calendar year, a core of both critical care and surgical skills training courses are offered to providers throughout Maryland, the country, and the world. A strong collaboration has been forged with the University of Maryland School of Medicine in offering advanced training in critical care and trauma care to medical students.

Advanced Trauma Life Support® (ATLS®) (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. It is currently offered in a number of states as well as internationally. In collaboration with The Johns Hopkins Hospital, the Shock Trauma Center is one of the few facilities to hold monthly ATCN courses. Claudia Handley, RN, MBA, MSN; Susan Ziegfeld, MSN, CRNP; and Elwood Conaway, BSN, CCRN, CEN, are the course directors.

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. Beginning May 1, 2014, Basic Endovascular Skills for Trauma (BEST) was added to our line of surgical skills training courses and will be conducted bimonthly at the Shock Trauma Center. The First Annual Resident Day, an eight-hour program of didactic sessions with the focus on physician in-training education, was held in FY 2014.

Claire C. Leidy serves as the ATLS®, ATOM®, ASSET®, and Trauma Evaluation and Management (TEAM) Program Coordinator for the Maryland Committee on Trauma.

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

Shock Trauma's Institute for Critical Care and Trauma Education has a 10,000 square foot medical simulation area with four reconfigurable labs and three adjacent classrooms and debriefing areas. The reconfigurable nature of the simulation labs optimizes space and allows each of the labs to present an environment that is unique to each class, ranging from basic individual skills training to multiple team-based courses focused on inter-professional education throughout the hospital system. The simulation center will support the development, implementation, and continuous evaluation of many certification and non-certification courses related to trauma and critical care management.

Shock Trauma and Anesthesiology Research-Organized Research Center

The Charles "McC" Mathias, Jr., National Study Center for Trauma and Emergency Medical Systems (NSC) is now part of an Organized Research Center (ORC). The Shock, Trauma, and Anesthesiology Research (STAR) ORC is the first research center in the nation dedicated exclusively to the study of trauma and its complications and prevention. STAR encompasses the research activities of the University of Maryland School of Medicine's Program in Trauma and Department of Anesthesiology, along with the existing NSC. In FY 2014 the annual extramural funding generated by STAR was over $11.5 million.

The efforts of the STAR-ORC are focused on clinical research trials on prospective and retrospective studies of resuscitation and treatment of the injured, especially victims of neurotrauma. The Crash Injury Research and Engineering Network (CIREN) focuses on automotive safety and design based on in-depth engineering analysis of automotive crashes. STAR-ORC serves as a test bed for emerging technologies such as telemedicine initiatives and military field-testing of resuscitation, offers an integrated pre-clinical translational research program focusing on central nervous system injuries, and collaborates with the military through its Center for the Sustainment of Trauma and Readiness Skills (C-STARS) program.

As part of STAR's portfolio, the research program at the Shock Trauma Center is an integrated multidisciplinary program that seeks to address issues affecting trauma patients. Shock Trauma Center researchers

participate in large national and international multi-institutional projects, some of which are funded by the National Institutes of Health, the US Department of Defense (DoD), and various industry sponsors. The US Air Force is a major sponsor of research at STAR with 15 projects funded for over $9.4 million, 13 of which are still active. Clinical projects conducted at the Trauma Center funded by the US Air Force included the construction of a state-of-the-art simulation center, a study of continuous noninvasive monitoring, the development of predictive triage indices for outcome following trauma, and predicting blood product needs using prehospital vital signs. Overall, there were 19 newly-funded projects at STAR in FY 2014, 10 of which actively involve patients at the Shock Trauma Center. For additional information pertaining to research at the Shock Trauma Center, refer to the section on the NSC (pages 90 to 92).

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 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 DoD to benefit both military and civilian trauma patients. A total of 198 C-STARS trainees rotated through the Trauma Center in FY 2014.

Pragmatic, Randomized Optimal Platelet and Plasma Ratios Study

The objective of the Pragmatic, Randomized Optimal Platelet and Plasma Ratios (PROPPR) study, currently underway at the Trauma Center, is to conduct a Phase III multi-site, randomized trial in subjects predicted to have a massive transfusion, comparing the efficacy and safety of 1:1:1 transfusion ratios of plasma and platelets to red blood cells (the closest approximation to reconstituted whole blood) with the 1:1:2 ratio. The study is being conducted at 12 Level I Trauma Centers across North America. The PROPPR study is funded by the National Heart, Lung, and Blood Institute and US DoD.

Membership in Regional and National Organizations and Leadership Roles

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

Dr. Thomas Scalea is the President-elect 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. 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 Orthopaedic Trauma Association. Dr. Robert O'Toole is the Co-Chair of the Program Committee for the Orthopaedic Trauma Association.

Karen Doyle, RN, completed her year as the President for the STN and is a member of the State Emergency Medical Services Advisory Council (SEMSAC). She is also a Delegate of the Roundtable for Critical Care Policy. 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-elect of the organization. She also serves on the AACN Certification Corporation. Tara Reed Carlson, MS, RN, is the Vice-Chair for the Maryland Trauma Center 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 is 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. In FY 2014 the Trauma Observation Program hosted 132 individuals from the United States and 26 other 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 Emergency Medical Services (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 12 months a year, is to give prehospital providers a better understanding of the relationship between prehospital procedures and definitive treatment in the hospital.

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 both didactic (classroom) and hands-on training in a cadaver lab supervised by Shock Trauma clinical staff and educators. In fall 2014 the Advanced Airway Course will be augmenting its clinical education by adding high fidelity simulation.

The EMS Office staff offers ongoing educational opportunities for prehospital providers. In FY 2014, eight evening educational programs open to prehospital and hospital care providers were held and could be linked via live broadcasts to 14 remote sites across the state; additionally, three counties returned to broadcasting. Tours were given to 22 groups of EMS providers. An ALS Advanced Airway Cadaver Skills course trained 168 EMS providers in 11 labs. The Observation Program provided experiences for 136 EMS providers in the TRU and 156 EMS providers in a critical care unit. Twenty-one onsite clinical educational programs were held at firehouses, training academies, and regional EMS conferences. In addition to the local and regional EMS conferences, the 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.

The EMS office and nursing staff of the trauma center have partnered with the Baltimore City Fire Department and assisted with providing education to over 120 providers in the ALS program.

Center for Injury Prevention and Policy

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 Carlson, MS, RN, 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. The high school trauma prevention programs are specifically tailored to address teens and young adults to reduce the preventable injuries that affect them. 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 NSC; and private businesses to keep all citizens safe from preventable injury.

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. Its primary focus areas and programs are based on morbidity and mortality data. Educational programs include the prevention of fire, pedestrian safety, and child passenger safety.

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. ***The Violence Intervention Project (VIP)***, led by Carnell Cooper, MD, FACS, 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.

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.

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 University of Maryland Medical Center campus.

The Trauma Prevention Program holds assemblies at high schools throughout Maryland focusing on impaired and/or distracted driving. The assembly opens with a slide presentation about the Shock Trauma Center then one of three video presentations produced by the CIPP team. "Get the Message" addresses distracted driving, specifically illustrating the fatal impact of a single text message on a young driver and her friends. "Someone Like You" emphasizes the very real possibility of being a victim in an impaired driving collision. "Sean" deals with a 17-year-old high school student who suffered severe brain trauma and eventually death after driving while impaired. Following the video, a team of nurses engage students in a discussion around smart decision-making and open the floor to student questions and comments about trauma prevention, impaired driving, and distracted driving. Students learn the consequences of impaired and distracted driving, along with 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 2014 the CIPP presented 125 programs reaching 18,500 high school students and community members with important prevention messages.

The CIPP has spread the message of the dangers of distracted driving to teens and young adults with the help of the Maryland Motor Vehicle Administration (MVA) Driver Education Programs. In accordance with MVA requirements, all new drivers must complete a driver's education course consisting of a minimum of 30 hours of classroom instruction and 6 hours behind-the-wheel training. Driver education instructors dedicate a portion of the curriculum to teach students the dangers of distracted driving. In the fall of 2012, it became mandatory that the "Get the Message" video be part of a distracted driving curriculum and shown to all new drivers in Maryland, demonstrating how CIPP is helping to drive public health policy in Maryland.

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 2014 more than 290 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 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 2014, 632 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 de-

signed 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 2014 the program presented 27 courses serving 1,412 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. Multidisciplinary services offered by the TSN include:

- Patient and Family Handbook providing practical information about the Shock Trauma Center and what patients and families can expect in the hours and days after injury
- Peer Visitation Program that links currently hospitalized trauma patients with specially trained volunteer trauma survivors who provide support, encouragement, and insight
- Peer Support Groups that allow trauma survivors to connect and learn from one another
- The NextSteps Program, which focuses on the concept of self-management to enhance survivor skills and educate the recovering trauma patient to better manage daily challenges
- Traumapedia for individuals to learn from experts about common injuries and treatments
- Family Support Groups to help family members prepare for the transition to the role of caregiver by providing essential resources, information, and support
- On-line Community Forum for trauma patients and their families to connect with one another, share experiences, and provide support and hope to others

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 2014 the TSN coordinated/presented 200 in-person programs that served 1,340 individuals and raised program awareness and participation through 1,275 in-patient contacts.

Level I

The Johns Hopkins Hospital, Adult Trauma Center

Located in Baltimore City, The Johns Hopkins Hospital Adult Trauma Center received 1,822 trauma patients from June 2013 to May 2014, 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. Christine Hearn, MSN, RN, ACNS-BC is the Trauma PI Coordinator. Elliott R. Haut, MD, PhD; Adil H. Haider, MD, MPH; Kent A. Stevens, MD, MPH; Albert Chi, MD; and Catherine Velopulos, MD, MHS, are the division's full-time trauma surgeons. Rob Leeper, MD, retains a part-time position while completing a Master's Degree in Simulation-Based Education. Sheri Kardooni, MD, MPH, and Cory J. Vatsaas, MD, are the Trauma/Acute Care Surgery Clinical Fellows. 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. With the opening of the Sheikh Zayed Adult Patient Care Tower two years ago, The Johns Hopkins Hospital Level I Trauma Center has been able to provide expanded trauma capabilities that include 6 state-of-the-art trauma rooms; a radiology suite with CT, MRI, and ultrasound; 96 intensive care beds; and 33 new operating rooms. This brand new facility has brought our capability to care for the injured patient to new heights.

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 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 to improve care of the injured 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. The patient was able to have 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 future 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 UAE; and participation in the WHO Global Alliance for Care of the Injured.

As Director of the Center for Surgery Trials and Outcomes Research at Johns Hopkins School of Medicine, Dr. Adil Haider has received national attention for his research into understanding the mechanisms that lead to racial disparities in trauma outcomes. Dr. Haider was recently funded by the National Institutes of Health for a four-year Mentored Patient-Oriented Research Career Development Award.

Dr. Elliott R. Haut recently completed his PhD in Clinical Investigation at JHSPH. His dissertation was titled *Preventable Harm from Venous Thromboembolism (VTE) – A New Metric for Quality of Care*. He 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, 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 Meeting.

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

[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/*

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 EAST, the premier organization publishing guidelines of trauma care, serving as the chair of the Guidelines Committee. These guidelines are freely available to all interested in trauma care at www.east.org. 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 from the curricula of the ACS Committee on Trauma. 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*[2] who published that 50% of trauma patients screen positive for alcohol use and ASBI is an effective means to decrease trauma recidivism.

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. Christine Hearn, in combination with Adult Trauma social workers, 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 serves as the current Chair of the Maryland Trauma Center Network (TraumaNet); Kathy Noll serves as Treasurer of TraumaNet, Chair of the Maryland Trauma Registry/Education/Prevention Committee, and Maryland State Chair for the Society of Trauma Nurses. Dr. Adil Haider continued to provide leadership for the Partnership for a Safer Maryland as a member of the Advisory Board.

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 1,583 trauma patients into the Maryland State Trauma Registry from June 2013 to May 2014. (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 two 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 JHBMC Trauma Program provides patient-centered comprehensive care to all trauma patients utilizing a team-oriented, multidisciplinary approach. Under the

[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.*

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 and institutional needs.

The focus of the JHBMC Trauma Program is to provide high quality care to the acutely injured patient through collaborative research and the application of evidence-based practices. The JHBMC Trauma Program utilizes a multidisciplinary approach to the management of the adult trauma patient and the community as a whole. Dedicated support from emergency medicine, anesthesia, orthopaedic, neurosurgery, plastic surgery, and rehabilitation department providers, nurses, and support staff is evident and ensures that JHBMC achieves this goal.

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 voluntary 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% for the past four years.

Community outreach and injury prevention, as well as clinical education for acute care professionals and prehospital providers throughout the region, are important to the JHBMC Trauma Program. Many existing programs continue to serve these health care colleagues and the community, including:

- Topics in Emergency Medicine (course offered twice a year for prehospital providers to obtain continuing education credits)
- On-site clinical training for prehospital providers in all areas of the hospital
- Paramedic student education (offered twice a year)
- 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 2015. Key hospital departments, such as Executive Leadership, Geriatrics, and the Trauma Division, have developed strategies and tactics to implement a comprehensive plan in our community.

The Trauma Division identified the ability to screen ambulatory patients for fall risk using EPIC medical record software. A collaborative committee implemented the process to screen and identify patients at risk of falling in our Geriatric Outpatient clinic in May 2014. To date over 530 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 educational pamphlet *"What YOU Can Do to Prevent Falls,"* sponsored by the Centers for Disease Control and Prevention, standard in their discharge instruction packets. This campaign will touch over 24,000 inpatients discharged from JHBMC each year.

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. According to the Maryland State Trauma Registry, Prince George's Hospital Center (PGHC) received 3,431 trauma patients from June 2013 through May 2014. (See pages 73 to 78 for additional patient data.)

The Trauma Service at Prince George's Hospital Center brought on a new Trauma Medical Director, R. Sean Benoit, MD, in July 2013. Gabriel Ryb, MD, MPH, FACS, serves as the Assistant Medical Director. Dr. Benoit and Dr. Ryb both hold Clinical Appointments at the University of Maryland School of Medicine. Sandra Waak, RN, CEN, is the Trauma Program Manager and Deborah Brown, RN, is the Assistant Department Manager and is in charge of Performance Improvement. Data collection is supported by two Trauma Registrars and a Registered Nurse Trauma Registry Coordinator.

