

State of Maryland
Emergency Medical Services Plan

Maryland State Emergency Services Board

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Emergency Medical Services Systems**

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Introduction

Emergency Medical Services (EMS) care is vastly different today from the emergency care that was available during the 1960's and early 1970's. Then, patients were transported to hospitals in station wagons or hearses. Ambulances functioned as taxicabs, contained no medical equipment and were staffed by personnel with no medical training. Patients often arrived at the hospital unannounced and were met by nurses and interns from the emergency department. Chaos often interfered with the efforts to save the patients' lives.

Maryland became the first state to implement a statewide EMS System in 1973 and, as a result, EMS in Maryland is very different today. The plan for development of the EMS System involved creating a system that would provide sophisticated pre-hospital treatment to the patient at the scene, rapid ground or air transport to hospitals capable of providing life-saving care, a network of specialty care hospitals to provide definitive treatment, and a communications network to link all the components of the EMS System. The plan was implemented and is standard practice in Maryland today.

The Statewide EMS System in Maryland is unique in the nation. Throughout Maryland, one seamless emergency medical services system incorporates all components necessary to respond to emergency care needs. Uniform standards for the operation of the statewide system are in place for all critical components of the system. This uniform approach to emergency medical services throughout the State ensures that the highest level of emergency care is available to respond to each patient care emergency.

By law, the statewide EMS system must be guided by a Statewide EMS Plan that identifies the goals and objectives for continued focus and further development. The Statewide EMS Plan delineates the areas of work and focus for MIEMSS for the next five years and affects all aspects of EMS system. The goals and objectives for the continued development and operation of the system are outlined in the Plan.

This Statewide EMS Plan differs from previous plans in that, in addition to providing for the operation of the existing EMS system, the Plan strives to identify opportunities for improving the delivery of services and community health care through increased collaboration between EMS and public health.

While EMS and public health are both committed to protecting and preserving health, there are fundamental differences in their approaches. Public health generally involves a proactive use of epidemiology to systematically identify threats to community health and to intervene in response to those threats. Public health involves community or population-based activities. EMS is traditionally more reactive, is set up to respond quickly to targeted acute instances of illness or injury, and based on treating individual patients.

EMS can benefit from adopting certain public health approaches, such as the greater use of population-based data to identify problems and place necessary resources. EMS can adopt public health's data-driven evaluation methods to determine the effectiveness of system operations or patient care regimes. Collaboration with the public health community can also lead to greater EMS access to specific technical expertise in epidemiology and disease management, as well as to create opportunities for EMS to become more proactive in community illness and injury prevention program. Public health alliances can help EMS target services and expand

community coverage where needed. The infrastructure needed to increase EMS / public health collaboration has developed in recent years as part of the health and emergency response planning associated with homeland security concerns. Collaborative efforts should continue to attain the goals and objectives outlined in the Plan.

The Statewide EMS Plan also accounts for key attributes that impact the operation of the statewide EMS system, the emergency care system, as well as the public health system at large. These include:

- Regionalization of Health Care Services – The move toward greater regionalization of health care services is grounded in medical research that has shown improved patient outcome from concentrating treatment of seriously ill and injured patients in specialized centers. Maryland’s EMS System was founded on the concept of regionalized emergency health care services and this approach is reflected in all operational aspects of the current statewide EMS system.
- Domestic, All Hazards Preparedness – Since the events of September 11, 2001, a significant amount of federal, state, and local effort has been directed toward increasing the ability of emergency responders, public safety agencies and the public health care system to respond to homeland security events, as well as to complex incidents involving a variety of hazards. These efforts to increase readiness have impacted all aspects of the EMS system and have required all jurisdictions to focus staff and resources to ensure readiness.
- Health Care Work Force Issues – In recent years, health care systems have been challenged by the need to ensure sufficient numbers of appropriate trained health care personnel who possess the necessary skills to provide emergency care and other types of health care services. Although a variety of initiatives have been implemented nationwide, the projected supply of certain kinds of health care providers, e.g., nurses, remains insufficient to meet anticipate needs, particularly given the increasing age of the population. These shortages of trained health care providers, which impact the entire emergency health care system and the operation of the statewide EMS system, are anticipated to continue into the foreseeable future.
- Improvements in Safety and Quality of Care and Reduction of Errors – Recent national attention has focused on the need to increase patient safety and to reduce errors in medical care. Medical errors affect all aspects of health care, including emergency care and pre-hospital EMS. Quality improvement / quality assurance programs that focus on methods for improving the systems of delivering care can work to increase patient safety and reduce medical errors.
- Health Care Financing and “Safety Net” Resources – The emergency care and EMS system is designed to respond to and treat patients who are critically ill and injured. Non-emergency patients who need access to health care, but lack the financial or other ability to access necessary treatment, sometimes use the emergency care system to obtain medical care. In this regard, EMS functions as a “safety net” for those who would otherwise not be able to secure medical care. Non-emergency use of the emergency care and EMS system, however, increases the burden on the entire EMS system adds to the costs of health care, and can result in delayed treatment for actual emergencies.

EMS Plan Organization and Framework

The specifics of the State EMS Plan are presented within the structure of the 14 EMS components that were jointly identified in the *EMS Agenda for the Future*¹ and are organized in the public health framework of system assessment, policy development and system assurance.

EMS System Assessment. Assessment involves the regular systematic collection, assembly, analysis and dissemination of information on the health of a community. Assessment serves as the basis for current system operation and future system planning, development and resource use. The emergency care and treatment provided to patients should be based upon research results that document the effectiveness of the treatment provided. The EMS system must monitor and report on the types of emergency calls to which they respond. Relevant data can be used to provide an assessment of health status problems; evaluation of system performance indicators and outcome measurements; relevant surveillance systems and other data sources. Quality Improvement / Quality Assurance provide the necessary foundation for system improvement. Accurate and relevant patient and system performance information can be used to clarify the impact of EMS on community-wide health, mortality and morbidity. The EMS System Assessment components are: (1) Research; and (2) Evaluation.

EMS Policy Development. Policy development involves the development of legal authority, endorsement by elected officials, secure and sufficient funding and human resources, the implementation of administrative rules, participation in community health activities, and the use of media to inform and educate the public. Policy development focuses on building constituencies, identifying needs and setting priorities, using appropriate authority to develop and fund plans and policies to address needs, and ensuring the public's health and safety. Policy development translates EMS assessment results into EMS systems development. EMS policy development in Maryland involves collaboration among state, county and local governments. Statutes and regulations frame EMS policy decisions and initiatives. EMS Operational Programs implement necessary policies at the local and county level and further refine them to meet individual geographic and population needs. The EMS Policy Development components are: (1) Integration of Health Services; (2) Public Access; (3) Legislation and Regulation; and (4) System Finance.

EMS System Assurance. Assurance works to ensure that identified system goals and objectives are met and problems are addressed. Assurance focuses on enforcing laws and regulations that protect and ensure health and safety, ensuring access to necessary treatment and compliance with treatment protocols and policies, securing a competent and available workforce, and providing a well-coordinated transportation system. The EMS System Assurance components are: (1) Prevention; (2) Medical Direction; (3) Human Resources; (4) Education Systems; (5) Communications; (6) Information Systems; (7) Clinical Care; (8) Public Education and (9) Homeland Security.

¹ *EMS Agenda for the Future*. U.S. Department of Transportation's National Highway Traffic Safety Administration and the Maternal and Child Health Bureau of the U.S. Department of Health and Human Services' Health Services Research Administration. 1996.

EMS System Assessment

Assessment involves the regular systematic collection, assembly, analysis and dissemination of information on the health of a community. Assessment serves as the basis for current system operation and future system planning, development and resource use. The emergency care and treatment provided to patients should be based upon research results that document the effectiveness of the treatment provided. The EMS system must monitor and report on the types of emergency calls to which they respond. Relevant data can be used to provide an assessment of health status problems and evaluation of system performance indicators and outcome measurements. Relevant data can be used to create surveillance systems that are integrated with public health, appropriate state agencies, as well as with other sources of data. Quality Improvement / Quality Assurance provide the necessary foundation for system improvement. Accurate and relevant patient and system performance information can be used to clarify the impact of EMS on community-wide health, mortality and morbidity.

Research

EMS research is important for the development of more effective treatments and improved patient care and for strategies for EMS service delivery. Research is essential to ensuring that the best possible pre-hospital patient care is provided and is key to maintaining an appropriate focus on improving the overall health of the community.

EMS research focuses on two main types of research. EMS clinical research involves the study of direct patient care activities. EMS systems research explores the effects of varying resources or operational methods. Both types of research require well-trained researchers with interest and expertise in EMS research, reliable funding sources, standardized and accessible data, and compliance with established ethical requirements for human research.

EMS and emergency care typically involve the treatment of critically ill and injured patients. Conducting pre-hospital research to assess new treatments is constrained by the limitations on consent for research participation by seriously incapacitated patients. These patients require special protections that must be implemented prior to initiation of research activities. Additionally, in order to conduct effective EMS, relationships and resources necessary for such studies must be developed and nurtured. A research infrastructure must be in place to provide the foundation to support such research. Large teaching hospitals and academic institutions have the necessary research infrastructure for conducting effective EMS research, including large libraries, statisticians, epidemiologists, methodologists, database managers, and software engineers, as well as emergency physicians, cardiologists, surgeons, pediatricians, and other specialists who have interests in specific EMS areas. Also, collaborative opportunities with other disciplines and with industry can be useful, particularly in the areas of public health initiatives, injury prevention, development of new technologies, and health economics.

EMS research in Maryland has historically focused on cardiac arrests and trauma. MIEMSS is currently conducting a cardiac arrest study through the Maryland Cardiac Arrest Surveillance System to identify the epidemiology of out-of-hospital sudden cardiac arrest in Maryland, and to evaluate the effectiveness of the Maryland EMS System in responding to cardiac arrests. The surveillance system also provides critical information for modifying and improving EMS and layperson responses to cardiac arrests. MIEMSS also tracks adult and pediatric trauma center performance. Results are reviewed for each trauma center and statewide and are provided to each trauma center every six months.

In other research areas, the MIEMSS' EMS for Children (EMSC) Program continues to participate on the Advisory Board for the Chesapeake Applied Research Network. In 2006, MIEMSS will become the EMS "node" for this collaborative research program, providing the first formal link between pediatric emergency department data systems and EMS statewide data systems. Additionally, the State EMS System is participating in an NIH-sponsored research project to develop an Acoustic Resuscitation Monitor to enable non-invasive assessment of shock and resuscitation in the pre-hospital phase of care.

EMS System Goals

1. Agency leadership in research, evaluation of care and system outcomes provides insight and guidance to EMS operations throughout the State and advances EMS pre-hospital care effectiveness.
2. Agency research focuses not only single clinical interventions, but also on public health issues, including cost-effectiveness, resource utilization, efficacy of field therapies, injury prevention, and reduction of errors/improved patient safety.
3. Critical links are forged with academic institutions and teaching hospitals to facilitate effective clinical and system research.

Objectives

1. Develop and implement an EMS Clinical and EMS Systems Research Program and research agenda; obtain program modeling assistance from established EMS research efforts, e.g., the Ontario Pre-hospital Advanced Life Support (OPALS) Study (see http://www.ohri.ca/programs/clinical_epidemiology/opals/protocol.asp).
2. Develop collaborative research efforts with the National Study Center for Trauma and EMS and with other academic centers in Maryland that have the infrastructure, expertise, interest and resources to participate in EMS clinical and systems research.
3. Renew efforts to create EMS research opportunities for Maryland that include statewide, regional and local initiatives.
4. Develop a cadre of experienced EMS investigators to collaborate with health services researchers, epidemiologists, social scientists, economists, health services researchers, operations researchers, and other clinical scientists to improve the quality of research investigations.
5. Complete linkages with available, large local, regional, and state databases (e.g., CAD, NFIRS, hospital ambulatory care data).
6. Implement “data mining” programs on specific databases, e.g., Ambulatory Care Dataset, to fully capture available emergency care information needed for effective research.
7. Work with other agencies and entities to identify and implement longitudinal patient tracking to permit patient tracking throughout the full spectrum of emergency care -- from telephone access to the system, to provision of pre-hospital care, to definitive hospital care in the hospital and through hospital discharge and rehabilitation.
8. Constitute and convene the MIEMSS Institutional Review Board to ensure protection of human subjects, compliance with federal and state research requirements, and assurance of patient and provider confidentiality.
9. Require reliable evidence showing the effectiveness of new technologies and therapeutic approaches prior to or at the initiation of their use.
10. Improve methods for tracking, compiling and reporting research activities and outcomes.
11. Ensure widespread dissemination of information on research activities conducted by and within the Maryland EMS system, including peer-reviewed research publications within medical journals.
12. Use evaluation data for EMS systems research that benefits the statewide EMS system.

Evaluation

Evaluation encompasses all the activities undertaken to assess and improve the services and components of statewide EMS system. Such comprehensive evaluation focuses on structural, process and outcome measures that provide the foundation upon which improvement of the statewide system can occur. In particular, evaluation of patient outcomes helps ensure that emergency care providers render the highest quality of care. Evaluation requires use of objective data and pairs carefully identified, measurable performance indicators with data from statewide information systems to monitor, analyze and trend data.

Patient safety, particularly in the pre-hospital phase of emergency care, is of paramount importance to maintaining the high quality of the statewide EMS system. The very nature of EMS care includes elements that can increase the likelihood of patient error, e.g., time constraints in the emergency care phase, patients presenting with a broad range of injuries and illnesses, difficult environments in which patients must be treated (e.g., site of a car crash), fluctuations in demand for EMS services, and provider stress and fatigue. Monitoring system operations for errors in medication, treatment processes and management, and equipment usage involves initiatives at the state, regional and EMS Operation Program levels. The EMS system must identify errors and monitor and address error trends in order to ensure effective patient treatment and continuation of public trust in the EMS system.

Maryland regulations detail the specific quality assurance requirements for EMS operational programs (COMAR 30.03.04), and MIEMSS assists in the development of quality assurance initiatives. Each EMS Operational Program in Maryland is required to have in place a comprehensive quality assurance program, including a quality assurance plan and a medical review committee to carry out the plan with medical director participation. The quality assurance plan must include the review of patient care data and identify and analyze trends in EMS care rendered by providers affiliated with each EMS Operational Program. The State EMS Medical Director reviews and approves the quality assurance programs of each EMS Operational Program. To date, all public sector EMS Operational Programs have approved quality assurance programs; approval of the quality assurance programs of the commercial services is underway.

