State of Maryland

Maryland Institute for Emergency Medical Services Systems

Maryland State Police Aviation Command

July 14, 2010

The Honorable Senator Ulysses Currie
Chairman, Senate Budget & Taxation Committee
3 West, Miller Senate Office Building
Annapolis, Maryland 21401

The Honorable Delegate Norman H. Conway
Chairman, House Appropriations Committee
House Office Building, Room 121
Annapolis, Maryland 21401

Re: 2009 JCR – Pages 102 through 103

Gentlemen:

The 2009 Joint Chairmen's Report requested that MIEMSS and the Maryland State Police jointly prepare and submit a status report on the implementation of each of the findings and recommendations of the National Transportation Safety Board and the Expert Panel. The enclosed report is submitted in compliance with that request.

Please do not hesitate to contact us if you have any questions or if we may provide you with any further information. Thank you for your continuing support of Maryland's statewide emergency medical services system and Medevac program.

Very truly yours,

Robert R. Bass, M.D.
Executive Director, MIEMSS

Major Andrew J. (A.J.) McAndrew
Commander, MSP Aviation Command

Cc: Members, House EMS Workgroup

Cathy Kramer, DLS (electronic copy)
Sarah Albert, DLS Library & Information Services (5 copies by mail)

Response to Independent Findings Regarding Triage Protocols, Helicopter Utilization, and Helicopter Safety

Report submitted jointly by the
Maryland Institute for Emergency Medical Services Systems (MIEMSS)
and
The Maryland State Police Aviation Command

The 2009 Joint Chairmen's Report contained the following language:

"The National Transportation Safety Board (NTSB) has made recommendations to improve the safety of helicopter medical transport including:

- compliance with Federal Aviation Administration (FAA) Part 135 regulations;
- terrain awareness warning systems;
- formal flight risk evaluation programs; and
- formal dispatch and flight following procedures.

"In November 2008, a panel of national experts convened to review and make recommendations regarding Maryland's emergency transport protocol following the September 2008 helicopter crash. The panel declared a Helicopter Emergency Medical Services system an essential component of a contemporary emergency medical services system as it improves outcomes in a nigh risk population of trauma patients. The panel made several recommendations that:

- the Maryland State Police Aviation Command comply with FAA Part 135 regulations and seek certification by the Commission for the Accreditation of Medical Transport Systems; and
- the Maryland Institute for Emergency Medical Services Systems (MIEMSS) perform a rigorous and regular utilization review of pre-hospital transport to ensure compliance with [the] triage process.

"By June 30, 2010, MIEMSS and the Maryland State Police shall jointly prepare and submit a report on the status of implementation of each of the findings and recommendations of the NTSB and the expert panel summarized above. The report shall also include an analysis of national helicopter emergency services system "best practices." The report should be submitted to the budget committees, any policy committee that is likely to have oversight over triage protocols and helicopter utilization, and if established by law, the Legislative Joint Oversight Committee on Emergency Medical Services."

This report is submitted in response to the above request contained in the Joint Chairmen's Report.

National Transportation Safety Board (NTSB) Safety Recommendations

The Maryland State Police Aviation Command places safety as its most important goal. The Command continually strives to improve the safety of its operations and build upon its outstanding record of service. The Command is comprised of 160 very dedicated personnel: 55 pilots, 50 trooper flight paramedics, 30 maintenance technicians, and 25 support personnel.

The Aviation Command's pilots are all highly skilled and experienced. Pilots must have a minimum of 2,000 helicopter hours to even be considered for hire. The Command's trooper flight paramedics are all sworn troopers and nationally registered EMT-Paramedics; they are among the most highly skilled pre-hospital EMS providers in the country. The Command's Maintenance Division is a certified Federal Aviation Administration Part 145 Repair Station. The Maintenance Division's technicians are responsible for repairing and maintaining the Command's helicopters and fixed wing airplanes and are all licensed Airframe and Power-Plant Mechanics.

The Aviation Command concurred with all of the recommendations made by the NTSB and the Expert Panel that reviewed helicopter utilization and protocols in Maryland. The following provides an update on the Command's progress in implementing the recommendations:

- Require all emergency medical services operators to comply with 14 *Code of Federal Regulations* Part 135 operations specifications during the conduct of all flights with medical personnel onboard (NTSB Recommendation A-06-12 and Expert Panel Recommendation).

  The Aviation Command has applied for and is in the process of obtaining FAA Part 135 certification. The Command has completed a Task Order Request For Procurement (TORFP) in order to solicit a consultant to assist in the certification process. The TORFP was recently submitted to the Department of Information Technology for review and approval. Once the TORFP is approved, Part 135 consultants will be solicited. This is a long and arduous process, but the Command anticipates that the process will be completed by year's end.

  The Aviation Command has already adopted and complied with many of the mandates required for Part 135 certification, to include but not limited to:
  - Pilot currency requirements.
  - Personnel position requirements such as Director of Operations and Chief Pilot.
  - Weather minimums.
  - Obstacle clearance pre-flight checks.
  - Crew rest requirements.

- Conduct scenario-based training, including the use of simulators and flight training devices, for helicopter emergency medical services (HEMS) pilots, to

include inadvertent flight into instrument meteorological conditions and hazards unique to HEMS operations, and conduct this training frequently enough to ensure proficiency (NTSB Recommendation A-09-97).

The Aviation Command has modified its pilot training program, which includes scenario-based training that simulates inadvertent flight into instrument meteorological conditions and hazards unique to HEMS operations. This training is conducted frequently enough to ensure pilot proficiency. The Command has, both prior to and after the Trooper 2 crash in September 2008, voluntarily complied with all FAA Part 135 helicopter pilot certification requirements.