The Prince George's Hospital Center is the primary adult trauma center for Prince George's, Calvert, Charles, St. Mary's, and Southern Anne Arundel Counties. Several areas within Montgomery and Howard Counties, as well as the eastern region of Washington, DC, are also included in its trauma care catchment area.

The Trauma Service at Prince George's Hospital Center (PGHC) was excited to begin the new fiscal year with a new Trauma Director. Dr. Benoit comes to us from Hahnemann University Hospital in Philadelphia, but he is no stranger to the Washington, DC area. He did his Trauma/Surgical Critical Care Fellowship at the R Adams Cowley Shock Trauma Center, University of Maryland, in Baltimore and his Surgical Residency at Howard University Hospital in DC. He has also worked as a Trauma Surgeon and Surgical Intensivist at Inova Fairfax Hospital in Falls Church, Virginia, and as a Senior Director working to improve the performance of

health care organizations while at the Advisory Board Company in DC. Since starting here one year ago, Dr. Benoit has already effected change. The Trauma Service has revamped the Trauma Multidisciplinary Committee, which is now meeting more frequently and includes the attendance of EMS representatives from Prince George's County, the Maryland State Police (MSP) Aviation Command, and DC EMS. Dr. Benoit has also been a key member of the Hospital Throughput Committee that has recently streamlined the process of getting admitted critical care patients out of the emergency department and into a critical care center bed more quickly and efficiently.

Prince George's Hospital Center trauma volumes remain steady. We continue to see a rise in the number of senior citizens sustaining injuries, especially from falls. Overall emergency department (ED) volumes have begun to rise. Under the new University of Maryland Medical System (UMMS) ED physician leadership, the median "door to first provider" time has been cut by more than half and the number of patients that have left without being seen has also dropped significantly. The PGHC ED has also been able to successfully decrease EMS diversion times. Our Yellow Alert time (ED volume overload) has been trending down, meaning our doors are open to ambulance traffic with greater frequency.

The ED has made continual improvements in reportable core measures, including our care of patients with pneumonia, stroke, and those with chest pain and ST-elevation myocardial infarctions. PGHC is proud to have achieved "Top Performer" status for the 4th quarter of 2013 as part of the Maryland Hospital Hand Hygiene Collaborative. Hospitals that are considered Top Performers have a minimum 90% overall hand hygiene compliance rate for three consecutive months.

In addition to the care we provide within the hospital, a new focus has been placed on providing holistic care in conjunction with community providers, 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, including clinics, individual physicians, and the Prince George's County Health Department. The ED has developed focused, multidisciplinary care plans for individuals who frequently present to the department in an effort to improve their health, access to care, and health literacy.

Prince George's Hospital Center was excited to be involved in the "Gift Card for Guns" Injury Prevention initiative that took place over two Saturdays in December 2013. During the gun buy-back events, the Trauma Center, under Dr. Benoit's direction, partnered with the First Baptist Church of Glenarden, The Tabernacle Church in Laurel, Prince George's County Police, MSP, the National Association for the Advancement of Colored People (NAACP), Prince George's County District 1 (Councilwoman Mary Lehman), the Prince George's County Department of Corrections, and the Prince George's County Youth Strategies Division. Over the two-day event, nearly 250 guns were turned in to the police and exchanged for gift cards. There are now fewer guns on the streets of Prince George's County available to cause injury or death. This event could not have been nearly so successful if not for our community partners. We are hoping for continued community support in order to make this an annual event.

In July 2011 the State of Maryland, Prince George's County, and Dimensions Healthcare System (DHS) reached a partnership agreement, through a Memorandum of Understanding (MOU), with UMMS and the University System of Maryland to develop a comprehensive plan to strengthen health care in Prince George's County. The MOU parties are committed to developing a regional health care system for the County and Southern Maryland region that will promote public health and consider population health management principles.

This partnership continues to move forward. PGHC's relationship with UMMS physicians continues to grow larger and get stronger. The ED has now been staffed by the Emergency Physician Group of UMMS, Maryland Emergency Medicine Network, for almost two years. The orthopaedic department added two additional trauma physicians within the last two years, and this year we added several new UMMS physician leaders: Dr. Imran Siddiqi, Chair, Department of Critical Care; Dr. Alan Harvey, Chair, Department of Anesthesiology; and Dr. Jamie Brown, Medical Director of Cardiac Surgery.

Approval is expected in FY 2015 for the system to begin construction of a replacement hospital to be built at the Largo Town Center, a location right off the Capital Beltway and easily accessible via the Largo Town Center Metro Station. The plan is for DHS to operate the Prince George's Regional Medical Center as an affiliate of UMMS; however, those details are still being worked out.

The staff of Dimensions Healthcare System and Prince George's Hospital Center are excited about the vision and commitment to superior health care in the county by the Governor, Lt. Governor, Prince George's County Executive and County Council, and the Prince George's County community. We look forward to continued growth in our relationship with the University of Maryland Medical System and the University System of Maryland 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 1,576 trauma patients from June 2013 through May 2014, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data.)

Dr. Thomas Genuit, MD, MBA, FACS, served as Trauma Director from 2003-2013 and as Head of the new Division of Acute Care Surgery, Trauma and Critical Care, from 2012 until present. Dr. Hashim Hesham, MD, joined the Trauma Center at Sinai Hospital, from the Albany University Medical Center, as the new Medical Director for Trauma in October 2013. Lauren Smith, MSN, ACNP, continues (since 2012) as the Trauma Program Manager. Ms. Smith has significant experience as a Critical Care Nurse Practitioner and educator at the University Of Maryland School Of Nursing and is now the Chair of the statewide Trauma Quality Improvement Committee. Her special interests lie in neurotrauma and performance improvement systems. Most recently the Trauma Center at Sinai Hospital has expanded its faculty contingent with two additional trauma and critical care trained surgeons: Dr. Habeeba Park of the R Adams Cowley Shock Trauma Center and Dr. Marcie Feinman of The Johns Hopkins Hospital Program in Trauma.

Along with the faculty expansion, the trauma center continues to have trauma/critical care trained and board certified or eligible surgeons available 24/7.

Over the past fiscal year, the number of trauma patients cared for by the Trauma Center at Sinai Hospital and their injury severity scores has remained relatively stable.

Quality of care is of the utmost importance to the Trauma Program at Sinai Hospital. Ongoing quality management is provided through weekly trauma case reviews by the Trauma Program Manager, Data Coordinator, and Trauma Medical Director; monthly departmental Continuing Medical Education (category I CME-approved) Trauma Morbidity and Mortality Conferences; and the monthly faculty peer-review meetings. The program now consistently uses the web-based Maryland Trauma Registry outcomes modules, has regular multidisciplinary and multispecialty peer-review meetings, and is implementing a streamlined communication system with EMS for feedback purposes.

The surgical residency program approved by the Accreditation Council for Graduate Medical Education (ACGME) is currently in its ninth year, with full accreditation. All residents and Physician Assistants/Nurse Practitioners are Advanced Trauma Life Support® (ATLS®) and Advanced Cardiovascular Life Support (ACLS) certified. 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 postgraduate III-V years.

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 Surgical 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 communications with EMS and its providers in the Greater Baltimore Metropolitan area.

In an effort to maintain a state-of-the-art facility at Sinai Hospital, the hospital has recently received funds to renovate and improve the ED-7 trauma bay areas. In addition, the emergency department is currently undergoing significant expansion and renovation, which will lead to improved patient flow and time to treatment.

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 Greater Baltimore Metropolitan area.

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 back-up support to Frederick, Washington, and Prince George's Counties.

From June 2013 through May 2014, 1,486 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 Cathy Pierce, BS, 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 formal 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.

Meeting the 90 minute "door to balloon" time 100% of the time, Suburban Hospital is also a State-designated Cardiac Interventional Center. With strong support from the Heart, Lung, and Blood Institute of the NIH and Johns Hopkins Medicine, the hospital continues to offer easy access to cardiac surgery and other advanced cardiovascular treatment. Additionally, in spring 2014 Suburban received a full five-year re-designation as a Primary Stroke Center.

In the current health care environment, Suburban Hospital has also stepped up its efforts to meet new regulatory challenges related to patient flow, re-admission requirements, length of stay, decreasing reimbursement, and other significant requirements. As a result of new initiatives, the Clinical Decision Unit (CDU) opened its doors in the fall of 2012 with eight beds. This unit expanded to 18 beds as of March 2014.

To ensure that trauma and other vital health care services are available to the community at all times, the administration of Suburban Hospital remains fully committed to maintaining hospital diversion hours to a minimum. In that regard, the recent renovation of the Emergency Department Triage Area has helped tremendously with patient flow, providing improved accessibility 24/7 while offering safe, dedicated, and high quality trauma and emergency care to all patients.

Injury prevention–related activities 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 the immediate past Chair of the Maryland Trauma Center Network (TraumaNet) and a 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 November 2013 a four-hour seminar, "Critical Issues in Trauma," was held at Suburban Hospital Trauma Center. 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 over 250 trauma care providers including physicians, registered nurses, physician assistants, and EMS providers.

Level III

Meritus Medical Center Trauma Center

Key staff includes: Karl P. Riggle, MD, FACS, Director; Marc E. Kross, MD, PhD, FACS, Surgeon-in-Chief; Susie Burleson, RN, MSN, MBA, Trauma/EMS Manager; and Corey Thomas, LPN, Trauma Registrar. Located in Hagerstown, Maryland, the Trauma Center at Meritus Medical Center continues to provide trauma services to residents of Washington and Frederick Counties, Southern Pennsylvania, and the Eastern Panhandle of West Virginia. From June 2013 to May 2014, the center received 1,002 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.

Our EMS Partners

The Trauma Center 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 Trauma Center staff regularly attends EMS jurisdictional and MIEMSS Region II EMS Advisory Council meetings. Recently, Meritus Medical Center Trauma Center honored crews from Washington and Frederick Counties (Maryland) and Adams County (Pennsylvania) for outstanding EMS care.

Community Impact

The dedicated staff of Meritus Medical Center Trauma Center 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. The Trauma Center 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. The trauma program has also partnered with the Washington County Health Department to provide "Stepping On" classes to the elderly in Washington County to prevent falls. Each community has made an investment to ensure that it is a safe place to live, work, and visit.

Trauma Center staff members actively participate in Meritus Health's annual Medical Academy for high school students interested in medical careers. Students spend a week taking part in activities that would provide care to a trauma patient including shadowing EMS teams, flight crews, and staff from various units such as the operating room, emergency department, physical therapy, laboratory, and infection control.

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

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

nity groups. Dr. Kross served on the planning committee for the Maryland Committee on Trauma Symposium and was on the faculty for numerous EMS case presentations.

The W. L. Riggle Memorial Trauma Nurse Education Fund continues to provide scholarship money for trauma nursing continuing education.

Trauma Center staff celebrated Trauma Awareness Month (May) with an art contest for Washington County elementary school students on summer safety. To further celebrate the contributions and dedication of the Trauma Center 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 1,213 trauma patients from June 2013 to May 2014, according to the Maryland State Trauma Registry. (See pages 73 to 78 for additional patient data.) 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. In addition to being designated as a Level III Trauma Center, PRMC is also a Joint Commission on Accreditation of Healthcare Organizations (JCAHO)-certified Acute Myocardial Infarction (AMI) and Stroke Center, as well as a Maryland Primary Stroke Center and Cardiac Interventional Center.

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 2014, 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 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. In June 2013 and 2014, trauma department 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. In 2012 PRMC trauma department 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-fourth 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.

Educational classes for EMS providers from Worcester, Wicomico, and Somerset counties continued to be provided by PRMC in FY 2014. Classes for Pediatric Education for Prehospital Providers (PEPP), Prehospital Basic Trauma Life Support (PHBTLS), Advanced Life Support (ALS) Paramedic Re-certifications/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 the Medical Center 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 received 640 patients from June 2013 to May 2014, 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, RN, MS, MsEM, is the Trauma Services Program Manager; and Kathy Witt is the Trauma Services Registrar.

In FY 2014 Western Maryland Health System Regional Medical Center's Emergency Department welcomed nearly 53,000 patients through its doors, 640 of whom were trauma patients. Also in 2014, the Trauma System was granted a full five-year designation as a Level III Center by MIEMSS.

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, and surrounding areas. The system actively participates in providing community health education and prevention activities. Programs presented by the Trauma Services at health fairs include injury prevention activities on issues specific to our region such as all-terrain vehicle safety, motor vehicle safety, and child passenger safety. A recent example of this community awareness on trauma is an initiative between the Trauma Service and the WMHS Foundation that allows multiple small groups of 10 to 12 an opportunity to tour the Trauma Center. This tour is headed by the CEO or CMO of the hospital 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 WMHS Trauma Center. This inside look at the Trauma Center has met with rave reviews from those attending, many of whom are former trauma patients.

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.

Elizabeth Wooster, RN, 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 34,000 students since its inception. "Watch Your Step" is an injury prevention lecture that is focused on our senior citizen population and was presented to 4,734 seniors in Western Maryland, West Virginia, and Pennsylvania during FY 2014.

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

A new partnership between law enforcement, EMS, and the hospital 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 a full-time and part-time Forensic Nurse Examiner (FNE) who work very closely with local law enforcement and the Domestic Violence Advocate at the local District Attorney's office and act as a resource to all employees and patients of WMHS on domestic violence issues. The FNE 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 Emergency Medical Services 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 act as the Base Station Coordinator facilitating communication between hospital and prehospital personnel, 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.

Moving forward into 2015, with the selfless commitment of our staff, Western Maryland Health System will continue to provide superior care to our citizens of Western Maryland and the surrounding communities.

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 an American Burn Association verified Burn Center 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 2013 from both national and international Burn Centers.

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. Kelly Krout, DNP, MS, RN, is the Patient Care Manager for the Burn Center and the Surgical Intensive Care Unit. (See pages 79 to 81 for additional patient data.)