Quality improvement / quality assurance are integrated into all aspects of the EMS system. In addition to requirements for EMS operational programs, there are also quality improvement / quality assurance requirements for commercial ambulance services, EMS educational programs, adult and pediatric trauma centers, all specialty care centers, and the AED layperson program. Additionally, a number of Quality Improvement Councils / Committees (QICs) have been established to facilitate evaluation of specific patient care areas, e.g., trauma. Results from QIC-conducted evaluations are used to implement improvements to the statewide system. Quality improvement activities are confidential by state law and are non-discoverable.

Further, the State of Maryland's Managing for Results (MFR) Program, a strategic planning process that sets organizational direction, determines priorities, and establishes desired program results/outcomes, includes several EMS system evaluation components. MIEMSS also tracks adult and pediatric trauma center performance; results are provided to each trauma center every six months.

Maryland statute and regulations have provided a strong foundation for evaluation of the statewide EMS system. Initial efforts established a secure framework for evaluation at the local level. Continuing efforts to ensure uniform quality EMS throughout the State will require adoption of common, minimum standards and benchmarks for system operation, patient outcome and other variables. Such an approach will parallel other statewide health evaluation efforts aimed at ensuring consistently high quality for all components of the state's health care system.

EMS System Goals

1. Measurable EMS systems standards are collaboratively developed, consistent statewide and implemented to respond to specific statewide, regional, and local needs.
2. Emergency care providers work in partnership with the broader health care community to create performance and outcome measurements to ensure consistent delivery of high quality care.
3. EMS system standards are broadly-based and include patient care protocols; response, treatment and transport times; procedures; equipment; field performance; and education.
4. Patient outcome measures include death and other outcome measurements, including disability.
5. Accurate and reliable data is available statewide for evaluation of the EMS system.

Objectives

1. Implement statewide use of statewide performance indicators ("benchmarks"), using indicators for which data are standardized and available statewide; identify other indicators for local and regional use.
2. Ensure EMS provider, company, and EMS Operational Program involvement in indicator development, approval, standardization and implementation.
3. Ensure continued confidentiality protection for performance indicator data.
4. Maintain responsibility for monitoring, collecting and evaluating state standardized EMS system indicators.
5. Work with jurisdictions to develop a standardized format for reporting standardized EMS system indicators that includes setting minimal indicators and reporting timelines.
6. Monitor, collect, organize, prepare, analyze, and provide feedback to participating agencies on state standardized EMS system indicators.
7. Continue a program for training EMS managers at all levels with principles and methods of outcomes measurement and performance indicators.
8. Assure reasonable availability of training and in-service for EMS providers and personnel on quality improvement and performance indicators.
9. Assure the ability of EMS Operational Programs to monitor, collect and evaluate state, regional and local EMS system indicators.
10. Enhance EMS quality improvement models based on near real-time data collection.
11. Continue to assess EMS system performance using process and outcome measures; report appropriate findings to all components of the EMS System.
12. Evaluate base station services through the use of quality indicators.
13. Improve local jurisdictional compliance with Title 30 credentialing requirements, including quality improvement / quality assurance.
14. Develop an administrative database to link patient outcome for purposes of quality assurance.
15. Access and use outcome data for quality assurance purposes.

16. Create a mechanism for EMS providers to request information on outcome for patients to whom they have provided pre-hospital care.
17. Develop guidance to assist jurisdictions and jurisdictional medical review committees in ensuring timely remediation and provider due process.
18. Re-invigorate the State Quality Leadership Council to ensure communication and collaboration among the various quality improvement committees.
19. Ensure that EMS data collection and reporting methods are standardized throughout the State.
20. Continue efforts to evaluate the effectiveness of medical interventions by the lay public.
21. Initiate initiatives that will determine the effectiveness of EMD pre-arrival instructions.
22. Continue the Maryland Cardiac Arrest Surveillance System.
23. Work with jurisdictions to develop a model customer service satisfaction survey and to encourage its use by the EMS system.

EMS Policy Development

Policy development involves development of legal authority, endorsement by elected officials, secure and sufficient funding and human resources, implementation of administrative rules, participation in community health activities, and use of media to inform and educate the public. Policy development focuses on building constituencies, identifying needs and setting priorities, using legislative authority and funding to develop plans and policies to address needs, and ensuring the public's health and safety. Policy development translates EMS assessment results into EMS systems development. EMS policy development in Maryland involves collaboration among state, county and local governments. Statutes and regulations embody EMS policy decisions and initiatives. EMS Operational Programs implement necessary policies at the local and county level and further refine them to meet individual geographic and population needs.

Integration of Health Services

While emergency care is critical to the survival of the ill or injured patient, it is but one component of the health care services that are provided to the patient. Integration of health services links emergency care providers with other community health resources to ensure that emergency care does not occur in isolation and to enhance patient outcomes. Integration involves collaboration and communication with patients' acute and community health care providers, networks and insurers, as well as with the public health system. Better integration of emergency care into the acute and public health system at large can result in improved patient care, improved delivery of health care and the improved collaboration among health related agencies and organizations.

The most common form of integration in EMS includes EMS personnel working and volunteering to provide patient services with other types of health care providers, regional EMS councils with broad health care and community representation, and sharing of training resources and administrative functions and expertise. Regional EMS Advisory Councils are located in each of the State's five (5) EMS regions. These Councils, which include broad representation from all aspects of the emergency care system, are charged by regulation to advise MIEMSS and the EMS Operational Programs in their respective regions on matters concerning the delivery of emergency medical services. They also provide a forum for coordinating EMS activities among EMS operational programs in the region and also operate inter-jurisdictional quality assurance and quality improvement programs.

Integration between pre-hospital providers and hospital emergency departments is another form of integration and often occurs through base station medical direction or training provided by hospitals. Maryland's statewide emergency communications system provides further integration by linking all components of the emergency care system into one medical communications system. Specific communications programs, e.g., "FRED" and "CHATS" (see Communications Section) address critical integration needs that arise in certain circumstances, e.g., in situations involving mass casualties or emergency overcrowding.

Broader integration – between EMS agencies, between EMS and hospitals, and between EMS and other emergency and acute health services – requires innovation. EMS must work with other entities (e.g., health related state and private agencies and institutions) to share expertise that can be used to evaluate system issues and to mutually address and solve problems. Recent trends in the health care sector, such as the nursing shortage and efficiency concerns, have increased interest in developing new approaches to integration. Such approaches will need to account for legal barriers to integration that may exist and will need to overcome traditional opposition from other health care providers.

Increased coordination between hospitals and EMS is particularly critical to ensuring that the needs of emergency patients are met in both the pre-hospital and emergency department phases of care. Emergency department over-crowding and increased transfer-of-care times from EMS to ED staff have underscored the need for implementation of effective strategies that will lead to better integrate of both phases of emergency care.

EMS System Goals

1. EMS is part of an integrated health system that coordinates efforts to reduce death and disability through improved emergency services, prevention and public education.
2. Effective partnerships exist between the various components of the statewide EMS system and other local, county and state health agencies, services and organizations.

Objectives

1. Create incentives and opportunities for EMS Operational Programs to become more integrated into the larger health care system.
2. Identify agencies and organizations for EMS collaboration in order to improve communications, cooperative service delivery, and subsequent follow-up by referral services.
3. Assist EMS Operational Programs to develop cooperative relationships with other health services providers in their geographic service area, e.g., hospitals, clinics.
4. Involve EMS Operational Programs in acute and public health monitoring activities.
5. Involve EMS Operational Programs in collaborative efforts with healthcare networks, insurers and other members of the community to address the particular needs of specific patient groups, e.g., geriatric patients.
6. Improve the understanding among EMS, healthcare networks and insurance managers regarding complementary roles of EMS and other emergency health care providers in caring for the community.
7. Identify and address barriers to integration of health services.
8. Provide forums for the study, examination, development and dissemination of models that integrate the goals and activities of healthcare networks and EMS systems through research, demonstrations, evaluations, conferences, publications and other means; define how these relationships affect EMS' contribution to community health.
9. Encourage the training of hospital personnel in EMS practices and operations.
10. Integrate hospital leadership in coordinated efforts throughout the State that are aimed at increasing efficiencies in emergency department patient flow.
11. Increase opportunities for hospital leadership to collaborate with EMS on strategies to address emergency department overcrowding, decrease ambulance diversion, and decrease transfer of care times.
12. Encourage increased hospital participation in Regional EMS Councils.
13. Create incentives and opportunities for hospitals to participate in clinical requirements for pre-hospital EMS education.
14. Encourage greater cooperation between hospital emergency departments and EMS providers, particularly for issues involving ambulance diversions and emergency department overcrowding.
15. Encourage and support certification and recertification of First Responder training for all public safety personnel.
16. Encourage cooperation and collaboration among public safety personnel.
17. Enhance notice and access to EMS public meetings.

Public Access

EMS public access focuses on the geographic availability of “911” and availability and effectiveness of EMD programs that include pre-arrival instructions.

The three-digit number “911” is used to access emergency care in every jurisdiction within the state. Additionally, enhanced 911 access that provides the caller’s name, address, and telephone number to the 911 answering service was mandated by July 1, 1995. Implementation of wireless 911 is underway. As of June 30, 2005, all jurisdictions are capable of wireless Automatic Number Identification (ANI) and Automatic Location Identification (ALI). Funding to support 911 services is through telephone subscriber fees administered by the State Emergency Numbers Board.

Once the 911 system is accessed, Emergency Medical Dispatchers (EMD) can provide pre-arrival instructions for lay persons prior to EMS arrival. EMS receives 911 calls from the public, responds verbally to emergency calls, dispatches appropriate EMS providers, and gives appropriate pre-arrival instructions to complainant prior to arrival of pre-hospital EMS personnel.

As the initial point of patient contact during a 911 call, the EMD receives and processes calls for emergency medical assistance. During the 911 call, the EMD must determine the nature and severity of the medical incident type. EMDs are trained to elicit patient symptoms and to use that information to decide what type of response is necessary, including what type of units to send, and what instructions should be given to callers. As EMDs are responsible for the coordination and dispatch of EMS, they must be able to coordinate and dispatch resources based on the predetermined response configurations found in the EMS Operational Program and must have knowledge of the availability of all resources in the system.

The EMD provides emergency medical assistance by providing callers with emergency medical instructions to ensure the patient’s health and safety until dispatched medical emergency personnel arrive at the scene. EMDs then relay pertinent patient information to EMS personnel in the responding unit(s), including patient location and current status information. Instructions are given to callers to help them prepare for the arrival of responders. The EMD also coordinates with other public safety and emergency medical services responders as necessary. For example, depending on the situation, other public services (e.g., HAZMAT) may need to respond to the scene to deal with other important aspects of the emergency response.

Medical direction for Emergency Medical Dispatch operations helps ensure that patient calls to 911 result in timely and effective pre-arrival instructions and rapid dispatch of appropriate resources. Quality improvement / quality assurance initiatives are an important part of this process.

EMS System Goals

1. Enhanced Wireless 911 is uniformly available in all locations in the State.
2. Trained and effective EMDs are available in all jurisdictions throughout the State to respond to 911 calls.

Objectives

1. Work with the local telephone services providers to obtain emergency telephone service for those who cannot otherwise afford routine telephone services.
2. Monitor the completion of the enhanced wireless 911 system in Maryland.
3. Fully implement EMD statewide in a manner that includes quality improvement and medical direction.
4. Monitor and track the proliferation of Voice Over Internet Protocol (VOIP) communications and work with the State Emergency Numbers Board and involved communications entities to appropriately integrate this communications mode into the Statewide EMS System.
5. Identify and address 911 access issues for patients with special needs, e.g., language barriers; hearing impairments.

Legislation and Regulation

The passage of the 1993 Maryland EMS law created an organizational framework for coordination of the statewide EMS system. The law established the Maryland Institute for Emergency Medical Services Systems as an independent state agency within the executive branch that is responsible for the coordination of all emergency medical services. The same statute created an 11-member Governor-appointed State Emergency Medical Services Board to govern MIEMSS and a Statewide Emergency Medical Services Advisory Council (SEMSAC) to advise and assist the EMS Board. The law requires that the Board develop and adopt an EMS Plan.

In addition to the 1993 law, several other pieces of legislation strengthened the authority of the EMS Board and MIEMSS to coordinate an effective EMS system. From 1993 through 2001, Education Article Title 13, Subtitle 5, Emergency Medical Services, was modified several times to better define the Board's and MIEMSS' responsibilities. Regulations were subsequently developed to implement the responsibilities defined in statute; regulations are compiled within the Code of Maryland Regulations (COMAR), Title 30. Additionally, some county and local governments have ordinances that affect the provision of emergency care.

Legislation and regulation play a critical role in shaping state and local EMS systems. Statutes and regulations facilitate the operation of the statewide EMS system and enable all system components by, among other things, authorizing funding resources, requiring personnel credentialing and defining EMS scope of practice. Existing laws and regulations were developed through consensus processes involving all aspects of the emergency care system. These laws and regulations should be periodically reviewed to ensure their continued relevance and application to the EMS System and should be revised as needed. New legislation that benefits the operation of the EMS system and assists EMS providers in providing emergency services should be sought where necessary. Inter-state reciprocity of EMS provider credentials should be improved, particularly with Maryland's neighboring border states.

EMS System Goals

1. The statewide EMS system, its components and the practice of emergency medical care are firmly grounded in law and regulation.
2. Laws and regulations affecting the EMS system are closely tailored to meet current statewide EMS system needs and are timely modified to meet future needs.

Objectives

1. Review and, with input from EMS and the emergency care community, revise as necessary state laws and regulations affecting EMS and emergency health care.
2. Ensure that laws and regulations support and enhance efforts to achieve the goals and objectives contained in the EMS Plan.
3. Identify upcoming changes to existing regulations required by federally-funded programs, e.g., federal EMSC Performance Measures.
4. Assess the level of EMS system knowledge among local and state elected officials.
5. Develop an ongoing program to educate public officials regarding the statewide EMS and emergency health care system and issues important to the system.

6. In collaboration with Maryland's border states, improve the delivery of EMS across state borders.
7. Assist EMS providers in initiating and maintaining their own contacts and awareness programs for their respective public officials.
8. Initiate / support legislation and regulations that enhance and improve the various components of the statewide EMS and emergency health care system.
9. Participate in educational efforts that address legislative and regulatory issues.
10. Provide ongoing updates regarding new and pending state and federal legislation.
11. Integrate the State EMS Plan into the State Health Plan.
12. Increase collaboration with state health agencies that are responsible for other components of the acute health care system.