Additionally, the Aviation Command is currently working with the Maryland Department of Transportation to procure new helicopters. The purchase or lease of a flight simulator or flight training device is being explored in the procurement process.

- Implement a safety management system program that includes sound risk management practices (NTSB Recommendation A-09-98).

  The Aviation Command has a robust safety management system that includes but is not limited to utilizing formalized dispatch and flight-following procedures, voluntarily complying with FAA Part 135 weather minimums, and utilizing a flight risk evaluation program. As mentioned previously, the Command has completed a Task Order Request For Procurement (TORFP) in order to solicit a consultant to assist in the FAA Part 135 certification process. The consultant will also be required to assist the Command in further developing a safety management program.

- Install flight data recording devices and establish a structured flight data monitoring program that incorporates routine reviews of all available sources of information to identify deviations from established norms and procedures and other potential safety issues (NTSB Recommendation A-09-99).

  Requirement specifications for the new helicopters mandate that they must be equipped with flight data recording devices and cockpit video recording devices. A monitoring program that incorporates routine reviews of the information from these devices will be used to identify deviations from established norms and procedures and other potential safety issues.

- Install and require that pilots use night vision imaging systems for visual flight rules operations at night (NTSB Recommendation A-09-100).

  Requirement specifications for the new helicopters mandate that they must be equipped with night vision imaging systems. In the interim until the existing fleet is fully replaced with the new helicopters, the Aviation Command has purchased

night vision goggles that are being used by flight paramedics who assist the pilots in identifying hazards.

- Equip helicopters that are used in emergency medical services transportation with autopilots, and train pilots to use the autopilot if a second pilot is not available (NTSB Recommendation A-09-101).

  All Aviation Command helicopters are equipped with autopilots and all Command pilots are trained and proficient in using the autopilot systems. Additionally, requirement specifications for the new helicopters mandate that they must be equipped with autopilots.

  Furthermore, the Aviation Command has testified in numerous hearings before the General Assembly in favor of hiring co-pilots as an added safety measure. An additional 30-pilots would be required to be hired in order to staff each mission with a second pilot at a cost of at least $2.26 million per year.

  The NTSB has recently published their opinion in support of co-pilots. The NTSB stated that a review of the NTSB Aviation Accident Database revealed that during the 8-year period from 2000-2008, 123 HEMS accidents occurred, killing 104 people and seriously injuring 42 more. All but nine of these accidents involved operations with only one pilot. Pilot actions or omissions, of some sort, were attributed as the probable cause in 60 of the 123 accidents. Many of these 60 accidents might have been prevented had a second pilot and/or an autopilot been present.

  Witnesses at the (February 2009) NTSB hearing described the risks for helicopter pilots working in the HEMS environment, which are greater than those in other types of flight operations. The airline industry, which has an accident rate much lower than that of the HEMS industry, conducts flights with two pilots who attend training regularly and are required to be evaluated during that training. Conducting flights with two pilots allows one pilot to fly the airplane while the other communicates on the radio, programs aircraft avionics, and runs checklists. The NTSB notes that some HEMS operators currently operate with two pilots. According to hearing testimony, the Canadian HEMS industry operates its helicopters with two pilots and has flown over 230,000 hours since 1977 with no fatal accidents. In addition, the New Jersey State Police, which flies its helicopters with two pilots, has had no accidents for the last 10 years.

  The NTSB noted how a second pilot might have prevented the Trooper 2 crash in September 2008. The NTSB stated that in the Trooper 2 crash, a second pilot could have handled radio communications with air traffic control, reducing the pilot's workload and allowing him to concentrate on flying the helicopter. Additionally, after the controller denied the pilot's request for a surveillance radar approach, a second pilot may have suggested they declare an emergency or

execute a missed approach and request a different approach rather than continue to descend. A second pilot could have also monitored the helicopter's altitude while on the approach to ensure terrain clearance.

- Develop and implement flight risk evaluation programs that include training all employees involved in the operation, procedures that support the systematic evaluation of flight risks, and consultation with others trained in EMS flight operations if the risks reach a predefined level (NTSB Recommendation A-09-131).

  The Aviation Command has developed and utilizes a computer based Risk Assessment Tool that includes procedures that support the systematic evaluation of flight risks, and consultation with others trained in EMS flight operations if the risks reach a predefined level.

  Policy was developed that requires flight crews to consider both the "static" and "dynamic" operational variables that have been known to increase and/or mitigate operational risk. Crews are required to complete the Risk Assessment Tool at the beginning of each shift and throughout the shift as conditions may change, to include but not limited to weather conditions and/or day to night conditions.

  Crews select the appropriate option for each of the "static" operational variables (shift working, pilot/flight paramedic flight experience, airworthiness of the aircraft, etc.) and "dynamic" operational variables (weather, day/night flight conditions, physiological variables, etc.) listed on the Risk Assessment Tool. Each option available for selection is given a value that will mitigate, increase, or will not affect the operational risk score, e.g., night conditions more risk, day conditions less risk. After completing the Risk Assessment Tool, a risk factor is assigned based on the selections chosen. If the risk factor reaches a predefined level, the mission may not be accepted without prior approval from command staff personnel who are trained and highly experienced in EMS flight operations.

- Use formalized dispatch and flight-following procedures that include up-to-date weather information and assistance in flight risk assessment decisions (NTSB Recommendation A-09-132).

