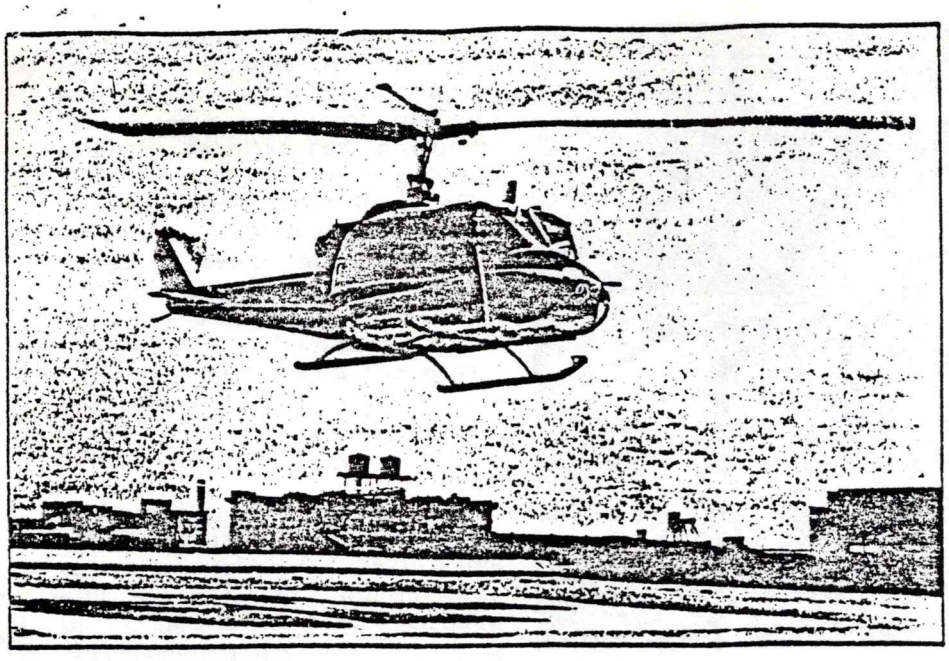


Photo courtesy MIEMSS

Med-Evac

The "Golden Hour" Deliverer

ON DECEMBER 30, 1978, Jack Henry was involved in an accidental stabbing while trying to attain his black belt in karate. The knife penetrated close to his heart, puncturing the pericardium and a lung, causing lacerations to two arteries and breaking two ribs. When the paramedic arrived, he immediately called for a Med-Evac helicopter to transport the victim to Maryland's Shock Trauma Center in Baltimore. The helicopter arrived 10 minutes later, and within another 15 minutes Henry was in the operating room, where surgeons and nurses worked to stop the internal bleeding. Nine days later, Henry left the Shock Trauma Center. Recently, he testified not only to the efforts of the doctors and nurses fighting for his survival, but to those of the Med-Evac operation who helped save his life: "I truly believe had I not been picked up by the helicopter, I would not be alive today. . ."

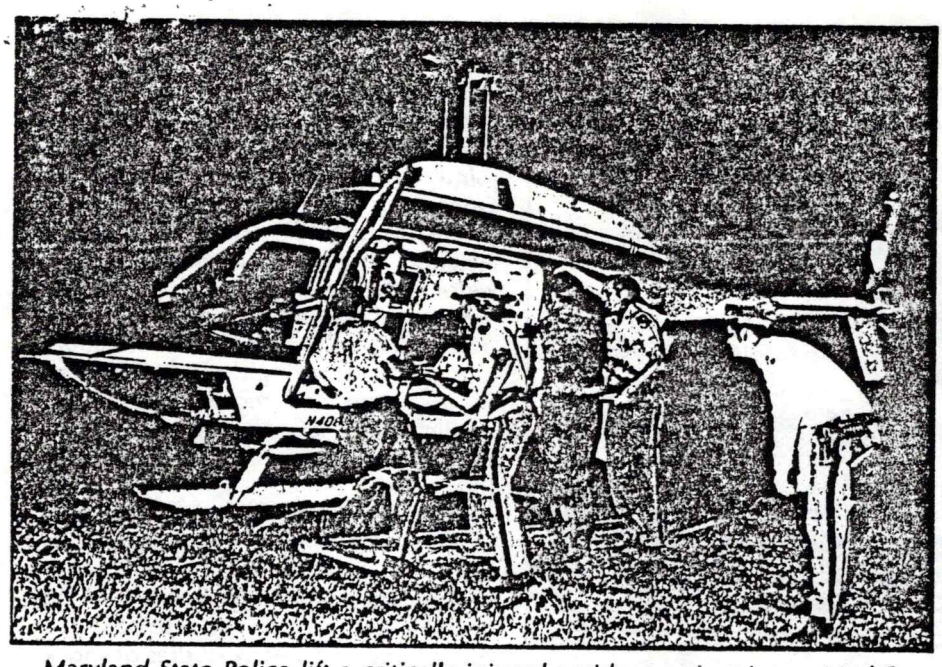
For 10 years Maryland's Med-Evac helicopters have been transporting such critically injured victims from any point in the state to specialty referral centers equipped to manage multiple trauma and severe medical problems. The Med-Evac helicopter program was developed jointly by the Maryland Institute for Emergency Medical Services Systems (MIEMSS) and the Maryland State Police Aviation Division to attempt to vastly reduce the time required to unite a victim with definitive medical care. In doing this, the program plays an important role in ensuring that every patient in the state can receive emergency medical care of the highest caliber, regardless of time, place, or type of injury.