EMS System Finance

EMS System Finance encompasses the costs of services provided to emergency patients, as well as the costs of the infrastructure and support activities required to provide the services. EMS finance affects EMS providers and ambulance companies (public and private); local, county and state governments; hospital emergency departments; and designated specialty care centers and the physicians who provide treatment to EMS-transported patients.

Funding for the major state-level components of the EMS system is provided through a motor vehicle registration fee surcharge, instituted in 1992. The biannual surcharge funds the Maryland Emergency Medical System Operations Fund (EMSOF) which is used to support MIEMSS, as well as the Aviation Division of the Maryland State Police, the Maryland Fire and Rescue Institute, the R Adams Cowley Shock Trauma Center, the Amoss Fire, Rescue and Ambulance Fund which provides aid to local jurisdictions, and the Low Interest Revolving Loan Account under the Volunteer Company Assistance Fund. The State EMS Board reviews the budgets of the state agencies that receive EMSOF funding, and EMSOF recipients participate in the State's strategic budgeting initiatives.

Funding mechanisms vary among the other components of the EMS System. A significant portion of Maryland's EMS care is provided by volunteer EMS personnel. These individuals, who are certified or licensed as EMS providers, volunteer their services to EMS Jurisdictional Operational Programs that provide the structure through which patient care is rendered. Many of these services do not bill patients for care and treatment provided. In recent years, however, many public safety organizations have implemented patient billing for EMS services. Other public safety organizations, particularly those associated with larger jurisdictions have billed for many years. Funds are used to cover the operational costs of providing the services and, in some instances, to hire staff to provide EMS care, particularly during shifts when volunteer coverage cannot be provided. Commercial ambulance services (ground and air) bill patients for ambulance services provided. Emergency departments, hospitals, specialty care centers and treating physicians also bill for services provided.

Provider reimbursement comes from federal and state insurance programs (Medicare and Medicaid), private payers, and tax payer-funded initiatives and grant programs. Reimbursement levels can be too low to cover actual costs; uncompensated care and charity care comprise a portion of the services provided. These can lead to system operation and coverage problems, as evidenced in the Washington County Hospital Trauma Center's temporary closing (May 2002) that resulted from a lack of trauma physician coverage.

State funding is also used to support various program initiatives. For example, MIEMSS provides grants for EMD programs, ALS training, and purchase of AEDs. Maryland Department of Transportation monies are used to fund local EMS projects. Federal funds, e.g., from the Health Resources Services Administration, the Department of Homeland Security, and the Department of Justice, have also been secured to meet specific needs, including the Rural AED Program, and bioterrorism response initiatives.

EMS System Goals

1. A secure and adequate financial base is available to provide for and support the resources necessary for a comprehensive and reliable statewide EMS System.

2. All components of the statewide EMS emergency health care system have implemented appropriate efficiencies to provide cost-effective care.

Objectives

1. Award state grants in accordance with state and federal budget requirements and the needs of the Statewide EMS System.
2. Identify and periodically update the costs associated with the provision of EMS services in Maryland.
3. Document funding needs, funding sources and funding levels of all components of the statewide system.
4. Revise, where necessary, funding distribution formulae in order to ensure equitable distribution of state monies and to address unique jurisdictional and regional needs.
5. Increase collaboration with federal and state agencies focused on rural health needs in order to increase jurisdictional / regional access to financial resources.
6. Increase State and regional efforts to support jurisdictional access to federal and State grants.
7. Encourage specialty centers to quantify the hospital and physician coverage costs associated with serving as specialty centers and providing specialty center treatment to patients.
8. Develop a multi-disciplinary task force to report annually on the financial status of the various system components and to make recommendations for its improvement.
9. Facilitate the development of proactive financial interactions among EMS, other emergency care providers, and health care insurers/provider organizations.
10. Increase collaboration with state agencies charged with addressing various issues associated with health care reimbursement to ensure that issues relevant to EMS are incorporated into health care finance policy.
11. Recommend changes to various emergency health care and EMS System components to ensure adequate financing and adoption of cost-saving efficiencies.
12. Monitor and report on the cost-effectiveness of the EMS transport system, including aeromedical transport.
13. Explore the need for stretcher transport systems for patients with special needs who do not require medical care during transport.
14. Monitor the impact of changes in federal and state health care reimbursement on EMS and on emergency health care services.
15. Monitor, and where necessary, devise strategies to address issues related to funding for specialty care center hospital and physician reimbursement.
16. Maintain a rolling five-year operating and equipment budgeting system for all state-supported EMSOF expenditures.

EMS System Assurance

Assurance works to ensure that identified system goals and objectives are met and problems are addressed. Assurance includes a focuses on enforcing laws and regulations that protect and ensure health and safety, ensuring access to necessary treatment and compliance with treatment protocols and policies, securing a competent and available workforce, and providing a well-coordinated transportation system.

Prevention

The overall health status of the population can be improved through prevention, early identification of illness and injury, access to the health care system, and effective treatment. Prevention is a cost-effective method of improving the health of specific populations, especially those at high risk for disease or injury. Successful prevention initiatives are critical to ensuring the best use of increasingly scarce health resources.

Prevention programs target three standard intervention areas: environment; enforcement; and education. Programs can employ a combination of these methods to maximize the likelihood of successful implementation. EMS prevention efforts typically focus on education-oriented activities, e.g., classroom curricula to educate school children about bicycle helmets, and media campaigns to teach the public the early warning signs of cardiac arrest. EMS and emergency care providers are also uniquely positioned to participate in collaborative prevention efforts based on enforcement, e.g., partnering with law enforcement on Stop Red Light Running Campaigns, and on environmental changes, working with highway traffic safety programs to locate geographic areas of frequent road crashes and identify improvements (e.g., warning signs) that might reduce the number of crashes, as well as working with Maryland's State Highway Administration to focus on provider and vehicle safety standards.

In Maryland areas targeted for prevention are identified annually through the various databases maintained at MIEMSS. Collaboration with other state agencies and university-based programs assists in prioritizing prevention needs. Public education plans are developed based upon these data; E-codes (a classification system documenting the external cause of injury, e.g., gunshot wound) are examined to determine specific needs, and specific needs of each of the five EMS regions are identified and incorporated into prevention efforts. Additionally, many of the major statewide prevention initiatives are driven by federal and state partners that receive prevention funding.

EMS System Goals

1. The health of Maryland residents is improved by the identification of EMS-related injury and illness patterns and implementation of prevention techniques to address them.
2. Emergency care providers are educated in the fundamentals of illness and injury prevention and practice prevention as it relates to their own health and safety.

Objectives

1. Expand the use of statewide databases to drive prevention and intervention programs and policies.
2. Educate EMS provider agencies about the principles and practices of illness and injury prevention; further incorporate "prevention" into EMS initial and continuing education.
3. Work with community agencies, public and private organizations, and healthcare providers to identify community prevention needs and create support for illness and injury prevention activities.
4. Facilitate regular interactions between EMS and emergency care providers and the local, state and federal health entities and agencies concerned with health promotion and disease / injury prevention.

5. Provide EMS personnel with educational materials to assist them in implementing illness and injury prevention educational programs in their communities.
6. Support the development of a cadre of emergency care providers, including EMS providers, who have expertise in implementing community based illness and injury prevention programs.
7. Monitor the impact of involvement of emergency care providers in community based illness and injury prevention efforts.
8. Strengthen existing partnerships with organizations which have a prevention focus; encourage and support developing partnerships at the local level.
9. Provide injury prevention information to policy makers and constituents.
10. Collaborate with academic institutions and prevention specialists to implement a scientific approach and rigorous methodological evaluations of the impact of EMS prevention efforts.
11. Explore the need to centralize statewide injury prevention efforts for improved focus and coordination.
12. Increase collaboration on injury prevention initiatives with the Department of Health and Mental Hygiene's (DHMH) Center for Preventive Health Services.
13. Work with the Medical Examiner's Office and the DHMH Injury Prevention Office to obtain current data on frequency and types of injuries by region in order to develop, implement and coordinate appropriate injury prevention activities.
14. Constitute an EMS Injury Prevention Committee to identify necessary prevention programs for adults and children from available epidemiologic data and to prioritize prevention activities based on need.

Medical Direction

Physicians provide the medical oversight for all components of the EMS system – Advanced Life Support, Basic Life Support, Emergency Medical Dispatch, Operational, Educational and Training. Maryland’s EMS system relies on these physicians to provide medical direction at the state, regional and jurisdictional levels. There are standardized selection criteria and job descriptions for medical directors at the state and regional levels.

Maryland’s advanced life support providers, e.g., paramedics and CRTs, provide advanced treatment through the delegated authority from medical direction. Medical direction is provided through several mechanisms, including the development and operation of protocols, on-line medical direction to providers caring for patients in the field, EMS quality improvement programs, and by ensuring that EMS personnel at the local level meet training and other standards.

All of the state’s licensed and certified providers are required to function within the scope of practice defined by the *Maryland Medical Protocols for EMS providers*. The protocols specify that EMS Operational Program medical direction has direct responsibility for the care delivered by EMS providers. The protocols are developed by the MIEMSS Protocol Review Committee, which ensures physician- and medically-driven protocols, and are updated annually. State regulations allow for approval of jurisdiction-initiated changes to the *Maryland Medical Protocols for EMS Providers*, including “optional supplemental protocols,” “pilot supplemental protocols” or “research supplemental protocols” that allow temporary changes to an EMS Operational Program’s protocol to evaluate the benefit of the new therapy or skill on optimal patient care or system configuration. “Optional supplemental protocols” allow EMS Operational Programs to implement a non-standard protocol based upon defined population needs within their geographic coverage area. Proposed protocol changes, including those for research purposes, must first be approved by the Protocol Review Committee.

On-line medical direction connects EMS providers at the scene of an emergency with physicians and hospital emergency departments. The statewide EMS communication system allows providers to consult with multiple entities simultaneously.

State regulations detail specific quality assurance requirements for EMS Operational Programs (see Evaluation). All public sector EMS Operational Programs have approved quality assurance programs; approval of the quality assurance programs of the commercial services is underway. Each plan must include a review of patient care rendered, remedial action to resolve any patient care issues involving EMS providers, and identification of incidents, protocol variations, or trends that might have resulted in harm to a patient, or which suggest a need for changes in the statewide EMS system. The EMS Operational Program’s Medical Director, along with the EMS Operational Program, is responsible for determining, through clinical evaluation and other means as necessary, the capabilities and skills level of each affiliated EMS provider, including the ability of the provider to function independently within that program. The EMS Operational Program’s Medical Director is authorized to credential the EMS providers within their jurisdiction and may also limit the provider’s credentials, where necessary. Problems of sufficient gravity are referred to the State’s disciplinary process.

EMS System Goals

1. Physician medical direction is consistently provided among EMS Operational Programs by qualified physicians and staffs with special competency in EMS who are highly involved in the operational medical oversight and leadership of EMS Operational Programs.
2. Physician medical direction is available throughout the regions and through jurisdictional operational programs throughout the State.
3. All EMS medical directors have successfully completed educational courses that provide a minimal level of formal preparation (e.g., NAEMSP Medical Director Course) and possess active, current knowledge of EMS protocols, practices, and procedures through participation in initial and ongoing training and education programs, including being adequately and appropriately educated all hazards emergency responses (e.g., natural disasters, WMD and terrorism).
4. EMS medical directors have the resources necessary to fulfill their obligations.
5. Provider treatment information and patient outcome data is available to medical directors in a timely manner for concurrent and retrospective review.
6. Physician medical direction assures uniform identification and disposition of protocol violations and disciplinary matters among the EMS Operational Programs.
7. EMS and emergency care physicians collaborate and coordinate with other community physicians and health programs.
8. EMS Operational Program Medical Director positions are established and funded.
9. Laws that provide liability protections for all aspects of EMS medical direction are enacted and in place.
10. Medical Directors are actively involved in Emergency Medical Dispatch Programs, including quality assurance and improvement activities.

Objectives

1. Maintain filled regional pediatric and other medical director positions.
2. Identify the unique emergency care needs of special populations, e.g., the growing geriatric population, and develop mechanisms and resources to address those needs.
3. Ensure that the identified areas of authority, responsibility, accountability (including job descriptions) for EMS medical directors are maintained.
4. Increase training opportunities for EMS Operational Program Medical Directors that ensures a standard level of medical director competency.
5. Create linkages between medical director educational requirements and compensation.
6. Revise and update base station training and certification programs and base station program standards.
7. Continue and expand mandated training and certification programs for base stations and base station personnel, including ensuring adequate medical control credentials for physicians, emergency departments and specialty referral centers.
8. Improve the quality and clarity of base station on-line medical direction through review of base station self-assessment program results and identification of areas for focused improvement effort.
9. Identify the need for improvement, as well as methods to improve the quality of off-line medical direction.
10. Identify resource needs of EMS medical directors and work with EMS Operational Programs to address those needs, e.g., liability protection, geographic service needs.

11. Increase the availability for quality assurance purposes of electronic patient outcome data that can be used by medical directors for concurrent and retrospective review.
12. Create a Task Force to develop strategies to address medical director liability and compensation issues.
13. Work with jurisdictions to reduce barriers for EMS personnel who wish to provide care in more than one jurisdiction.

Human Resources

The Maryland EMS system includes over 35,000 state-certified career and volunteer EMS providers operating in the 23 counties/jurisdictions and the City of Baltimore. In FY04, there were 665,429 EMS calls and 373,229 EMS transports in Maryland. Maryland currently has 10,358 First Responders, 15-597 EMT-Basics, 312 Cardiac Rescue Technicians, 337 CRT-99s, 2,175 EMT-Paramedics, and 731 Emergency Medical Dispatchers. Annually, about 3,500 personnel at all levels are initially tested, processed and certified/licensed, and over 10,400 provider applications are processed for re-certification or re-licensure.

Despite a strong core of EMS providers, there are increasing challenges to ensuring sufficient numbers and levels of EMS personnel throughout the state. Many factors, including increases in population levels or call volumes, can significantly affect EMS coverage. For example, recent changes were made in staffing levels in several jurisdictions to require two ALS providers on each unit, which doubled the number of personnel needed to provide ALS service in those EMS Operational Programs. Additionally, the volunteer community, which often serves as a “pathway” to career service, faces ongoing provider recruitment and retention challenges. These and other stressors have resulted in a shortfall of available providers to fill vacant positions, particularly at the ALS level. However, the number of per capital EMS providers at all levels (EMT-B, CRT, and EMT-P) have increased over the last 15 years, from 2.65 providers per 1000 population (FY91) to 3.26 in FY04. In that same time period, the number of paramedics has increased fourfold from 578 to 2,191 (an increase of .37 ALS providers per 1000 population to .50 ALS per 100 population).