  SYSCOM (Systems Communications Center) located at MIEMSS serves as the Aviation Command's formalized dispatch and flight-following center.

  All Aviation Command duty officers and MIEMSS dispatch personnel have been trained to a nationally accepted standard of Certified Flight Communicator (CFC) or higher, using a curriculum and accreditation process promulgated by the National Association of Air Communication Specialists (NAACS).

The Aviation Command is in compliance with the FAA guidelines regarding the establishment of an Operational Control Center (OCC) for helicopter EMS (HEMS) operations. Benchmarks include the standardized training and certification of dispatch personnel, and the establishment of a Joint Operational Control Center (OCC). A Joint Standardized Operating Procedure was established for all employees of the OCC, and subsequently published and ratified by both MIEMSS and MSPAC.

Electronic Flight Following has been enhanced using software provided by the Johns Hopkins Applied Physics Laboratory (JHUAPL). Alarm mechanisms and redundancy across workstations have been enhanced to minimize the possibilities of undetected missing aircraft. Detected missing aircraft are immediately highlighted and the last reported aircraft positions preserved. The upgraded OCC procedure for lost/missing/overdue aircraft has been published, enacted and evaluated via a series of random missing aircraft drills; all of which resulted in adherence to policy and simulated overdue aircraft promptly located.

Real-time aeronautical weather information continues to be available to Aviation Command duty officers on a 24/7/365 basis. In addition to the HEMS weather tool, and the Digital Weather product at the Shock Trauma Center, conventional aeronautical weather reporting is available via computer or telephone to the duty officers. The Certified Flight Communicator training received by duty officers and dispatchers enables these personnel to retrieve weather reports as necessary to assist pilots in decision-making. Furthermore, real-time weather reporting is available to pilots in flight or in aircraft on ground via satellite down linking.

- Install terrain awareness and warning systems on your aircraft and provide adequate training to ensure that flight crews are capable of using the systems to safely conduct EMS operations (NTSB Recommendation A-09-133).

  Requirement specifications for the new helicopters mandate that they must be equipped with integrated terrain awareness and warning systems. In the interim until the existing fleet is fully replaced, the Aviation Command has purchased new portable Garmin 696 systems to outfit each of its helicopters. All of the Command's pilots have been trained on the use and capabilities of the systems. The systems provide enhanced situational awareness and feature a high-resolution terrain page showing hazards relative to altitude and a vertical profile of terrain along the route of flight. The systems come with a terrain database and an obstacles database. With information from the terrain and obstacles databases, the systems monitor current position in relation to surrounding terrain to provide alerts.

- Implement a program to screen and if necessary treat your pilots for obstructive sleep apnea (NTSB Recommendation A-09-134).

The Aviation Command concurred with this recommendation and is currently exploring ways in which to screen and, if necessary, treat our pilots for obstructive sleep apnea.

- Revise your policy regarding incident commanders to specify that, in any event involving a missing or overdue aircraft, an Aviation Command trooper will serve as the incident commander (NTSB Recommendation A-09-135).

  The Aviation Command has created a policy in which an Aviation Command pilot will respond to a Command Post and provide expert consultation to incident commanders in any event involving a missing or overdue aircraft.

- Provide additional training to your dispatchers on the use of cell phone "pinging" and include instruction about how to integrate the data obtained from cell phone pinging into an overall search and rescue plan (NTSB Recommendation A-09-136).

  The Maryland State Police has trained investigators on the use of cell phone "pinging" and include instruction about how to integrate the data obtained from cell phone pinging into an overall search and rescue plan. These investigators are on-call and available to respond to any incident involving a missing or overdue aircraft.

Expert Panel Recommendations

- The EMS Board should establish a multidisciplinary task force to determine the optimal number and distribution of HEMS assets based on population needs, geography and current location and capabilities of existing hospitals. This process should be informed by a systematic analysis of the available data and current techniques for optimizing resource allocation.

  The 2009 Joint Chairmen's Report requested that MIEMSS and the State Police submit formal recommendations regarding the number of bases and helicopters necessary to provide statewide emergency medical services. That report will be completed and submitted by December 1, 2010.

- The Maryland HEMS program should take the necessary steps to achieve accreditation by the Commission for the Accreditation of Medical Transport Systems (CAMTS).

  CAMTS Accreditation requires Part 135 Certification and the staffing of a second medical provider on each medical flight. In order to achieve CAMTS accreditation, the Aviation Command must first achieve Part 135 certification (see above), hire a minimum of an additional 30 flight paramedics at a cost of at least $1.7 million per year, and meet other specified CAMTS requirements. MSP

Aviation has indicated that it intends to pursue CAMTS accreditation, pending availability of funding to meet CAMTS requirements.

- MIEMSS should continue their comprehensive and prospective evaluation of the recent modifications to the triage process (Medical consultation for category "C" and "D" patients) examining over-triage, under-triage, secondary triage, time-to-definitive care, and patient outcomes.

  Triage Protocols. Immediately subsequent to the September 2008 crash, MIEMSS modified statewide EMS provider protocols to require that providers consult with receiving trauma center medical personnel in certain instances to discuss whether certain patients should be transported by helicopter or by ground ambulance. Patients for whom trauma center consultation is required are those patients with no obvious injury, but either whose mechanism of injury suggests that a serious injury may be present (Category "C"), or who have certain co-morbid factors (Category "D"), e.g., a patient who is taking anticoagulant medication. Patients with obvious serious injuries (Category "A" or "B") may be transported by helicopter without trauma center consultation. In June 2009, the triage process was further modified to incorporate into the consultation process the consideration of whether transport by ground, instead of helicopter, would deplete limited EMS resources in the community, particularly in rural areas; the EMS provider protocols for 2010 (effective July 1, 2010) were further modified to reflect this additional change.

