

STATE OF MARYLAND
A REASSESSMENT
OF
EMERGENCY MEDICAL
SERVICES

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**National Highway Traffic
Safety Administration
Technical Assistance Team**

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BACKGROUND

Injury is the leading cause of death for persons in the age group one through 44 as well as the most common cause of hospitalizations for persons under the age of 40. The financial costs of injuries are staggering: injuries cost billions of dollars in health care and social support resources. In 1995 for example, the lifetime costs of all injuries in the United States were estimated at \$260 billion annually. These estimates do not include the emotional burden resulting from the loss of a child or loved one, or the toll of severe disability on the injured person and his or her family. Each year over 40,000 people lose their lives on our nation's roads, and approximately 70 percent of those fatalities occur on rural highways. The National Highway Traffic Safety Administration (NHTSA) is charged with reducing accidental injury on the nation's highways. NHTSA has determined that it can best use its limited resources if its efforts are focused on assisting states with the development of integrated emergency medical services (EMS) programs that include comprehensive systems of trauma care.

To accomplish this goal, in 1988 NHTSA developed a Technical Assistance Team (TAT) approach that permitted states to utilize highway safety funds to support the technical evaluation of existing and proposed emergency medical services programs. Following the implementation of the Assessment Program, NHTSA developed a Reassessment Program to assist those states in measuring their progress since the original assessment. The Program remains a tool for states to use in evaluating their statewide EMS programs. The Reassessment Program follows the same logistical process, and uses the same ten component areas with updated standards. The standards now reflect current EMS philosophy and allow for the evolution into a comprehensive and integrated health management system, as identified in the 1996 *EMS Agenda for the Future*. NHTSA serves as a facilitator by assembling a team of technical experts who demonstrate expertise in emergency medical services development and implementation. These experts demonstrate leadership and expertise through involvement in national organizations committed to the improvement of emergency medical services throughout the country. Selection of the Technical Assistance Team is also based on experience in special areas identified by the requesting state. Examples of specialized expertise include experience in the development of legislative proposals, data gathering systems, and trauma systems. Experience in similar geographic and demographic situations, such as rural areas, coupled with knowledge in providing emergency medical services in urban populations is essential.

The Maryland Institute of Emergency Medical Services Systems (MIEMSS), in concert with the Maryland Governor's Highway Safety Office requested the assistance of NHTSA. NHTSA agreed to utilize its Technical Assistance Program to provide a

technical reassessment of the Maryland statewide EMS program. NHTSA developed a format whereby the State EMS staff coordinated comprehensive briefings on the EMS system.

The TAT assembled in Baltimore on June 1-3, 2004. For the first day and a half, over 30 presenters from the State of Maryland provided in-depth briefings on EMS and trauma care, and reviewed the progress since the 1991 Assessment. Topics for review and discussion included the following:

General Emergency Medical Services Overview of System Components

- Regulation and Policy
- Resource Management
- Human Resources and Training
- Transportation
- Facilities
- Communications
- Trauma Systems
- Public Information and Education and Prevention
- Medical Direction
- Evaluation
- Homeland Security (at the State's request)

The forum of presentation and discussion allowed the TAT the opportunity to ask questions regarding the status of the EMS system, clarify any issues identified in the briefing materials provided earlier, measure progress, identify barriers to change, and develop a clear understanding of how emergency medical services function throughout Maryland. The team spent considerable time with each presenter so that they could review the status for each topic.

Following the briefings by presenters from the MIEMSS, the Maryland State Office of Highway Safety, public and private sector providers, and members of the medical community, the TAT sequestered to evaluate the current EMS system as presented and to develop a set of recommendations for system improvements.

When reviewing this report, please note that the TAT focused on major areas for system improvement. Unlike the State's initial assessment that contained many operational recommendations, several of which were identified as a priority, this report offers fewer yet broader recommendations that the team believes to be critical for continued system improvement.

The recommendations in bold typeface are viewed as priority by the TAT.

The statements made in this report are based on the input received. Pre-established standards and the combined experience of the team members were applied to the information gathered. All team members agree with the recommendations as presented.

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The TAT would like to acknowledge the Maryland Institute for Emergency Medical Services Systems and the Maryland Highway Safety Office for their support in conducting this assessment.

The TAT would like to thank all of the presenters for being candid and open regarding the status of EMS in Maryland. Each presenter was responsive to the questions posed by the TAT, which aided the reviewers in their evaluation. Many of these individuals traveled considerable distance to participate.

Special recognition and thanks are extended for the extraordinary efforts of Dr. Robert Bass, his staff and all the briefing participants for their well-prepared and forthright presentations. In addition, the TAT is grateful for the well-organized, comprehensive briefing material sent to the team members in preparation for the reassessment.

Special thanks also to Vern Betkey, Maryland Highway Safety Office, for supporting this process and providing special assistance to the TAT while in Maryland.

INTRODUCTION

Maryland is a state with a mature and sophisticated statewide EMS system. The origin of the system is traceable to the vision and force of personality of R Adams Cowley, MD. He believed that seriously injured patients would have better outcomes if they could arrive quickly and reliably at a trauma center.

In 1991, Maryland took a significant step towards organizing its EMS system with its original NHTSA EMS assessment. That report identified many infrastructure needs to support the best possible care for ill and injured persons in Maryland.

Since 1991, the Maryland EMS system has embraced change with impressive results. The EMS Board and State EMS Director, Robert Bass, MD have implemented a vision of excellence through collaboration and consensus. The Technical Assistance Team (TAT) heard from many presenters about how the Maryland Institute for Emergency Medical Services Systems (MIEMSS) fosters a spirit of teamwork and cooperation. MIEMSS has provided the resources, leadership and neutral posture that supported the many system stakeholders to come together for planning, implementation, and evaluation of the system.

Maryland has benefited from a number of key policy and strategic decisions over the years. The 1993 EMS legislation defined the system structure and provided the authority for operations. Funding from motor vehicle registration fees provides an EMS Operating Fund that appropriately supports the needs of the system. The state has a well established EMS communications system that is capable of meeting the needs for both routine daily incidents and larger more unusual events. Specific patient populations such as children and major trauma cases are well integrated into the overall EMS system. The state is beginning to use EMS information, in some cases linked with other health care data, to drive decisions.

The NHTSA EMS Assessment process compares a state's EMS system with a number of predetermined "gold" standards. All states are at different points in building their programs to meet the standards. Maryland EMS is unique in beginning to apply a disease-based model to develop its system of emergency care for trauma, stroke, cardiac, and perinatal patients. This model includes care during a patient's progression through the continuum of the health care system. By using this approach, the state is making excellent progress towards meeting the NHTSA standards.

Despite excellent progress over the past 13 years, Maryland is facing a number of challenges in elevating its system to the next plateau. A few of these challenges include:

- Capturing data, translating it into information and using it to provide a scientific basis for system planning and operations.
- Maintaining sufficient financial support to meet the continuing needs of the system.
- Assuring a sufficient EMS workforce, including volunteers, to meet the demands for service generated by the population.
- Preparing the system for response to future manmade or natural disasters.
- Preservation of the core function of the Maryland State Police in serving the air medical needs of trauma patients while assuring that other patients in need of inter-facility transfer by air are equally well served.

Given the relatively robust status of Maryland's EMS system, another challenge is for the state to offer national leadership in promoting the continued development and improvement of other state systems. Maryland's achievements have much to offer in terms of promoting improved emergency care throughout the United States.

The greatest asset that Maryland's EMS system possesses is its people. As a team, they have been faithful to the original vision of Dr. Cowley. That vision has been expanded by the EMS Board's contemporary approach of cooperative excellence and the Executive Director's program of quality improvement. At every level, the people involved in Maryland EMS are committed and capable about the work they do. MIEMSS brings them together as a force multiplier. The citizens and visitors to Maryland are well served by the accomplishments that MIEMSS has achieved and the work that it will do in the future.

