MEHAC Considers Chopper Issues

Governor William Donald Schaefer has established the Maryland Executive Helicopter Advisory Committee (MEHAC) to provide ongoing oversight and policy guidelines and to be a liaison to the governor's office, the General Assembly, and the Department of Budget and Fiscal Planning (DBFP) regarding the Med-Evac system.

At the first meeting of the committee, Chairman Lt. Gov. Melvin A. Steinberg emphasized that although it would consider a variety of policy and operating issues, the committee is primarily a decision-making body. Immediate attention is being given to the pending procurement of 12 twin-engine med-evac helicopters, for which the General Assembly allocated $31 million to be derived from an increase in motor vehicle registration fees.

Consistent with the legislation enacted and with the chairman's direction, helicopters are to be acquired through a fully open and competitive process. Ronald Moser, assistant secretary of transportation of the Maryland Department of Transportation (MDOT) and chairman of the procurement team, is taking steps to ensure "maximum competition." Other members of the team are Joseph Drack, state procurement officer for helicopter acquisition; F/S Michael Wenrich, Maryland State Police (MSP) helicopter operations manager; and John Stafford, MD, MIEMSS state aeromedical director. PHH Aviation Services, Inc., which did the initial consultant study on the Med-Evac system, is under contract to provide technical assistance.

Some of the issues that MEHAC is considering pertain to personnel, such as the levels of training for pilots, mechanics, and medical personnel, and whether air crews will be sworn MSP officers. Communication must be evaluated to determine access to SYSCOM; medical telemetry circuits; and county police, fire department, and MSP networks.

It must be decided what the interior configuration of the helicopters should be. This will be developed after data identify the kinds and numbers of potential patients to be transported. Provision

(Continued on page 6)

One of many patients transported by a Bell Jet Ranger MSP Med-Evac helicopter over the past 17 years. The Bell Jet Rangers, which have served Maryland's EMS system well, will soon be replaced by twin-engine helicopters.

Members of MEHAC

Lt. Gov. Melvin A. Steinberg—Chairman
R Adams Cowley, MD—Director of MIEMSS
Ameen I. Ramzy, MD—State Medical Director and State EMS Director
Maj. Warner I. Sumpter—Commander, Maryland State Police Aviation Division
Paul H. Reincke—Chief, Baltimore County Fire Department; Maryland Fire and Rescue Services
John M. Staubitz—Deputy Secretary for Operations, Maryland Department of Health and Mental Hygiene
Senator Francis X. Kelly—Chairman, Joint Legislative Committee on the Med-Evac Program
Delegate John C. Astle—Vice-Chairman, Joint Legislative Committee on the Med-Evac Program
William Benton—Secretary, Department of Budget and Fiscal Planning
Col. Elmer H. Tippett—Superintendent, Maryland State Police. (John J. O'Neill, as acting superintendent of the Maryland State Police, served on the committee prior to November 23, 1987.)

MEHAC Followup to Crash

After the tragic MSP Med-Evac helicopter accident that killed two State Police crew members in January 1986, it became apparent that it was necessary to upgrade the emergency transport system. It was proposed that a charge of $3 should be added to the motor vehicle registration fee to raise the money for the improvements, since motor vehicles are involved in a majority of Med-Evac calls. The bill did not pass, but it was the forerunner of subsequent legislation.

The 1986 Maryland General Assembly formed the Joint Legislative Committee on the Med-Evac Program, requiring a consultant study to address the organization of the Med-Evac program; analyze the need to replace the MSP helicopter fleet; recommend the type of aircraft that should be acquired and how they should be deployed; examine the training requirements of Med-Evac personnel, particularly flight hours and experience; and study whether pilots and medical technicians should be police officers or civilians. The resultant study, prepared by PHH Aviation Services, Inc., was presented to a joint committee composed of members of the budget committees.

Following a joint resolution of the 1987 Maryland General Assembly, the Maryland Executive Helicopter Advisory Committee (MEHAC) was established by the Governor to provide ongoing oversight and policy guidelines to EMS and to act as liaison to the governor's office, the General Assembly, and the Department of Budget and Fiscal Planning. The committee addresses issues such as the deployment of helicopters, staffing requirements, experience levels of personnel, support functions, communications systems, training needs, and the optimal utilization of the helicopter fleet. It will also structure a budget, develop protocols for cooperative use of the helicopters, and examine reciprocity with adjoining states. The committee has been meeting since July 27.