Helicopter Utilization. MIEMSS continues tracking and evaluation of the impact of the protocol change. The percentage of trauma patients transported by helicopter is shown in Figure 1.

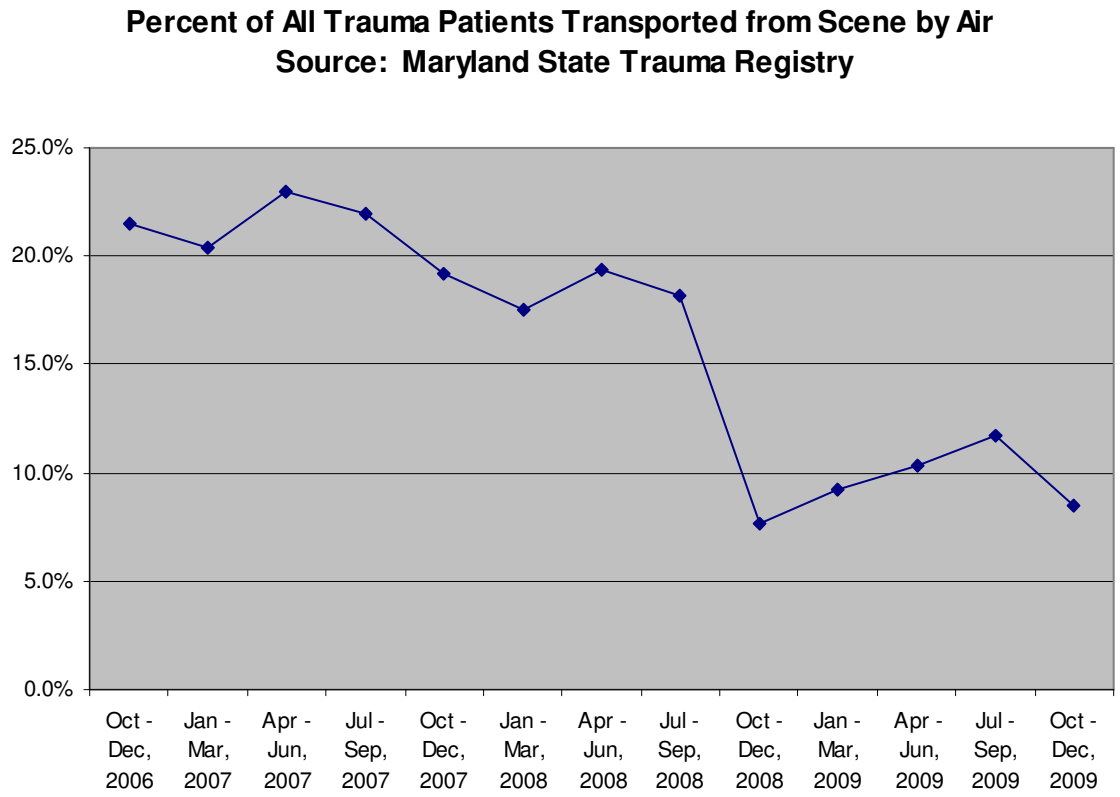

Figure 1

As of June 19, 2010, in the 90 weeks since comprehensive data collection began, there have been 4,677 requests for helicopter transport, of which 3,468 (74.1%) resulted in helicopter transport and 1,209 (25.9%) were transported by ground. See Figure 2 (below). Of the non-transports, 426 (35.2%) were directed to use ground transport through the medical consultation process, 185 (15.3%) were cancelled due to weather, 285 (23.6%) were cancelled by EMS field personnel, and for 313 (25.9%) cases, field personnel decided to transport the patient by ground ambulance.