MARYLAND INSTITUTE FOR EMERGENCY MEDICAL SERVICES SYSTEMS (MIEMSS)

The TAT revisited the ten essential components of an optimal EMS system that were used in *Maryland: An Assessment of Emergency Medical Services*, in 1991. These components provided an evaluation or quality assurance report based on 1989 standards. While examining each component, the TAT identified key EMS issues, reviewed the State's progress since the original report, assessed its status, and used the 1997 Reassessment Standards, as well as the State's requested area of Homeland Security, as a basis for recommendations for EMS system improvement. Items related to EMS for Children were integrated throughout the document.

A. REGULATION AND POLICY

Standard

To provide a quality, effective system of emergency medical care, each EMS system must have in place comprehensive enabling legislation with provision for a lead EMS agency. This agency has the authority to plan and implement an effective EMS system, and to promulgate appropriate rules and regulations for each recognized component of the EMS system (authority for statewide coordination; standardized treatment, transport, communication and evaluation, including licensure of out-of-hospital services and establishment of medical control; designation of specialty care centers; and Public Information Education and Relations (PIER) program). There is a consistent, established funding source to adequately support the activities of the lead agency and other essential resources which are necessary to carry out the legislative mandate. The lead agency operates under a single, clear management structure for planning and policy setting, but strives to achieve consensus among EMS constituency groups in formulating public policy, procedures and protocols. The role of any local/regional EMS agencies or councils who are charged with implementing EMS policies is clearly established, as well as their relationship to the lead agency. Supportive management elements for planning and developing effective statewide EMS systems include the presence of a formal state EMS Medical Director, a Medical Advisory Committee for review of EMS medical care issues and state EMS Advisory Committee (or Board). The EMS Advisory Committee has a clear mission, specified authority and representative membership from all disciplines involved in the implementation of EMS systems.

Status and Progress on the 1991 Recommendations

Maryland passed its current EMS law in 1993 establishing the Maryland Institute for Emergency Medical Services Systems (MIEMSS) and creating an 11 member board appointed by the governor to provide oversight and authority to promulgate EMS system regulations. The law included a requirement that the Maryland EMS Board develop and adopt an EMS Plan. The Board followed through on that commitment and adopted the state's first plan in August 1995. The list of goals and objectives, which is the plan, was updated in 2000 and again in 2002/2003.

Under the Maryland law, MIEMSS is an independent state agency. This model has served Maryland well. The structure of the Maryland EMS Board, the 29 member State Emergency Medical Services Advisory Committee (SEMSAC), and MIEMSS as the lead agency, all funded through an EMS Operating Fund provides a balance of resources and accountability. MIEMSS enjoys the ability to focus on its stated Mission, Vision, and Values without the compromises that might be necessary if it were housed within a larger state agency. The configuration of the EMS Board and the SEMSAC assures broad based stakeholder participation in system design and oversight by persons with an array of EMS expertise and interests, including pediatrics.

The EMS Board and its Executive Director promote a philosophy of "cooperative excellence." This outlook is reflected in the Code of Maryland Regulation (COMAR) Title 30 that governs system operations. These regulations are updated on approximately an annual basis after an extensive development process that is intended to build consensus and support rather than force change. The COMAR Title 30 regulations have evolved over time to cover all essential components of an EMS system. The regulations include standards for the designation of specialty centers including trauma, pediatrics, neonatal, and neurological services.

In 1992, secure funding for MIEMSS and the major components of the state EMS system was established through a motor vehicle registration fee surcharge. Over time, the fee has evolved to its current level of \$11.00 and provides funding for the operating expenses of MIEMSS, support to the Maryland State Police Aviation Division, the Maryland Fire and Rescue Institute, the R Adams Cowley Shock Trauma Center, the Amoss Fire, Rescue and Ambulance Fund, and the Volunteer Company Assistance Fund. Senate Bill 479 called for a two year study of EMS and allocated an additional \$2.50 of the vehicle registration fee for on-call specialty physician coverage in trauma centers.

There has been recent interest by commercial helicopter providers in performing scene responses as well as inter-facility transfers. The TAT views the Maryland State Police Aviation Division as a key resource in the care of critically injured patients. As

the role of non-public air medical providers is further explored, Maryland should focus on preserving this important core capacity.

MIEMSS has pursued two different pathways to regulate ambulance services. There are specific standards and requirements for commercial ambulance services. The requirements for public ambulance services are less definitive, relying more heavily on jurisdictional oversight and a requirement for quality improvement plans. While this approach arguably creates two different levels of protection for the public, it appears to be working but may not be the ideal long term approach.

Recommendations

- ◆ **Expand and revise the Maryland EMS plan. Include a comprehensive vision for the system in light of the *EMS Agenda for the Future* that includes a level of detail identifying EMS services, strategies, commitments and operations. Establish benchmarks for system performance as part of the plan.**
- ◆ Identify opportunities as part of the Maryland EMS plan to educate the public about the role of MIEMSS in assuring the delivery of essential EMS care to Maryland's citizens and visitors.
- ◆ Examine the feasibility of combining the regulatory approaches of the Commercial Ambulance Licensing program with the quality improvement orientation applied to public sector ambulance services. There are benefits to both approaches that may present an opportunity to consolidate and unify the quality requirements for all ambulance services.
- ◆ **Define in regulation the specific roles for both public and private air medical services in a way that preserves the core medical function of the Maryland State Police Aviation Division and integrates the resources of commercial air medical services to best meet all public needs.**

B. RESOURCE MANAGEMENT

Standard

Central coordination and current knowledge (identification and categorization) of system resources is essential to maintain a coordinated response and appropriate resource utilization within an effective EMS system. A comprehensive State EMS plan exists which is based on a statewide resource assessment and updated as necessary to guide EMS system activities. A central statewide data collection (or management information) system is in place that can properly monitor the utilization of EMS resources; data is available for timely determination of the exact quantity, quality, distribution and utilization of resources. The lead agency is adequately staffed to carry out central coordination activities and technical assistance. There is a program to support recruitment and retention of EMS personnel, including volunteers.

Status and Progress on the 1991 Recommendations

Since the 1991 assessment tremendous progress has been made in addressing the Resource Management Standard recommendations of the initial assessment team. In 1993 the legislature revised the EMS law that included a requirement to develop a state EMS plan. In 1994, EMS system stakeholders met to begin the process of identifying issues and areas needing improvements using a SWOT analysis. As a result, definitive goals and objectives were defined to develop an initial state EMS plan. That plan was finalized and approved by the EMS Board in 1995 and has been updated since that time. The needs of children and families are integrated within the EMS plan. The plan as written does not include current system strengths or weaknesses nor does it identify future directions. The state also expanded a Region 3 hospital diversion policy to statewide application in 1995.

In 2002, MIEMSS developed the Facility Resource Emergency Database (FRED). This comprehensive web-based data system serves as a real-time inventory of state hospital resources. The development of FRED accomplished the three pertinent recommendations of the 1991 assessment. MIEMSS has continued to monitor the system and make changes to the state plan and FRED.

The same method was used in 2000 and 2002 to revise the state EMS plan. The FRED was enhanced in April 2004 to include paging capabilities and better organize the resource information. The FRED continues to expand its capabilities to establish linkages with other state systems including the state's Emergency Management software, EMMA, which will include adding GIS information to the system. In 2003, MIEMSS revised the hospital diversion policy and updated the trauma bypass policy.

All EMS providers are required to submit data to MIEMSS and have been meeting this requirement using a paper EMS run report. Currently MIEMSS is piloting a new electronic ambulance information system in five counties.

The current EMS workforce exceeds thirty thousand certified or licensed career and volunteer personnel. In addition to the more than six hundred public service EMS vehicles, the state is also utilizing the services of commercial ground and air medical vehicles and personnel to meet the increasing needs of its citizens.

Although not addressed in the standard, it is noteworthy that MIEMSS has been aggressive in working with the state's 48 hospitals with emergency departments to improve the level of care being provided by taking on the responsibility of designating Trauma and Specialty Referral Centers.