Recruitment and retention affects volunteer and career services alike. Some incentives have been established to attract more students into the EMS field. The Maryland Higher Education Commission provides tuition reimbursement for EMS, rescue, and fire personnel who pursue a degree in EMS, rescue, or fire services. MIEMSS provides grant monies to EMS Operational Programs to fund certain education programs in the State. Retention of EMS personnel is affected by occupational risks, including exposure to blood borne pathogens and infectious diseases, highly traumatic events and other mental stressors, and the potential for assault and work-related injuries. Also the contributions made by EMS personnel and other emergency care providers to the health of their communities are often unrecognized, and compensation (whether financial or otherwise) is often inadequate.

The availability of other health care professionals also impacts the delivery of emergency care services in Maryland, e.g., the long-standing shortage of trained nurses. The demands associated with providing emergency care of all types (e.g., trauma, burns) will likely continue to affect the emergency care system for the foreseeable future not only in Maryland, but throughout the nation as well.

EMS System Goals

1. There are sufficient numbers and levels of qualified EMS providers, volunteer and career, as well as acute care health providers, to meet the needs of the communities served.
2. The composition of the EMS workforce reflects the diversity of the population served.
3. Inter-jurisdictional agreements regarding credential reciprocity exist to facilitate the ability of EMS personnel to provide services in more than one jurisdiction and to increase provider mobility.

4. Health, safety, and wellness issues that affect the physical and psychological well-being of EMS providers are accounted for in state, county and local operations.
5. EMS personnel are recognized as members of the health care delivery team and provide services in coordination with other health care providers.

Objectives

1. Conduct bi-annual needs assessments to identify numbers and types of care providers and services needed throughout the state, and develop appropriate strategies to address identified needs.
2. Identify and incorporate the unique needs of the various geographic areas in the State, e.g., rural areas, in planning and programming to meet EMS human resource needs.
3. Promote volunteerism through public service announcements, recognition programs and other means.
4. Expand opportunities for providers with expired certification / licensure to return to the practice of EMS.
5. Increase the diversity of EMS providers.
6. Determine the effectiveness of various approaches to critical incident stress management.
7. Promote workers' compensation coverage for all EMS providers.
8. Increase opportunities for communication and cooperation between volunteer and career EMS providers and between EMS providers and physicians, nurses and other health care providers.
9. Promote EMS provider physical and mental health and well-being and increase EMS provider access to necessary health care treatment, including vaccinations and prevention programs.
10. Assist EMS Operational Programs in optimizing use of ALS personnel.
11. Track state and jurisdictional data on ambulance crashes.
12. Implement and evaluate programs to increase EMS personnel safety in specific areas, e.g., safety belt usage.
13. Develop model credentialing reciprocity agreements for use by EMS Operational Programs.
14. Analyze call types and volumes to determine best practices for provider ambulance and staff utilization models.
15. Increase the online access for EMS provider certification and licensure services, including initial certification / licensure and re-certification / re-licensure, and change of affiliation.
16. Promote emergency care and emergency services as career options for those interested in the health care profession.
17. Implement the recommendations contained in the *Maryland EMS Work Force Report, September 1, 2005*.

Education Systems

Maryland statutes and regulations require provider licensure / certification and specify standards for other credentialing requirements. Uniform EMS provider competency is assured through the initial and continuing education requirements which include skill assessments and the requirement that each provider be affiliated with an EMS Operational Program (each of which may have additional competency / experience requirements). For Advanced Life Support providers, skills competency is verified by the EMS Operational Program's Medical Director. Basic Life Support providers have skills verified in the initial and recertification courses by approved EMS instructors.

The curricula used to educate all Maryland EMS providers for initial certification and licensure are the current National Standard Curricula. Additionally, the refresher curricula for all levels of providers contain the National Standard Curricula objectives with additional content as deemed necessary by scope of practice modifications or by analysis of ambulance run data. As national standards are modified, Maryland EMS will need to determine whether to continue to model provider levels according to those standards. Continuing education used toward recertification and re-licensure is approved by MIEMSS. The continuing education of all providers is tracked, with on-line tracking data available for providers. Access to specialty continuing education courses is provided through local EMS Operational Programs, hospitals and through the Maryland Fire and Rescue Institute.

Maryland has 24 approved educational programs that provide required didactic and skill instruction for EMS students and providers, of which 21 provide ALS education, 3 provide BLS education programs and 15 provide EMS refresher training programs. Maryland regulations specify the process for approval of EMS educational programs that offer courses leading to certification / licensure which mirrors the national accreditation process. The program approval process promotes direct, centralized oversight of education delivered across the State and ensures that instructors/faculty met certain requirements.

Review of statewide data on providers, frequency and types of calls, and other variables identifies educational resource needs. In addition, analysis of EMS educational system data, including student outcomes, can provide and identify improvements needed to educational processes.

A toll-free 800 # is available to providers for easy access to the MIEMSS Office of Licensure and Certification, and all forms for licensure/certification are available on-line. Providers, as well as EMS operational programs, may verify certification status and continuing education records on-line.

The initial certification or licensure examination methods for EMS providers are becoming increasingly sophisticated with computer-based and computer-adaptive testing being provided by the National Registry of Emergency Medical Technicians (NREMT). The NREMT is a pre-requisite to Maryland licensure as a CRT and paramedic. For EMT-B and First Responders, MIEMSS works collaboratively with the Atlantic EMS Council, which includes representatives from state EMS systems in the mid-Atlantic region, to develop valid and reliable examination instruments.

As the EMS profession continues to evolve and become increasingly sophisticated, high quality educational programs must also evolve to meet the needs of the profession. The evolution of EMS education, as outlined in *EMS Education Agenda for the Future*, as well as the advent of the new EMS curricula, has resulted in modifications in educational programs to meet the curricula changes, as well as in the creation of unique and non-traditional methods to educate providers. See: <http://www.nhtsa.dot.gov/people/injury/ems/EdAgenda/final/>

EMS System Goals

1. EMS educational programs provide the knowledge and skill sets necessary to serve identified needs of the state's population.
2. Educational programs are available, accessible and affordable for EMS providers and for those desiring to become EMS providers.
3. Educational programs are conducted by qualified instructors, use appropriate adult learning techniques, and are regularly evaluated to ensure program effectiveness, efficiency and competence.
4. Where appropriate, educational programs are based upon national core content for the various levels of providers.
5. Sufficient clinical resources are available statewide for ALS skill development and retention, as well as for continuing education.
6. Ongoing and uninterrupted electronic provider and jurisdictional access to state-maintained provider information is assured for the purposes of initial and continuing education, credentialing, affiliation, disciplinary and other provider and jurisdictional needs.
7. EMS providers have access – in terms of availability, cost, and geographic proximity – to new and emerging technologies for initial and continuing education and testing.

Objectives

1. Monitor statewide health indicators to identify emerging health needs and implement modifications to EMS training program requirements where necessary.
2. Work with the Maryland Fire & Rescue Institute to maximize opportunities to ensure sufficient opportunities for provider education, including alternative methods of education such as distance learning classes.
3. Periodically evaluate EMS training programs, with a focus on skill retention, including focusing on outcome data and trends.
4. Supplement management and leadership training for EMS providers where necessary.
5. Determine the adequacy of the current level of state support for ALS and BLS training.
6. Continue development and presentation of training programs throughout the State and encourage benchmarking and sharing of best practices among programs.
7. Increase use of distance education, where appropriate, for EMS providers.
8. Enlarge the availability of clinical resources for ALS education within each region and throughout the state.
9. Increase the availability of technical resources needed to support ongoing electronic access to provider information.
10. Enhance provider access to new and emerging technologies through grants and other support mechanisms, such as statewide EMS conferences.
11. Evaluate the impact on Maryland EMS of national developments in the National Highway Traffic Safety Administration's Model Scope of Practice and EMS Education

Agenda for the Future regarding certification levels, training requirements, curriculum and testing.

12. Complete the development of and implement appropriate training programs for Specialty Care Transports.
13. Assist in the transition to computer-adaptive and computer-based testing.
14. Continue efforts with the Atlantic EMS Council to develop and improve provider testing procedures and processes.

Communications Systems

Maryland's EMS Communications System connects all components that participate in the spectrum of emergency care. This complex network provides statewide communications among ambulances, medevac helicopters, dispatch centers, hospital emergency departments, specialty referral centers, and trauma centers. It is the largest medical communications system in the state.

Patients gain access to the EMS system by dialing "911" which connects them to the local Public Safety Answer Point in every jurisdiction in the state. Each county is responsible for the dispatch of its ambulances in response to the emergency. Ambulance dispatching may be manually or computer aided. All counties have implemented programs to provide pre-arrival instructions to callers to assist in stabilizing patients prior to the arrival of medical assistance.

Once at the incident scene, the EMS provider treats the patient under existing medical protocols or, where required by the patient's condition, may access the EMS Communications System to obtain a medical channel for consultation with the hospital emergency department. Regional communications centers, called "Emergency Medical Resource Centers" ("EMRCs"), connect with dispatch centers and hospital base stations which allows field EMS providers at the scene to receive physician medical direction from a hospital emergency department base station. MIEMSS operates the EMRC for the two busiest regions (Regions III and V). In other areas of the state, local jurisdictions operate the service using MIEMSS-provided and maintained communications equipment. In rural areas, such as western Maryland and some areas of the eastern shore, the systems are near completion.

The EMS Communications System also encompasses medevac helicopter communications. All medevac helicopters transporting patients to or from medical facilities within Maryland are required to communicate with SYSCOM. The communications system includes ten (10) VHF 44.74 MHz helicopter communications sites strategically located throughout the state to ensure reliable in-flight radio coverage to and from helicopters. A Maryland State Police Aviation Division ("MSP") duty officer, stationed in SYSCOM, dispatches MSP helicopters or, when needed, Delaware State Police or U.S. Park Police helicopters for scene responses. SYSCOM also arranges for scene response by commercial air ambulance services in the event that the MSP are unavailable or significantly delayed. Commercial air ambulance service backup is provided by those commercial air ambulance services that have agreed to provide this function through a written Memorandum of Understanding. Medical communications from the helicopter to trauma centers and other medical facilities are also available. Additionally, a flight following system in SYSCOM tracks the status and location of all MSP helicopters. GPS navigational coordinates and aircraft personality data are transmitted from the helicopter every 30 seconds when the aircraft is operating. This allows the MSP duty officer to locate and dispatch the nearest helicopter to the scene of an incident. The system also can identify helicopters that are out of communications to permit helicopter emergencies to be quickly identified.

Maryland's statewide public safety communications network project, initiated in early 2000, is constructing the necessary infrastructure to support a public safety 700 MHz communications network. A key component of this project is the replacement of the 25 year-old MIEMSS analog microwave system with new digital equipment. The new microwave system is based on 28 T-1 point-to-point links between all of the usable existing and newly constructed communications towers. Connectivity to the county 9-1-1 center is included. MIEMSS has provided all of the engineering services for the design of this network; other allied State agencies have contributed

to the installation of the equipment. Towers and microwave equipment are provided by both the State and the local counties in a partnership arrangement. Monitoring of the network is primarily done by MIEMSS with access to the management system available to the county maintenance personnel. Existing communications systems, including the MIEMSS UHF system, have benefited from access to the new towers and microwave service. The EMS Communication System is also working with other public safety and public works agencies to establish a statewide public safety intranet to reduce public safety reliance on the public internet and to provide a back-up system for system monitoring, mobile data and for special communications applications (see below).

The EMS Communications System encompasses the Facility Resource Emergency Database (“FRED”), a web-based application that provides a real-time inventory of state hospital and emergency resource. FRED can be accessed by a variety of “users”, including hospitals, 9-1-1 centers, specialty referral centers, law enforcement agencies, state and local health departments, and EMS jurisdictions. When an incident occurs, the EMRC alerts the statewide system to the event. Users then log in to the secure system, access the details about the incident, and enter information on the availability of specific resources required for the response, including: emergency department bed availability; available in-patients beds; available medications, blood and blood components on hand; available emergency response personnel, apparatus and specialty teams. Data are immediately posted, and resources can then be managed centrally from the scene of an incident or at an emergency operations center. Through the Governor’s Office of Homeland Security, FRED can communicate with other emergency management software being used in Maryland. FRED has been adopted for use in Pennsylvania and Delaware, and other states bordering Maryland are developing plans to use the system.

The EMS Communication System also tracks current hospital emergency department status (County Hospital Alert Tracking System or “CHATS”). When hospital emergency departments are unable to accept additional patients, one or more of the alert categories are declared and ambulances can be re-directed to other emergency departments. CHATS information is available in real-time to the public via the MIEMSS web site. EMRC operators communicate changes in alert status on a continuing basis to all affected jurisdictions and serve as the focal point for communications with hospitals as they go on and off various alert statuses.

Although communications has traditionally focused on voice and telemetry, there is expanding interest in wireless data integration and inter-operability, especially for homeland security needs. Efforts will continue to further integrate the State’s emergency communications system with other federal, state and local communications systems.

EMS System Goals

1. The statewide EMS Communications System encompasses all necessary emergency care providers throughout the State.
2. Technological advances are available and incorporated into the EMS Communications Systems in a manner that increases the reliability of the system and enables future needs to be met.
3. The EMS Communication System is fully integrated with public health entities and providers.

4. The EMS Communication System enables rapid and coordinated emergency responses, both on a daily basis and during large scale events and provides the mechanism for effective use of available resources.

Objectives

1. Complete the projects in process to provide statewide EMRC coverage.
2. Increase EMS provider understanding of the resources available through the EMS Communications System, especially EMRC and SYSCOM capabilities.
3. Evaluate current communications systems, including FRED and CHATS, in light of new technologies and cost; and, where needed, upgrade the systems.
4. Identify opportunities to improve existing communication operations and structures through pilot tests of alternative approaches and implement approaches that are determined to be advantageous and cost-effective.
5. Ensure that communication systems address issues regarding access for patients with special needs, e.g., language barriers; hearing impairments.
6. Determine the feasibility of automating certain communications processes, including FRED and CHATS.
7. Complete the conversion of analog to digital microwave.
8. Complete the linkage of FRED, CHATS and syndromic surveillance systems to public health systems and entities.
9. Explore options to implement video teleconferencing to support EMS provider educational needs and to increase local and county involvement in statewide EMS issues.
10. Develop a consolidated communications and information management plan for the State in conjunction with other Maryland public safety agencies and with the assistance of outside expertise in communications and information technology.
11. Complete development of communications linkages to the District of Columbia, Pennsylvania, Delaware, Northern Virginia and West Virginia for use in homeland security and disaster responses.
12. Maintain collaborative efforts with the Emergency Numbers Board, the Federal Communications Commission, the wireless industry and others to fully implement enhanced wireless 911 throughout the State.
13. Continue collaborative efforts with other state agencies to support the State's transition to 700 MHz and to improve inter-operability.
14. Incorporate regional EMS input into the Statewide Interoperability Project.