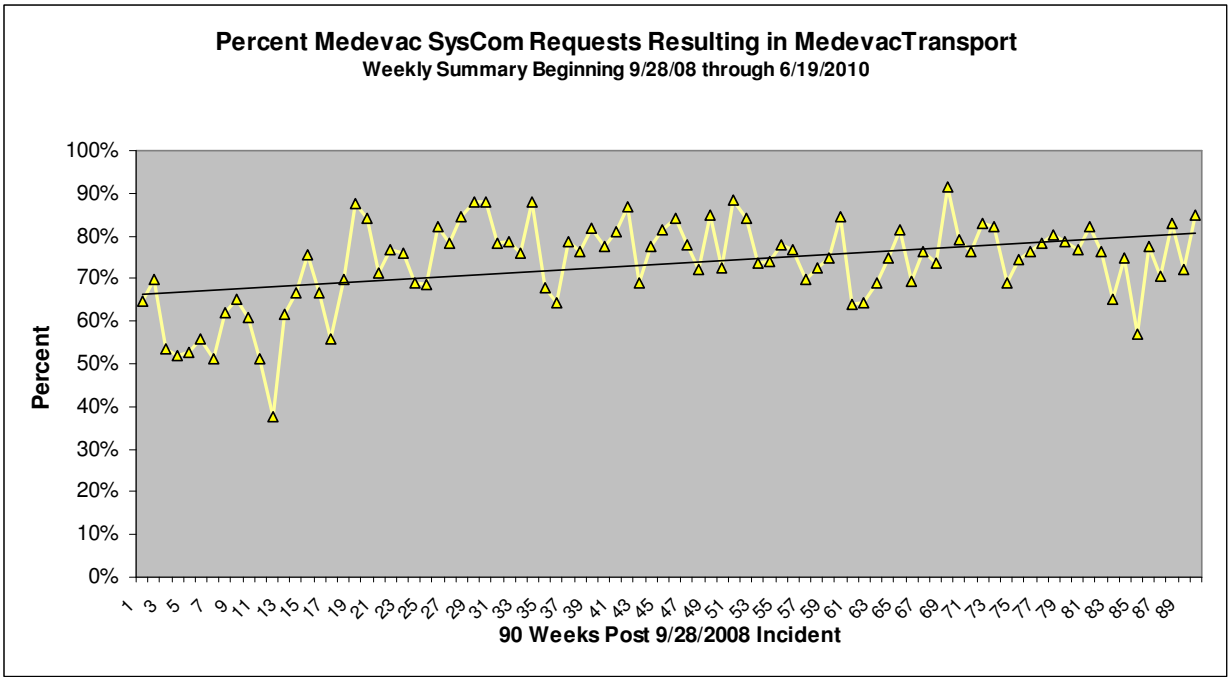

Figure 2

Patient Transfers. Patient transfers between hospitals are monitored as a threshold indication of whether the patient was initially transported (by ground or air) to the facility best able to treat the patient's injuries. Two types of patient transfers are monitored: (1) non-trauma center hospital transfers to trauma centers; and (2) trauma center transfer to a higher level trauma center. Non-trauma center hospital transfers to trauma centers increased from 7.2% of all trauma center admissions in 2007 to 9.0% in 2009. Trauma center transfers to a higher level trauma center during the same period decreased from 2.3% to 2.1%.

Trends in Mortality. MIEMSS tracks trends in patient mortality by examining overall mortality trends, as well as TRISS Methodology Survival Probability Norms ("TRISS"). TRISS is a methodology by which several severity indices and statistics are calculated for the purpose of estimating the probably of patient survival or death which is used in the comparison of actual and expected survival rates for a sample of patients. Analyses indicate that both mortality and TRISS scores remain essentially unchanged after the protocol change, as compared with before the protocol change for scene transports, hospital transfers, and overall.

- MIEMSS should perform rigorous and regular utilization review on pre-hospital transport to ensure compliance with established triage process and criteria –

particularly for HEMS transport. MIEMSS should provide enhanced oversight of helicopter utilization and compliance with published triage criteria.

In 2009, MIEMSS started development of a Helicopter Utilization Database (HUD) to provide each jurisdiction with the ability to conduct retrospective quality improvement reviews of patients transported by helicopter. In October 2009, MIEMSS began to make the HUD available on-line to jurisdictions. Specific information collected at SYSCOM about each helicopter-transported patient is compiled into the HUD database that is accessible by jurisdictions and jurisdictional medical directors within hours after the patient transport occurs. Each jurisdictional medical director is required to review patient-specific information from the EMS patient care report in order to:

(1) determine the patient triage category (e.g., Category A, B, C or D) and verify whether the EMS provider appropriately categorized the patient;

(2) verify whether the patient met the triage criteria for helicopter transport; and

(3) determine whether the use of the helicopter was of apparent clinical benefit in terms of: decreased transport time, added patient care support in a medically challenging patient or in a multiple patient incident, availability of ground transport resources within the community, and/or timely access to patient not readily accessible by ground vehicle.

Jurisdictions throughout the state are continuing implementation of the HUD. As of June 14, 2010, of the 1,232 cases that have been entered and reviewed, 90% of the transports met the protocol requirements. MIEMSS will continue to work with jurisdictions toward full implementation of the HUD and with jurisdictional medical directors to ensure provider compliance with helicopter triage protocols.

- The current indicators for the appropriateness of HEMS transport (injury severity, hospital stay less than 24 hours) being collected and used by MIEMSS are appropriate and should be comparatively analyzed on an ongoing basis to monitor system performance.

MIEMSS has continued collecting and comparatively analyzing indicators associated with helicopter transport.

Figure 3 (below) shows the percentage of patients transported from the scene by air or ground to a designated trauma center and discharged home within 24 hours. A lower percentage of patients transported by air are discharged within 24 hours when compared with ground-transported patients. Further, the percentage of air-transported patients discharged within 24 hours remains lower than that prior to the September 2008 crash.