Since the initial assessment in 1991, MIEMSS has made substantial progress in improving the Maryland's EMS system, with only a minimal increase in administrative staffing.

Recommendations

- ◆ **Develop a comprehensive State EMS plan. Include objectives relating to the EMS role in Homeland Security activities. Use a collaborative approach with EMS system stakeholders.**
- ◆ **Implement the electronic Maryland ambulance information system statewide and complete the linkages with other healthcare systems in order to identify and utilize all available resources.**
- ◆ Assure the continuation of secured funding to support the activities of MIEMSS and related EMS system needs.

C. HUMAN RESOURCES AND TRAINING

Standard

EMS personnel can perform their mission only if adequately trained and available in sufficient numbers throughout the State. The State EMS lead agency has a mechanism to assess current manpower needs and establish a comprehensive plan for stable and consistent EMS training programs with effective local and regional support. At a minimum, all transporting out-of-hospital emergency medical care personnel are trained to the EMT-Basic level, and out-of-hospital training programs utilize a standardized curriculum for each level of EMS personnel (including EMS dispatchers). EMS training programs and instructors are routinely monitored, instructors meet certain requirements, the curriculum is standardized throughout the State, and valid and reliable testing procedures are utilized. In addition, the State lead agency has standardized, consistent policies and procedures for certification (and re-certification) of personnel, including standards for basic and advanced level providers, as well as instructor certification. The lead agency ensures that EMS personnel have access to specialty courses such as ACLS, PALS, BTLs, PHTLS, ATLS, etc., and a system of critical incident stress management has been implemented.

Status and Progress on the 1991 Recommendations

Since 1991, Maryland has adopted National Standard Curricula for the initial and refresher training of its EMS provider personnel as Emergency Medical Dispatchers (EMD), First Responders (FR), EMT-Basics (EMT-B), Cardiac Rescue Technicians (CRT), and EMT-Paramedics (EMT-P). The EMD level is new in Maryland as of 1997 and its utilization is growing rapidly.

Currently the Maryland EMS workforce includes:

907	EMDs
11,034	FRs
15,548	EMT-Bs
626	CRTs
2,322	EMT-Ps

Training in FR and EMT-B as well as some ALS refresher and continuing education is available at no cost to students through the Maryland Fire and Rescue Institute and/or training academies. Initial BLS and ALS courses are taught at 25 community colleges, academies, or hospitals.

The Maryland CRT level is being aligned with the National Standard EMT-Intermediate '99 level for training and scope of practice. This level has proven to be useful for Maryland's volunteers in providing Advanced Life Support (ALS) to patients and progressing to the EMT-Paramedic level. The scope of practice for this level is aligned with the training curriculum and reflected in the Maryland EMS protocols.

There appears to be no shortage in access to EMS training programs nor any specific deficiencies in the quality of training delivered. A continuous quality improvement approach to training is used and there is provision for adjustments to protocols for supplemental and research purposes. Maryland uses the National Registry as the basis for licensing its EMT-Ps and CRTs. An exam developed and maintained by the Atlantic EMS Council is used for the certification of FRs and EMT-Bs. The state is implementing a mechanism for educational program approval that is similar to the national accreditation process. All programs are scheduled to be approved under this process by October 2004.

There is a perceived shortage of EMT-Ps in Maryland although this has not been determined through any formal needs assessment process. MIEMSS is concerned about the adequacy of the state's EMS workforce overall and has established a task force to monitor the situation. A Maryland EMS Student Application form gathers demographic data about students in all EMS training programs and tracks their outcomes. Data from the Prehospital Provider Registry and the EMAIS are being analyzed to identify specific training needs and opportunities. There is on-line access and 800# capability to obtain information about a provider's certification status.

In addition to the formal EMS certification programs, MIEMSS also operates the layperson AED training program. To date the AED program has 360 facilities with 758 total sites and 9500 trained persons. Sixty cardiac arrests have occurred in these facilities since 2000; of these patients, 18% had return of spontaneous circulation at the time of EMS arrival.

MIEMSS also operates a statewide Critical Incident Stress Management (CISM) team. This group utilizes a combination of mental health professionals in conjunction with peer providers to assist with defusings, debriefings, and referrals to additional stress management services. There has been no formal evaluation to determine the effectiveness of these services.

Recommendations

- ◆ Evaluate the effectiveness of the CISM program in light of conflicting national data about some approaches to Critical Incident Stress Debriefing sessions.
- ◆ Perform a formal needs assessment to determine the anticipated workforce needs of the Maryland EMS system. Include a study of the use of National Registration as the basis for all levels of Maryland EMS licensure or certification.

D. TRANSPORTATION

Standard

Safe, reliable ambulance transportation is a critical component of an effective EMS system. The transportation component of the State EMS plan includes provisions for uniform coverage, including a protocol for air medical dispatch and a mutual aid plan.

This plan is based on a current, formal needs assessment of transportation resources, including the placement and deployment of all out-of-hospital emergency medical care transport services. There is an identified ambulance placement or response unit strategy, based on patient need and optimal response times. The lead agency has a mechanism for routine evaluation of transport services and the need for modifications, upgrades or improvements based on changes in the environment (i.e., population density). Statewide, uniform standards exist for inspection and licensure of all modes of transport (ground, air, water) as well as minimum care levels for all transport services (minimum staffing and credentialing). All out-of-hospital emergency medical care transport services are subject to routine, standardized inspections, as well as spot checks to maintain a constant state of readiness throughout the State. There is a program for the training and certification of emergency vehicle operators.

Status and Progress on the 1991 Recommendations

The Maryland EMS System has made progress in the transportation component since the 1991 Assessment. The two recommendations from that assessment are partially met. There is authority in place for MIEMSS to conduct inspection and licensing of commercial ground and air medical services and, while not mandated for public services, there is a voluntary inspection program that has been implemented in 13 jurisdictions. Participation in the Voluntary Ambulance Inspection Program (VAIP) among public sector services is reportedly expanding. Two members of the pediatric emergency medical advisory committee participate in the periodic review of the VAIP standards.

The second recommendation from the 1991 assessment dealt with developing an ambulance placement strategy for urban services that used patient and response time data to establish location and deployment methodologies. While the state has not developed such a strategy for deployment and placement of ambulances, it is done within many of the local jurisdictions using data from the state and with input from the regional offices.

There are currently 116 BLS, 131 ALS, and 7 neonatal commercial ground

ambulances within the state. Additionally, within the commercial market, there are 3 helicopter and 1 fixed wing air medical units. Three levels of services are licensed by MIEMSS within the commercial fleet including BLS, ALS and neonatal. Commercial services have been integrated into the state emergency disaster response system. All of the commercial operators are licensed to provide services within the State. The state has good data on the number of vehicles and units within the commercial fleet. The MSP Aviation Division has a fleet of 12 helicopters with eight available throughout the State in strategic locations 24 hours a day. Public service ambulance providers are not licensed in Maryland. Among the public sector ground services the data and reporting is not as complete as for the commercial vendors. It was reported that there are approximately 224 public BLS units, 341 public ALS units, 74 public chase cars, and 351 companies (fire engines and squads). The state also has implemented a voluntary 39 hour Emergency Vehicle Operators Course although the number of ambulance personnel attending the course was unavailable.

There is uniform statewide air medical coverage through the MSP with criteria to measure response and transport times. The MSP program will also respond to border states within 30 miles for rescue missions and when necessary will also provide interfacility transfers. Ground services are provided by a combination of volunteer and career personnel. Baltimore City has an all paid/career services program and many areas in the state are adding career staff. This is particularly true for services provided during day time hours. Both BLS and ALS service providers are available throughout the state. While not every responding ambulance has an ALS provider on board, there is a tiered response system providing ALS intervention prior to arrival at a treating facility.