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 Coordinator for the Burn Center. Many programs currently exist to serve 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 the Critical Care Service, Nursing Department, Burn Nutrition, Burn Rehabilitation, Psychology, and 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.

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

Johns Hopkins Children's Center

From June 2013 to May 2014, the Pediatric Burn Service at Johns Hopkins Children's Center treated 393 children with severe burn injuries, with 182 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.

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. This includes pediatric burn surgeons, pediatric intensivists, pediatric plastic and reconstructive surgeons, pediatric infectious disease specialists, and a dedicated pediatric pain service. This acute care team is capable of taking care of the most severely burned child.

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

Dr. Dylan Stewart was named the Director of the Pediatric Burn Center in 2014. A pediatric surgeon, Dr. Stewart has focused on acute burn care and management for over five years at Johns Hopkins, and leads the burn team through all stages of the child's resuscitation, acute burn surgery and grafting, and the long term recovery and rehabilitation in outpatient care. Together with Co-Director Dr. Richard Redett, they provide all aspects of acute and reconstructive pediatric burn surgery.

Susan Ziegfeld is a Master's prepared Nurse Practitioner who serves full time as the Burn Program manager. Also added to the team in 2014 was Lisa Puett, BSN, who took over as Quality Improvement Coordinator.

Lauren Davis, MSW, is now in her second year as our Burn Injury Prevention (IP) Coordinator, and has brought a tremendous new drive to our initiatives. Ms. Davis provides injury prevention education for patients and families in the Children's Center. Education is geared toward the individual child's age and developmental level. While the IP Coordinator is able to discuss a range of safety topics, such as burn prevention, fireworks safety, etc., the majority of her time is spent meeting with families who have suffered a burn-related injury. The IP Coordinator provides brief counseling, printed educational materials, and makes referrals to the Children's Safety Center (CSC) and community resources. The IP Coordinator is active in the outpatient setting in the Rubinstein Building, attending burn clinic twice a week. She is also an integral part of the Burns Late Effects Clinics, helping families identify barriers to safety within the home and provide solutions.

Leading safety outreach efforts for the Children's Center, the IP Coordinator's responsibilities include:

- Managing the community outreach calendar
- Ensuring safety messages are accurate, evidence-based, and streamlined across institution/staff
- Establishing relationships with community partners to bring injury prevention education to at-risk, target populations
- Training staff to lead burn-related injury prevention activities for children

The IP Coordinator works with the Office of Public Affairs to create website, social media, and newsletter alerts pertaining to childhood burn prevention and additional burn education. Topics range from cooking safety to fireworks safety. The IP Coordinator also conducts a staff trivia competition during Burn Prevention Week to raise staff awareness of burn mechanisms, household risks, prevention tips, and resources to share with families on their units.

As well as the expansion of our injury prevention programs, significant basic science investigations have begun in the past year. Dr. Deepa Kattail, working with the laboratory of Drs. Srinivasa Raja and Yun Guan, is establishing an acute rodent burn model to evaluate and study the effects of burn pain and possible therapeutic interventions.

In FY 2014 the Pediatric Burn Center also joined the Eastern Regional Burn Disaster Consortium. The purpose of this consortium is to bring together twenty-seven burn centers from Maine to Maryland to assist one another in the event of a mass casualty burn incident.

Both Dr. Stewart and Ms. Ziegfeld became active members of the American Burn Association (ABA) in 2014, and Dr. Stewart became an instructor for the Advanced Burn Life Support class offered by the ABA. With the support of our new Surgeon-in-Chief for the Children's Center, Dr. David Hackam, we plan to apply to become an independent ABA Pediatric Verified Burn Center within the next year. We believe we now have all the components necessary to achieve this prestigious verification, and our burn center will continue to improve the quality of care delivered to burned children from Maryland and beyond.

Pediatric Burns

Children's National Health System

From June 2013 to May 2014, Children's National Health System, as a pediatric burn specialty referral center, treated 863 children from Maryland. Forty Maryland children with burn injuries were admitted as inpatients. (See pages 86 to 89 for additional pediatric burn data.) Randall S. Burd, MD, PhD, is the Chief of the Trauma and Burn Services; Jennifer Fritzeen, MSN, RN, PCNS-BC, is the Trauma and Burn Program Manager; Amy Wright, BSN, RN, is the Trauma and Burn Clinical Coordinator;

Katherine Worst, MSN, CPNP, Elizabeth Leachman, MSN, CPNP, Catherine Walsh, MSN, CPNP, and Elizabeth Waibel, MSN, CPNP, are the Trauma and Burn Nurse Practitioners; Sally Wilson, BSN, RN, is the Injury Prevention, Education, and Outreach Coordinator; Elizabeth Carter, PhD, is the Trauma Epidemiologist; and Yu Yan, MSN, RN, is the Trauma Registry Coordinator.

The Children's National Health System has served as a Pediatric Burn Center in the State of 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, 40 children from Maryland have been admitted to the Burn Service. The number of outpatient burn clinic visits totaled 611. In addition, 206 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 2014 there were 18 Maryland children who received burn wound care utilizing NORA.

Working jointly with the Safe Kids District of Columbia, Safe Kids USA, 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 cater for the specialized care of injuries to the hand, wrist, and elbow. In FY 2014, 1,442 patients with traumatic hand injuries were cared for at the 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 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 orthopaedic, plastic, and general surgeons in the field.

The Curtis National Hand Center and MedStar Union Memorial Hospital (www.medstarhealth.org/union-memorial) 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 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. Thirty percent of traumatic hand cases are transported through the MIEMSS system (public safety ambulance or medevac helicopter) (Chart 1). The addition of an onsite heliport in 2009 reduced travel time and improved the speed of intervention for the most critically wounded.

The Center's expertise in challenging bone and soft tissue trauma is supplemented by advanced microsurgery skills. The handling of fractures, complex soft tissue coverage problems, and amputations requiring replantation attempts continues to be the major focus of the Hand Surgery Service at MedStar Union Memorial Hospital.

The acute trauma unit is staffed by specialists in orthopaedic and plastic surgery with subspecialty training in hand and upper extremity surgery. The team is available 24/7 to respond to a variety of injuries ranging from severing or crush injuries to infections and animal bites. Most hand injuries treated at the Center are the result of accidents 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 white males over 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 National 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.

The Curtis National Hand Center at MedStar Union Memorial Hospital

Chart 1.
Transport Mode

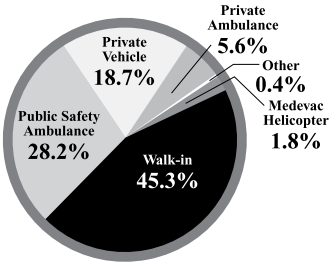


Chart 2.
Injury Type

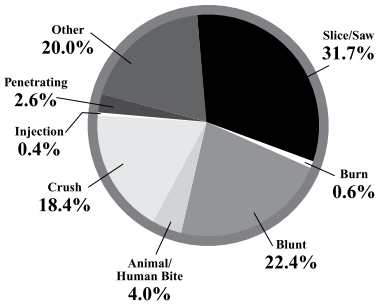


Chart 3.
Injury Location

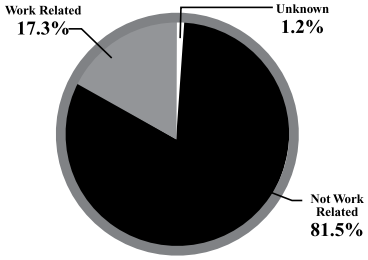
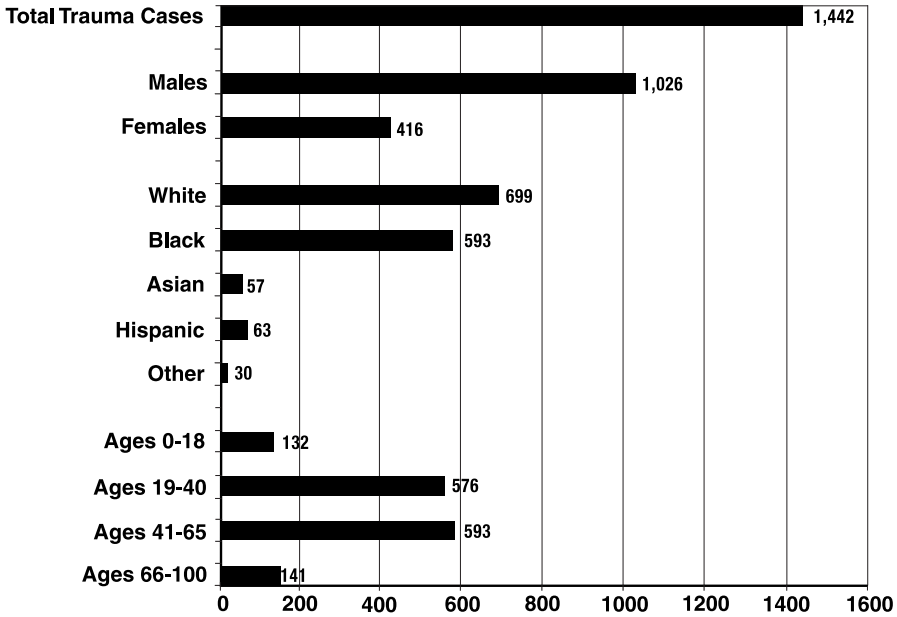


Chart 4.
MedStar Union Memorial Hand Trauma Demographics



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 the 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 experienced diving incidents, carbon monoxide poisoning, smoke inhalation, and gas gangrene. In CY 2013, 340 patients (both inpatients and outpatients) were treated at the Center. Over 200 patients were screened for carbon monoxide poisoning; 97 of those patients received therapeutic hyperbaric oxygen. 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.

This 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, our team of 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.

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

Since its founding in 1925, the Wilmer Eye Institute has always provided a dedicated eye trauma and emergency service to the citizens of Maryland and is the first statewide designated eye trauma center in the United States. The Wilmer Eye Institute of The Johns Hopkins Hospital 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 Wilmer Eye Institute is responsible for providing optimal management of severe eye injuries and conducting research of eye traumas. New treatment and procedures for eye trauma are also part of its goals. Michael P. Grant, MD, PhD, FACS, is the Director of the Center; Connie Chen is the Associate Director for FY 2015; and Shailaja Chopde, MSN, RN, is the Eye Trauma Coordinator.

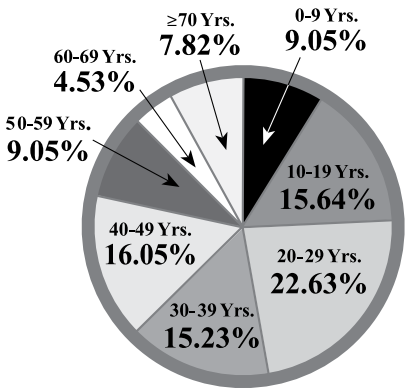
The Wilmer Eye Institute (WEI) has, for years, established itself as "the premier eye care center of the world," including eye trauma. The WEI has expertise in all aspects of eye diseases as they relate to eye trauma, including oculoplastic surgery, neuro-ophthalmology, pediatric ophthalmology, glaucoma, uveitis, retinal surgery, and eye pathology.

The WEI nurses have organized an eight-hour Ocular Trauma Workshop, offered quarterly to nurses within The Johns Hopkins Hospital, for which participants can earn six hours of CEUs. On June 13, 2014, the WEI Nurses coordinated the 31st Wilmer Nursing Conference, which was well attended by nurses, technicians, and other allied health professionals. The theme of this year's conference was "Setting Sight on Safety." The keynote speaker was

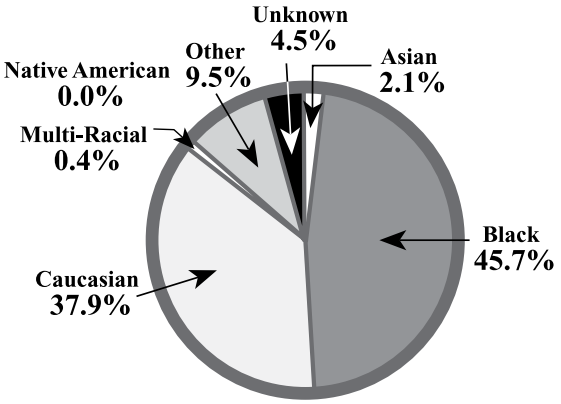
Wilmer Eye Instutute at The Johns Hopkins Hospital Demographics

(July 2013 - March 2014)

Age Distribution



Race Distribution



Note: Total number of patients reflected in demographic statistics is 243.

Paula S. Kent, the Patient Safety Coordinator at The Johns Hopkins Hospital.

Dr. Michael Grant is beginning his second year as president of the American Society of Ocular Trauma. He recently organized and chaired a three-day cadaver-based course, sponsored by the AO foundation, focused on treatment of orbital and midface fractures. Dr. Grant has been an invited speaker at several international meetings over the past year focused on ocular and orbital trauma, including the World Ophthalmology Congress, Tokyo, Japan; the Chinese Ocuplastic Society Annual Meeting, Nanchung, China; and the Malaysian Society of Plastic Surgeons, Kuala Lumpur, Malaysia. At the upcoming American Academy of Ophthalmology annual meeting, Dr. Grant is chairing a symposium on the management of orbital and ocular trauma and co-chairing an instructional course focusing on ocular trauma.

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

As the State's designated referral center for head and spinal 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 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 service 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

As a statewide clinical resource, the staff and faculty of the Neurotrauma Center avails its clinical and research expertise globally to health care providers.

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 2013 to May 2014, the Neurotrauma Center provided care to 1,676 patients with traumatic brain injury, 184 patients with spinal column or spinal cord injuries, and 402 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, decompressed craniectomies, and cranioplasties.

Patients with spinal cord injury, 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 orthopaedic 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*. Surgical interventions for spinal column injuries include discectomies, laminectomies, arthrodesis, and open reduction internal fixations.

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. 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 communities' understanding of severe head and spinal trauma. 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.

Pediatric Trauma Center at Johns Hopkins Children's Center

From June 2013 to May 2014, the Pediatric Trauma Center at Johns Hopkins Children's Center treated 860 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, now in its second year after the grand opening in April 2012. Our trauma team has settled nicely into the new, 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 fifth 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.