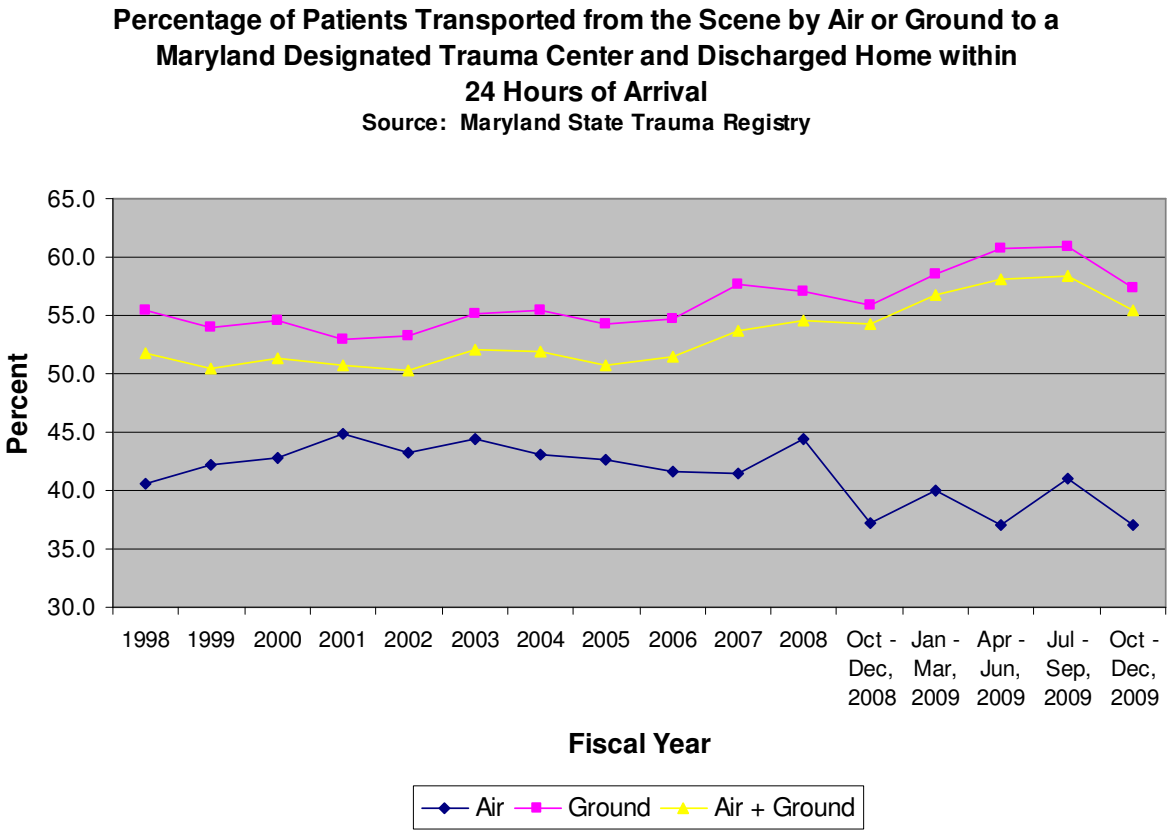

Figure 3

Figure 4 (below) shows the percentage of patients with an Injury Severity Score of 13 or greater transported directly from the scene to a trauma center by ground or air. The Injury Severity Score is a measure of the degree of anatomical injury to the patient; a score of 13 or greater indicates higher levels of severity. The data indicate that patients transported by helicopter are more severely injured than those transported by ground ambulance.

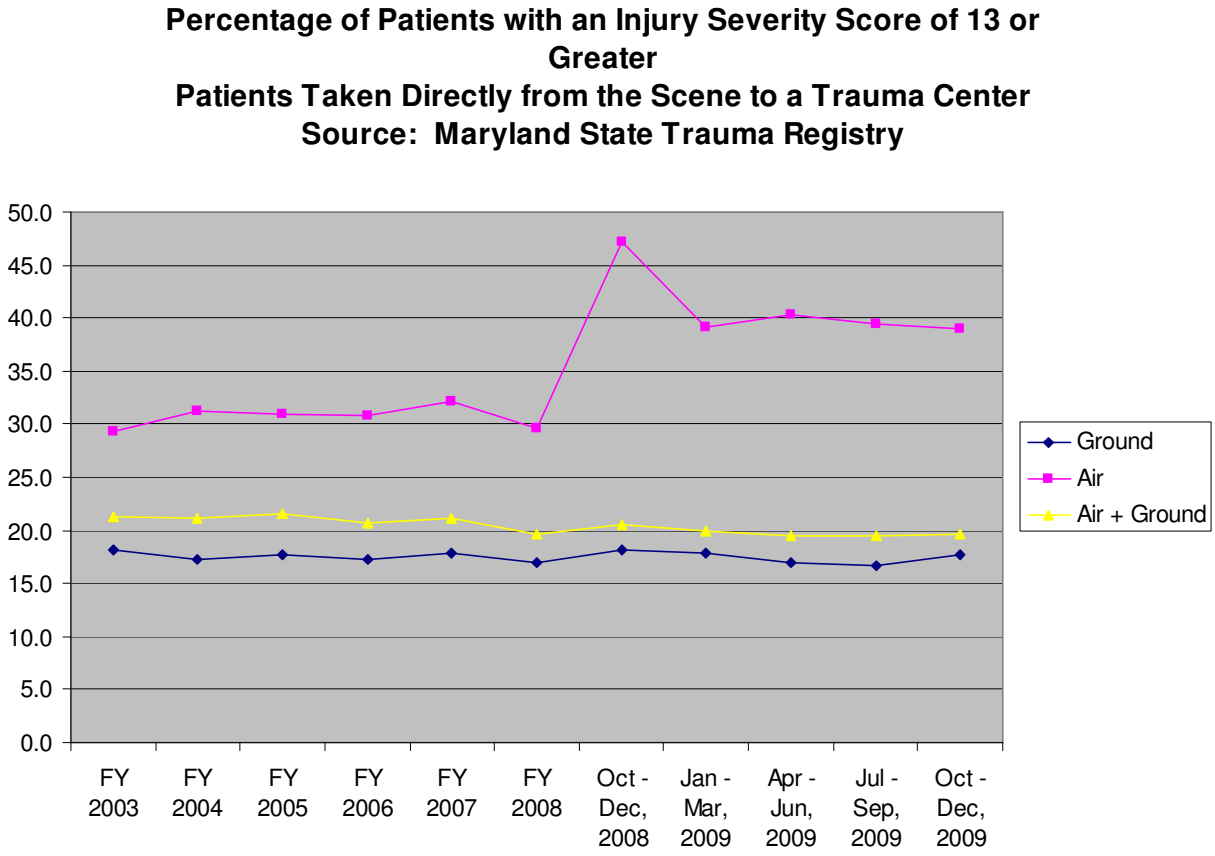

Figure 4

Figure 5 (below) shows the percentage of patients who met the "Enhanced COMAR Patient Severity" definition by mode of transport. The Enhanced COMAR Patient Severity definition identifies those patients who meet one of the factors enumerated in COMAR for being a patient with a severe injury, plus at least one of the following conditions: (1) ICU admission; (2) operating room visit within one (1) calendar day of admission; (3) transfer to another trauma center; or (4) death. The data indicate that patients transported by helicopter are more severely injured than those transported by ground ambulance.