There have been no formal needs assessments performed at the state level to assess transportation resources. Further, there does not appear to be a mechanism to routinely evaluate transport services giving consideration to changes in the environment. There are assessments of transportation services made within the local jurisdictions as issues arise. Data for these reviews is sometimes provided by the regional offices. In some instances information gathered from local assessments is forwarded to the State to assist in statewide planning efforts. Ambulance placement and deployment is done exclusively within the local jurisdictions. Standards for establishing new services or adding additional resources based on increases in population or demographics have not been done on a statewide basis. The state has study groups that review placement issues and use information from statewide data bases to establish placement and deployment strategies. At least one area has used data/information from the state to assist in developing new deployment and coverage patterns for ambulance stations and response. In doing so, this area was able to attain a more uniform response capability.

Minimum staffing levels for ambulances have been established. There are defined

scopes of practice with credentialing of the EMS providers at multiple levels. There are regulations describing the operation, minimum equipment and protocols for responding units. Equipment requirements are routinely evaluated. New requirements are released annually or as needed to meet changes in protocols.

Maryland also has established a Neonatal Transport Program as a joint venture between University of Maryland Medical Center and Johns Hopkins Hospital. They provide approximately 700 transports annually as well as providing continuing education and outreach to community based providers, and facilities.

Recommendations

- ◆ **Enhance (and expand as necessary to meet the mission) the strong presence of the Maryland State Police Aviation Division in the delivery of scene medical treatment and transport for trauma patients as part of a triple mission capability. As necessary, the MSP should also provide the back up response to commercial air services for interfacility transfer of patients needing a higher level of care. The MSP service should be viewed as a core competency within the State EMS system. Continue to incorporate commercial air services for interfacility transport and as a backup to the MSP for scene response when appropriate (e.g., mass casualties, surge capacity).**
- ◆ **The regional councils and local jurisdictions should develop benchmarks and indicators for service and system improvement that can be used to measure system performance. Use information gained from the benchmarks and indicators review process to improve system performance and outcomes at the jurisdictional regional level and ensure the data can be aggregated by the state for review and analysis across the entire state.**
- ◆ **Conduct an asset identification program through the regional councils that can be routinely updated and used to assess the status of jurisdictional assets (facilities, ground and air vehicles etc) to respond to daily events and be prepared for mass casualties or surge capacity. Ensure that the information is available to the local jurisdictions, regional offices and the state lead agencies (EMS and Public Health).**
- ◆ Expand FRED to track real time response/vehicle information similar to how facility availability is monitored now within the system (e.g. GIS tracking).
- ◆ Mandate Emergency Vehicle Operator Courses for all ambulance drivers.
- ◆ Incorporate findings from QA/QI processes to manage the disparity between the ambulance inspection and enforcement processes for commercial and public

transport services. Explore a new process that combines parameters from both approaches and levels the requirements for both services.

E. FACILITIES

Standard

It is imperative that the seriously ill patient be delivered in a timely manner to the closest appropriate facility. The lead agency has a system for categorizing the functional capabilities of all individual health care facilities that receive patients from the out-of-hospital emergency medical care setting. This determination should be free of political considerations, is updated on an annual basis and encompasses both stabilization and definitive care. There is a process for verification of the categorizations (i.e., on-site review). This information is disseminated to EMS providers so that the capabilities of the facilities are known in advance and appropriate primary and secondary transport decisions can be made. The lead agency also develops and implements out-of-hospital emergency medical care triage and destination policies, as well as protocols for specialty care patients (such as severe trauma, burns, spinal cord injuries and pediatric emergencies) based on the functional assessment of facilities. Criteria are identified to guide interfacility transport of specialty care patients to the appropriate facilities. Diversion policies are developed and utilized to match system resources with patient needs; standards are clearly identified for placing a facility on bypass or diverting an ambulance to another facility. The lead agency has a method for monitoring if patients are directed to appropriate facilities.

Status and Progress on the 1991 Recommendations

As in all well developed EMS systems, field triage criteria have been developed, assessed, and revised with the intent of identifying specialty care patients, principally trauma patients, that will benefit from directed transport to a specialty care center. In addition, interfacility transfer criteria for several other types of conditions including eye trauma, hand trauma, neurotrauma, and perinatal conditions have been developed in order to promote and facilitate the early transfer of appropriate patients to specialty care centers. For trauma patients, the system appears to deliver the vast majority of more severely injured patients to designated centers, although there is some concern for overtriage.

In the past, trauma-related care facilities within the EMS system were specifically identified and categorized according to an 'Echelons of Care' system. In 1993, regulations providing for the formal designation of trauma and specialty centers were approved by the EMS board and put into effect. The classification of trauma centers, through these regulations, now utilizes a Level 1,2,3 system similar but not identical to that specified by the American College of Surgeons in the *Resources for the*

Optimal Care of the Injured Patient. In addition to trauma centers, regulations enabling the designation of other specialty centers, including Burns, Pediatric Trauma, Eye Trauma, Neurotrauma, and most recently Perinatal centers were completed in 2003. Regulatory requirements for specialty centers is specified in the Code of Maryland Regulations (COMAR) section 30.08. As of this writing, the centers currently identified as specialty destination / referral centers include the following:

Center type	Number of facilities
Primary Adult Trauma Resource Center (PARC)	1
Level 1 Trauma Centers	1
Level 2 Trauma Centers	4
Level 3 Trauma Centers	3
Pediatric Trauma Centers (Level 1)*	2
Eye Trauma	1
Neurotrauma	1
Perinatal Referral Centers*	16
Hand/Upper Extremity Trauma	1
Hyperbaric Medicine	1
Burn Center*	2

* Includes out of state centers

MIEMSS has made considerable and noteworthy progress in the development of disease-based systems of care for emergency conditions. As part of this progress, a defined process for verification of designated specialty care centers has been developed. For trauma centers it involves a MIEMSS-directed (internal) process utilizing an external trauma center survey team composed of a trauma surgeon, emergency physician, and trauma program manager. Trauma center verification is on a 5 year cycle versus a 3 year cycle for Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and the American College of Surgeons (ACS). The ACS verification process is accepted for out-of-state trauma referral centers. All other verification programs are internal except for the burn center, which utilizes external verification via American Burn Association (ABA) standards. Perinatal centers are also designated according to COMAR provisions. Review and verification of these centers is currently voluntary and conducted using the standards of the American Academy of Pediatrics (AAP), and American Academy of Obstetricians and Gynecologists (AOG). Perinatal care oversight in the system is provided via an advisory committee to MIEMSS.

In addition to existing designation/verification standards, plans are in place to verify stroke centers through the adaptation of existing JCAHO standards. With respect to cardiac conditions, task force recommendations are being considered for the identification, designation, and verification of interventional cardiac centers.

Rehabilitation centers are not included in the designation/verification process for

specialty centers, and there are no provisions for rehabilitation centers provided in the COMAR. There is limited integration of rehabilitation centers into either institutional or system-wide programs. Rehabilitation Directors have limited involvement in the acute care phase except where the facilities are connected. The availability to the EMS system of longer term functional recovery outcomes (beyond acute hospitalization) also appears to be limited. This is inconsistent with the development of disease-based systems of care for several emergency conditions including stroke, neurotrauma, hand injuries, and burns.

The verification / re-verification for specialty centers have been completed for trauma, burn, pediatric trauma, neurotrauma, and perinatal centers. Those for the trauma centers were completed in 2003. The verification process for trauma centers appears to be less stringent than the ACS process and allows for provisional designation in the setting of deficiencies provided that these are corrected within a 12 month time-frame. Focused re-visits to confirm that deficiencies have been corrected are conducted primarily by the state trauma program manager. There has been no direct comparison between the internal MIEMSS verification process and the ACS verification process for any of the Maryland trauma centers.

Diversion policies exist at the state level and for each institution per requirements. A county alert tracking system maintains the status of each hospital and emergency department and is based on hospital notification (web-based). Facility diversion is monitored continuously and tabulated on a monthly basis by MIEMSS and reported back to trauma and emergency department program managers and CEOs at each institution.