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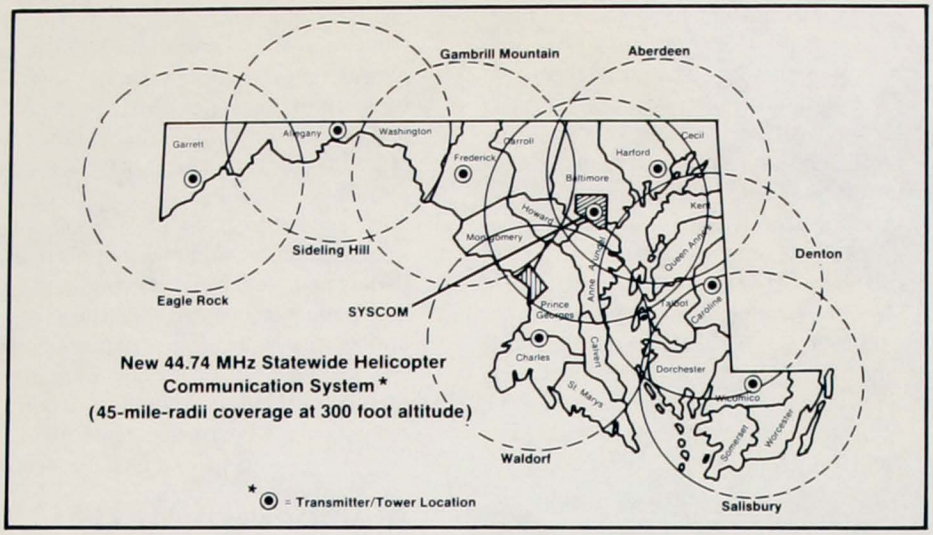
Radio Frequency Assigned to Helicopters



The new 44.74 MHz frequency communications system uses eight transmitters/towers to give SYSCOM contact with every MSP Med-Evac helicopter in the state.

A new communications system using a frequency of 44.74 MHz establishes direct contact from SYSCOM to every MSP Med-Evac helicopter around the state. The new system, which took effect on October 15, uses eight transmitters/towers that connect through a series of telephone lines and microwave links from the farthest west to the southernmost parts of Maryland to SYSCOM, in the Shock Trauma Center in Baltimore City.

The transmitters/towers are located at Eagle Rock, Garrett County; Sideling Hill, Washington County; Gambrill Mountain, Frederick County; Aberdeen, Harford County; Denton, Caroline County; Salisbury, Wicomico County; Waldorf, Charles County; and SYSCOM in Baltimore City.

Gene Bidun, director of MIEMSS communications explains, "This channel is licensed to the Maryland State Police and through a cooperative agreement it is being used for helicopter coordination. The channel is **not** meant to be used for medical consultations. However, safety will be enhanced because we will know exactly where each helicopter is located, especially when multiple flights must be coordinated."

When statewide coverage was being investigated, it was determined that helicopters within a 30-mile radius minimum of a transmitter/tower would have 95 percent statewide coverage at an altitude of 200 feet. The range increases if the aircraft goes higher. By placing the towers' ranges in overlapping circles, there can be constant contact with SYSCOM throughout the state. SYSCOM can be informed of the location of the helicopter, the hospital to which it is flying, the identity of the patient, the patient's condition, and the estimated time of arrival (ETA). SYSCOM will notify the hospital so it can be prepared to meet the patient. When a helicopter picks up a patient at the scene of an accident it will notify SYSCOM of its departure from the scene. Upon arrival at its destination, but before landing, the helicopter will notify SYSCOM. Upon completion of its mission, the crew will notify SYSCOM of its departure from the hospital and the ETA at its destination or hangar. Upon arrival at its destination or hangar, prior to descending below an altitude of 200 feet, it will notify SYSCOM of its imminent landing. After landing, the crew will call SYSCOM to notify it of the helicopter's safe arrival by calling on the EMSTEL network or an 800- telephone number in areas where that network is not available.

In response to increased demands on SYSCOM, eight operators were changed from part-time to full-time status, making the dedicated professional staff now 17 full-time employees.