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 Johns Hopkins Children's Center (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 now 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. We provide instructors for the Advanced Trauma Care for Nurses (ATCN) program as well as the ATLS® program. Benefits of ATCN include an educational, collaborative, and synchronized team approach to trauma care with the participants of the concurrent ATLS® course.

We have had great success this year with our new collaboration with the advanced Johns Hopkins Simulation Center. Pediatric trauma simulations can now be performed in the Simulation Center, as part of a larger educational mission, as well as throughout the hospital. The simulations provide realistic teaching experiences and can be studied in an academically rigorous fashion to improve the quality of the teaching.

Lisa Puett, BSN, joined the team as our Trauma Coordinator, taking over the job performed so effectively by Katie Manger, BSN. Ms. Puett assumes day-to-day responsibility for process and performance improvement activities, as well as chairing the Performance Improvement Committee along with the trauma director. She also provides pediatric trauma education throughout the Johns Hopkins Children's Center, including orientation and ongoing educational activities for new trauma nurses. Ms. Puett coordinates and manages all protocols and policies that reflect evidence-based practices in pediatric trauma care.

Lauren Davis, MSW, had another very successful year as our Injury Prevention Coordinator. Ms. Davis is responsible for planning, evaluating, and maintaining all injury prevention programs. She has been very successful in multiple public awareness initiatives. For almost every outreach event, the Trauma Center generates media coverage through working with the Children's Center Public Affairs Team. The Public Affairs Team posts descriptions of our events along with injury prevention tips on the JHCC website and social media pages (including Facebook, YouTube, and Twitter). Media presence at local outreach events has helped to spread safety messages to a broader audience. Media representatives often interview safety experts and community members at events; participants share their personal experience, new knowledge, and received benefit. Ms. Davis also serves on the Baltimore Safe Kids Coalition. Throughout the year Safe Kids hosts community outreach events that increase public awareness of injury risks and educate families on household modifications that help prevent trauma and burn-related injuries, such as working smoke alarms.

The Children's Safety Center (CSC) continues to serve free, personalized education by a safety health educator, access to reduced-cost safety products, and specialized injury prevention services, such as car safety seat installations and checks. The CSC is a partnership between the Johns Hopkins Center for Injury Research and Policy and the Johns Hopkins Department of Pediatrics.

The Children are Safe (CARES) Mobile Safety Center is a 40-foot vehicle built as a house on wheels that has interactive exhibits and low-cost safety products. It travels to Baltimore City neighborhoods to teach parents and caregivers about the injury risks that children face at home, and ways to make the home a safer place. Led by the Center for Injury Research and Policy, CARES was created through a partnership with the Baltimore City Fire Department, the Maryland Institute College of Art, Maryland Science Center, and the Pediatric Trauma Center. Together, the CSC and CARES are significant resources for children and families for providing education and injury prevention supplies.

Pediatric Trauma Center Children's National Health System

From June 2013 to May 2014, the Children's National Health System, as a pediatric specialty referral center, treated 768 Maryland children for trauma injuries. Of these, 387 children had multiple trauma injuries, with 303 of the 387 brought directly to Children's National Health System through the Maryland EMS system. A total of 84 trauma patients were transfers to Children's National after stabilization in another emergency department. (See pages 82 to 85 for additional pediatric trauma data.) The staff at Children's National Health System includes: Randall S. Burd, MD, PhD, Chief of the Trauma and Burn Services; Jennifer Fritzeen, MSN, RN, PCNS-BC, Program Manager; Amy Wright, BSN, RN, Trauma Coordinator; Katherine Worst, MSN, CPNP, Elizabeth Leachman, MSN, CPNP, Catherine Walsh, MSN, CPNP, and Elizabeth Waibel, MSN, CPNP, Trauma and Burn Nurse Practitioners; Sally Wilson, BSN, RN, Injury Prevention, Education, and Outreach Coordinator; Elizabeth Carter, PhD, Trauma Epidemiologist; and Yu Yan, MSN, RN, Trauma Registry Coordinator.

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. Thirteen courses in Pediatric Advanced Life Support are offered annually. Advances in Pediatric Emergency Medicine is a course offered annually to community physicians. Numerous pediatric trauma outreach educational programs 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. The trauma research team completed a three-year grant, funded

by MIEMSS' Emergency Medical Services for Children (EMSC) Program and the Health Resources and Services Administration, to develop a trauma checklist to be used in the assessment and evaluation of pediatric trauma patients during resuscitation. The Trauma Checklist Toolkit is currently available on the EMSC National Resource Center's website. Drs. Randall Burd and Elizabeth Carter have acquired additional funding through the National Institutes of Health to investigate various technologies for use in treating pediatric trauma.

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. Children's National is currently partnering with 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 the State of 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 13 specialists at the MPC have over 250 years of combined poison center experience, ensuring that callers have access to experienced, qualified, and well-trained staff.

In March 2013 the MPC launched a newly designed website (www.mdpoison.com) that is more user-friendly and provides more poison information for the public and resources for health professionals.

In CY 2013 the MPC received 56,839 calls. While 33,190 of these calls involved a human exposure, the remaining 23,649 were animal exposures and requests for information where no exposure occurred. Forty-four percent of poison exposures involved children under the age of six. Sixty-six percent of the cases reported to the MPC were managed at a non–health care facility site, 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 10,245. Maryland EMS providers consulted with the MPC on 1,827 cases in 2013. In 335 (18%) 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 biological weapons exposures and public health events throughout Maryland and the Washington, DC region. The MPC's data collection system allows data to be submitted in real time to a nationwide poison center surveillance system. An automated symptom and substance outlier detection strategy is used to identify evolving patterns or emerging clusters of exposures.

In 2013 the MPC worked with the Maryland Alcohol and Drug Abuse Administration (ADAA), the Maryland chapter of the American College of Emergency Physicians (MD ACEP), the Maryland Office of the Chief Medical Examiner (OCME), and MIEMSS to focus on the important issues of prescription medication overdose deaths. We expanded our collaboration to local health departments in the area of overdose prevention and fatality review. Other examples of our continued commitment to help prevent poisonings included presentations on safe opioid prescribing to the Maryland Patient Safety Center and the Maryland Academy of Family Physicians. Additionally, peer-reviewed publications authored by Maryland Poison Center staff addressed the nonmedical use of prescription medications and overdose deaths.

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 2013 included:

- Changes in types of cases managed by US poison centers 2000-2011
- Evaluation of unintentional buprenorphine exposures in children and nonmedical use in adults
- Evaluation of quetiapine abuse and misuse reported to poison centers
- The toxicity and clinical outcomes of paliperidone exposures reported to US poison centers
- Evaluation of the use and safety of octreotide as antidotal therapy for sulfonylurea overdose in children
- A novel approach to informing the public about the risks of overdose and nonmedical use of prescription medications
- A performance improvement guideline reduces opioid prescriptions for emergency department dental patients
- Fatalities involving acetaminophen combination products reported to US poison centers
- Analysis of overdose deaths involving methadone

- Medical outcomes associated with nonmedical use of methadone and buprenorphine
- Anaphylaxis after injection of buprenorphine

The Maryland Poison Center's public education efforts are intended to help increase awareness of the poisons that are found in every home, business, and school and to help prevent poisonings from occurring. The MPC also strives to make sure that everyone knows that if a poisoning occurs, they can quickly and easily get information by contacting the Maryland Poison Center, 24/7. Angel Bivens, BS Pharm, MBA, CSPI, is the MPC's Public Education Coordinator. In 2013 the MPC provided speakers and/or materials for 72 programs in 16 Maryland counties, Baltimore City, and Washington, DC, reaching approximately 3,300 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 46,000 brochures, magnets, telephone stickers, Mr. Yuk stickers, teacher's kits, and other pieces of educational material were distributed at these programs and by these organizations. Approximately 104,000 additional materials were mailed to people and groups who requested them.

Throughout 2013, 16 county school systems and daycare centers used educational materials from the MPC in their classrooms. More than 21,000 pieces of educational material were distributed in schools throughout Maryland. The MPC also partnered with the Frederick County Health Department and Frederick County Public Schools to conduct a Pharmacist Adopt-A-School program in which local volunteer pharmacists are trained to present a poison and medicine safety program to first-grade students. In spring 2013, 12 Frederick County elementary schools participated in the program, reaching over 1,200 first-grade students and their families.

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 partnered with Safe Kids Baltimore to offer Poison Prevention Week Kits to elementary schools in Baltimore City. Schools chose from a list of activities to increase awareness of poison safety to students and their families. Twelve schools participated, reaching over 5,000 students.

The MPC publishes a bimonthly *Poison Prevention Press*, an e-newsletter for the public that highlights poison safety topics for all ages. Topics addressed in 2013 included Don't Google…Just Call!, Kids Eat the Darnedest Things, Parent Information for Senior Week, Electronic Cigarettes and Nicotine, and Toy Safety. *Poison Prevention Press* is sent to e-mail subscribers who are encouraged to post and share the newsletter with others.

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 2013, 74 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 16,900 physicians, nurses, EMS providers, pharmacists, physician assistants, and others. Podcasts were broadcast on two websites devoted to continuing education for health care providers: MedicCast.com and NursingShow.com. The MPC also provides on-site training for physicians, pharmacists, and EMS providers. More than 100 health professionals came to the MPC in 2013 to learn about the assessment and treatment of poisoned patients.

ToxTidbits is a monthly e-newsletter for health professionals containing important toxicology information, updates, and news. Topics addressed in 2013 included Ricin, The Cinnamon Challenge, What is Krokodil?, and Laundry Detergent Pod Ingestions. *ToxTidbits: Antidote Facts* are short reviews of antidotes written by MPC staff and students. We also provide a list of recommended antidotes and stock levels for hospital pharmacies. *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 our website.

Reason for Poisoning (CY 2013)

Circumstance	Number of Patients	Percentage
Unintentional	24,931	75.1
Intentional	6,676	20.1
Adverse Reaction	1,030	3.1
Other and Unknown	553	1.7
TOTAL	33,190	100.0

Medical Outcome of Poisoning (CY 2013)

Medical Outcome	Number of Patients	Percentage
No Effect/Minor Effect	29,240	88.1
Moderate Effect	2,223	6.7
Major Effect	216	0.6
Death	33	0.1
Other and Unknown	1,478	4.5
TOTAL	33,190	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 2013)

Region	Number of Exposures	Percentage
Region I (Allegany, Garrett)	855	2.5
Region II (Frederick, Washington)	2,981	9.0
Region III (Anne Arundel, Baltimore City, Baltimore County, Carroll, Harford, Howard,)	20,818	62.7
Region IV (Caroline, Cecil, Dorchester, Kent, Queen Anne's, Somerset, Talbot, Wicomico, Worcester)	3,376	10.2
Region V (Calvert, Charles, Montgomery*, Prince George's*, St. Mary's)	3,114	9.4
Unknown County/ Other state	2,046	6.2
TOTAL	33,190	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 12,249 human exposures in Maryland were reported to the National Capital Poison Center in 2013.*

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 their maximum potential. Patients are assessed early in the acute phase of trauma care to align patient needs with the appropriate components of therapy. 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 2014 Maryland trauma centers referred 1,898 adult trauma patients (ages 15 and over) to inpatient rehabilitation services and 38 pediatric trauma patients (ages 14 and under) to inpatient rehabilitation services. The ten rehabilitation facilities receiving the majority of adult patients are listed to the right. Rehabilitation facilities receiving pediatric patients are also listed.

Top Ten Destinations of Patients (Ages 15 & Over) Who Went to Inpatient Rehabilitation Facilities (June 2013 to May 2014)

Source: Maryland State Trauma Registry

Rehabilitation Center	Number
Adventist Health Care	49
Future Care	37
Genesis Health Care	213
HCR Manor Care	46
Health South Chesapeake Rehabilitation Center	27
Lorien Health Systems	32
MedStar Good Samaritan Hospital	51
MedStar National Rehabilitation Network	36
Sinai Rehabilitation Center	76
University of Maryland Rehabilitation & Orthopaedic Institute	640

Note: Total patients age 15 and over that went to rehabilitation centers = 1,898.

Destinations of Patients (Ages 14 & Under) Who Went to Inpatient Rehabilitation Facilities (June 2013 to May 2014)

Source: Maryland State Trauma Registry

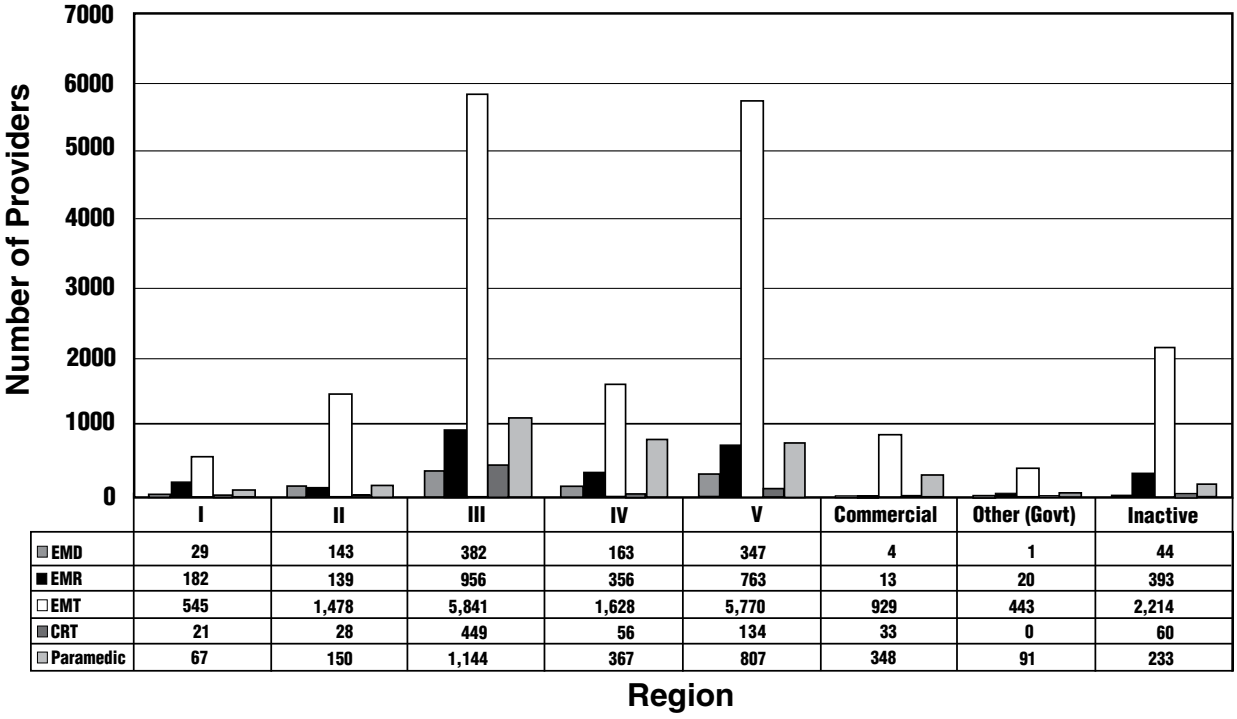
Rehabilitation Center	Number
Nemours/Alfred I. duPont Hospital for Children	1
Blasdell Children's Hospital, NY	1
Hospital for Sick Children	5
Kennedy Krieger Institute	13
Mt. Washington Pediatric Hospital	12
MedStar National Rehabilitation Network	4
University of Maryland Rehabilitation & Orthopaedic Institute	1
Unknown	1

Note: Total patients age 14 and under that went to rehabilitation centers = 38.