Recommendations

- ◆ Incorporate the ACS-VRC trauma verification process into the existing internal process for purposes of validation. Shorten the current 5 year verification cycle for trauma centers to a more conventional 3 year cycle.
- ◆ **Reevaluate the current triage criteria with respect to the overtriage rate and potential over utilization of air medical transport. Reevaluate the distribution of trauma patients with modest injuries between PARC and Level 2 facilities in the context of overtriage.**
- ◆ Formalize the role of rehabilitation physicians and rehabilitation centers in the relevant systems of care (trauma, burns, etc.) and integrate the post-acute rehabilitation process into the trauma center performance improvement processes and outcomes analyses.
- ◆ Develop and implement standards for rehabilitation hospitals designed to complement existing disease-based systems of care for trauma, pediatric trauma,

neuro-trauma, and burns. Develop a verification and designation process for rehabilitation facilities based on these standards.

- ◆ **Continue the development of disease-based systems of care for other emergency conditions including cardiac and stroke by developing verifiable standards for the designation of specialty care centers, and incorporating all elements of the continuum of care (prevention, pre-hospital, acute care, rehabilitation/recovery, research/PI).**

F. COMMUNICATIONS

Standard

A reliable communications system is an essential component of an overall EMS system. The lead agency is responsible for central coordination of EMS communications (or works closely with another single agency that performs this function) and the state EMS plan contains a component for comprehensive EMS communications. The public can access the EMS system with a single, universal emergency phone number, such as 9-1-1 (or preferably Enhanced 9-1-1), and the communications system provides for prioritized dispatch. There is a common, statewide radio system that allows for direct communication between all providers (dispatch to ambulance communication, ambulance to ambulance, ambulance to hospital, and hospital to hospital communications) to ensure that receiving facilities are ready and able to accept patients. Minimum standards for dispatch centers are established, including protocols to ensure uniform dispatch and standards for dispatcher training and certification. There is an established mechanism for monitoring the quality of the communication system, including the age and reliability of equipment.

Status and Progress on the 1991 Recommendations

The General Assembly authorized a comprehensive study of communications in 1999. As a result of the study, funds were allocated to develop and build the infrastructure necessary to meet the state's emergency medical communications needs. Specifically, the system needed to be upgraded to accommodate a future digital microwave communications environment. These decisions and actions were consistent with the recommendations offered by the initial NHTSA assessment team.

Although the state enacted legislation in 1985 to require all jurisdictions to provide its citizens access to 911, the General Assembly enacted new legislation in 1995 that required all jurisdictions to offer enhanced 911 services to its citizens. Funding for the enhanced 911 systems are through a telephone subscriber fee administered by the State Emergency Numbers Board.

Currently calls received through the wireless 911 system do not provide for caller automatic location information (ALI). This is due primarily to reasons outside the control of MIEMSS and the State Emergency Numbers Board. However, this is an important feature for EMS systems that can potentially reduce response times to those in need of medical services.

The state also has developed and implemented an integrated EMS telephone network (EMSTEL) that connects a number of dispatch centers and medical facilities such as trauma centers and specialty referral centers to the Emergency Medical Resource Centers (EMRC's) and the Systems Communications Center (SYSCOM). This system is an alternative method of communications to the public telephone system.

Maryland is one of the first states to implement a statewide communication system that enables field personnel to contact online medical control and then be patched through the communications network to referral centers and receiving facilities such as trauma centers. In addition, MIEMSS develops and maintains a centralized communications system that supports quality of service delivery.

It is noteworthy that all counties in Maryland have implemented the EMD program and offer pre-arrival instructions to those calling for assistance in a medical emergency. Although each county is responsible for the dispatch of its resources, MIEMSS provides overall coordination and the necessary funding to build and maintain the statewide emergency medical communications infrastructure.

In 2003, the Governor established a statewide interoperability governance committee to review and make recommendations for future enhancements to the communications systems. A consultant is currently evaluating the voice and data systems to enable linkages at all levels of government for interoperability.

Maryland has begun a ten-year planning initiative to consider future migration of its communications systems to the 700 MHz spectrum for emergency and public safety communications. This is a commendable proactive planning initiative.

Recommendations

- ◆ **Complete the building and implementation of the statewide digital microwave network necessary to provide improvements to the state voice communication system, and for the migration of state data systems to a more secure intranet system.**
- ◆ Maintain a collaborative effort between MIEMSS and the State Emergency Numbers Board, FCC, NHTSA, and the wireless industry to implement the wireless 911 system that includes the caller Automatic Location Information (ALI) feature.
- ◆ **Link FRED and other data systems such as the public health syndromic surveillance system to include the prehospital providers.**

G. PUBLIC INFORMATION, EDUCATION AND PREVENTION

Standard

To effectively serve the public, each State must develop and implement an EMS public information, education and prevention (PIEP) program. The PIEP component of the State EMS plan ensures that consistent, structured PI&E programs are in place that enhance the public's knowledge of the EMS system, support appropriate EMS system access, demonstrate essential self-help and appropriate bystander care actions, and encourage injury prevention. The PIEP plan is based on a needs assessment of the population to be served and an identification of actual or potential problem areas (i.e., demographics and health status variable, public perceptions and knowledge of EMS, type and scope of existing PIEP programs). There is an established mechanism for the provision of appropriate and timely release of information on EMS-related events, issues and public relations (damage control). The lead agency dedicates staffing and funding for these programs, which are directed at both the general public and EMS providers. The lead agency enlists the cooperation of other public service agencies in the development and distribution of these programs, and serves as an advocate for legislation that potentially results in injury/illness prevention.

Status and Progress on the 1991 Recommendations

In 2001, the Centers for Disease Control and Prevention reported that injuries were the leading cause of death for persons between the ages of 1 and 34 in Maryland. It is fitting then that MIEMSS has committed resources to informing the public about the epidemic of injury in Maryland and the need for prevention programs to reduce the burden of injury statewide.

There is an extensive Public Information and Education (PIE) program within the Maryland EMS system. The current program meets many of the goals identified in the 1991 Assessment. A needs assessment has been done for the pediatric population and programs to address the findings from the needs assessment are being implemented. A plan for PIE is part of the EMS plan with goals and measurable objectives. The MIEMSS Office of Public Information and Media Services (OPIMS) has established close working relationships with a host of community partners including injury prevention and control experts, Public Health, the National Study Center and others. OPIMS is very active in PIER training and has conducted several training programs for providers on how to work with the media during emergency events. The EMS-C program has been equally involved with establishing partnerships in the community and developing outreach efforts.

The evaluation of existing programs is in process and is a project that has not yet

been fully realized. While efforts have been undertaken to evaluate certain projects, overall assessment of outcomes and changes in behavior due to prevention/intervention is still a work in the planning and development phase.

There is considerable capacity within MIEMSS to develop public information and education programs. Currently, monthly newsletters, annual reports, training programs, designing materials, conducting workshops, creating media messages are all part of the state OPIMS. Preparation of topic related videos, printed materials, PSA's and technical assistance are all within the scope of services provided by the state EMS OPIMS to local and regional jurisdictions and providers as necessary to carry out the mission of informing and educating providers and the public about EMS, Trauma and Pediatric emergency care. There are established media councils and within Metropolitan Baltimore, a media relations group. MIEMSS OPIMS is instrumental in facilitating the process of working with and through the media to spread the message of EMS. Additionally, OPIMS works to inform and educate elected officials on EMS issues as requested.

Information on injury patterns and prevention strategies is a joint effort between all stakeholders and jurisdictional agencies. State data bases are used to target prevention intervention strategies. Providers can also request a review of issue specific events to identify the need for additional prevention programs. Many current programs are national programs, and grant driven.