For further information on the protocols for helicopter communications, call the MIEMSS communications office, 301/328-3668. *—Erna Segal*

A Moment to Pause and Reflect

While the *Maryland EMS News* customarily focuses on many aspects of the emergency medical services system, it seems appropriate that in this holiday season, we take a moment to pause and reflect. To EMS providers, the holiday season may mean many different things, such as trying to adjust schedules so as to spend some holiday time with family and loved ones, hoping that the requests for service might be a little lighter (although they may not be), and hoping that a particularly difficult or tragic call does not happen over the holidays. Unfortunately, illnesses and injuries do not stop for the holidays, and neither ambulance companies nor hospitals have the luxury of being able to close and let their staffs not come to work during such times.

The values of peace, charity, and good will which are embodied in Christmas as well as in Chanukah, are obvious during the holiday season, but hopefully last far beyond December. And while we recall that mankind (although around a million years old) has had Christianity for only some 2,000 years, and while democracy as a system of governance is just over 200 years old, emergency medical services as we know them are a little over 20 years old. Even though EMS is such a young endeavor in the span of human history, EMS likewise embodies a sense of values and ethics which are an extension of our religious heritage. The fundamental tenet of EMS is to render aid and assistance to a stranger in distress and to treat that person as one's own family. Much as the good Samaritan did nearly 2,000 years ago, providers of emergency medical services do every day. In the same way that the holiday spirit should continue throughout the year, we should remind ourselves of our service to others and our caring for others throughout the year.

For all of the providers of emergency medical services, as well as to all of the citizens of Maryland who support them, as well as to those who do not even know of EMS (until they need it), we wish a safe and peaceful holiday season.

Ameen I. Ramzy, MD
State EMS Director

Prehospital Treatment of Hypothermia

Many opinions regarding the treatment of hypothermic patients have been published in the medical literature. It is difficult to diagnose hypothermia precisely in the field, because the appropriate thermometer equipment is not readily available. Ironclad statements that may be made regarding a controlled clinical setting in which one may apply cardiopulmonary bypass and monitor a patient very closely may not be applicable to the prehospital setting.

As prehospital care continues to improve in the accuracy of assessment and specificity of intervention, care must be taken in trying to apply special treatments for special patients. Most importantly, while attempts are made to define interventions for a very special group of patients more precisely, the basic needs of the vast majority of patients who may be in cardiopulmonary arrest must not be overlooked.

In response to inquiries from an EMS jurisdiction in Maryland, Ameen Ramzy, MD, state medical director and state EMS director, has compiled the following guidelines for the treatment of hypothermia in the field.

1. Should defibrillation for ventricular tachycardia, ventricular fibrillation, and asystole be attempted in the hypothermic patient? Although there is controversy in this area, the safest approach is to obtain consultation in the usual fashion. Until consultation is obtained, it is reasonable to defibrillate pulseless ventricular tachycardia and fibrillation using standard methods. While the likelihood of success may be low, it is unlikely that harm would be done to the patient on a single attempt. Defibrillation for asystole is not recommended, because this is not Maryland's standard protocol for patients with asystole.

2. Should oral adjuncts be used in the hypothermic patient? Some data indicate that they may precipitate ventricular fibrillation or asystole. What if the patient is already in ventricular fibrillation or asystole? If an oral adjunct is used, which method is best: oropharyngeal, esophageal obturator airway, endotracheal tube? It is correct that there are statements in the literature regarding the risk of precipitating ventricular fibrillation with oral adjuncts in the hypothermic patient. However, it must be emphasized that the "A" of the ABCs is still of prime importance. Although there is a theoretical concern about oral adjuncts, the primary concern must remain the adequacy of the airway. Therefore, while it is reasonable to attempt ventilation with a mask initially, if there is any concern about the adequacy of maintaining the airway or of the adequacy of oxygenation or ventilation, airway adjuncts should be utilized as needed.

3. What criteria should be used to determine whether or not to start CPR in the hypothermic patient? One author has stated that it may be impossible to obtain a pulse or blood pressure in the hypothermic patient and that the ECG should be the determining factor in beginning BLS; however, this is contrary to Maryland protocols. Clearly, if the monitor shows a nonviable rhythm (for example, ventricular fibrillation or tachycardia), CPR should be initiated. A question arises in situations in which there may be a viable rhythm but no palpable pulse. In this case, initiation of CPR is recommended if no palpable pulse is detectable anywhere, including, for example, no palpable carotid pulse. In the absence of any pulses, one cannot infer that any perfusion is occurring. Although there are anecdotal reports of patients surviving after a prolonged period of hypothermia and although there is a theoretical concern about inducing ventricular fibrillation by CPR, the safest route is to initiate CPR in the pulseless patient unless directed to do otherwise by on-line consultation.