MARYLAND EMS STATISTICS

Number of EMS Providers (Primary Affiliation) by Region

(As of June 30, 2014)

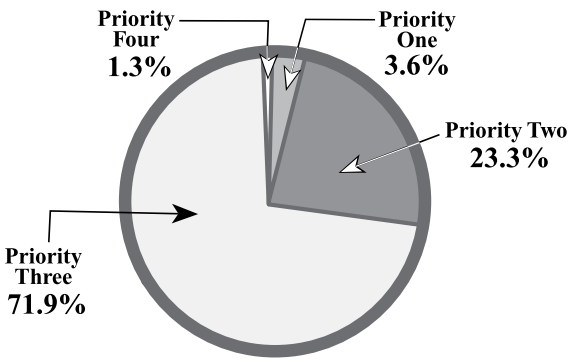


	I	II	III	IV	V	Commercial	Other (Govt)	Inactive
EMD	29	143	382	163	347	4	1	44
EMR	182	139	956	356	763	13	20	393
EMT	545	1,478	5,841	1,628	5,770	929	443	2,214
CRT	21	28	449	56	134	33	0	60
Paramedic	67	150	1,144	367	807	348	91	233

Types of EMS Calls

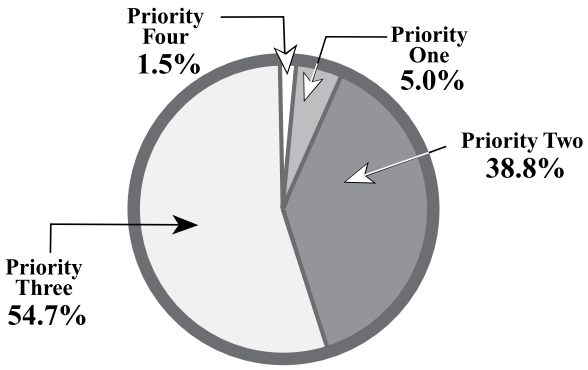
Patient Priority For Injury Transports

Calendar Year 2013



Patient Priority For Medical Transports

Calendar Year 2013



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. 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 2014, 23 of 24 jurisdictional EMSOPs in Maryland enter data either by uploading data via a local device with Internet connectivity or by logging onto a dedicated website to enter call information directly. The remaining jurisdiction, Montgomery County, presently submits electronic data uploads based on NEMSIS 2.2.1 National Data Element format. The table below demonstrates jurisdictional participation by date of implementation and quarterly record volume for FY 2014.

ePCR Records Submitted to MIEMSS per Fiscal Year 2014 Quarter

Reporting Between: 7/1/2013 - 06/30/2014

Jurisdictional Total	eMEDS® Implementation	1st Qtr. FY 2014	2nd Qtr. FY 2014	3rd Qtr. FY 2014	4th Qtr. FY 2014	Total
Allegany County	1-Oct-11	2,938	2,892	3,104	3,174	12,081
Anne Arundel County*	21-Feb-12	20,390	22,497	23,889	25,520	92,296
Baltimore City	1-Nov-11	56,436	55,412	54,970	59,319	226,137
Baltimore County*	22-Feb-12	27,549	27,339	28,495	29,414	112,797
Calvert County	1-Jan-13	3,674	3,544	3,649	4,034	14,901
Caroline County	1-Jun-13	1,630	1,540	1,717	1,732	6,619
Carroll County	1-May-12	4,370	4,594	4,858	4,579	18,401
Cecil County	4-Feb-11	5,892	5,407	5,525	5,902	22,726
Charles County	1-Dec-13	**6,221**	**5,673**	5,870	6,582	24,346
Dorchester County	1-Jan-13	1,445	1,249	1,412	1,434	5,540
Frederick County	4-Mar-13	9,533	9,193	9,564	9,915	38,205
Garrett County	1-Oct-11	841	808	833	819	3,301
Harford County*	4-Feb-11	7,368	7,445	7,741	7,798	30,352
Howard County	14-May-13	7,085	6,849	7,372	7,261	28,567
Kent County	1-Mar-12	1,528	1,450	1,266	1,472	5,716
Montgomery County	N/A	*20,435*	*20,281*	*13,304*	*25*	*54,045*
Prince George's County	27-Jan-14	*40,454*	*38,421*	*37,937*	41,230	158,042
Queen Anne's County	4-Feb-11	2,000	1,749	1,883	2,000	7,632
Somerset County	1-Dec-12	779	695	676	762	2,912
St. Mary's County	1-Oct-12	4,653	4,478	4,455	4,616	18,202
Talbot County	16-Jan-12	1,390	1,265	1,212	1,385	5,252
Washington County	19-Dec-11	6,146	5,951	6,670	7,143	25,910
Wicomico County	15-Nov-12	3,368	3,472	3,376	3,398	13,614
Worcester County*	1-Jan-13	3,685	1,825	1,921	2,983	10,414
Jurisdictional Total		239,810	234,029	231,699	232,470	938,008

Notes: Figures in bold represent records submitted via the electronic Maryland Ambulance Information System (eMAIS®). Charles County data from the 2nd Quarter of FY 2014 includes some data entered directly into eMEDS®.

Italicized figures represent electronic data submitted via another system and uploaded to eMEDS®. Prince George's County data from the 3rd Quarter of FY 2014 includes some data electronically 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	19 - 20 Pts	< 10 Pts
Region I	0	0	34	0	0	0	0
Region II	46	2	13	10	0	0	0
Region III	22	1	154	17	0	15	0
Region IV	18	2	111	9	0	1	0
Region V	118	12	43	5	3	0	0
STATEWIDE TOTAL	204	17	355	41	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

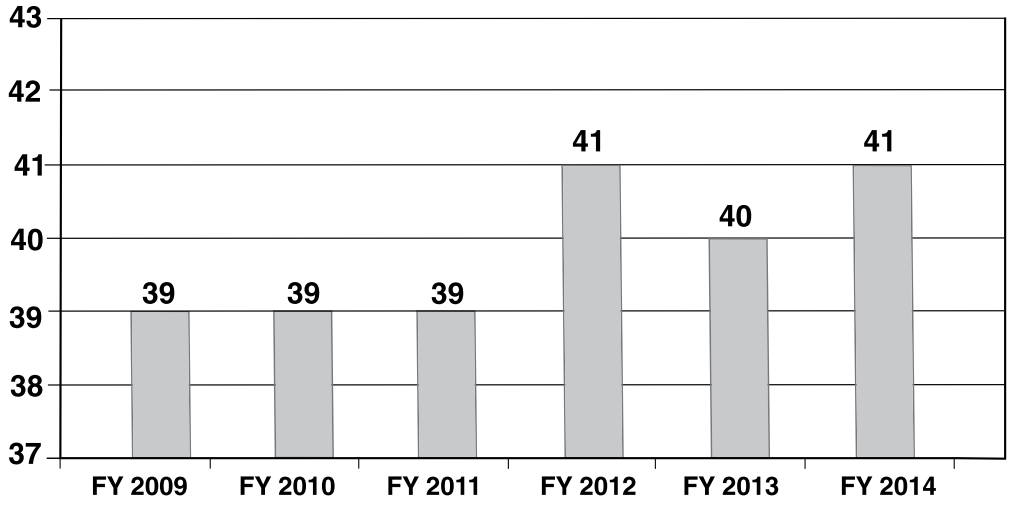
Region	Non-Transport Support					Disaster Supplies*		
	BLS First Response	Suppression BLS First Response	ALS Chase			MCSU Type I (100+ Pts)	MCSU Type II (50 Pts)	MCSU Type III (25 Pts)
			Non-Supervisory	Supervisory	ALS Engines			
Region I	11	8	10	2	0	0	2	0
Region II	34	58	16	6	0	0	1	4
Region III	26	279	18	19	15	4	5	1
Region IV	24	98	29	24	4	1	3	4
Region V	26	304	12	8	31	3	0	0
STATEWIDE TOTAL	121	747	85	59	50	8	11	9

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

Commercial Ambulance Services

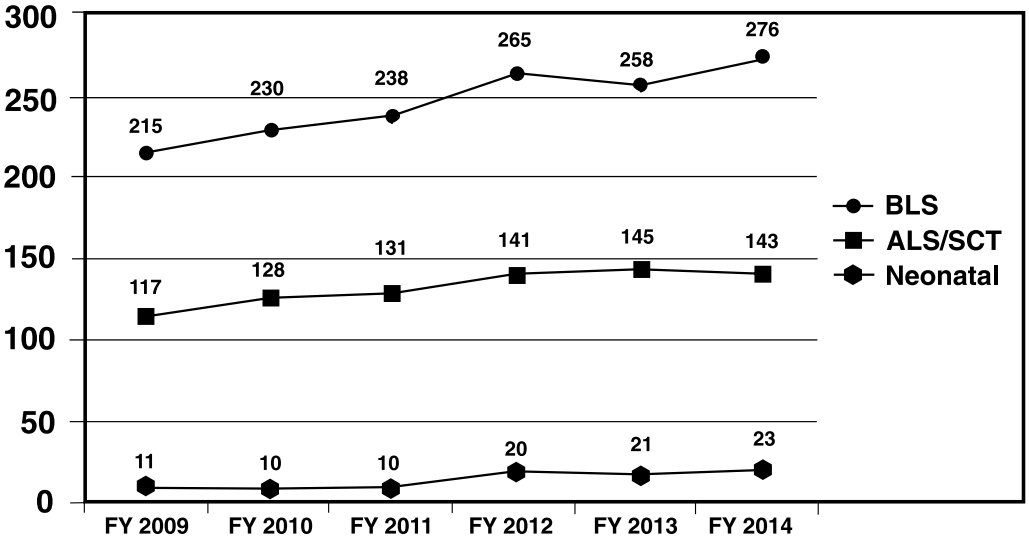
Commercial Ambulance Services (Ground & Air)

(FY 2009 - FY 2014)



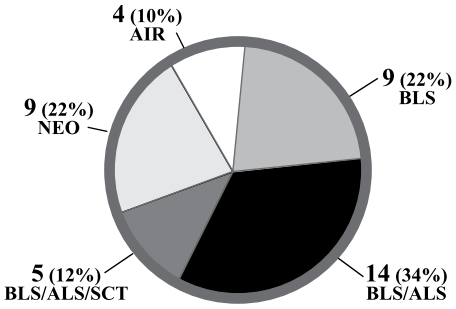
Commercial Ground Ambulance Vehicles by Type

(FY 2009 - FY 2014)



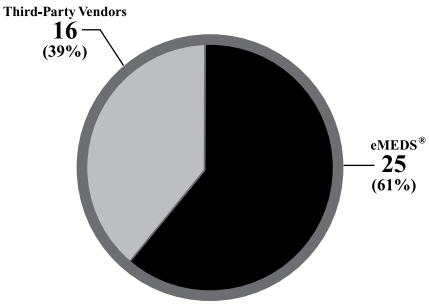
Commercial Services by License Type

(FY 2014)



Commercial Services ePCR Reporting Status

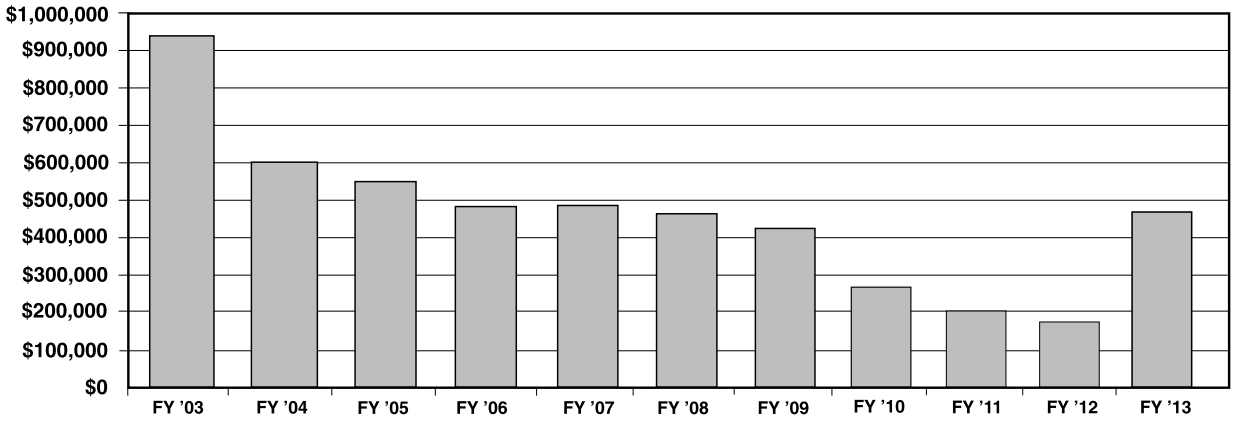
(FY 2014)