The EMS-C program provides technical assistance, advocacy, training and a host of public education messages, workshops and quality improvement activities. This program is part of an eight state coalition of EMS-C programs and was recently recognized as the leading EMS-C program nationally. Efforts have been underway to integrate the needs of children across all MIEMSS programs, from designation of specialty centers, to EMS protocols, training programs, prevention and outreach. Issues relating to the care and treatment of children in emergencies are discussed and resolved within the QIC system. Statewide data is used to assess needs, develop programs and routinely evaluate the care of children within the system.

Recommendations

- ◆ Expand the use of statewide data bases to drive prevention and intervention programs and policies.
- ◆ Evaluate and assess PIE results.
- ◆ Utilize your media relations group to disseminate success stories about MIEMSS and the EMS system statewide.

- ◆ Create media messages that can be distributed to local jurisdictions to describe the role of MIEMSS, the services provided by MIEMSS and the interlinking relationships between MIEMSS, local jurisdictions and providers.
- ◆ **Develop a system for evaluating and promoting the health and safety of EMS providers (smoking cessation, impaired driving, exercise, safety belt usage, etc).**

H. MEDICAL DIRECTION

Standard

EMS is a medical care system that involves medical practice as delegated by physicians to non-physician providers who manage patient care outside the traditional confines of office or hospital. As befits this delegation of authority, the system ensures that physicians are involved in all aspects of the patient care system. The role of the State EMS Medical Director is clearly defined, with legislative authority and responsibility for EMS system standards, protocols and evaluation of patient care. A comprehensive system of medical direction for all out-of-hospital emergency medical care providers (including BLS) is utilized to evaluate the provision of medical care as it relates to patient outcome, appropriateness of training programs and medical direction. There are standards for the training and monitoring of direct medical control physicians, and statewide, standardized treatment protocols. There is a mechanism for concurrent and retrospective review of out-of-hospital emergency medical care, including indicators for optimal system performance. Physicians are consistently involved and provide leadership at all levels of quality improvement programs (local, regional, state).

Status and Progress on the 1991 Recommendations

Since its previous NHTSA assessment in 1991, MIEMSS has made substantial progress on Medical Direction.

On-Line and Off-Line Medical Direction

The active involvement of physicians at all levels of the Maryland EMS system is a major reason that the state can boast that it provides its citizens and visitors with a level of emergency medical care that is unsurpassed.

Maryland has two full-time medical directors at the state level: the State EMS Medical Director (state medical director) and the medical director for the air medical program. There are also two part-time pediatric medical directors. In addition, MIEMSS provides a nominal stipend for five pediatric and five adult regional medical directors. (The MIEMSS Executive Director is also a physician but the role is fully committed to executive and administrative duties. However, having a physician as the executive director sets the tone that the system exists to meet the emergency medical needs of the citizens of Maryland.)

There are also jurisdictional, company and squad level medical directors, many of whom provide real-time in-the-field medical direction, in addition to their usual off-line and on-line medical direction.

Maryland has implemented state-developed criteria and training programs for on-line and off-line medical direction. Examples of these programs include standardized criteria for the selection of medical directors at the state and regional levels as well as standardized job descriptions for those medical directors. There are also qualification and performance criteria for the EMS Operational Program Medical Director. In addition there is a Maryland Medical Director Orientation Course and Medical Director requirements for the Facility Automated External Defibrillator Program.

State regulations set forth the credentials and requirements for hospital staff that provide on-line medical direction. Hospital staff members that provide on-line medical direction must complete a MIEMSS-approved base station course and the annual protocol update.

A special feature of the MIEMSS on-line medical direction system is the ability of a field provider to consult with multiple entities at the same time (through EMRC). This helps assure that the patient with an emergency will get to the right place the first time.

There are, however, opportunities for improvement in medical direction. For example, there are no criteria for selecting company or squad level medical directors and for training and monitoring them once they become part of the system.

Another opportunity for improvement involves the initial and ongoing training of medical direction physicians. Attendance at the Maryland Medical Direction Course, the statewide annual symposium or the regional meetings is voluntary. There is no systematic orientation for local medical directors who are new to the Maryland system.

All medical directors in the system who provide any form of off-line medical direction should be trained at some minimal level (beyond their residency training and the base station course). This would assure familiarity with the Maryland system and its protocols.

EMS Quality Assurance

The state has developed guidelines for and implemented a uniform EMS quality assurance program and established published rules for incident reporting. State regulations set forth specific quality assurance and quality improvement requirements. These are implemented at the jurisdictional level with oversight and approval by the state medical director.

As a way of assuring quality, BLS services and providers are integrated into all aspects of medical direction and quality improvement. Specifically, BLS and ALS protocols are part of one comprehensive document and all state certified and licensed providers (BLS, ALS, public and commercial) are required to function within the protocols. The operational program medical director has direct responsibility for the care delivered by all providers.

In addition to protocols that establish uniform practice statewide, regulations require that the EMS Operational Program Medical Director be responsible for assuring a uniform level of skill and practice among providers. Most importantly, the jurisdictional medical director and the state medical director may limit a provider's practice and enact the formal disciplinary process if necessary.

Regulations require provider certification or licensure and, for ALS providers, skills competency. In addition, to practice in Maryland, a provider must be affiliated with a jurisdiction.

The current quality improvement challenge is to fully-implement its electronic patient care report and then to use the data generated from the reports to review out-of-hospital care. A particular challenge of this effort will be linking the data to patient outcome information from non-EMS sources. Once such a system of outcome-based review and feedback is established, Maryland will be a leader in this area.

Recommendations

- ◆ **Integrate company and squad level physicians into the MIEMSS medical direction system; develop standards for the selection, training and monitoring of these physicians.**
- ◆ Require a minimal level of formal preparation for all off-line medical direction physicians.
- ◆ **Implement the electronic patient record and establish linkages to patient outcome data.**
- ◆ Make the electronic patient outcome data available to medical directors for use in concurrent and retrospective review.

I. TRAUMA SYSTEMS

Standard

To provide a quality, effective system of trauma care, each State must have in place a fully functional EMS system; trauma care components must be clearly integrated with the overall EMS system. Enabling legislation should be in place for the development and implementation of the trauma care component of the EMS system. This should include trauma center designation (using ACS-COT, ACEP, APSA-COT and/or other national standards as guidelines), triage and transfer guidelines for trauma patients, data collection and trauma registry definitions and mechanisms, mandatory autopsies and quality improvement for trauma patients. Information and trends from the trauma registry should be reflected in PIER and injury prevention programs. Rehabilitation is an essential component of any statewide trauma system and hence these services should also be considered as part of the designation process. The statewide trauma system (or trauma system plan) reflects the essential elements of the Model Trauma Care System Plan.

Status and Progress on the 1991 Recommendations

Since the last NHTSA assessment in 1991, the Maryland trauma system has been further developed under enabling EMS legislation in 1993. (Education Article 13-509, Ann. Code MD) This legislation provides for the designation and verification of trauma centers under a substantial set of requirements for each level of center contained in the Code of Maryland Regulations (COMAR). Other than these regulations, however, there is no current trauma plan although it appears that one was originally developed circa 1992 following the creation of the HRSA Model Trauma Care System Plan. Goals and objectives pertaining to the care of trauma patients are imbedded in the State of Maryland EMS Plan (most recently revised June 2003), but do not specifically address trauma-related issues. There are no specific provisions for rehabilitation facilities as part of the system of trauma care.

The implementation of trauma center designation and other regulations provided in COMAR has been through a consensus-driven process utilizing stakeholder input from a variety of committees. These include the State EMS Advisory Committee (SEMSAC), and the Trauma Network. The Trauma Network serves as the principal vehicle for providing advisory committee feedback to MIEMSS, but has no specific legislative provision.

In May of 2002, Western Maryland's Washington County Hospital, a Level II trauma center, requested a temporary suspension of its trauma center status due to a lack of physician coverage for trauma call. This critical event led to the development and

passage of SB479 which acted to provide ongoing funding for trauma centers and trauma surgeons through an addition to vehicular license fees. Trauma Net, served as an advisory and advocacy forum for promoting this legislation.