4. Which intravenous solution should be used: 5 percent dextrose in water (D5W) or lactated Ringer's solution? Unless otherwise directed by on-line consultation, D5W should be used to be consistent with treatment for other medical emergencies. Although there are statements in the literature concerning the preferability of an isotonic solution, administration of D5W at a KVO (keep vein open) rate should be appropriate treatment.

5. Should medical antishock trousers (MAST) be used? MAST therapy is not recommended unless it is ordered specifically by the consulting physician.

6. How should the hypothermic patient be positioned for transport? One author advocated the Trendelenburg position, but this conflicts with the *Maryland Way*. The Trendelenburg position offers no clear-cut benefit for the patient with profound hypothermia. While one could argue that the position theoretically provides improvement in cerebral perfusion based upon a slight increase in arterial pressure to the brain, there is also a slight increase in venous back pressure to the brain; therefore, we see little, if any, net benefit from this procedure.

7. How should the hypothermic patient be ventilated? Several texts state that the patient should not be hyperventilated due to the potential for alkalosis. While there is information in the literature suggesting that hypocapnia may be disadvantageous for a hypothermic patient, this is more clearly followed in a controlled setting in which blood gases can be measured readily and frequently. In the field setting with a profoundly hypothermic patient who needs ventilatory assistance, the safest course is to stay with a standard ventilatory pattern rather than hyperventilate or hypoventilate.

8. Should ventilation be accomplished by demand valve, bag-valve mask, or mouth to mask? Some sources recommend mouth-to-mouth ventilation to assist in core rewarming. Standard ventilatory assistance is best in this setting, as in others. A specific preference can be made for bag-valve mask so that individuals may have a sense of ventilatory compliance and watch the chest wall move in response to their specific efforts, rather than be reassured by the sound of the demand valve and not focus on chest wall motion. Despite the theoretical possibility of improving temperature transfer by the rescuer's breathing for the individual, mouth-to-mouth ventilation is not recommended for this or any other situation in which a ventilatory-assist device is available.

9. What is the best method of prehospital rewarming to avoid rewarming complications? Should rewarming be attempted at all? The many controversies about methods of rewarming, even in a controlled hospital setting, are not resolved. In the prehospital setting, the best measures to follow are to remove any wet clothing that the patient may have on, cover the patient with blankets, and place him or her in a warm environment, such as a warmed medic unit, to minimize ongoing heat loss during transport.

(Continued on page 6)

Region I Units Test Response Plans

EMS and fire personnel from various agencies respond to a mock disaster involving an overturned school bus that had been struck by a tractor-trailer. A car had also become lodged under the truck. The disaster exercise was located at the Allegany County Fairgrounds.

A mock disaster in Region I on August 22 gave EMS personnel from a variety of agencies the opportunity to work together in response to a large-scale incident and to test their response capabilities and protocols. It also demonstrated a mock tragic situation to about 200 school bus drivers and taught them about emergency procedures and resources.

The drill scenario was set up at the Allegany County Fairgrounds. A school bus carrying 36 students had been struck by a tractor trailer, causing the bus to overturn. A car was also involved and became lodged under the truck.

Chuck Wood, assistant coordinator of the Western Maryland Office of the Maryland Fire and Rescue Institute, explained that the exercise was originally requested by the Allegany County school board. That group was planning a safety seminar for bus drivers and wanted to better prepare them for emergencies that could occur on the road.

A "victim," who had been riding on the school bus, is helped by an EMT.

Prior to the disaster exercise, school children are moulaged to simulate various injuries.

The transportation officer directed the transport of 36 patients by five ambulance companies.

A portable computer system is used to track patient transports.

The first call for emergency assistance was issued by Allegany County Civil Defense at 2:15 pm. EMS personnel who were first to arrive at the scene assessed the extent of the incident and immediately called for additional assistance. To add to the tension and realism of the response, the organizers of the drill timed the events to cause the path of arriving units to be blocked by a train passing near the fairgrounds; they were delayed for several minutes.

After the bus passengers, the truck driver, and the two car occupants had been triaged, EMS providers began treatment and transport of the 36 with mock injuries severe enough to warrant treatment at a medical facility. The last patient was moved from the scene at 3:45 pm.