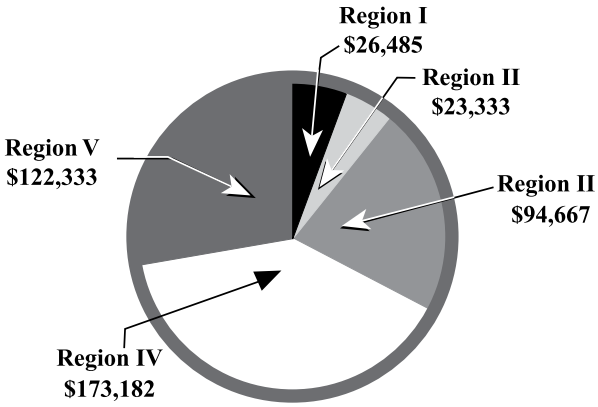
Health Preparedness Program (HPP)
Bioterrorism Funding for Maryland EMS

(Federal FY 2003 – FY 2013)

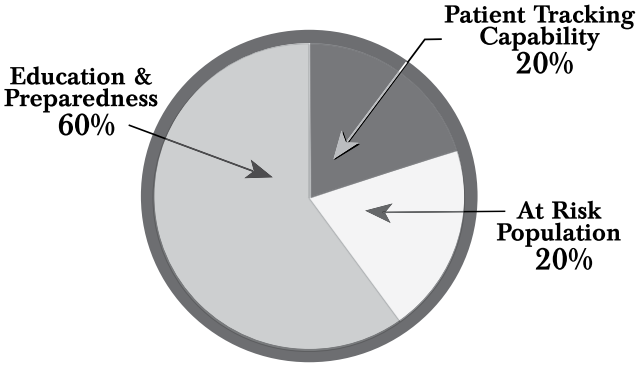
HPP Bioterrorism Funding Totals
(Federal FY 2003 – FY 2013)



HPP Bioterrorism Funding Allocation By Maryland EMS Region*
(Federal FY 2013)



HPP Bioterrorism Funding Categories
(Federal FY 2013)



** Includes BTX-PT; see page 31.*

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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Under 1 year	180	182	215
1 to 4 years	553	548	514
5 to 9 years	564	525	560
10 to 14 years	651	679	576
15 to 24 years	4,893	4,512	4,081
25 to 44 years	6,764	6,649	6,171
45 to 64 years	5,533	5,322	4,976
65+ years	3,190	3,533	3,485
Unknown	13	8	6
TOTAL	22,341	21,958	20,584

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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Johns Hopkins Bayview Medical Center	1,569	1,483	1,583
Johns Hopkins Medical System	2,121	2,131	1,822
Meritus Medical Center	1,154	1,000	1,094
Peninsula Regional Medical Center	1,493	1,526	1,213
Prince George's Hospital Center	3,533	3,671	3,394
R Adams Cowley Shock Trauma Center	6,859	6,633	6,177
Sinai Hospital of Baltimore	1,726	1,625	1,562
Suburban Hospital – Johns Hopkins Medicine	1,706	1,572	1,486
Western Maryland Regional Medical Center	618	724	640
TOTAL	20,779	20,365	18,971

**** Maryland Trauma Statistics are based on patient discharge data from June 2013 to May 2014.***

Occurrence of Injury by County: Scene Origin Cases Only

(June 2013 to May 2014)

Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	383
Anne Arundel County	870
Baltimore County	2,141
Calvert County	125
Caroline County	45
Carroll County	333
Cecil County	39
Charles County	218
Dorchester County	99
Frederick County	407
Garrett County	46
Harford County	521
Howard County	351
Kent County	55
Montgomery County	1,314
Prince George's County	2,080
Queen Anne's County	98
St. Mary's County	163
Somerset County	83
Talbot County	40
Washington County	695
Wicomico County	368
Worcester County	224
Baltimore City	3,774
Virginia	61
West Virginia	135
Pennsylvania	169
Washington, DC	263
Delaware	69
Other	13
Not Indicated	656
TOTAL	15,838

Note: Scene origin cases represent 83.5 % of the total trauma cases treated statewide.

Residence of Injury by County: Scene Origin Cases Only

(June 2013 to May 2014)

Source: Maryland State Trauma Registry

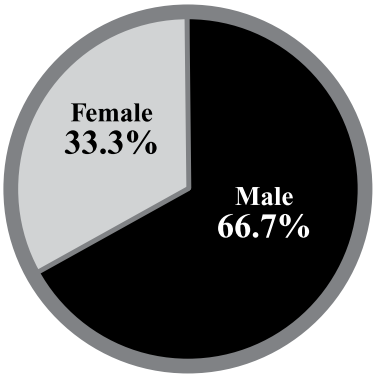
County of Residence	Number
Allegany County	332
Anne Arundel County	757
Baltimore County	2,159
Calvert County	155
Caroline County	43
Carroll County	286
Cecil County	62
Charles County	274
Dorchester County	83
Frederick County	363
Garrett County	26
Harford County	508
Howard County	313
Kent County	51
Montgomery County	1,304
Prince George's County	2,151
Queen Anne's County	76
St. Mary's County	110
Somerset County	75
Talbot County	40
Washington County	624
Wicomico County	316
Worcester County	148
Baltimore City	3,722
Virginia	300
West Virginia	206
Pennsylvania	376
Washington, DC	496
Delaware	129
Other	310
Not Indicated	43
TOTAL	15,838

Note: Scene origin cases represent 83.5 % of the total trauma cases treated statewide.

Gender Profile: Primary Admissions Only

(June 2013 to May 2014)

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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
None	22.9%	19.8%	15.6%
Seatbelt	24.6%	24.5%	25.6%
Airbag & Seatbelt	23.1%	22.2%	21.1%
Airbag Only	4.2%	4.3%	5.5%
Infant/Child Seat	0.2%	0.2%	0.1%
Protective Helmet	15.0%	14.8%	15.1%
Padding/Protective Clothing	0.1%	0.1%	0.3%
Other Protective Device	0.1%	0.0%	0.3%
Unknown	9.8%	14.1%	16.4%
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 2013 to May 2014)

Source: Maryland State Trauma Registry

Modality Type	BVMC	JHH	MMC	PEN	PGH	SH	STC	SUB	WMRMC	TOTAL
Ground Ambulance	97.9%	87.1%	76.3%	88.7%	82.1%	88.4%	75.4%	98.4%	81.8%	84.7%
Helicopter	0.2%	0.6%	1.2%	9.5%	13.7%	0.0%	24.1%	0.5%	7.7%	10.6%
Other	1.9%	12.3%	22.5%	1.8%	4.2%	11.6%	0.5%	1.1%	10.5%	4.7%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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

Origin of Patient Transport to Trauma Centers

(June 2013 to May 2014)

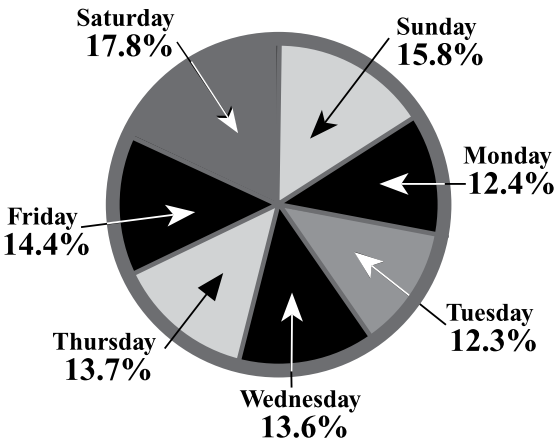
Source: Maryland State Trauma Registry

Origin Type	BVMC	JHH	MMC	PEN	PGH	SH	STC	SUB	WMRMC	TOTAL
Scene of Injury	92.5%	88.6%	97.0%	73.6%	96.7%	96.8%	66.6%	93.5%	95.1%	84.0%
Hospital Transfer	0.3%	5.7%	2.4%	2.4%	1.8%	2.9%	33.3%	2.3%	1.1%	12.5%
Other	7.2%	5.7%	0.6%	24.0%	1.5%	0.3%	0.1%	4.2%	3.8%	3.5%
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 2013 to May 2014)

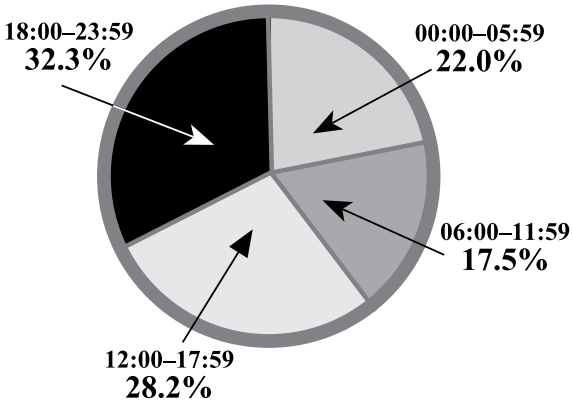
Source: Maryland State Trauma Registry



Emergency Department Arrivals by Time of Day: Primary Admissions Only

(June 2013 to May 2014)

Source: Maryland State Trauma Registry



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

Number of Deaths by Age

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

Age	June 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Under 1 year	1	0	1
1 to 4 years	1	2	1
5 to 14 years	3	8	2
15 to 24 years	137	122	127
25 to 44 years	190	185	205
45 to 64 years	158	138	147
65+ years	238	209	224
Unknown	0	1	2
TOTAL	728	665	709
Deaths Overall as a Percentage of the Total Injuries Treated	3.5%	3.3%	3.7%

Note: Only pediatric patients that 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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Under 1 year	40	36	42
1 to 4 years	118	123	88
5 to 14 years	291	249	214
15 to 24 years	4,830	4,445	3,989
25 to 44 years	6,764	6,649	6,171
45 to 64 years	5,553	5,322	4,976
65+ years	3,190	3,533	3,485
Unknown	13	8	6
TOTAL	20,779	20,365	18,971

Note: Only pediatric patients that 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 2013 to May 2014)
Source: Maryland State Trauma Registry

	Number of Injured Patients		Number of Deaths	
Age	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	42	35	1	1
1 to 4 years	88	76	1	1
5 to 14 years	214	168	2	2
15 to 24 years	3,989	3,512	127	108
25 to 44 years	6,171	5,462	205	176
45 to 64 years	4,976	4,365	147	133
65+ years	3,485	3,133	224	210
Unknown	6	5	2	2
TOTAL	18,971	16,756	709	633

Note: Only pediatric patients that 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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Motor Vehicle Crash	29.7%	28.6%	26.6%
Motorcycle Crash	6.7%	6.0%	5.4%
Pedestrian Incident	5.3%	5.1%	4.9%
Fall	29.9%	32.0%	33.2%
Gunshot Wound	5.2%	5.6%	6.1%
Stab Wound	6.4%	6.2%	6.6%
Other	16.8%	16.5%	17.2%
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.

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

(June 2013 to May 2014)
Source: Maryland State Trauma Registry

Blood Alcohol Concentration	Motor Vehicle Crash	Assault	Fall	Other	Total
Negative	18.0%	13.3%	9.9%	12.7%	13.8%
Positive	24.6%	28.9%	19.7%	15.5%	22.9%
Undetermined	57.4%	57.8%	70.4%	71.8%	63.3%
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 2013 to May 2014)
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%	0.2%	0.1%	0.0%	0.3%	0.1%
1 to 4 years	0.1%	0.0%	0.3%	0.3%	0.0%	0.1%	0.7%	0.3%
5 to 14 years	0.4%	0.0%	2.1%	0.4%	0.3%	0.0%	1.3%	0.6%
15 to 24 years	23.4%	20.8%	20.6%	5.8%	41.1%	33.1%	21.0%	18.6%
25 to 44 years	36.1%	35.7%	32.8%	16.2%	46.6%	48.8%	36.7%	30.8%
45 to 64 years	25.0%	39.3%	34.0%	29.3%	10.3%	17.0%	31.4%	27.3%
65+ years	14.9%	4.2%	10.2%	47.8%	1.6%	1.0%	8.6%	22.3%
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 that 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 2013 to May 2014)
Source: Maryland State Trauma Registry

Etiology	Percentage
Motor Vehicle Crash	31.2%
Motorcycle Crash	6.3%
Pedestrian Incident	5.7%
Stabbing	0.1%
Fall	39.0%
Other	17.6%
Unknown	0.1%
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

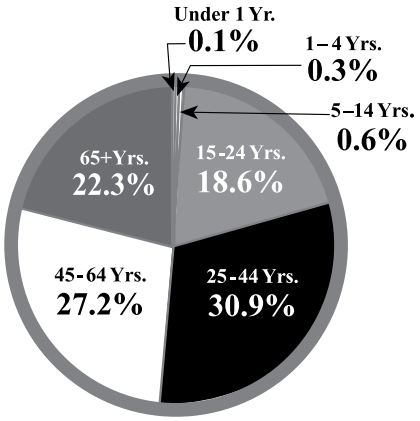
(June 2013 to May 2014)
Source: Maryland State Trauma Registry

Etiology	Percentage
Motor Vehicle Crash	0.5%
Motorcycle Crash	0.2%
Pedestrian Incident	0.2%
Gunshot Wound	44.7%
Stabbing	47.9%
Fall	1.7%
Other	4.4%
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

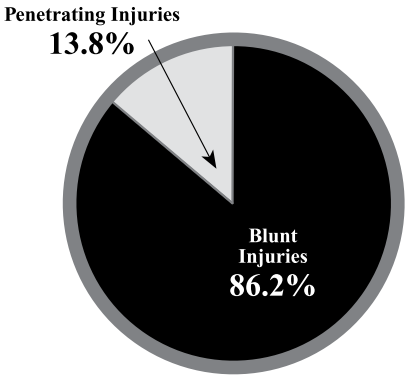
(June 2013 to May 2014)
Source: Maryland State Trauma Registry