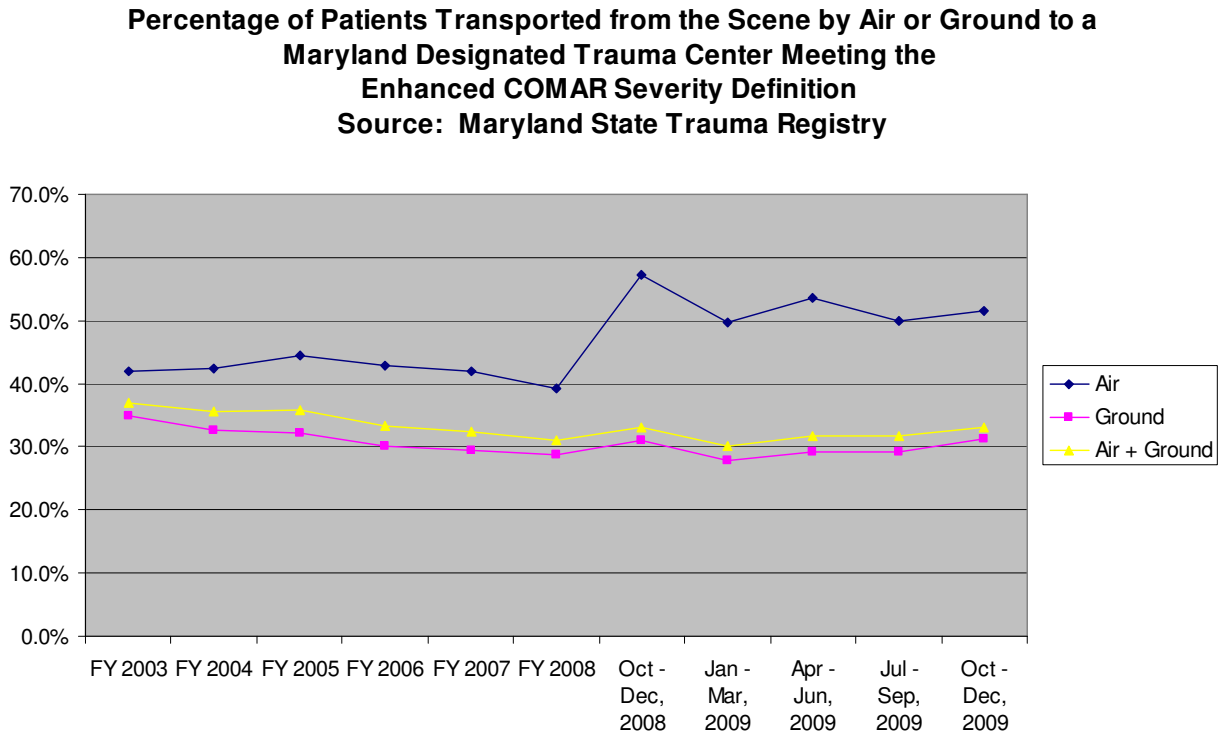

Figure 5

- <u>The Maryland HEMS program should evolve to a program which emphasizes time-drive critical care goals. This recommendation has implications for crew configuration, education, and expansion of the mission profile to include provision of direct scene response for STEMI and stroke intervention to underserved areas of the state</u>.

Patients who have suffered a stroke or STEMI (ST-segment elevation myocardial infection) require rapid access to hospital-based time-sensitive interventions. In 2007, MIEMSS began implementation of a statewide stroke system to ensure that patients who have suffered a stroke are quickly identified in the field and transported to a designated primary stroke center that can provide fibrolytic

therapy within a specific time after the onset of stroke symptoms. To date, 34 primary stroke centers have been designated in Maryland.

STEMI patients also need time critical interventions at hospitals with special capabilities and sufficient volume to ensure good patient outcome. In these patients, the coronary artery is blocked-off and, as a result, the heart muscle being affected by the artery begins to die. In 2003, the Maryland Health Care Commission recommended that MIEMSS develop a system to transport STEMI patients to hospitals with the ability to perform percutaneous coronary intervention (PCI). Maryland has about 5,600 STEMIs per year, approximately 50% of which go to an emergency department via 911. Key elements to treating STEMI patients include 12-lead EKGs in the field, rapid transport to a designated center capable of performing primary PCI unless more than 30 minutes transport time, and integration of pre-hospital and hospital care. Now that 12-leads are available statewide and provider protocols for treatment of STEMI patients are in place, MIEMSS is poised to begin designating hospitals that perform primary PCI to receive ambulance-transported STEMI patients. Criteria for designating hospitals able to perform primary PCI ("Cardiac Interventional Centers") became effective in May 2010, and MIEMSS will be soliciting applications from interested hospitals throughout 2010.