A portable computer system for tracking the movement of patients was demonstrated during the drill. Ken Young, director of prehospital care at MIEMSS,

(Continued on page 5)

ATLS Courses Offered to MDs, RNs

Assessment and treatment of the trauma patient are begun at the scene of the accident by the prehospital care provider and continued in the hospital phase by the physicians and nurses who receive the patient. The quality of the assessment and management of the severely injured patient has a direct impact on the patient's eventual recovery. Advanced Trauma Life Support (ATLS) courses, originated by the American College of Surgeons and encouraged by the American College of Emergency Physicians, are dedicated to ensure that trauma patients receive the quality of care they need. The courses focus on the first hour of initial assessment and primary management, starting from the point of impact and continuing through life-saving intervention, reevaluation, stabilization, and, if needed, transfer to another health-care facility.

In Maryland, the MIEMSS Shock Trauma Center provides ATLS courses. Under the direction of Ameen I. Ramzy, MD, state EMS director and chairman of the Maryland Committee on Trauma of the American College of Surgeons, and Roy A.M. Myers, MD, MIEMSS director of the ATLS program for the State of Maryland, 14 courses a year are generally offered to physicians, including two courses for those who wish to be ATLS instructors. Between 1980 and 1986, 63,286 physicians in the United States were trained in the ATLS program. Descriptions of these courses follow.

Provider's Course for Physicians

The purpose of this course is to train physicians in the concepts, skills, and techniques used in initial patient management through lectures, skills, demonstrations, and skills practicum. Life-saving techniques are studied under live and simulated conditions. The course includes pre- and post-course tests, didactic lectures, moulaged case presentations and assessments, discussions, development of life-saving manipulative skills, practical laboratory experience, and a performance proficiency evaluation.

Didactic lectures begin with primary assessment including the ABCDEs of assessment: airway, breathing, circulation or core, disability (central and peripheral nervous systems), and extremities or exposure.

Next, there is a detailed secondary assessment, with the insertion of lines and tubes for resuscitation and stabilization. At this time, investigations are begun regarding blood, urine, and x-rays. When the patient is stabilized, plans are made for necessary surgical procedures and the disposition of the patient.

The ATLS course has been modified in Maryland. Instead of physicians dissecting large animals such as dogs, sheep, or pigs, close association with the State Anatomy Board and the University of Maryland School of Medicine makes it possible for the physicians to dissect cadavers. Procedures in the dissection laboratory include venous cutdowns, peritoneal lavage, needle cricothyroidotomy, surgical cricothyroidotomy, chest tube insertion, and pericardial centesis. A thoracotomy is performed to familiarize students with the chest content and the problems associated with thoracotomies in acute emergency trauma. Cross-clamping the aorta and the management of hemorrhage in the chest are also studied.

Practical skills stations provide a review of x-rays of neck injuries and of extremity immobilization. The shock station demonstrates the surface anatomy of the major peripheral and central veins and shows methods of accessing them. Means of monitoring patients' response to resuscitation are introduced and demonstrated. MAST suits are available and techniques for application are discussed.

There are specific lectures on assessment and diagnosis of abdominal, thoracic, head, neck, orthopedic, pediatric, and obstetric trauma. Burns and stabilization are discussed, as are penetrating and blunt trauma involving any system—head, neck, chest, abdomen, and the extremities. Transfer protocols are also discussed.

Parallel-Track Courses for Nurses

The course for nurses is parallel to that of physicians. Nurses attend the same didactic lectures and skills stations as physicians, but they do not participate in the cadaver laboratory. Instead, they

(Continued on page 8)

Mock Bus Crash in Region I

Prehospital care at the mock disaster.

Extricating "victims" from the overturned bus.

(Continued from page 4)

noted that this system was very well received. EMS personnel in Region I have recently acquired computer equipment and are looking at various EMS applications.

Prehospital care and patient transport were provided by five ambulance companies: Corriganville, Cumberland City, Flintstone, Frostburg, and La Vale. Patients were taken to Cumberland Memorial, Frostburg, and Sacred Heart Hospitals. Participating fire departments were from Cresaptown, Bowling Green, and Bedford Road. Personnel from the Maryland State Police were also involved in the drill; the scenario included the use of a Med-Evac helicopter, but inclement weather prevented its arrival.