Information Systems

EMS requires timely, accurate and comprehensive data to aid in establishing relevant policy and monitor system quality and effectiveness. The statewide EMS information system collects and analyzes data necessary for all aspects of the operation of the statewide EMS system, including system planning, evaluation, research and quality improvement, as well as provider training and credentialing. The data collected by the information system is used to monitor and evaluate patient care, outcome, and cost; to assess EMS provider compliance with protocols, regulations, and standards; for resource planning and management; for injury surveillance, analysis, and prevention programs; and for research and education.

Each emergency services unit responding to an incident involving the delivery of emergency care is required to complete a run report. Most EMS Operational Programs meet this requirement either by using the state-provided paper Maryland Ambulance Information System (MAIS) runsheet or by participating in the state's electronic data collection system (EMAIS). Several EMS Operational Programs complete a self-developed form, but must submit their data in a specified format.

The information system also includes the State Trauma Registry which collects data on patient admitted to Maryland trauma centers and specialty care data bases from hospitals that are designated as specialty care centers. Additionally, to assist in evaluation, research, and quality improvement / assurance, MIEMSS maintains or has access to a number of statewide databases, including data from other state agencies, such as the Health Services Costs Review Commission Hospital and Ambulatory Services data sets.

Data necessary for special studies is also collected and analyzed (see Research). The Maryland Cardiac Arrest Surveillance System captures all out-of-hospital sudden cardiac arrests where the Maryland 9-1-1 emergency medical system is contacted. The Trauma Registry collects data on patients admitted to Maryland trauma centers and is used to assess trauma center performance.

Several unique information gathering and sharing projects are underway. The Facility Resource Emergency Database ("FRED") provides a real-time inventory of state hospital and emergency resources, permits more efficient management of emergency resources and reduces the time needed to maintain an ongoing resource catalog from hours to minutes (see Communications). Also, an electronic triage tag has been developed for use, particularly in disaster and Homeland Security events. The tag uses a bar code to identify and track patients through the triage and treatment system to aid in the delivery of care and ensure the appropriate use of pre-hospital and hospital resources.

While adoption of new technologies and electronic data systems is targeted to achieve cost-savings, an improvement in the breadth and quality of data, and shortened timeframes for data processing and analysis, implementation has required focused application of state resources. Further, there has been great interest in the continued development and refinement of specific information projects, e.g., FRED and electronic triage tags, which has also required additional resources. Finally, incorporation of advanced technologies and the information they produce into the statewide EMS information system, e.g., transmission of crash data to 911 centers from car computers equipped with automatic crash notification systems, will require unique expertise and sufficient resources to ensure effective system integration.

EMS System Goals

1. Valid data is available that provides complete information on patient treatment and outcome from initial encounter with EMS through the emergency care system until discharge from the health care system.
2. By 2010, ambulance run information is collected and reported electronically using EMAIS for public safety providers and CMAIS for commercial ambulance services.
3. Electronically-submitted data is available electronically and in a timely manner to EMS Operational Programs that submit data for their use in quality improvement and provider credentialing.
4. EMS providers, EMS Operational Programs, and EMS educational programs have ongoing electronic access to, as well as the ability to modify or process their own license / certification information and educational information.
5. EMS Operational Programs possess the necessary technology and programming capabilities to use ambulance and provider data for their quality assurance, quality improvement and system evaluation needs.
6. EMS reporting and data collection systems are integrated as appropriate with other public safety and health care reporting and data collection systems.
7. Useful information produced by technological advances is available to EMS and other components of the emergency care system.
8. EMS educational programs have the ability to enroll, track student progress, and transfer educational data to MIEMSS electronically.

Objectives

1. Ensure compliance with Maryland regulations for data submission.
2. Create incentives to encourage the statewide adoption of the EMAIS electronic reporting system for public safety systems.
3. Continue use of the EMAIS User Group to guide future enhancements and to improve EMAIS interface with other databases.
4. Develop a mobile capability for EMAIS.
5. Ensure compatibility of electronic data collection systems and eventual elimination of the MAIS paper run form.
6. Develop and implement the CMAIS electronic reporting system for commercial ambulance services.
7. Integrate EMS data with other existing and planned databases, where feasible, including CAD and other pre-event databases.
8. Establish permanent linkages necessary to obtain ongoing access to patient information necessary for evaluation and research, e.g., hospital outcome data.
9. Secure adequate resources at the state level necessary to operate the statewide EMS information system.
10. Improve dissemination of quality improvement and provider credentialing data to EMS Operational Programs and local providers while maintaining confidentiality and addressing discoverability concerns.
11. Identify and implement methods to improve data collection in the field to improve reliability, accuracy, consistency, speed and integration with the patient's medical record.
12. Ensure patient confidentiality at all levels of data access and transfer and comply with applicable HIPAA requirements.

13. Implement necessary changes to EMS data collection to ensure compliance with the data elements contained in the National EMS Information System database.
14. Improve the mechanisms for timely dissemination of aggregated data results and analysis.
15. Prioritize technology and information system advances that will be adopted by the EMS system so that necessary resources may be secured in a timely manner.
16. Link FRED with other data systems, e.g., public health syndromic surveillance.
17. Automate EMS provider certification / licensure and associated processes via the web.
18. Automate educational system processes so that MIEMSS and educational programs can access and input data and electronically transfer necessary information.
19. Build and maintain a scalable information technology infrastructure that ensures high availability of mission-critical systems.

Clinical Care

EMS clinical care encompasses the clinical methods, technologies and delivery systems used to provide emergency medical care. Such care encompasses in-hospital care, as well as pre-hospital patient care and transport to and between various healthcare facilities. It also can include community health services and mass casualty management. Clinical care accounts for the needs of special populations, e.g., children and geriatric patients, and incorporates into daily operations specific methods to meet those needs.

Effective EMS systems provide a seamless and consistent emergency care system, as opposed to a geographic “patchwork” of varying levels of resources. Appropriate and effective emergency treatment capabilities involve all components of the statewide emergency care system. At a minimum, clinical care strives for a standard level of pre-hospital EMS care and hospital emergency department care throughout the State and seeks to ensure that the patient need is matched with the appropriate level of pre-hospital and hospital resource. Ensuring effective clinical care also requires that Maryland participate in the larger continuum of health care that exists beyond its borders.

Emergency Department Access. The ability of emergency departments to accept EMS-transported emergency patients is a critical linchpin in the operation of the statewide system. In recent years, a growing number of hospital emergency departments have experienced periods during which they are over-crowded with patients and unable to accept additional EMS-transported patients. Additionally, due to a declining overall psychiatric bed capacity, an increased number of voluntary and involuntary psychiatric patients are utilizing emergency departments for care. Emergency department diversions occur when hospital emergency departments decide to accept only very critically ill patients arriving by ambulance for immediate stabilization and to divert all other ambulance transports to alternate hospitals for treatment. MIEMSS operates the County/Hospital Alert Tracking System (CHATS) to monitor emergency department overcrowding. To manage in hospital emergency department diversions, MIEMSS established a Yellow Alert Task Force composed of EMS providers, hospitals, and state agencies to serve as the central forum for developing strategies to manage emergency department diversions at the statewide level.

EMS for Children. MIEMSS’ Emergency Medical Services for Children (EMSC) Program provides expertise and coordination of resources to focus on the unique emergency care needs of children and their families. MIEMSS has developed and promulgated standards for pediatric trauma centers and pediatric burn centers. EMSC programs are integrated into the state, regional and local EMS activities and include injury and illness prevention, clinical protocols, standards of care and initial and continuing EMS provider education. The needs of children and families are integrated within the goals and objectives of the State EMS Plan, as well as into emergency preparedness initiatives for all hazard responses. Additionally, the Maryland EMSC Program continues to emphasize prevention and preparedness. Federal EMSC grants, however, will no longer provide funding for primary prevention activities; instead, close collaboration with state health departments will be encouraged. Renewed partnerships with DHMH will help ensure that childhood prevention initiatives can be continued.

Geriatric Patients. In order to incorporate a geriatric-specific component into the Maryland EMS System, MIEMSS established the Geriatric Emergency Medical Services Advisory Committee (GEMSAC). Committee membership consists of individuals with clinical knowledge and

expertise in geriatric care. GEMSAC's primary responsibilities include the evaluation of current geriatric assessment guidelines, recommendations for geriatric-specific protocol changes, and providing input and guidance on future EMS geriatric educational curricula.

Automated External Defibrillators. Automated External Defibrillators (AEDs) are computerized defibrillators that interpret a person's heart rhythm and automatically deliver a defibrillation shock if a person is suffering from sudden cardiac arrest. MIEMSS oversees the Facility AED Program which permits a layperson business or organization that meets certain requirements to use AEDs to treat sudden cardiac arrest. As of September 1, 2005, 523 entities located at 1,078 sites throughout the State have met program requirements. Since implementation, the Facility AED Program has documented 102 instances of lay AED use on cardiac arrest patients; in 24 of these instances, the patient's heart rhythm was restored.

Specialty Center Designation - Existing Specialty Centers. MIEMSS has designated specialty referral care centers that provide advanced treatment for adult trauma; pediatric trauma; neurotrauma; eye trauma; burns; and perinatal care. Designation is based on regulatory standards in COMAR that are either drawn from national standards or, where no national standards exist, Maryland-developed standards. For example, the Eye Trauma and Neurotrauma center criteria were developed by the local experts using the disciplines' current standards of patient care since there were no existing national center standards. For Perinatal specialty centers designation, MIEMSS adopted the perinatal standards that were developed by the Department of Health and Mental Hygiene's Perinatal Advisory Committee. Maryland's designated specialty referrals centers are shown in Table 1.

Patient access to specialty care centers via EMS may occur through initial EMS transport, or by inter-facility transfer from a hospital that initially received the patient to a specialty care center that has the staff and capabilities necessary to provide the necessary care. The statewide EMS system must secure the needed capacity to ensure that necessary inter-facility patient transfers occur in a timely manner.

Table 1: Maryland's Trauma and Specialty Care Referral Centers

Adult Trauma Centers

- Primary Adult Resource Center: R Adams Cowley Shock Trauma Center
- Level I: Johns Hopkins Hospital
- Level II: Johns Hopkins Bayview Medical Center
 - Prince George's Hospital Center
 - Sinai Hospital
 - Suburban Hospital
- Level III: Peninsula Regional Medical Center
 - Washington County Hospital Center
 - Western Maryland Health System–Memorial Trauma Center

Pediatric Trauma Centers

- The Johns Hopkins Children's Center, Baltimore, MD
- The Children's National Medical Center, Washington, DC

Specialty Referral Centers - Burn

- Johns Hopkins Bayview Medical Center
- Burn Center at the Washington Hospital Center

Specialty Referral Center – Eye

- The Johns Hopkins Wilmer Eye Institute

Specialty Referral Center – Neurotrauma

- R Adams Cowley Shock Trauma Center

Perinatal Referral Centers

- Anne Arundel Medical Center
- Franklin Square Hospital Center
- Greater Baltimore Medical Center
- Holy Cross Hospital
- Howard County General Hospital
- Johns Hopkins Bayview Medical Center
- Johns Hopkins Hospital
- Mercy Medical Center
- Prince George's Hospital Center
- St. Agnes Health Care
- St. Joseph Medical Center
- Shady Grove Adventist Hospital
- Sinai Hospital of Baltimore
- University of Maryland Medical System

Poison Consultation Center*

Maryland Poison Center/University of Maryland School of Pharmacy

Hand Injuries*

The Curtis National Hand Center at Union Memorial Hospital

Hyperbaric Medicine*

The Hyperbaric Medicine Center at the R Adams Cowley Shock Trauma Center

* These centers, which were part of the State's original identification of specialty centers in the 1970's, have been grand-fathered into the Statewide EMS System.

Statewide Trauma System. The Statewide Trauma System Plan is included as Annex A.

Future Designation - Primary Stroke Centers. Effective treatment of stroke requires rapid field triage and transport to a hospital with the necessary resources, capabilities and personnel to provide prompt treatment, all within a small timeframe. National recommendations have indicated that hospitals that meet certain requirements should be designated as stroke centers and should be identified to receive and treat EMS-transported stroke patients. Based upon these recommendations, MIEMSS has developed and promulgated standards for primary stroke center designation and will develop standards for comprehensive stroke centers.

Future Designation – Cardiac Centers. Improvements in the technique of angioplasty and expanded indications for use have increased the number of patients receiving cardiac angioplasty. While most angioplasty is elective, the procedure is also used to treat certain patients with acute ST-segment elevation myocardial infarction (“primary angioplasty”). Based on the recommendations of the Maryland Health Care Commission’s 2003 Report of the Interventional Cardiology Subcommittee of the Advisory Committee on Outcome Assessment in Cardiac Care, MIEMSS’ protocols should triage appropriate acute MI patients to primary angioplasty centers capable of offering interventional cardiology services rather than the “closest” hospital, provided the time to treatment is not significantly increased. Based upon this recommendation, MIEMSS will develop specialty center designation standards for cardiac centers.

Future Designation – Pediatric. It is anticipated that the federal Emergency Medical Services for Children Program will mandate the designation of Pediatric Medical Emergency specialty centers as a separate and unique process.

EMS System Goals

1. Timely access to appropriate emergency medical care is consistently available throughout the State.
2. The special needs of specific patient populations are provided for within the inclusive Statewide EMS System and reflected in daily EMS operations.
3. Sufficient specialty referral center resources are available to meet the needs of the emergency care system.
4. Cooperative regional efforts by state health agencies, local health agencies, hospitals, healthcare providers, and emergency medical services (EMS) to deal with emergency department overcrowding are effective in easing emergency department overcrowding.
5. Ambulance diversions and delays in patient transfer of care occur rarely.
6. Layperson participation in the Facility AED Program ensures that AEDs are widely available throughout the State.
7. There is a single, statewide “Do Not Resuscitate” Form that is applicable to EMS as well as to other health care providers.
8. Rapid, safe, reliable, and effective helicopter transport is available statewide and meets the needs of emergency patients requiring such transport.