System leadership is provided through the MIEMSS office and involves the EMS Medical Director and a full time state trauma program manager. There is participation in the informal advisory committee (Trauma Network) by the trauma medical directors at the major trauma centers. The management of the trauma system is integrated in the EMS system. There is currently no trauma system medical director.

The current trauma system facility cohort consists of one Primary Adult Resource Center (PARC), one adult Level 1 center, four adult level 2 centers, three adult level three centers, and two pediatric Level 1 centers. Specialty center for eye and neuro trauma are also designated. The degree of integration of non-trauma centers (NTCs) into the system appears to be limited. Although not excluded, physician involvement from these centers in system-wide committees (Trauma-QIC, Trauma Network) also appears to be limited as is the amount of direct contact between the highest level trauma centers (PARC, Level 1). In general, these NTCs appear to liaison through EMS regional councils, which serve as regional trauma committees, as well as regional base stations for purposes of providing input to the trauma system.

There is a state Trauma Registry based on the 'Collector' platform which receives trauma data from designated centers. Registry data is used for routine PI reports and to track institutional compliance, utilizing defined audit filters. The registry is also used to analyze a variety of QA/QI and TRISS-related outcome measures with comparison to established benchmarks. The use of System Registry data to direct injury surveillance and policy development appears to be more limited. Currently, the Trauma System registry does not receive data from NTCs, nor does it submit data to the National Trauma Data Bank (NTDB).

Trauma System performance improvement (PI) is conducted through the Trauma Quality Improvement Committee (TraumaQIC). This committee is composed largely of institutional trauma program managers with medical oversight provided by the MIEMSS Medical Director. Physician involvement with TraumaQIC appears to be spotty. Major system PI issues identified at TraumaQIC are forwarded to the Trauma Network for discussion as needed. The system appears to be capable of 'closing loops' with respect to system issues as it did recently with interfacility transfer problems, and has been able to recruit the involvement of NTCs. This trauma system PI "loop-closure" process, however, is not well defined or well practiced within the system. Consistent and high quality institutional PI within the system has been problematic, prompting the MIEMSS office to conduct QI/QA workshops for hospital-based nursing coordinators. For purposes of PI, all trauma deaths are referred to the ME for autopsy, but performance of a post-mortem exam is not mandatory.

Recommendations

- ◆ **Write a new state trauma plan (or component of the EMS plan) incorporating current elements of the Maryland trauma system and addressing trauma specific goals and objectives. The plan should be structured around an inclusive trauma system and include all elements of the continuum of trauma care as outlined in the 1992 HRSA Model Trauma Care System Plan.**
- ◆ **Develop a position and comprehensive job description for a state trauma system medical director (analogous to the pediatric medical director positions). In order to complement existing expertise at MIEMSS, this position should be filled by a trauma surgeon who should have oversight responsibilities for all components of the inclusive trauma system.**
- ◆ Cultivate greater multidisciplinary physician participation in system performance improvement (Trauma QIC). This involvement should ideally include physician representation from each trauma center and from non-trauma centers who regularly receive injured patients.
- ◆ **Formalize the role of a trauma advisory committee with defined responsibilities, goals and objectives, and scope of activity to include strategic planning, system performance improvement, research, and prevention activities.**
- ◆ Expand the use of the state trauma registry to link with other trauma related databases, and use this data to enhance injury surveillance and guide strategic planning and policy development.
- ◆ Develop mechanisms to allow use of case-specific data to help drive system performance improvement. Create mechanisms allowing the submission of data to the National Trauma Data Bank (NTDB)
- ◆ **Conduct a formal external assessment of the Maryland Trauma System. This would enable continued growth & development of the trauma system and help create a model for other disease-based systems of care that are being developed within MIEMSS.**

J. EVALUATION

Standard

A comprehensive evaluation program is needed to effectively plan, implement and monitor a statewide EMS system. The EMS system is responsible for evaluating the effectiveness of services provided victims of medical or trauma related emergencies, therefore the EMS agency should be able to state definitively what impact has been made on the patients served by the system. A uniform, statewide out-of-hospital data collection system exists that captures the minimum data necessary to measure compliance with standards (i.e., a mandatory, uniform EMS run report form or a minimum set of data that is provided to the state); data are consistently and routinely provided to the lead agency by all EMS providers and the lead agency performs routine analysis of this data. Pre-established standards, criteria and outcome parameters are used to evaluate resource utilization, scope of services, effectiveness of policies and procedures, and patient outcome. A comprehensive, medically directed, statewide quality improvement program is established to assess and evaluate patient care, including a review of process (how EMS system components are functioning) and outcome. The quality improvement program should include an assessment of how the system is currently functioning according to the performance standards, identification of system improvements that are needed to exceed the standards and a mechanism to measure the impact of the improvements once implemented. Patient outcome data is collected and integrated with health system, emergency department and trauma system data; optimally there is linkage to databases outside of EMS (such as crash reports, FARS, trauma registry, medical examiner reports and discharge data) to fully evaluate quality of care. The evaluation process is educational and quality improvement/system evaluation findings are disseminated to out-of-hospital emergency medical care providers. The lead agency ensures that all quality improvement activities have legislative confidentiality protection and are non-discoverable.

Status and Progress on the 1991 Recommendations

Since its previous NHTSA assessment in 1991, MIEMSS has made progress on Evaluation.

Evaluation Authority and Data Validity

Evaluation of emergency medical services receives significant attention in Maryland statutes and regulations. Through the Code of Maryland Regulations, authority to ensure compliance with data collection is established. A run report is completed for each patient encounter and trauma centers maintain registries of the patients they

treat. MIEMSS is authorized through state regulations to use data sources to: 1) evaluate patient care; 2) evaluate EMS provider compliance with protocols and standards; 3) manage resources; 4) conduct injury surveillance and prevention; and 5) conduct research and education.

Data validity is assured at the jurisdictional level by an analysis of record completeness. However, the hard copy nature of the current system limits the ability of MIEMSS to assure any real depth of data validity. For this reason, the system is developing and piloting an electronic Maryland Ambulance Information System (EMAIS). Once fully implemented, the EMAIS should increase data reliability and accuracy. The EMAIS project will be easier to achieve because MIEMSS has made substantial advances in its technology infrastructure and computerized network.

Quality Assurance and Quality Improvement

Maryland has implemented a comprehensive quality program which states that evaluation equals quality assurance plus quality improvement plus research. In addition, there is an emphasis on “managing for results.”

Quality assurance at the state level includes the management of prehospital licensure and certification database and incident review. There are multiple quality task forces and advisory committees. An innovative device is the informal QIC: Quality Improvement Committees that quickly address a single quality issue. Quality improvement projects are conducted at the state, regional, agency and hospital level. They are also conducted locally and include the evaluation of airway management and intubation success, response times, refusal of care, and initial cardiac arrest medication.

Each jurisdiction and commercial service is required to have a quality assurance plan that is approved by its medical director which is then approved by the state EMS medical director. Jurisdictional quality indicators are approved locally.

A major, system-wide quality improvement effort has centered on the management of cardiac arrest patients. Data is collected using the Utstein templates. However, the evaluation outcome is currently limited to “return of spontaneous circulation”.

The philosophy of keeping most QA/QI “local” may keep the state office from fully utilizing the large amount of statewide data it already collects. Advances in state level QA/QI should begin with the execution of a consensus process that results in the identification of optimal system performance benchmarks and indicators.

A cornerstone of quality improvement is feedback of pertinent information to the person whose behavior you want to influence. The dissemination of evaluation findings is limited in the state of Maryland. The creation of the EMAIS presents an

opportunity for MIEMSS to vastly improve its dissemination efforts. MIEMSS should develop a system that allows the dissemination to the local provider information on the care they provide.

A weak link in the current evaluation system is the lack of patient outcome data. There are plans to link the EMAIS with multiple sources of patient outcome data in the future. Achieving this will be a challenge but is necessary for MIEMSS to know if EMS providers and the system are making a difference.