Amateur radio operators provided essential means of communication among drill participants. Hams were stationed at the site and in each of the three receiving hospitals. Mr. Wood commended them for their efficient organization and technologic sophistication. Protocols for communications using ham radios are being tested in the region; this drill allowed those procedures to be evaluated more extensively.

Mr. Wood commented that "the skills and ingenuity of various agencies contributed to this exercise. It was a valuable opportunity for many departments to work together toward the enhancement of EMS preparedness in the region."

—Linda Kesselring

DNR Hovercraft Serves Maryland

A hovercraft has been added to the fleet of rescue vehicles that serve Maryland's coastal waters. The craft, stationed at Sandy Point, has been in service since August, when it was acquired by the Department of Natural Resources (DNR) Police. It was displayed during Chesapeake Appreciation Days on October 31 and November 1.

Cpl. Morris Jones, director of the DNR Police hovercraft program, explained that the DNR studied the proposal to buy such a vehicle for 2 years before finally deciding to proceed. "We needed to find out if the technology was feasible and if this vehicle would be economical to operate." Their findings were favorable toward the purchase.

The 35-foot, diesel-powered hovercraft is owned and maintained by the DNR, a state law enforcement agency. Suspended on a cushion of air, the hovercraft can travel on water and land. When its unique capabilities are needed for emergency operations on or along the water, it is summoned through the DNR's 24-hour communications center in Annapolis.

A log of landing sites on shore is being created. Via radio communications, the crews of the land and water vehicles en route to the incident scene can arrange meeting sites and relay estimated times of arrival. The hovercraft can maneuver from the water onto shore, providing a stable base for the transfer of patients to an ambulance or a Maryland State Police Med-Evac helicopter.

Dr. Ameen Ramzy and Cpl. Morris Jones discuss the Department of Natural Resources' new hovercraft, shown here at Sandy Point State Park.

The hovercraft is particularly valuable for rescues in the white water of the Susquehana River, the marshes of the eastern shore, and at other sites where shallow water prohibits the passage of standard boats. It can also move over or break through ice, an important asset when the conventional fleet is "iced in" for 2 to 6 weeks during winter. The vehicle can travel up to 40 knots over water and at 12 to 14 knots while going through ice up to 10 inches thick.

The craft's interior is adaptable to different configurations. Two patients on litters can be transported comfortably. Additional patients (as many as 4 on litters or 23 "walking wounded") can be accommodated by other arrangements within the cabin.

The MIEMSS Region III and Region IV offices have worked closely with the DNR Police to establish the hovercraft ALS program. MIEMSS provides EMS training for crew members, guidance in program development, and communications equipment. ALS-trained hovercraft crew members will be available by the summer of 1988. Ten people (DNR police officers and civilians) from various parts of the state are enrolled in a CRT course at Eastern VoTech School in Essex, which began in mid-November. When their training is complete, they will work as medics at the hovercraft base station. When they are not on duty with that vehicle, they will function as ALS personnel in their home communities.

The usual hovercraft crew consists of a pilot, a navigator, and an ALS-trained medic. They will work as three-member teams in 8-hour shifts.

This ALS program is the first of its kind in the United States. As a 1-year pilot, it will be evaluated at the end of the trial period by all involved parties to assess operational, economic, and personnel factors.

Studies have been conducted to determine the seasons and hours of peak water recreational activities and thus the times with greatest potential need for EMS and rescue teams. CRTs will be on duty at the hovercraft base during those periods, primarily during summer weekends and holidays.

"The hovercraft program is a natural extension of the DNR's services and capabilities," said Cpl. Jones. "The ALS program is an enhancement of our program and will enable us to better serve the citizens of the state."

—Linda Kesselring

Chopper Improvements

(Continued from page 1)

must be made for trauma patients who need higher levels of care. In addition, medical emergencies require rapid transport of patients to increase their chances of survival and minimize disability. These patients require highly specialized life support and monitoring en route and may need up to three medical care providers.

It is hoped that the contract for the new helicopters will be awarded by February 1988 and that the first twin-engine helicopters will be in place by August 1988. When these and other questions have been answered, the Maryland Med-Evac system will be more sophisticated and better able to meet the needs of the public.

—Erna Segal

Guidelines for Treating Hypothermic Patients

(Continued from page 3)

These guidelines are based on what is felt to be the safest course for the greatest number of patients. Of course, consultation should be utilized whenever a Priority 1 or 2 patient is encountered. Although specialized procedures for hypothermic patients may be applicable in some parts of the country with vast geographical areas and prolonged transport times, our approach in Maryland should be to continue to refine our techniques of assessment and intervention and utilize those techniques that will most likely ensure transport of a viable patient to definitive care.