Objectives

1. Develop a system to categorize all hospitals with respect to their capabilities to provide emergency care.
2. Work with hospital leadership to promote efficient through-put of emergency and hospital patients.
3. Develop a forum to identify strategies to address the growing problems associated with emergency calls from and responses to unlicensed / unregulated group homes and assisted living facilities.
4. Ensure that EMS personnel and other licensed health care providers, including those at nursing homes and assisted living facilities, are educated in the appropriate use of DNR forms.
5. Work with the Office of the Attorney General and others involved in end-of-life issues to develop and implement a DNR form that is applicable to EMS providers and other licensed health care providers.
6. Continue quality assurance efforts to identify and evaluate trends in scene and interfacility helicopter transport.
7. Appropriately coordinate and integrate private air ambulance services into the Statewide EMS System.
8. Identify and address factors that affect the safety, reliability, geographic coverage and cost-effective use of public and private helicopter transport services.

Pre-Hospital Care

1. Identify and publicize local EMS “best practices”.
2. Identify geographic coverage of the various levels of EMS service available in Maryland; determine any gaps in service coverage.
3. Monitor the number and geographic distribution of EMS vehicles, including transport services.
4. Define goals for levels of EMS service coverage in Maryland.
5. Increase the quality of the protocol roll-out to ensure that EMS providers statewide receive consistent and complete information on protocol changes and updates.
6. Increase the use of the Voluntary Ambulance Inspection Program – Seal of Excellence by all jurisdictions throughout the State.
7. Facilitate timely transfer of patient event data from EMAIS to the receiving hospital.

EMS for Children

1. Identify physicians willing to assume the responsibilities of the currently-vacant pediatric medical director positions in Regions I, II and IV.
2. Apply for EMS-C Special Project in Poison Center training.
3. Educate EMS providers in the need for and methods of primary prevention activities for children; encourage EMS provider participation in such efforts.
4. Review national pediatric prevention education performance measures and make recommendations regarding their adoption.
5. Develop and implement a program to designate Pediatric Emergency Departments that will identify those EDs that have made the additional commitment to acquire and

maintain the necessary resources and capabilities to effectively treat pediatric emergencies.

6. Review and improve, where necessary, the Pediatric Base Station Course.
7. Continue participation with the PECARN (Pediatric Emergency Care Applied Research Network) research efforts.
8. Ensure that the needs of children are adequately incorporated into planning for the medical response to disasters, mass casualty events, and homeland security incidents.
9. Ensure that pediatric education is included in the required components of initial and continuing EMS education in Maryland.

Perinatal

1. Closely collaborate with state health agencies on issues affecting Perinatal Center designation and operation, e.g., DHMH, Maryland Health Care Commission.
2. Complete designation of Level IIIA, Level IIIB and Level IIIC Perinatal Centers.
3. Consider incorporating volume, acuity and geographic distribution as factors for review in the designation and re-designation of Level IIIA, Level IIIB and Level IIIC Perinatal Centers.
4. Implement data collection among designated perinatal centers.
5. Maintain collaborative and cooperative relationships with designated Perinatal Centers.
6. Ensure sufficient agency resources to continue the Perinatal Designation Program and associated issues.
7. Monitor the compliance of perinatal centers with designation standards.

Stroke

1. Promulgate regulations for primary stroke center designation that meet national recommendations for the major elements of a stroke center.
2. Implement the designation process for primary stroke centers.
3. Identify a timetable for for designation of comprehensive stroke centers.
4. Promulgate regulations for comprehensive stroke center designation.

Cardiac

1. Develop a Primary Angioplasty Hospital Designation Program.
2. Promulgate regulations to implement designation of primary angioplasty hospitals.
3. Complete primary angioplasty designation process.

Emergency Department Access

1. Periodically review and update ambulance diversion guidelines on a statewide basis.
2. Compile and disseminate information on hospital “best practices” that address emergency department overcrowding.
3. Publicize hospital successes in reducing emergency department overcrowding.

4. Encourage continued communication and collaboration among affected hospitals to facilitate the development and implementation of cooperative short-term and long-term solutions.
5. Develop alternative destination criteria for ambulance patient transports.
6. Implement regulations that define the relationship between EMS free-standing emergency departments and specify requirements for such facilities to participate in the statewide EMS System.
7. Monitor the appropriateness of geographic coverage and capabilities of existing emergency care facilities.
8. Continue to monitor and evaluate the impact of emergency department overcrowding and ambulance diversion; establish mechanisms to reduce the incidence and impact of such diversions.
9. Secure the needed capacity for inter-facility patient transfer to occur in a timely manner.
10. Incorporate inpatient psychiatric bed capacity/availability into the Facilities Resource Emergency Database.
11. Identify and implement innovative strategies targeted to address emergency department overcrowding and ambulance diversion.

AED Program

1. Continue to evaluate the effectiveness of the AED usage and the Facility AED Program.
2. Identify and implement changes to the Facility AED Program, as necessary to ensure program effectiveness and appropriate availability of AEDs.
3. Establish on-line registration for the AED Layperson Program.
4. Evaluate and improve the current method for disseminating information on the geographic location of AEDs.

Public Education

Public Education programs provide the public with information regarding the value and necessity of EMS and the emergency care system, as well as with specific information on how to access the EMS system, methods for assisting EMS in responding to emergencies and for rendering care before EMS arrives, and specific facts and timely directions needed in the event of a disaster, disease outbreak or large scale event. Public education programs provide accurate information on EMS resources and capabilities, as well as on the constraints and limitations of the emergency care system. Public education programs support the role of emergency medical services in the community by preparing citizens to respond before an emergency occurs.

Effective public education is a combination of three different elements: (1) public information or news relating the facts about an issue of public concern or the circumstances involved in a major incident; (2) public education that imparts knowledge about service specifics or provides training, e.g., CPR; and (3) public relations that seeks to shape public opinion about specific aspects of the system. Effective public education is integrated with information regarding the community health care system in which the EMS service operates.

Public education in Maryland has included programs on accessing emergency care, recognizing emergencies, appropriate use of the EMS system, emergency department overcrowding, bystander care, obtaining flu vaccinations, child safety issues, and EMS system financing issues.

EMS System Goals

1. Effective public education programs are implemented statewide, focused on issues important to the operation of the statewide EMS and emergency care system, and tailored to reach specific audiences within the state.
2. The public understands the statewide EMS system and how to use the system to achieve maximum benefit.

Objectives

1. Create community partnerships for public education that address EMS as part of the broad-based emergency and health care network for public education.
2. Support EMS regions in surveying their citizens and community organizations to identify priority community health and safety issues and to determine the educational needs of the public regarding the EMS system.
3. Develop a comprehensive public education program that is available for use on a regional basis.
4. Formulate a specific public awareness program that can be used statewide to encourage the recruitment of EMS personnel.
5. Provide basic media training to regional and local EMS agencies to enhance the flow of information through local media.
6. Complete and implement bystander care training where appropriate.
7. Establish public education programs that are distinct from prevention efforts.

8. Encourage hospitals and organizations of health professionals to foster partnerships with EMS and to collaborate to develop EMS involvement in public education projects.
9. Revise and update EMS public education efforts as indicated by needs assessments by convening focus groups at the regional level to identify needs and to assess public education efforts.
10. Use state-of-the-art technology and various media to enhance public education efforts.
11. Monitor and evaluate public education activities to ensure messages reach their intended audience and achieve their intended goals.
12. Disseminate information about MIEMSS and the Statewide EMS System.
13. Ensure that emergency care and EMS public education messages regarding patients care areas (e.g., stroke, cardiac) are tailored to the cultural, language and physical needs of the variety of populations located throughout the state.

Emergency Preparedness

MIEMSS' statutory responsibilities for coordination of the statewide EMS system also apply to emergency preparedness, which includes all hazards response and homeland security issues. MIEMSS, in conjunction with the Department of Health and Mental Hygiene and the Maryland Emergency Management Agency, has and continues to take a lead role in the statewide planning for health and medical preparedness issues for weapons of mass destruction (WMD) events and in the development of special systems and the operation of specific critical resources necessary to respond to such events. MIEMSS spearheaded statewide efforts to develop a statewide Health and Medical WMD Response Plan three years before September 11, 2001, the product of which was adoption of the final "Maryland Health and Medical WMD Response Plan" in October 2001.

MIEMSS' efforts in this area include all aspects of the emergency medical care and response system. Subsequent to 9 / 11, MIEMSS conducted the first statewide survey of hospital capabilities to respond to WMD events. Subsequently, MIEMSS held the first statewide meeting of hospitals to review survey results and distributed a recommended planning framework and assumptions for hospital disaster plans for WMD. A concurrent statewide meeting of EMS providers was also held for the same purpose. The *Maryland Medical Protocols for EMS Providers* were modified in 2002 to include Clinical Treatment Guidelines for WMD Incidents. MIEMSS, the EMS jurisdictions, hospitals, and other critical components of the system throughout the state participate in preparation exercises on a continuing basis.

"Best practices" for the EMS, public health, and hospital components of the response system have been developed that place emphasis on decontamination, personal protective equipment, communications, and education and training across the health care system.

Certain "best practices" have been evaluated through multi-county / multi-location exercises with separate simultaneous disasters over the course of several days stressing the response and management capabilities of an entire region. Efforts to improve system readiness have included development of system-wide surge capacity; development of the Maryland Strategic National Stockpile Plan; increased coordination with the National Capital Region for planning and response; financial assistance to EMS providers; and development and refinement of communications and information systems.

MIEMSS provides technical assistances and support to the Maryland Emergency Management Agency's State Emergency Operations Center and, in conjunction with the Maryland Department of Health and Mental Hygiene, Emergency Support Function #8, Health and Medical Services. MIEMSS' role in disaster and emergency preparedness, including WMD, is expected to increase as the Health and Medical Committee expands to include a much broader membership, an increased coordination role with public health, and increased preparedness efforts coordinated with the Maryland Emergency Management Agency and the Governor's Office of Homeland Security.

EMS System Goals

1. The State of Maryland is prepared and equipped to provide an effective emergency medical response to All Hazard incidents.

2. Emergency care providers, including EMS, are well-trained and well-equipped to respond to emergency preparedness incidents.
3. Effective linkages between EMS, acute care, the public health community, and public safety entities ensure necessary communications, data linkages and coordination of efforts.
4. Communities are capable of increased medical self-sufficiency for the first 48-72 hours following a catastrophic event.

Objectives

1. Continue to partner with, support and provide technical expertise to other Maryland agencies and entities for planning, training and exercises related to emergency preparedness.
2. Use the communications and data infrastructure within MIEMSS and the public health system to support early identification and management of evolving major incidents such as infectious disease outbreaks.
3. Use MIEMSS' epidemiologic capacity to improve on EMS System syndromic surveillance; secure state and local epidemiologists to work with EMS providers to improve communications around infectious disease issues.
4. Continue to improve patient tracking systems, paying particular attention to the needs of pediatric patients and families that may be separated during these events.
5. Advocate for equitable distribution of available federal resources for EMS System preparedness.
6. Establish minimum education, skill and equipment levels for EMS providers and make recommendations regarding these components for other emergency care workers.
7. At a minimum, assure that EMS providers attain the education and skill level and obtain the appropriate personal protective equipment necessary to respond to homeland security incidents.
8. Participate in assessments required by the Target Capabilities List.
9. Complete assessment of resource adequacy and tracking capability.
10. Determine adequacy of mutual aid agreements and plans throughout the State.
11. Assure compliance with the National Incident Management System.
12. Develop a system to pre-register and credential EMS providers for out-of-state responses to disasters (EMAC).
13. Continue to provide training and support to counties and companies on the implementation of the Maryland Virtual Emergency Response System (MVERS) in collaboration with Maryland State Police with the primary goal to improve and enhance the communication and coordinated response of public safety, public health, and educational professionals to any incident involving large numbers of victims.
14. Identify the technical and hardware support necessary for continued availability of the MVERS project after the conclusion of the MSP Patriot grant in June of 2006.
15. Maintain the team of EMS evaluators for both drills and full scale exercises while enhancing the electronic tools for real time evaluations and documentation of the appropriateness of Triage, Treatment and Disposition.
16. Establish guidelines for the safety and supervision of children and youth during drills and full scale exercise in collaboration with child health experts.

17. Continue to provide technical support and resources to State and local agencies during their planning process for emergency preparedness exercises.
18. Work with DHMH, MEMA and local agencies and organizations to secure effective use of hospital and local resources to support community self-sufficiency during the first 48 – 72 hours following a catastrophic event.

Annex A:

Maryland Trauma System Plan

Introduction

The Maryland Trauma System has been integrated into the EMS System from the initial planning and implementation of the system in the late 1960s and early 1970's. The first trauma center opened in 1969 at the University of Maryland Hospital. Throughout the state, other hospitals were identified as trauma centers in 1975. These trauma centers have continued to serve as the foundation of the state's trauma system since that time.

EMS legislation passed in 1993 identified the Maryland Institute for Emergency Medical Services Systems (MIEMSS) as the lead agency for the EMS and Trauma System. Under this enabling legislation, the State EMS Board has statutory and regulatory oversight of the system. This legislation provided that MIEMSS has the authority for trauma and specialty center verification and designation and system evaluation. By law, the statewide EMS/Trauma System must be guided by a Statewide EMS Plan which must identify goals and objectives for continued focus and further development. The Statewide EMS Plan delineates the areas of work and focus for MIEMSS for the next five years and affects all aspects of the EMS system, including trauma. The goals and objectives specific for the continued development and operation of the trauma system are outline in the EMS Plan and elaborated on in this addendum.

The Maryland Trauma System continues to be integrated into the EMS system and consists of an organized approach to facilitate and coordinate a multidisciplinary medical response to the severely injured. This system provides for a continuum of care that includes emergency medical services' timely dispatch through coordinated statewide 911 systems; medical protocols, online medical direction, ground and air transportation, emergency department trauma care, a network of designated trauma centers with organized trauma teams, timely definitive medical care, rehabilitative services, and injury prevention.

The EMS/Trauma system is a crucial component in the public health safety net. The Maryland EMS/Trauma system supports timely access to designated trauma and specialty care hospitals that provide organized, specialized medical care expertise using multidisciplinary team approach for patients with severe injuries.