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 that 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 2013 to May 2014)
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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Inpatient Rehab Facility	13.4%	14.8%	14.3%
Skilled Nursing Facility	2.3%	2.6%	3.6%
Residential Facility	0.5%	0.6%	1.1%
Specialty Referral Center	3.4%	3.9%	3.6%
Home with Services	2.6%	2.8%	2.4%
Home	66.1%	64.1%	62.5%
Acute Care Hospital	2.8%	2.5%	2.7%
Against Medical Advice	2.0%	1.9%	1.7%
Morgue/Died	5.1%	4.7%	5.4%
Left without Treatment	0.3%	0.4%	0.4%
Hospice Care	0.2%	0.3%	0.3%
Jail	1.1%	1.2%	1.5%
Psychiatric Hospital*	0.0%	0.0%	0.2%
Other	0.2%	0.2%	0.3%
TOTAL	100.0%	100.0%	100.0%

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

** "Psychiatric hospital" is a new category that was added in CY 2013. Previously, "psychiatric hospital" was included in "acute care hospital."*

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

(June 2013 to May 2014)
Source: Maryland State Trauma Registry

ISS	Blunt	Penetrating	Total
1 to 12	75.8%	76.2%	75.9%
13 to 19	14.1%	10.5%	13.6%
20 to 35	8.5%	10.6%	8.7%
36 to 75	1.6%	2.7%	1.8%
TOTAL	100.0%	100.0%	100.0%

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

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

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

ISS	June 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
1 to 12	71.5%	74.6%	76.2%
13 to 19	12.2%	10.7%	10.5%
20 to 35	10.8%	10.8%	10.6%
36 to 75	5.5%	3.9%	2.7%
TOTAL	100.0%	100.0%	100.0%

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

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

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

ISS	June 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
1 to 12	70.4%	71.1%	75.8%
13 to 19	15.9%	15.5%	14.1%
20 to 35	11.4%	11.0%	8.5%
36 to 75	2.3%	2.4%	1.6%
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 of Penetrating Injuries: Primary Admissions Only

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

ISS	June 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
1 to 12	70.5%	71.6%	75.9%
13 to 19	15.4%	14.9%	13.6%
20 to 35	11.3%	10.9%	8.7%
36 to 75	2.8%	2.6%	1.8%
TOTAL	100.0%	100.0%	100.0%

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

MARYLAND ADULT BURN STATISTICS

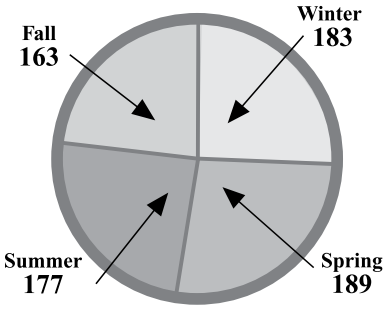
Total Number of Adult Burn Cases

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

Institution	June 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Johns Hopkins Burn Center at Bayview	701	720	712

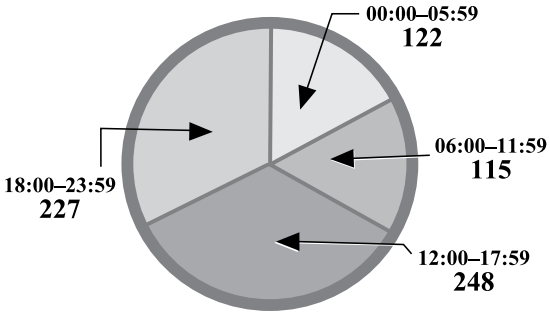
Season of Year Distribution

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2013 to May 2014)
Source: Maryland State Trauma Registry



Time of Arrival Distribution

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2013 to May 2014)
Source: Maryland State Trauma Registry



Place of Injury

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2013 to May 2014)
Source: Maryland State Trauma Registry

Place of Injury	Number
Home	414
Industrial Place	104
Place for Recreation or Sport	48
Street/Highway	46
Public Building	3
Residential Institution	5
Other Specified Place	13
Unspecified Place	79
TOTAL	712

Occurrence of Injury by County

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2013 to May 2014)

Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	2
Anne Arundel County	50
Baltimore County	144
Calvert County	5
Caroline County	3
Carroll County	20
Cecil County	16
Dorchester County	3
Frederick County	10
Garrett County	1
Harford County	40
Howard County	24
Kent County	1
Montgomery County	7
Prince George's County	11
Queen Anne's County	5
Saint Mary's County	2
Somerset County	3
Washington County	12
Wicomico County	13
Worcester County	9
Baltimore City	226
Virginia	4
West Virginia	18
Pennsylvania	19
Washington, DC	1
Delaware	4
Other	1
Not Valued	58
TOTAL	712

Residence of Patients by County

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2013 to May 2014)

Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	2
Anne Arundel County	49
Baltimore County	158
Calvert County	6
Caroline County	2
Carroll County	25
Cecil County	17
Dorchester County	3
Frederick County	10
Garrett County	1
Harford County	44
Howard County	23
Kent County	1
Montgomery County	11
Prince George's County	12
Queen Anne's County	5
St. Mary's County	2
Somerset County	4
Washington County	12
Wicomico County	12
Worcester County	8
Baltimore City	241
Virginia	6
West Virginia	19
Pennsylvania	27
Washington, DC	1
Delaware	5
Other	5
Not Valued	1
TOTAL	712

Mode of Patient Transport

Patients Age 15 and Older Treated at Johns Hopkins Burn Center at Bayview (June 2013 to May 2014)

Source: Maryland State Trauma Registry

Modality Type	Number
Ground Ambulance	400
Helicopter	43
Other*	268
Not Valued	1
TOTAL	712

**Note: The category "Other" includes patients that 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 2013 to May 2014)
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	5	41	13	47	1	0	2	0	111
25 to 44 years	10	20	85	28	113	5	0	7	0	268
45 to 64 years	6	15	106	18	69	8	0	14	1	237
65 years and over	0	4	47	5	27	3	2	8	0	96
Total	18	44	279	64	256	17	2	31	1	712

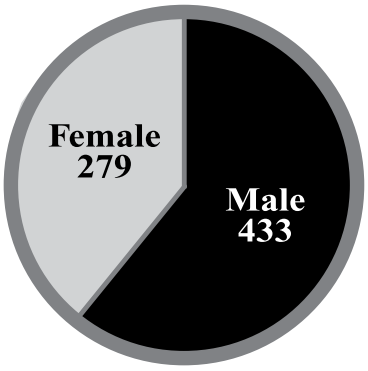
Final Disposition of Patients

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

Final Disposition	June 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Home	559	583	594
Home with Services	51	54	41
Transfer to Another Acute Care Facility	6	7	3
Transfer to Another Service	0	2	2
Discharge to Extended Care Facility	0	5	4
Discharge to Foster Care	0	0	1
Discharge to Alternate Caregiver	0	0	2
Rehabilitation Facility	29	26	6
Skilled Nursing Facility	15	16	26
Psychiatric Hospital	6	2	5
Morgue/Died	12	15	13
Unable to Complete Treatment	8	5	6
Jail	1	0	4
Not Valued	14	5	5
TOTAL	701	720	712

Gender Profile

Patients Age 15 and Older Treated at
Johns Hopkins Burn Center at Bayview
(June 2013 to May 2014)
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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
15 to 24 years	110	140	111
25 to 44 years	263	247	268
45 to 64 years	247	252	237
65 years and over	81	81	96
TOTAL	701	720	712

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

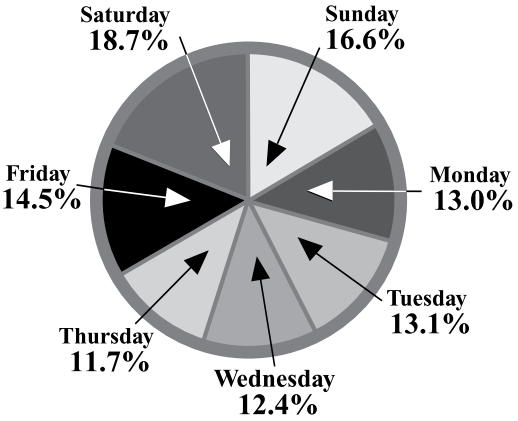
(3-Year Comparison)

Trauma Center	June 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
CNHS	862	760	772
JHP	700	833	841
TOTAL	1,562	1,593	1,613

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 that were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

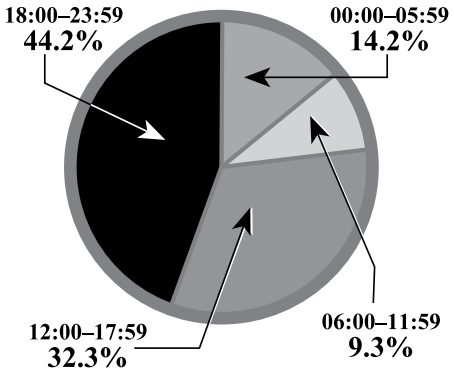
Emergency Department Arrivals by Day of Week: Children Treated at Pediatric Trauma Centers

(June 2013 to May 2014)



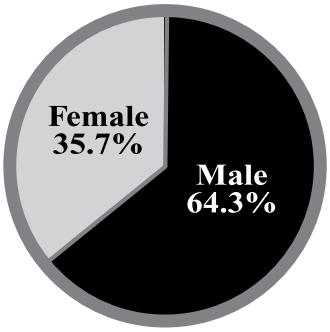
Emergency Department Arrivals by Time of Day: Children Treated at Pediatric Trauma Centers

(June 2013 to May 2014)



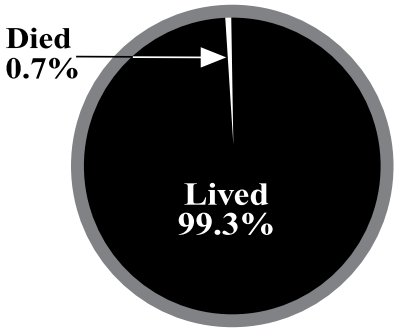
Gender Profile: Children Treated at Pediatric Trauma Centers

(June 2013 to May 2014)



Outcome Profile: Children Treated at Pediatric Trauma Centers

(June 2013 to May 2014)



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 that were burn patients at each hospital, see Maryland Pediatric Burn Center Statistics.

Mode of Patient Transport by Center: Scene Origin Cases Only

Children Treated at Pediatric Trauma Centers (June 2013 to May 2014)

Modality Type	CNHS	JHP	Total
Ground Ambulance	58.8%	80.6%	70.9%
Helicopter	23.8%	19.4%	21.4%
Other	17.4%	0.0%	7.7%
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 that 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 2013 to May 2014)

Origin	CNHS	JHP	Total
Scene of Injury	49.5%	65.6%	57.9%
Hospital Transfer	39.1%	31.9%	35.3%
Other	11.4%	2.5%	6.8%
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 that 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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Blunt	94.4%	93.4%	95.0%
Penetrating	3.0%	2.4%	2.2%
Near Drowning	1.0%	0.9%	0.4%
Hanging	0.2%	0.3%	0.2%
Inhalation	0.0%	0.1%	0.1%
Ingestion	0.0%	0.1%	0.1%
Crush	0.3%	0.3%	0.4%
Animal Bite/Human Bite	1.0%	2.5%	1.5%
Other	0.1%	0.0%	0.1%
TOTAL	100.0%	100.0%	100.0%

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

Etiology of Injuries

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

Etiology	June 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Motor Vehicle Crash	17.1%	14.9%	16.4%
Motorcycle Crash	0.8%	0.7%	0.9%
Pedestrian Incident	9.4%	9.4%	10.1%
Gunshot Wound	0.9%	0.8%	0.6%
Stabbing*	2.0%	2.2%	2.4%
Fall	41.7%	42.8%	39.7%
Other	28.1%	29.2%	29.9%
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 that 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 2013 to May 2014)

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Stab Wound*	Other	Total
Under 1 year	6.1%	0.0%	0.6%	14.3%	0.0%	0.0%	13.2%	10.7%
1 to 4 years	24.7%	6.7%	17.9%	35.3%	22.2%	17.9%	19.8%	26.4%
5 to 9 years	35.0%	20.0%	40.8%	30.2%	22.2%	30.8%	21.5%	29.3%
10 to 14 years	30.0%	60.0%	40.1%	16.0%	44.5%	38.5%	36.1%	27.9%
15+ years	4.2%	13.3%	0.6%	4.2%	11.1%	12.8%	9.4%	5.7%
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 that 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 2013 to May 2014)

Age	Number of Injured Patients		Number of Deaths	
	Total	Maryland Residents	Total	Maryland Residents
Under 1 year	173	164	2	2
1 to 4 years	426	412	7	6
5 to 9 years	471	445	2	1
10 to 14 years	451	428	1	1
15+ years	92	86	0	0
TOTAL	1,613	1,535	12	10

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 that 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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Under 1 year	140	146	173
1 to 4 years	435	425	426
5 to 9 years	451	440	471
10 to 14 years	473	515	451
15+ years	63	67	92
TOTAL	1,562	1,593	1,613

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 that 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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Under 1 year	3	2	2
1 to 4 years	7	8	7
5 to 9 years	5	4	2
10 to 14 years	2	3	1
15+ years	0	1	0
TOTAL	17	18	12

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 that 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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
Inpatient Rehab Facility	2.5%	3.2%	2.4%
Skilled Nursing Facility	0.0%	0.0%	0.1%
Residential Facility	0.4%	0.1%	0.2%
Specialty Referral Center	0.1%	0.1%	0.0%
Home with Services	1.5%	1.0%	1.7%
Home	92.9%	92.5%	93.1%
Acute Care Hospital	0.3%	0.2%	0.1%
Morgue/Died	1.1%	1.1%	0.7%
Foster Care	1.2%	1.6%	1.6%
Jail	0.0%	0.1%	0.0%
Other	0.0%	0.1%	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 that 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 2013 to May 2014)

Age	Motor Vehicle Crash	Motorcycle	Pedestrian	Fall	Gunshot Wound	Stab Wound*	Other	Total
Under 1 year	7.5%	0.0%	2.0%	15.5%	8.3%	0.0%	13.5%	11.5%
1 to 4 years	23.1%	8.7%	16.7%	36.8%	16.7%	22.9%	23.2%	27.5%
5 to 9 years	34.6%	21.7%	40.4%	30.5%	16.7%	34.3%	23.2%	30.1%
10 to 14 years	34.8%	69.6%	40.9%	17.2%	58.3%	42.8%	40.1%	30.9%
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 that 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 2013 to May 2014)