Pediatric Trauma: Airway Management

Accidents are the leading cause of death in children between the ages of 1 and 4 years, and this pattern continues through the teen and young adult years. Injuries account for more deaths in young adulthood than heart disease and cancer combined, and injuries kill more children than all other causes of the 20,000 pediatric deaths that occur annually. Moreover, 100,000 children are permanently disabled each year and another 2 million are temporarily incapacitated as a result of injury.

Several important differences between adults and children must be considered when dealing with the pediatric trauma patient—mechanism of injury, anatomy, and physiology.

Blunt trauma, most often sustained by passengers, pedestrians, and bike riders, is responsible for 80 to 90 percent of all serious pediatric injuries. The child with blunt trauma usually has multisystem injuries. The classic triad of pediatric injuries consists of a long bone fracture, a closed head injury, and thoracic or abdominal injury. Immediate recognition and management of these injuries, which may cause and be complicated by hypoxia secondary to airway compromise, are essential. The goals of upper airway field management are optimum ventilation and oxygenation while protecting the cervical spine. Any traumatically injured child who is seen with an injury above the clavicles, an alteration in level of consciousness, a closed head injury, or complaints of neck pain must be assumed to have a cervical spine injury until proven otherwise. Proper neck immobilization is critical.

Certain anatomical differences between the airways of children and adults make management of the pediatric airway unique. A child's oral cavity is much smaller, the tongue is relatively large, the larynx is more cephalad and anterior, the tissues are more delicate, and the passages are narrower and shorter. These characteristics make endotracheal intubation more difficult. Additionally, the tissue under the child's neck is thin, increasing the possibility of airway obstruction if direct pressure is applied to this area during bag-and-mask ventilation. Infants less than 6 months of age are primarily nose-breathers; therefore, obstruction of the nasal passages with blood or mucus can cause significant compromise of the airway. Tonsils and adenoids are large and have a plentiful blood supply; these structures can obstruct the airway or bleed heavily if injured.

The "A" of the ABCs includes management of the upper airway (from lips to larynx) and the lower airway (from vocal cords to carina). Upper airway obstruction is suspected in patients with stridor who are cyanotic and exhibit chest wall retractions or have absent breath sounds. The frequency of head injury and the large size of the tongue relative to the back of the mouth and throat make upper airway obstruction with the tongue far more common. The first maneuver that should be attempted in a child with airway compromise is the "chin lift" or "jaw thrust." Both procedures raise the mandible by bringing the tongue forward and are safe to perform when cervical spine injury is suspected. When effective, these techniques relieve airway obstruction immediately. If obstruction persists, the prehospital care provider should look quickly inside the child's mouth for possible causes. Blood, vomitus, secretions, foreign objects, or debris should be removed by suction.

If the child is not breathing, he or she should be hyperventilated and well oxygenated with a bag-valve-mask device. The resuscitation bag should be self-inflating in order to accommodate a reservoir that will allow the delivery of 100 percent oxygen. The mask should be tight fitting and appropriate in size. The following chart provides guidelines for mask sizes:

Preemie	Size 0
Newborn to 1 yr	Size 1
1 to 2 yr	Size 2
3 to 10 yr	Size 3
11 to 14 yr	Size 4
+ 14 yr	Size 5

Soft disposable masks are now commercially available for pediatric patients. These masks are relatively easy to use, facilitate a good seal, are clear to allow visibility of the mouth, and are discarded after use.

The vast majority of pediatric patients can be ventilated and oxygenated adequately with a bag-valve-mask device in a volume adequate to cause the chest to rise. The rate of respiration must be appropriate for age: infant, 20 breaths per minute (BPM); young child, 30 BPM; older child, 20 BPM.