Under the Maryland Medical Protocols, both stroke and STEMI patients are eligible for medevac transport. Neither condition requires medical consultation for helicopter dispatch. Regional and jurisdictional forums are being held to discuss the appropriate role of helicopters in transporting STEMI patients.

National helicopter emergency services system "best practices"

Helicopter emergency medical services incorporate emergency medical care provided to critically ill or injured patients, as well as aviation and flight safety issues. Generally, aviation issues fall within the purview of the federal government and its regulatory agencies, while states have the authority to regulate medical issues.

Aviation and flight safety standards are set by the Federal Aviation Administration and are embodied in federal aviation rules. MSP Aviation Command currently operates under Part 91 General Aviation Requirements, but has voluntarily adopted a number of Part 135 requirements and is actively working toward full certification under Part 135. Achieving Part 135 certification constitutes an overall "best practice" in aviation and safety and requires meeting FAA standards in a number of different areas, including administrative leadership qualifications, general operations and policy, flight and duty times, weather minimums, maintenance and documentation requirements, and maintenance personnel qualifications. As noted above, MSP Aviation is already compliant with several of these requirements and is working to achieve compliance in the remaining areas.

Core principles for helicopter emergency medical services have been developed and adopted by the Air Medical Task Force of the National Association of State EMS Officials, National Association of EMS Physicians, and the Association of Air Medical Services[1]. These core principles, which are shown below, along with an indication of Maryland's compliance with each principle, provide a consensus foundation for the operation of helicopter emergency medical services.

Core Principle 1. States must assume regulatory oversight of the medical aspects of air medical services that advertise service and / or operate in their states. This oversight includes communications, dispatch and transport protocols. States should regulate the medical aspects of the operation including personnel on board (nurses, paramedics, physicians, and others providing patient care), the medical equipment, and the transport destination protocols regarding hospitals, trauma and other specialty centers. In addition, states should establish protocols for air medical response and should incorporate air medical providers into the broader emergency and trauma care system through improved communication.

By statute and regulation, MIEMSS has regulatory oversight of the medical aspects of air medical services, communications, dispatch and transport protocols, medical equipment, transport destination protocols, and incorporation of air medical providers into the trauma and EMS system.

Core Principle 2. Air medical resources are essential elements of contemporary EMS systems. States should ensure their effective integration into those systems and into systems of community health care where they may provide a service deemed by the state as essential in a manner more cost-effective than is otherwise available.

Air medical resources are well-integrated into Maryland's statewide EMS and trauma system in both the pre-hospital and inter-facility transport phases.

Core Principle 3. EMS systems should strive to ensure that every patient having an emergent condition that can be addressed by a nationally recognized time-critical treatment has access to quality air medical and ground critical care transport to benefit from that treatment, and that transport type is dictated by case-specific objective evaluation of the distance, circumstances, and logistics of the transport.

[1] McGinnis KK, Judge T, Netmitz B, et al. Air Medical Systems: Future Development as an Integrated Component of the Emergency Medical Services (EMS) System. A Guidance Document by the Air Medical Task Force of the National Association of State EMS Officials, National Association of EMS Physicians, and the Association of Air Medical Services. *Prehospital Emergency Care*, 2007; 11:353-368.

The Maryland State Aeromedical Director, a position created pursuant to a study conducted for the state in the late 1980's [2], provides full-time medical direction and oversight to the MSP Aviation Command's medevac program. Protocol modifications that require medical consultation for specific patients, along with retrospective helicopter case reviews, help to ensure that use of helicopter transport is tailored to patient need.

Core Principle 4. Air medical and critical care medical transport represents a particular expertise in the delivery of acute emergency care often with non-physicians practicing at physician scope of practice level. As such, clinical care provided by non-physicians should be overseen by physicians who practice and have expertise in emergency, critical care and critical care transport medicine.

MSP Aviation Command's Medical Director provides oversight for the medevac program, training for its medical personnel, and quality improvement programs that include MSP's medevac program, as well as private air ambulance providers. Further, specific case reviews are conducted by jurisdictional medical directors to ensure provider compliance with appropriate protocols for transport and treatment.

Core Principle 5. All medical transport systems should use the national consensus guidelines developed by NAEMSP and endorsed by AAMS and the Air Medical Physicians Association (AMPA) for both dispatch and post-mission review.

Maryland's protocols, policies and quality improvement are all consistent with these principles and have been updated as the national guidelines have evolved.

Core Principle 6. Air medical resources should operate at the level consistent with the standards developed by the Commission for the Accreditation of Medical Transport Systems (CAMTS).

CAMTS is an organization dedicated to improving the quality and safety of medical transport services. CAMTS offers a program of voluntary evaluation of compliance with accreditation standards demonstrating the ability to deliver service of a specific quality. Each standard is supported by measurable criteria used to measure a program's level of quality and is periodically revised to reflect the dynamic, changing environment of medical transport. In order to obtain accreditation, a medical transport service must be in substantial compliance with the CAMTS Accreditation Standards.

MSP Aviation has indicated that it intends to pursue CAMTS accreditation, pending availability of funding to meet CAMTS requirements.

[2] An Evaluation of the State of Maryland's Med-Evac Program. Volume 1. PHH Aviation Services, Inc. Hunt Valley, MD. Sept. 30, 1986.

Core Principle 7. Air medical transport providers should operate at the highest levels of safety practically possible, and implement and maintain comprehensive risk management and safety systems management programs.

MSP Aviation Command has instituted risk management and safety systems management programs in accordance with NTSB recommendations and advisories (see above).