The three core functions of public health, assessment, policy development and assurance, as they apply to the Maryland Trauma System are as follows.

Trauma System Assessment

Assessment involves the regular systematic collection, assembly, analysis and dissemination of information on the health of a community. The statewide system and trauma centers must monitor and report on the types of injured patients treated. Relevant data can be used to provide an assessment of types of injury, health status of the injured; evaluation of system performance indicators and outcome measurements. Information can be used to clarify the impact of injury on the community and healthcare system. Assessment serves as the basis for future system planning, development and resource use.

Trauma System Goals

1. Population-based occurrence of injury in Maryland is monitored through partnerships with the Medical Examiner's Office and DHMH's Office of Injury Prevention.
2. The Trauma Registry Database is used to monitor injury severity, descriptions of injury, and distribution of injuries treated in the trauma system.
3. Patient outcomes, including death and measurements of disability, are monitored and tracked statewide.
4. Trauma System disaster/emergency preparedness is assessed in coordination with DHMH and MEMA.

Objectives

1. Compare Maryland's injury mortality statistics against national and regional data.
2. Work with public health partners, trauma centers, and EMS providers to integrate injury into other public health risk assessments at the State and county levels to identify "at-risk" populations and to integrate injury risk information into key reports and planning documents.
3. Continue to develop the capacity for data linkages to a variety of sources to provide more timely and accurate injury surveillance information.
4. Explore methods of collecting trauma financial information from trauma centers.
5. Assess the effect of the continued increase in demand for trauma care with respect to available resources to meet the needs, with particular emphasis on population growth and mechanisms of injury.
6. Evaluate the "Field Triage Decision Scheme" developed through the Centers for Disease Control & Prevention for application to the Maryland Trauma System.
7. Assess public communication needs for accessing the EMS/Trauma System, patient communication, and injury prevention with specific emphasis on immigrant populations for language and cultural barriers.
8. Consider and evaluate the impact of the 2004 NHTSA Technical Assistance Team recommendations for the Trauma System.
9. Assess physician and nurse workforce availability issues that impact trauma and specialty care centers
10. Assess regional and special population needs, e.g., children, elderly, rural and the diverse cultural needs.

Trauma Policy Development

Policy development involves use of scientific knowledge in decision making and the development of legal authority, endorsement from elected officials, secure and sufficient funding and human resources, the implementation of administrative rules, participation in community health activities, and the use of media to inform and educate the public. Policy development focuses on building constituencies, identifying needs and setting priorities, using legislative authority to and funding to develop plans and polices to address needs, and ensuring the public's health and safety. Policy development translates EMS assessment results into EMS systems development.

Trauma System Goals

1. The trauma system is part of an integrated EMS system that coordinates efforts to reduce death and disability through legislative authority and effective partnerships to continue to develop, implement, manage, and evaluate the trauma system and its component parts.
2. A secure and adequate financial base is available to provide the trauma system with sufficient resources, including both financial and infrastructure related, to support system planning, implementation, and maintenance.
3. Trauma system data is used to evaluate system performance and to develop statewide policy.
4. MIEMSS informs and educates State and local stakeholders and policy makers to foster collaboration and cooperation for system enhancements and injury control.

Objectives

1. In collaboration with multidisciplinary stakeholders and advisory committees, review and update trauma care standards based on national guidelines and current research findings.
2. Review current trauma regulations for effect on patient care outcomes and, if needed, initiate changes based on findings.
3. Increase collaboration with state agencies charged with addressing various issues associated with health care insurers/provider organizations.
4. Monitor, and where necessary, devise strategies to address issues related to funding for trauma and specialty center hospitals and physician reimbursement.

5. Encourage trauma and specialty center hospitals to quantify the hospital and physician coverage costs associated with serving as designated specialty centers and providing treatment and care for the injured patients.
6. Collaborate with other public health agencies and stakeholders to develop an injury prevention and control plan for Maryland that is data driven, with targeted programs based on high risk injury areas.
7. Based on data and stakeholders' input, institute policy and regulatory changes as appropriate to promote performance improvements and enhancements.
8. Continue trauma and specialty center healthcare provider input into policy and regulation affecting the trauma system through the EMS Board, SEMSAC, Trauma QIC, and other advisory committees.

Assurance

Assurance works to ensure that identified system goals and objectives are met and problems are addressed. Assurance includes focuses on: (1) on enforcing laws and regulations that protect and ensure health and safety, (2) ensuring access to necessary treatment, (3) compliance with treatment protocols and policies, (4) securing a competent and available workforce, and (5) providing a well-coordinated transportation system.

Trauma System Goals

1. The Maryland Trauma Registry and other patient care data bases are used to facilitate ongoing assessment and assurance of system performance and provide information for improving the trauma system on an ongoing basis.
2. The trauma system is fully integrated into the statewide EMS system that includes communication, medical oversight, pre-hospital triage, and transportation.
3. Acute care facilities are integrated into a resource-efficient network that meets required standards and that provides optimal care for all injured patients.
4. In collaboration and cooperation with other healthcare agencies and organizations, analytical tools are used to monitor the performance of population-based prevention and trauma services.
5. The trauma system plan is integrated with, and complementary to, the state's comprehensive mass casualty plan for natural disasters and manmade disasters.
6. The trauma system, in collaboration and cooperation with trauma and specialty centers, ensures that prevention and medical outreach activities are provided in defined service areas.
7. Designated trauma and specialty centers continually work to improve trauma care as measured by patient outcomes.

8. Adequate rehabilitation facilities have been integrated into the trauma system and these resources are made available to all populations requiring them.
9. The financial aspects of the trauma system are integrated into the overall quality improvement system to assure ongoing “fine-tuning” and cost-effectiveness.
10. A competent, adequate workforce is available and works in collaboration and cooperation with professional organizations, healthcare facilities, and other agencies
11. Public welfare is protected through enforcement of application laws and regulations as they pertain to trauma system components and the overall trauma system.

Objectives

1. Facilitate the availability of EMAIS information in emergency departments and trauma centers receiving EMS-transported patients, as well as the transfer of EMAIS data to hospital patient records.
2. Expand use of statewide patient care databases to drive injury prevention and intervention programs and policies.
3. Work with state and community agencies, healthcare providers, and organizations to identify community injury prevention needs and create support for injury prevention activities.
4. Strengthen existing partnerships with organizations which have an injury prevention focus; encourage and support developing partnerships at the both the State and local level.
5. Provide injury prevention information to policy makers and constituents.
6. Collaborate with academic institutions and injury prevention specialists to implement a scientific approach and rigorous methodological evaluations of the impact of injury prevention programs.
7. Identify the unique needs of injured special populations, e.g., the increasing geriatric population, and develop mechanisms and resources to address those needs.
8. Identify the need for improvement, as well as methods to improve the quality of off-line medical direction related to pre-hospital care of the injured.
9. Collaborate with Maryland Hospital Association and other professional and educational organizations to conduct assessments to identify numbers and types of acute care healthcare providers and services needed in trauma and specialty centers statewide.

10. Pursue the data linkage and transfer of EMAIS data into the trauma registry.
11. Explore the need for a State Rehabilitation database.
12. Determine the adequacy of existing rehabilitation services; further integrate rehabilitation centers and services into the trauma system.
13. Ensure adequate medical oversight of the trauma system through trauma centers directors in their roles on the EMS Board, SEMSAC, the Trauma QIC and other state committees that impact trauma system policies or operations.
14. Evaluate the trauma triage criteria for effectiveness and update criteria as necessary.
15. Evaluate the appropriateness of transport of trauma patients for timeliness and appropriate mode.
16. Evaluate the availability of and access to trauma and specialty care centers by the injured statewide including unique populations.
17. Continue to evaluate trauma patient inter-hospital transfers for appropriateness and timeliness.
18. Evaluate the compliance by trauma and specialty care hospitals with disaster planning and readiness to “all hazard” multiple patient events.
19. Work with DHMH and MHA to address issues of hospital surge capacity for mass casualty events.
20. Continue to collaborate with trauma centers, academic centers, and medical community to promote research and quality improvement efforts for trauma systems and trauma care.
21. Continue to support the work of the Trauma Quality Improvement Council to address safety and quality of care issues for trauma patients; encourage and facilitate trauma physician input.
22. Encourage all trauma centers to submit trauma registry data to the National Trauma Data Bank
23. Monitor the compliance of trauma and specialty centers with designation standards.

Appendix: The Maryland Institute for Emergency Medical Services Systems

As the state EMS agency in Maryland and under the direction of the State EMS Board, the Maryland Institute for Emergency Medical Services Systems (MIEMSS) works with thousands of EMS providers, other emergency health care providers, including physicians, nurses and hospitals, and many emergency agencies to coordinate the components of the statewide EMS system. The system has been built by consensus and through the hard-work and dedication of all the participants in the system.

MIEMSS is responsible for implementing the State EMS Plan. The various program departments within MIEMSS are responsible for the achieving Plan objectives and completing Plan tasks. The major program departments at MIEMSS are described below.

1. EMS Communications

- Houses and staffs the Systems Communication Center (SYSCOM), the communications core for helicopter dispatch, coordination, and monitoring; and the Emergency Medical Resources Centers (EMRC) that coordinate medical consultation between medic units and hospital physicians for the Baltimore and Washington metropolitan areas, southern Maryland and Frederick County.
- Responsible for planning, implementation, installation, maintenance and repair of statewide EMS communications system and voice and data infrastructure.
- Provides matching grant funds to local jurisdictions for EMS communications and medical equipment.

2. Education and Certification

- Responsible for the testing, licensing, certification, recertification, continuing education and records management of over 30,000 pre-hospital providers.
- Develops educational resources to meet the training needs of EMS providers.
- Supports the Provider Review Panel and the EMS Board in discharging their responsibilities regarding the conduct of EMS providers.
- Provides educational grants to local jurisdictions to provide initial and re-licensure training for ALS providers and EMD dispatchers.
- Responsible for the conducting and coordinating the EMS Educational Program approval process.

3. Information Technology

- Programs and deploys custom software packages for MIEMSS and other EMS agencies to meet a variety of administrative, research, and education and certification needs.
- Collects, scans and houses ambulance run information for over 600,000 statewide EMS responses per year.

- Responsible for implementing electronic ambulance information system (EMAIS) and the new resource identification and allocation tool (Facility Resource Emergency Database).
- Responsible for MIEMSS internal network.

4. Regional Administration

- Serves as liaison between MIEMSS state office and local EMS agencies.
- Provides staff support to five Regional Councils that meet regularly to discuss local EMS issues and to advise the EMS Advisory Council and the EMS Board.
- Provides support for testing of EMS providers, distribution and collection of run sheets, inspection of ambulances, analysis of EMS equipment and training needs.
- Solicits, prioritizes and assists in managing special grant programs.
- Works to resolve local problems and issues relating to jurisdictional EMS operations.
- Organizes and staffs regional EMS educational conferences throughout the state
- Assists local officials in developing, testing and evaluating all-hazards disaster response plans.
- Conducts, monitors, and supports prevention activities with local jurisdictions.
- Provides staff support to Pediatric and Regional Medical Directors.

5. Medical Direction

- Provides medical consultation and oversight for pre-hospital emergency services and the state's aeromedical programs.
- Responsible for development and updates of medical protocols for EMS providers.
- Provides quality assurance for medical aspects of EMS programs.
- Participates in disaster planning and responses to hazmat and mass casualty incidents.
- Serves as liaison to MEMA and sits at MEMA's Emergency Operations Center.

6. EMS for Children

- Manages a variety of pediatric EMS initiatives through regional and state pediatric committees.
- Provides education, quality management, consultation and coordination of hospital and pre-hospital resources for patients in pediatric care settings through federal grants.

7. Policy and Programs

- Develops innovative policies and programs to enhance statewide the EMS system and volunteer, career and commercial services.
- Tracks emergency department overcrowding throughout Maryland and develops initiatives to reduce ambulance diversions.
- Manages public access AED program to increase availability of defibrillators throughout the state;
- Coordinates the Rural AED Grant Program throughout Maryland.

- Directs the Critical Incident Stress Management program that provides intervention and support to providers who have been involved in difficult response situations.

8. Quality Management

- Develops, implements and coordinates the agency's quality improvement efforts.
- Develops and monitors agency progress in meeting Managing for Results goals.
- Manages ambulance transport and trauma center databases.

10. Hospital Programs

- Develops recommendations for regulations and standards for designation of trauma and specialty care centers.
- Designates and verifies trauma and specialty referral centers and provides continuing evaluation of these centers.
- Manages and coordinates quality monitoring activities for trauma/specialty care system.

11. Educational Support Services

- Provides technical assistance for the design and development of educational programs for EMS providers.
- Provides information to the public on the statewide EMS System, including how to recognize an emergency, call for an EMS response and incorporate injury prevention methods in daily life.
- Participates in provider recruitment and retention programs.

12. State Office for Commercial Ambulance Licensing and Regulation

- Develops and enforces requirements for commercial ambulance services and vehicles.
- Licenses and regulates commercial ambulance services in Maryland.
- Conducts routine and spot inspections and implements responses for non-compliance.
- Collects and deposits fees for the self-supporting program.

13. Attorney General's Office

- Provides legal advice to the State EMS Board, Statewide EMS Advisory Council and MIEMSS regarding EMS, administrative functions, and regulation of commercial ambulance services.
- Serves as the administrative prosecutor for cases involving allegations of prohibited acts by providers before the Provider Review Panel, the Board and the courts.

14. Emergency Operations

- Responsible for the public safety and medical aspects of planning efforts related to Homeland Security issues.

- Supports and coordinates with the Department of Health and Mental Hygiene and the Maryland Emergency Management Agency for statewide planning for health and medical preparedness issues.
- Develops and implements special systems and critical resources necessary for the response to mass casualty or homeland security events.

Appendix: The Maryland Institute for Emergency Medical Services Systems

Discussion of Program Performance

- MIEMSS has made significant strides in the development of the statewide EMS System over the course of the past twelve years.
- These advances can be attributed, in large part, to the passage of 1993 Maryland Laws Ch. 592 (H.B.1222) which created an organizational framework for EMS coordination and to the creation of the EMS Operations Fund.
- The EMS Law provided legal authority for statewide coordination of emergency medical services and detailed the responsibilities of the agency and its role in support of the Emergency Medical Services Board. With the legal authority of MIEMSS and the passage of dedicated funding (see below), a more stable base to Maryland EMS was created.
- The foundation of efforts is based on “consensus building” through a pyramid of subcommittees and effective communication combined with the legal authority to enforce the standards arrived at by consensus.
- The EMS Operations Fund provided for the first time a stable resource with which MIEMSS could plan and budget for system improvements. Prior to both of these pieces of legislation, MIEMSS was administratively located within the University of Maryland System. As an independent state agency, MIEMSS has greater opportunity to participate fully in the budget process. This independence also brings greater responsibility and accountability to the state’s administrative, budgeting, and legislative processes, which the agency has successfully met.
- The long-term financial security of the EMS Operations Fund was improved by passage of legislation in 2001 to increase the vehicle registration fee surcharge from \$8 to \$11 per year. This should ensure the solvency of the Fund through the next decade.