County of Injury	Number
Anne Arundel County	63
Baltimore County	123
Calvert County	18
Caroline County	7
Carroll County	24
Cecil County	9
Charles County	29
Dorchester County	2
Frederick County	18
Harford County	32
Howard County	23
Kent County	7
Montgomery County	92
Prince George's County	183
Queen Anne's County	10
St. Mary's County	21
Somerset County	1
Washington County	21
Worcester County	3
Baltimore City	228
West Virginia	1
Pennsylvania	3
Washington, DC	10
Delaware	1
Not Indicated	5
TOTAL	934

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 57.9% of the total cases treated at pediatric trauma centers. For children that 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 2013 to May 2014)

County of Residence	Number
Anne Arundel County	63
Baltimore County	106
Calvert County	16
Caroline County	7
Carroll County	23
Cecil County	7
Charles County	31
Dorchester County	3
Frederick County	18
Harford County	36
Howard County	23
Kent County	4
Montgomery County	92
Prince George's County	162
Queen Anne's County	8
St. Mary's County	19
Somerset County	1
Talbot County	3
Washington County	18
Worcester County	2
Baltimore City	236
Virginia	9
West Virginia	2
Pennsylvania	7
Washington, DC	20
Delaware	3
Other	14
Not Indicated	1
TOTAL	934

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 57.9% of the total cases treated at pediatric trauma centers. For children that 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 2011 to May 2012	June 2012 to May 2013	June 2013 to May 2014
None	34.4%	40.5%	26.2%
Seatbelt	21.2%	21.0%	15.0%
Airbag & Seatbelt	0.8%	3.5%	7.8%
Airbag Only	0.0%	0.8%	2.0%
Infant/Child Seat	21.2%	11.6%	16.4%
Protective Helmet	13.2%	9.7%	15.2%
Other Protective Device	0.5%	0.0%	0.2%
Padding/Protective Clothing	0.3%	0.0%	0.2%
Unknown	8.4%	12.9%	17.0%
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 that 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
(June 2013 to May 2014)
Source: Maryland State Trauma Registry

Institution	Legend Code	Number
Children's National Health System Pediatric Burn Center	CNHSPBC	266
Johns Hopkins Pediatric Burn Center	JHPBC	393
Johns Hopkins Burn Center at Bayview	JHBC	19
TOTAL		678

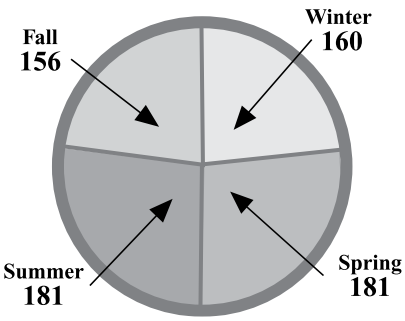
Place of Injury

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview
(June 2013 to May 2014)
Source: Maryland State Trauma Registry

Place of Injury	Number
Home	590
Place for Recreation or Sport	8
Street/Highway	7
Public Building	20
Residential Institution	3
Other Specified Place	17
Unspecified Place	33
TOTAL	678

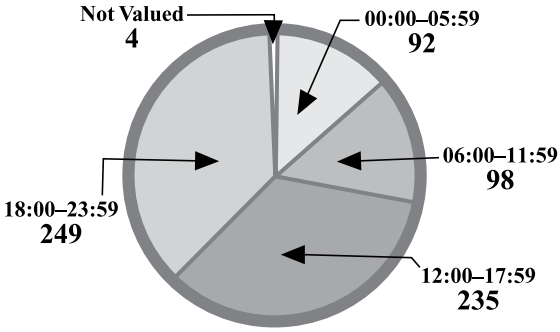
Season of Year Distribution

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview
(June 2013 to May 2014)
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 2013 to May 2014)
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 2013 to May 2014)

Source: Maryland State Trauma Registry

County of Injury	Number
Allegany County	1
Anne Arundel County	28
Baltimore County	71
Calvert County	3
Carroll County	9
Cecil County	2
Charles County	16
Dorchester County	1
Frederick County	12
Harford County	13
Howard County	21
Montgomery County	72
Prince George's County	134
St. Mary's County	19
Somerset County	3
Talbot County	1
Washington County	9
Wicomico County	4
Baltimore City	182
Virginia	3
West Virginia	2
Pennsylvania	6
Washington, DC	2
Delaware	2
Other	4
Not Valued	58
TOTAL	678

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 2013 to May 2014)

Source: Maryland State Trauma Registry

County of Residence	Number
Allegany County	1
Anne Arundel County	40
Baltimore County	81
Calvert County	3
Carroll County	10
Cecil County	2
Charles County	16
Frederick County	16
Harford County	15
Howard County	29
Montgomery County	76
Prince George's County	133
Queen Anne's County	1
St. Mary's County	19
Somerset County	3
Talbot County	1
Washington County	10
Wicomico County	4
Worcester County	1
Baltimore City	203
Virginia	1
West Virginia	2
Pennsylvania	5
Delaware	2
Other	4
TOTAL	678

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 2013 to May 2014)

Source: Maryland State Trauma Registry

Modality Type	CNHSPBC	JHPBC	JHBC	Total
Ground Ambulance	114	197	3	314
Helicopter	9	9	0	18
Other*	143	178	16	337
Not Valued	0	9	0	9
TOTAL	266	393	19	678

**Note: The category "Other" includes patients that 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 2013 to May 2014)

Source: Maryland State Trauma Registry

Origin Type	CNHSPBC	JHPBC	JHBC	Total
Scene of Injury	199	280	18	497
Hospital Transfer	67	113	1	181
TOTAL	266	393	19	678

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 2013 to May 2014)

Source: Maryland State Trauma Registry

Age Range	Electrical	Chemical	Thermal			Inhalation	Other Burn	Other Non-Burn	Unknown	Total
			Flame	Contact	Scald					
Under 1 year	1	1	4	30	45	4	2	1	0	88
1 to 4 years	18	5	11	91	211	1	1	1	5	344
5 to 9 years	1	4	26	27	76	4	0	0	0	138
10 to 14 years	4	3	17	10	41	1	1	1	0	78
15 years and over	0	5	5	4	15	0	1	0	0	30
Total	24	18	63	162	388	10	5	3	5	678

Final Disposition of Patients

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2013 to May 2014)

Source: Maryland State Trauma Registry

Final Disposition	Number
Home	640
Home with Services	10
Transfer to an Acute Care Facility	10
Transfer to an Another Service	1
Rehabilitation Facility	7
Extended Care Facility	1
Alternate Caregiver	5
Foster Care	2
Not Valued	2
TOTAL	678

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 2013 to May 2014)

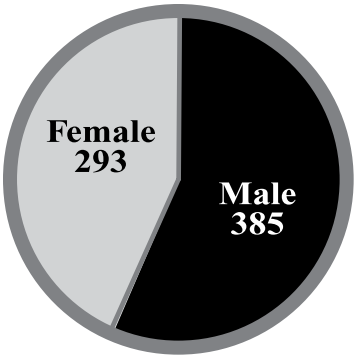
Source: Maryland State Trauma Registry

Length of Stay	Less Than 10% TBSA	10 - 19% TBSA	20% or Greater TBSA	Not Valued	Total
1 Day	489	7	0	73	569
2 - 3 Days	42	16	1	5	64
4 - 7 Days	10	6	0	2	18
8 - 14 Days	5	7	0	1	13
15 - 21 Days	0	3	2	2	7
22 - 28 Days	1	0	1	0	2
Over 28 Days	0	0	1	2	3
Not Valued	0	0	0	2	2
TOTAL	547	39	5	87	678

Gender Profile

Patients Treated at Pediatric Burn Centers and Patients Less Than Age 15 Treated at Johns Hopkins Burn Center at Bayview (June 2013 to May 2014)

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 (June 2013 to May 2014)

Source: Maryland State Trauma Registry

Age Range	Number
Under 1 year	88
1 to 4 years	344
5 to 9 years	138
10 to 14 years	78
15 years and over	30
TOTAL	678

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

(June 2013 to May 2014)

Source: Maryland State Trauma Registry

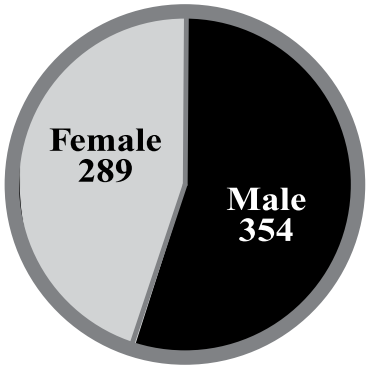
Age Range	Number
Under 1 year	83
1 to 4 years	330
5 to 9 years	126
10 to 14 years	73
15 years and over	31
TOTAL	643

**Note: During the above time period, there were 1,403 total pediatric burn clinic visits. Of these, 643 were unique patients.*

Gender Profile

Patients Treated at the Pediatric Burn Clinics at the Johns Hopkins Pediatric Center and Children's National Health System (May 2013 to June 2014)

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 2013 to May 2014)

Source: Maryland State Trauma Registry

			Thermal							
Age Range	Electrical	Chemical	Flame	Contact	Scald	Inhalation	Other Burn	Other Non-Burn	Unknown	Total
Under 1 year	0	0	1	30	50	0	1	1	0	83
1 to 4 years	8	2	9	113	195	0	1	0	2	330
5 to 9 years	1	0	19	19	86	1	0	0	0	126
10 to 14 years	0	1	10	15	47	0	0	0	0	73
15 years and over	0	1	6	5	17	0	1	1	0	31
Total	9	4	45	182	395	1	3	2	2	643

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 this designation, 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 research activities of the UMSOM's Program in Trauma and its Department of Anesthesiology. Along with the existing National Study Center, the STAR-ORC is led by Alan I. Faden, MD, the David S. Brown Professor of Trauma and Professor of Anesthesiology, University of Maryland School of Medicine. The Executive Committee of the STAR-ORC is comprised of Dr. Faden; Thomas M. Scalea, MD, FACS, FCCM, Physician-in-Chief, R Adams Cowley Shock Trauma Center (STC), System Chief for Critical Care Services, University of Maryland Medical System, and the Francis X. Kelly Professor of Trauma Surgery, Director, Program in Trauma; and Peter Rock, MD, MBA, the Martin Helrich Professor and Chair, 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 2015. During the 2013-2014 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 NSC's 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 on changing motor vehicle injury patterns over the last decade at the CIREN Annual Meeting at NHTSA Headquarters in September 2013. Additionally, the NSC continues its collaborations with MIEMSS and impact research 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 allow for in-depth analysis of highway safety programs. During the past year, while funding support from NHTSA ended, the Maryland CODES team has continued as the Program Resource Center (PRC) for the national CODES data network. The PRC, in conjunction with the Technical Resource Center at the University of Utah, provides coordination and support for the 17 states currently participating in the program. On state and local levels, 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 (TRCC), 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.

Under a contract with the MHSO, the NSC serves as a key data analysis 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 presented Maryland crash data to the Maryland General Assembly at the beginning of its legislative session in January 2013 and continued to utilize NHTSA guidelines in the implementation of the Maryland Seat Belt Survey for 2013. 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 selec-

tion and jurisdictional roadway-specific vehicle miles traveled, was 90.7%. 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 to the core data available to the NSC through the CODES initiative, 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. During 2013 NSC staff established a mentorship with the Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Through this partnership, the NSC redeveloped the MHSO Maryland Annual Driving Survey. Survey findings will be used by the MHSO to fulfill a missing gap in data for their annual SHSP and HSP. Survey responses from 2013 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 2013-2014 the NSC continued to make enhancements to its website, making many data products available for public use.[1] Partner agencies can submit a specific data request to NSC epidemiologists and data analysts using the data request form[2] on NSC's website.

NSC staff also attended and presented at the Traffic Records Forum, MHSO SHSP Summit, 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 to 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 treatment for their problem drinking is a medical necessity and 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, which will provide valuable long-term outcome data on mortality once discharged.

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 are underway to collect and analyze continuous vital signs data in trauma patients, both in prehospital and on arrival at the STC, for two hours of resuscitation. The objective is to develop predictive algorithms based on collected vital signs data, patient outcomes, and therapeutic interventions between field encounter and completion of resuscitation. Comprehensive resuscitation data from 1,200 patients have been collected, including all interventions and laboratory results during the first two hours. Automated (no user input) predictions of blood use and mortality, using only pulse oximeter signal processing, are 97% accurate. The project has developed proto-

[1] *http://medschool.umaryland.edu/NSCforTrauma_MCTSA_data.asp*
[2] *http://medschool.umaryland.edu/orc_trauma_anes/data_request.asp*

type decision aids for military and civilian prehospital providers that are being tested to predict transfusion and emergency surgery needs before hospital arrival.

Retention and Assessment of Surgical Performance Study: A study funded by the US Army is developing surgeon performance metrics and surgical skill retention in vascular control procedures in cadaver and simulated physical models. The study will use performance assessments to determine readiness for deployment that are measured before and after training 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 to 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.

Internationally, 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 health professionals in a number of injury prevention and emergency response–related courses. The material covered in these various courses includes injury epidemiology and biostatistics, emergency preparedness and disaster response, and the clinical care of trauma patients. As a key component of this grant, 27 trainees from the Middle East and East Africa, including Egypt, Iran, 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. Eight additional trainees, primarily from Egypt, are scheduled for training at the NSC during August and September of 2014. Through this grant, approximately 800 trainees from multiple countries in the Middle East have participated in one or more of the training courses. Recently, a two-week long introductory injury epidemiology course was taught in Medina, Saudi Arabia (January 2014) and in Khartoum, Sudan (June 2014). Overall, these courses are designed to strengthen injury prevention and control research and practice within Egypt and the Eastern Mediterranean region.

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 Research Interest Group was developed with members from MIEMSS, University of Maryland, and Johns Hopkins University. The purpose of this group, which meets monthly, is 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. 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 11 manuscripts by University of Maryland, Baltimore researchers between June 2013 and May 2014, with at least five additional papers still in various stages of critical review.

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