In conjunction with the bag-valve-mask set-up, an oropharyngeal airway may be helpful in maintaining separation of the tongue and posterior pharyngeal wall in the unconscious child. Because the child's airway is narrow and short, use of the correct airway size is of paramount importance. The correct size can be determined by measuring from the corner of the child's mouth to the earlobe. The rotational insertion method used for the adult should *not* be used when inserting the pediatric oral airway, because significant dental and soft palate damage may result. A properly sized airway is inserted in a child by opening the mouth and lifting the tongue off the posterior pharyngeal wall with a tongue depressor. The care provider can then proceed with the insertion under direct visualization. Suction equipment must be near at hand during this maneuver, because vomiting may occur if the child's gag reflex is still intact. (Airway insertion should not be attempted in a conscious patient.) Nasal airways are not recommended because insertion may cause epistaxis and adenoidal bleeding due to the abundant blood supply in this area. The use of an esophageal obturator airway (EOA) is also contraindicated in children who are 16 years of age or younger.

A few special problems, such as severe facial trauma and gastric distension, may complicate management of the pediatric airway in the field. Severe maxillofacial or mandibular trauma may cause airway obstruction by facial and oral tissues. In this situation, it may be difficult to ventilate the child with bag and mask without an airway in place. Gastric distension, with consequent elevation of the diaphragm and respiratory compromise, often occurs in pediatric trauma patients. Children frequently swallow large amounts of air when they are crying, fearful, or in pain. The stomach may also become distended with air during ventilation with a positive-pressure bag and mask. Placement of a gastric tube may relieve the distension; however, this is not usually a field maneuver and is most often done in the trauma center. It may be necessary for the field provider to vary the ventilatory technique to achieve adequate ventilation if gastric distension is severe.

In summary, although the basic principles of airway management are the same in adults and children, proper treatment of the pediatric trauma victim re-

(Continued on page 8)

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DATED MATERIAL

EMS Care '88 Slated

Mark your calendars! EMS Care '88, sponsored by MIEMSS and the Baltimore County Fire Department, is scheduled for May 13-15 at the Towson Sheraton Conference Hotel in Baltimore County.

The conference will focus on the specialty referral centers, with several workshops being offered simultaneously. Preconference programs scheduled for May 13 include "Street Survival" and an EOA/MAST course.

Program details and registration information will appear in the February issue of this newsletter.

Airway Management

(Continued from page 7)

quires knowledge of the child's unique anatomy and physiology. Children have remarkable recuperative powers, even after devastating injuries, if the severe complications of hypoxemia and hypoventilation are minimized. Prehospital providers contribute to the preservation of vital functions when the potential for good recovery in traumatized children is maximized by managing the "A" of the ABC's effectively from the very beginning.

—Linda Snouch-Hurgronje, RN, MS
Pediatric Trauma Coordinator
The John Hopkins Children's Center

ATLS Courses Hone MD, RN Skills

(Continued from page 5)

attend a special section to learn to set up surgical trays for procedures that will be performed in the admitting area and also learn how to assemble autotransfusion equipment. Physicians and nurses work together as a unit, as they will in true practice. Special nurse instructors are required for practical skills stations in patient assessment.

Instructor's Courses for Physicians

Primary emphasis is placed on course content in conjunction with teaching methods and techniques. Between 1980 and 1986, 558 instructor- and 87 abbreviated-instructor courses were given, producing 10,976 instructors in the United States. These instructors then trained 52,310 providers through 2,579 courses, averaging 20 students per course. Maryland can train 18 nurses and 36 physicians per course.

Physicians who take ATLS courses come from a variety of specialties and sub-specialties. The majority of physicians are surgeons, emergency medicine specialists, family practitioners, and anesthesiologists. Many emergency departments require that their physicians have ATLS and ACLS (Advanced Cardiac Life Support) training.

The only prerequisite for a physician who wishes to take the ATLS course is his/her medical degree. Medical students in their fourth year may audit the course. (They do, however, receive CME credits and verification upon graduation as long as the final written exam and the course were passed.) Nurses receive CEU credits through the nurses' accreditation system. Prehospital care providers may audit the course. They may receive continuing education credits through their county or city fire department, with standard approval mechanisms.

For further information about the ATLS course, physicians should contact Melody Nelson, ATLS secretary, at 301/328-2919. Nurses should contact JoAnn Hanes, nurse coordinator for ATLS programs, at 301/328-3930. A calendar of upcoming ATLS courses in 1988 follows:

Provider	January 14 & 15
Provider	February 18 & 19
Instructor	March 16-18
Provider	April 14 & 15
Provider	May 19 & 20
Provider	June 16 & 17
Provider	July 14 & 15
Provider	August 18 & 19
Instructor	September 14-16
Provider	October 13 & 14
Provider	November 17 & 18
Provider	December 15 & 16