The following is a summary of major accomplishments in the statewide EMS System through the past decade.

Communications:

- Completed the microwave backbone to the communications system and expanded and upgraded tower sites to provide effective EMS communications coverage to 98% of the state.
- Provided thousands of pieces of vitally needed monitor defibrillators, mobile radios and AEDs to local jurisdictions.
- Built an upgraded EMRC/SYSCOM center in the new MIEMSS building built in 1998.
- Expanded centralized EMS communications capabilities from the Baltimore Metropolitan area to the Washington Metro area, Southern Maryland and the Eastern Shore. The Eastern Shore EMRC is located at the Talbot County PSAP, serving five of the upper Shore counties and providing a direct link to the Baltimore EMRC.
- Received funding to provide centralized EMS communications to Western Maryland to be completed by the end of FY 2006 and seeking funds for completion of EMRC on the Eastern Shore beginning in FY 2007.
- Implementing transfer of ownership of AEDs, monitor-defibrillators, and portable radios to local jurisdictions that will enable them to have more flexibility upon time of trade-in and allow MIEMSS to improve its inventory compliance.

- Created a matching grant program for future purchases of communications equipment. MIEMSS will at least maintain its financial commitment and that buying power will be increased by local contributions of up to 50%. By buying into statewide contracts, local jurisdictions will be able to secure the best prices for equipment and service. MIEMSS will maintain portable radios. Also secured Federal funding to enable rural jurisdictions to purchase AEDs.
- Supported the Department of Budget & Management's telecommunications efforts to avoid duplication of effort and to enhance the effectiveness of statewide communications.

Education, Training and Certification:

- Increased funding for advanced life support education from \$50,000 to over \$300,000 to enhance paramedic (ALS) coverage across the State.
- Upgraded the emergency medical technician-basic (EMT-B) level and transitioned nearly 15,000 providers to the new EMT-B US DOT National Standard Curriculum.
- Implemented a licensing process for Emergency Medical Dispatchers (EMD) to upgrade the skill of the first line of EMS response. EMD is now functioning in all of the state's jurisdictions, providing pre-arrival instructions to 911 callers. Training, in accordance with the DOT National Standard Curriculum, is available in all jurisdictions through MIEMSS grants.
- Based on review of data and current medical evidence, expanded the scope of practice and skill levels of providers, including MEDEVAC flight paramedics.
- Implemented the upgrading the CRT curriculum to the EMT-I 1999 US DOT National Standard Curriculum, providing a seven-year transition period for current CRTs to the new curriculum and standard.
- Implemented the collection of educational data for EMT-Basic and First Responder students and providers enrolled in EMS courses. Data from the "Maryland Emergency Services Student Registry" (MESSR) will be used to improve curricula and courses offered to EMS providers.
- Upgraded on-line capabilities for providers to secure current certification/continuing education status. Providers currently can also access many forms used for the certification and licensure processes. Planning for additional services, perhaps including testing, on-line, as well as re-licensure and recertification of EMS providers.
- Approval of EMS education programs offering courses leading to the initial EMS certification or licensure and recertification and re-licensure through regulation. The approval process is applicable to ALS, BLS, EMD, and continuing education programs throughout the State.

Medical Direction:

- Established paid regional medical director part-time positions and defined their responsibilities.
- Establish paid pediatric medical director part-time positions and defined responsibilities.
- Improved the quality, readability and effective use of ALS and BLS protocols.
- Provided base station training throughout the state.
- Initiated an Emergency Medical Services-Children program aimed at the particular needs of our children. Secured federal support to enhance program capabilities.

- Promulgated regulations which set standards for and assumed responsibility over all Maryland emergency services providers. Previously, the DHMH Board of Physician Quality Assurance regulated advanced life support providers. Basic life support providers were overseen by MIEMSS without statutory authority.

System Coordination:

- Promulgated regulations which formally organized the jurisdictional basis for medical oversight of EMS providers and set standards for medical oversight and medical consultation.
- Established standards for the designation of trauma and specialty centers, including neurotrauma centers throughout the state. Performed designation reviews for new and existing centers. Completing re-verifications on on-going schedule.
- A performance improvement program is in place for the trauma system that includes quality monitoring mechanisms.
- Established and refined standards and licensing requirements for commercial ambulances.
- Promulgated regulations for specialty care inter-facility transports and commercial air ambulance services.
- Organized and is currently operating the public access program for automated external defibrillators.
- Provided training, supplies and coordination for the Do Not Resuscitate program in Maryland.
- Coordinated reports on the long term maintenance and replacement of Maryland State Police MEDEVAC helicopters.
- Worked with DHMH and others to develop an Emergency Department Overload Plan” (formerly referred to as “Yellow Alert”) that allows the system to quickly and effectively respond to overcrowding conditions in emergency departments. Alert monitoring became available through MIEMSS web page.

Quality Improvement:

- Established quality improvement and quality assurance programs in most of the state’s jurisdictions.
- Improved information technology capabilities, data collection and use, quality assurance, and realized significant progress towards an effective Managing for Results program.
- Established contractual epidemiologist positions to support information gathering and analysis for cardiac arrest and AED use.
- Established QI office.
- Created a series of Quality Improvement Committees targeted at various key aspects of MIEMSS programs.
- Established major quality improvement and quality assurance programs at the local level.
- Implemented an electronic data capturing system (EMAIS) to eventually replace the paper system for collecting ambulance run data.
- Increased the services available through MIEMSS website.
- Provided education and real world application examples of QM at the regional, jurisdictional and local EMS services levels.
- Ensured that all operational programs have written QA/QI plans.

- Created Geriatric Emergency Medical Services Advisory Committee, a panel of experts in the geriatric healthcare and public policy fields to address education needs of EMS providers specific to the needs of geriatric patients.
- Established Data Access Research Committee to ensure that data requests are handled appropriately.

Emergency Preparedness / Weapons of Mass Destruction

- Provided significant contributions to the State's effort to ensure preparedness to potential Weapons of Mass Destruction issues.
- Sponsored two major conferences, one for pre-hospital providers and one for the hospital personnel to share WMD information.
- Supported Governor's legislative initiatives related to strengthening the state's response capabilities related to WMD.
- Completed and are in the process of implementing statewide WMD work plans.
- Redirected existing resources to establish a Field Operations Division. Consisting of Communications Engineering Services, EMRC/SYSCOM, and Emergency Operations to ensure a coordinated response.
- Redirected existing resources to establish a Field Operations Division consisting of Communications Engineering Services, EMRC/SYSCOM, and Emergency Operations to ensure a coordinated response.
- Implemented "FRED", a web-based computer program to identify statewide hospital resources available for responding to WMD or mass casualty events.
- Participated with the Governor's Office of Homeland Security on program coordination and review. The Executive Director co-chairs the Health and Medical committee of the Governor's Emergency Management Advisory Council with the Deputy Director of DHMH.
- Completed a "Health and Medical WMD Response Plan" which includes aspects of the previous WMD Strategic Plan and the three focus group reports from Hospital, Public Health, and EMS.

Other Areas:

- Developed and periodically refined the EMS Plan and updated it so that it remains a viable, usable document.
- Redesigned and implemented triage tag system.
- Upgraded standards and broadened categories of public conveyances for volunteer inspection.
- Established position of ombudsman to serve as liaison to the EMS community of pre-hospital providers.
- Provided leadership in monitoring federal issues that relate to state EMS including ambulance restocking issues, the implementation of federal security standards related to privacy and security of medical records and AHA guidelines for cardiopulmonary resuscitation and emergency medical care.
- Maintained registry of 200 people to support emergency programs throughout the state for Critical Incident Stress Management.

Appendix: Acronyms

AAP	American Academy of Pediatrics
ACEP	American College of Emergency Physicians
ACLS	Advanced Cardiac Life Support
ACS	American College of Surgeons
AED	Automated External Defibrillator
ALI	Automatic Location Identification
ALS	Advanced Life Support
AMLS	Advanced Medical Life Support
ANI	Automatic Number Identification
APCO	Association of Public Communication Officials
ATLS	Advanced Trauma Life Support
ATS	American Trauma Society
BLS	Basic Life Support
BON	Board of Nursing
BTLS	Basic Trauma Life Support
CAD	Computer Aided Dispatch
CARN	Chesapeake Applied Research Network
CASAC	Commercial Ambulance Services Advisory Committee
CDC	Centers for Disease Control & Prevention
CEN	Certified Emergency Nurse
CHATS	County Hospital Alert Tracking System
CIREN	Crash Injury Research & Engineering Network
CISM	Critical Incident Stress Management.
CNMC	Children's National Medical Center
COMAR	Code of Maryland Regulations
CPEMS	Commission on Public Elementary and Middle Schools
CPR	Cardio-Pulmonary Resuscitation
CPS	Child Passenger Safety
CPSI	Child Passenger Safety Instructor
CRT	Cardiac Rescue Technician
CRT-I	Cardiac Rescue Technician Intermediate
CSHN	Children with Special Health Needs
DAC	Data Access Committee
DHMH	Department of Health & Mental Hygiene
DNR	Do Not Resuscitate
DNR Police	Department of Natural Resources Police
DOT	Department of Transportation

ED	Emergency Department
EHS	Emergency Health Services
EIF	Emergency Information Form
EMAIS	Electronic Maryland Ambulance Information System
EMS	Emergency Medical System
EMD	Emergency Medical Dispatch
EMRC	Emergency Medical Resources Center
EMSC	Emergency Medical Services for Children
EMSOF	Emergency Medical System Operations Fund
EMT	Emergency Medical Technician
EMT-B	Emergency Medical Technician Basic
EMT-I	Emergency Medical Technician Intermediate
EMT-P	Emergency Medical Technician Paramedic
ENA	Emergency Nurses Association
ENB	Emergency Numbers Board
ENPC	Emergency Nursing Pediatric Course
EOI	Expression of Interest
ESNB	Emergency System Numbers Board
FOST	Field Operations Support Team
FR	First Responder
FRED	Facility Resource Emergency Database
FY	Fiscal Year
GEMSAC	Geriatric EMS Advisory Committee
GEMS	Geriatric Education for Emergency Medical Services
GCS	Glasgow Coma Scale
HAZMAT	Hazardous Materials
HHS	U.S. Department of Health & Human Services
HIPAA	Health Insurance Portability & Accountability Act
HRSA	Health Resources & Services Administration
HSCRC	Health Services Cost Review Commission
IRB	Institutional Review Board
IRC	Incident Review Committee
IT	Information Technology
JAC	Jurisdictional Advisory Committee

L&C	Licensure & Certification
LEPC	Local Emergency Planning Committee
M & M	Mortality & Morbidity
M-CAPD	Maryland Cardiac Arrest Public Defibrillation
M-CASS	Maryland Cardiac Arrest Surveillance System
MAIS	Maryland Ambulance Information System
MCHB	Maternal & Child Health Bureau
MCI	Mass Casualty Incident
MCISM	Maryland Critical Incident Stress Management
MEMA	Maryland Emergency Management Agency
MESSR	Maryland Emergency Services Student Registry
MFIRS	Maryland Fire Incident Reporting System
MP-CAS	Maryland Pediatric Cardiac Arrest Study
MDDOT	Maryland Department of Transportation
MedChi	Medical & Chirurgical
MESSA	Maryland Emergency Services Student Application
MFR	Managing for Results
MFRI	Maryland Fire & Rescue Institute
MHA	Maryland Hospital Association
MHCC	Maryland Health Care Commission
MHEC	Maryland Higher Education Commission
MICN	Mobile Intensive Care Nurse
MIEMSS	Maryland Institute for Emergency Medical Services Systems
MOU	Memorandum of Understanding
MPPR	Maryland Prehospital Provider Registry
MR-AED	Maryland Rural (Health Grant) AED
MSDE	Maryland State Department of Education
MSFA	Maryland State Firemen's Association
MSP	Maryland State Police
MVERS	Maryland Virtual Emergency Response System
NAESMP	National Association of EMS Physicians
NALS	Neonatal Advanced Life Support
NDMS	National Disaster Medical System
NEMESIS	National EMS Information System
NFIRS	National Fire Information Reporting System
NFPA	National Fire Protection Association
NHTSA	National Highway Traffic Safety Administration
NIMS	National Incident Management System
NREMT	National Registry of Emergency Medical Technicians
NREMTPT	National Registry of Emergency Medical Technician-Paramedics
NSC	National Study Center for Trauma & Emergency Medical System
NSC	National Standard Curriculum

OPALS	Ontario Pre-hospital Advanced Life Support Study
OPHPR	Office of Public Health Preparedness & Response
PALS	Pediatric Advanced Life Support
PECARN	Pediatric Emergency Care Applied Research Network
PEMAC	Pediatric Emergency Medical Advisory Committee
PEPP	Pediatric Education for Prehospital Professionals
PHTLS	Pre-Hospital Trauma Life Support
PIER	Public Information, Education, & Relations
PIO	Public Information Officer
PPE	Personal Protective Equipment
PPOC	Patient's Plan of Care
PRP	Provider Review Panel
PSA	Public Service Announcement
PSAP	Public Safety Answering Point
QA	Quality Assurance
QI	Quality Improvement
QIC	Quality Improvement Committee
QLC	Quality Leadership Council
QM	Quality Management
RAED	Rural Access to Emergency Devices
RRT	Rapid Response Team
RSI	Rapid Sequence Intubation
SCT	Specialty Care Transport
SEMSAC	State EMS Advisory Council
SFMO	State Fire Marshal's Office
SHA	State Highway Administration
SOCALR	State Office of Commercial Ambulance Licensing & Regulation
SNS	Strategic National Stockpile
SYSCOM	Systems Communications Center
TBI	Traumatic Brain Injury
TNCC	Trauma Nursing Core Nurse
USPP	United States Park Police

VAIP	Voluntary Ambulance Inspection Program
VOIP	Voice Over Internet Protocol
WMD	Weapons of Mass Destruction