Recommendations

- ◆ **Implement the EMAIS and establish linkages to patient outcome data, NEMSIS, and other statewide databases.**
- ◆ **Improve dissemination of evaluation information to local providers. Develop a system whereby local providers receive timely information on every aspect of the care they provide along the continuum from the time the call is received through patient discharge and outcome.**
- ◆ **Determine standard optimal system performance benchmarks and indicators (“results”); monitor, track, report and act on these results in a timely fashion as necessary to improve system performance.**
- ◆ Utilize outcomes related to neurologic recovery for the evaluation of cardiac arrest management.

K. HOMELAND SECURITY

Status

MIEMSS recognized the need to be prepared for terrorist and other mass casualty incidents prior to the events of 9-11-01. The state's proximity to the nation's capital, the harbors along the coastal waterway, and several high profile structures provide plausible scenarios for large scale incidents.

Early steps taken included the development of a WMD strategic plan, a Maryland Health and Medical WMD Response Plan, and a statewide survey of hospital capabilities to respond to WMD events. In 2002, the Maryland EMS protocols were revised to include clinical treatment guidelines for WMD incidents. Exercises involving MIEMSS, the EMS jurisdictions, hospitals, and other system stakeholders occur on a continuing basis.

The linkages between public health and local EMS providers does not support the easy passage of information related to the recognition, reporting and tracking of infectious diseases. This is somewhat surprising in light of what appears to be a strong relationship at the upper levels of MIEMSS and the Maryland Department of Health and Mental Hygiene.

The Governor has established an Office of Homeland Security. There is also a Governors Emergency Management Advisory Council with a Health and Medical Committee that is broadly charged with the Emergency Support Function #8 (Health and Medical) duties. The Health and Medical Committee is co-chaired by the MIEMSS Executive Director and Deputy Commissioner of the Maryland Department of Health and Mental Hygiene. The Committee is supported by a number of technical advisory groups that address issues including Volunteer Corps, training and exercises, decontamination, the Strategic National Stockpile (SNS), etc. Best practices for EMS, public health, and hospital components of the response system have been developed with an emphasis on decontamination, personal protective equipment, communications, and training.

Current projects to improve system readiness have included development of system wide surge capacity; creation of a Maryland SNS Plan; increased coordination with the National Capital Region for planning and response; financial assistance to EMS providers; and ongoing refinement of communication and information systems.

The presenters on this topic acknowledged the difficulty of moving ahead without the existence of established national guidelines for EMS system preparedness. Recent national surveys also indicate that only a very small percentage of federal funding to states for terrorism preparedness is reaching EMS systems.

Recommendations

- ◆ Continue to partner with other system stakeholders in planning, training, and exercise activities related to terrorism preparedness.
- ◆ **Use the considerable communications and data infrastructure that exists within MIEMSS and the public health system, to support the early identification and management of evolving major incidents such as infectious disease outbreaks.**
- ◆ **Develop a program whereby state and local epidemiologists work with EMS providers to improve communications around infectious disease issues. Use the epidemiologic capacity that exists within MIEMSS to improve on syndromic surveillance by the EMS system.**
- ◆ Test plans to improve patient tracking systems in the event of a mass casualty incident. Pay particular attention to the needs of pediatric patients and families who may be separated during these events.
- ◆ **Advocate within Maryland for an equitable distribution of available federal resources to be applied to EMS system preparedness.**
- ◆ Identify a strategy to deploy and maintain Chem-Pack resources to EMS and hospital providers who will be able to access them in time to be of use if ever needed.

L. CURRICULUM VITAE

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ORGANIZATIONS/APPOINTMENTS

San Diego County, (Former)
 Emergency Medical Care Committee
 Trauma System Medical Audit Committee
 Youth Suicide and Homicide Task Force
 Methamphetamine Task Force
 Drug Summit Partnership
 County Fire Chiefs Association
 Unified Disaster Council
 Domestic Violence Fatality Rev.

State of California, (Former)
 Trauma System Regulatory Review
 Emergency Medical Services Administrators of California
 State and Local Injury Control Network
 Region five Medical Disaster Management Committee

National, Department of Transportation - Consultant
 EMS Agenda for the Future Implementation Guide task force
 Instructor, Development of Trauma Systems: A State and Community Guide
 Instructor, Emergency Medical Services Information Systems
 DOT/NHTSA, Emergency Medical Services, Technical Assistance Team,
 Member, states of Alaska, Colorado, Connecticut, Illinois, New Hampshire,
 Oklahoma, Pennsylvania and the Territory of Guam.
 DOT/ NHTSA, Technical Reassessment Team, Member

American College of Surgeons, Committee on Trauma, Trauma System,
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HRSA Trauma Systems Consultation, 1992 Model Trauma Care Plan

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Governor, American College of Surgeons
Chairman, COT Committee on Education, American College of Surgeons
Chairman San Francisco Trauma Systems Audit Committee
Chairman, Publications Committee, Western Trauma Association
Board of Managers, Western Trauma Association
Secretary/Treasurer, HC Naffziger Surgical Society - UCSF
Chief of Staff, San Francisco General Hospital
President, Northern California Chapter, American College of Surgeons
Member, Committee on Trauma Executive Committee, ACS
Professional & Academic societies including: American Association for the Surgery of
Trauma, Western Trauma Association, Society of Critical Care Medicine, Society of
University Surgeons, Pacific Coast Surgical Association, Southwestern Surgical
Association, and others.

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Director

ORGANIZATIONS/APPOINTMENTS

National Association of State EMS Directors
Past President
Past Treasurer
Executive Committee
Program Committee
Health Care Finance Administration Negotiated Rule Making, Committee Member
National Scope of Practice Model Project – Principal Investigator
Institute of Medicine - Emergency Medical Care in the US,
Emergency Department Subcommittee
American College of Surgeons- Trauma System Consultation Committee
Liaison from NASEMSD
New England Council for EMS
Executive Committee
Vermont Trauma System Development Committee
Co-Chair
EMS Agenda for the Future
Co-Chair
EMS Agenda for the Future Implementation Guide
Committee Member
Essex Rescue, EMT-I Captain
DOT/NHTSA EMS Assessment Program, Technical Assistance Team, Member,
States of Delaware, Texas, and North Dakota
DOT/NHTSA EMS Reassessment Program, Member, States of Colorado, Alaska,
Connecticut, and Mississippi
American College of Surgeons –Trauma System Assessment Team Member
EMSC Grant Review Team Member

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EMS Specialist
DOT, National Highway Traffic Safety Administration
(March 1996 - to Present)

Director, Office of Emergency Medical Services
Virginia Department of Health
(1976 to March 1996)

ORGANIZATIONS/APPOINTMENTS

National Association of State EMS Directors (1979-1996)
Past President
Past Chairman, Government Affairs Committee
National Association of EMS Physicians, Member
American Medical Association,
Commission on Emergency Medical Services (1982-87)
American Trauma Society
Founding Member, Past Speaker House of Delegates
ASTM Committee F.30 on Emergency Medical Services
Institute of Medicine/National Research Council
Pediatric EMS Study Committee, Member (1991-93)
Committee Studying Use of Heimlich Maneuver on Near Drowning Victims,
Member (1993-94)
World Association on Disaster and Emergency Medicine
Past Executive Committee, Member
Editorial Reviewer for *A Prehospital and Disaster Medicine*

Drexdal Pratt, Chief

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ORGANIZATIONS/APPOINTMENTS

National Association of State EMS Directors
Liaison to the American Ambulance Association
Chair of the NC Hospital Preparedness Committee
NC State Emergency Response Commission Member
HRSA EMSC Grant Review Team Member
NC State Trauma Advisory Committee Member
NC American Heart Association ECC Committee Member
NC Unintentional Death Task Force Member
NC Dept. of Transportation Executive Committee for Highway Safety Member
NC Bioterrorism Steering Committee Member
NC SNS/Chempack Task Force Member
NC Brain Injury Task Force Member