By Denise Calabrese

The Med-Evac program was actually the first EMS component requested to assist the clinical Shock Trauma Center in Baltimore. R Adams Cowley, M.D., founder and director of MIEMSS, had recognized in his early studies of shock the importance of the "golden hour" — the first hour following serious injury. Studies indicated that with such injuries, the first 60 minutes were crucial to saving the victim's life. However, many serious injuries (particularly traffic accidents) occur in rural areas, far from definitive treatment. To provide care within the limits of the "golden hour" for such victims, a helicopter transport system was proposed.

Some preliminary trials using military helicopters to transport patients from Quantico, Virginia and Bethesda Naval Hospital to the Shock Trauma Center in Baltimore had been undertaken in 1968. At that time no communications system had been developed, and the only landing area was a courtyard adjacent to the Center. In that same year, Dr. Cowley met with the Maryland State Police to discuss using their helicopters as a support component in his developing EMS program. At that time, the State Police had ordered a Bell Jet helicopter, but a litter kit was not available. With Dr. Cowley's request in mind, the State Police asked the Bell Jet helicopter manufacturer to develop a litter kit; the Maryland State Police thus had the first operative civilian Bell Jet Ranger Med-Evac helicopter in the country. A federal Department of Transportation grant was then developed to purchase a second Bell Jet Ranger to support the Med-Evac system. Although these helicopters were to be used mostly for police work, Med-Evac transports were to receive top priority.

In 1970, the first Maryland State Police Med-Evac mission to the Shock Trauma Center was undertaken. A heliport was built adjacent to MIEMSS, and later a complex communications system was



Maryland State Police lift a critically injured accident patient into a Med-Evac helicopter for the ride to a speciality referral center. Photo courtesy Maryland State Police.

developed to coordinate the transports.

The Med-Evac program has grown significantly in the past 10 years. Today the fleet numbers 10: eight two-litter Bell Jet Rangers and two three-litter Hueys. The Jet Ranger is the primary vehicle for medical use, with the heavier Huey on-call as a backup vehicle. Each crew is made up of a pilot and a medical observer. Presently, there are 53 troopers serving in either capacity. On call 24 hours, the helicopters have flown over 78,000 Med-Evac and police missions and operate out of four bases geographically distributed across Maryland (at Andrews Air Force Base serving the Maryland-D.C. suburbs, Martin's Airport in Baltimore, Frederick Airport, and Salisbury Airport).

Helicopter transports are reserved for the most critical victims of life-threatening illnesses or injuries and are flown only to specialty referral centers at the top levels of the echelons of trauma care system (for adult, pediatric, burn, hand, neurotrauma, and neonatal trauma) and to some area-wide trauma centers in rural areas.

The Med-Evac system is used for five major purposes: 1) direct pickup of patients with life-threatening injuries from the scene of an accident; 2) inter-hospital transfer of critically ill and injured patients; 3) transport of premature or ill neonates; 4) transport of medical personnel to the scene of an accident or to other hospitals for emergency care or evaluation; and 5) transport of medical supplies, blood, or organs for transplantation.

The majority of Med-Evac missions involve transporting patients directly from the scene of an accident — 70 percent of the transports to MIEMSS are of this type. The helicopter crew is sometimes the first to provide care for the victim if they see an accident or are alerted by emergency radio communication while on patrol. Other times an ambulance or rescue squad, having been alerted through the county central alarm system by police or civilians, may provide initial triage and resuscitation and stabilize the victim until the helicopter arrives and the medic/observer continues the care en route to the hospital.

Mean response time for helicopters from call to pickup is 15 minutes. The return trip to a Baltimore treatment center can usually be made from most areas of the state within the critical "golden hour." The patient is rapidly evaluated and evacuated to a treatment facility and treated aboard the helicopter.

During this time the medic/observer will maintain the airway, administer oxygen, stop external bleeding, and provide cardiopulmonary resuscitation, while the pilot takes charge of the flight and communications. The communication system allows the crew to give the estimated time of arrival and the nature of the injuries and to consult with physicians at the treatment centers.

When the helicopter lands at MIEMSS heliport, it is met by a physician/nurse trauma team that continues support and rapidly assesses patient injuries during the five-minute ambulance ride to the center. The rest of the multidisciplinary trauma team is prepared to do surgery either in the admitting area or in an adjacent operating room.

Once stabilized, patients are taken to the Critical Care Recovery Unit where they are closely monitored. An average stay there is five days, after which the patient is transferred to a step-down unit, the Intensive Care Unit, to stay an average of another five days, From the ICU, the patient may be transferred to the Intermediate Care Unit, a general hospital bed, a rehabilitation facility, or home.

What about the crew involved in these Med-Evac missions? What is their job like? Both the pilot and medic/observer (both of whom are state troopers) receive extensive training to prepare them for the responsibilities the missions require. The medical observer is required to hold an EMT certificate granted after successful completion of an 84-hour course. He must complete an additional 120-hour Aviation Trauma Training program that provides in-depth instruction in such areas as treatment of burns and various trauma and neonatal injuries. Much of the training is given on site at the treatment centers.

Maryland Med-Evac pilots must have a minimum of two years of service with the state police and have a commercial helicopter license prior to transfer to the Aviation Division. Actual flying experience is also preferred. New pilots in the division receive 100-150 hours of flight practice with a certified flight instructor, who is a senior pilot in the division, and 400 hours of ground instruction, covering flight characteristics of helicopters and emergency procedures. Pilots are given flight checks with different flight instructor-evaluators throughout their training; they also are evaluated several times a year throughout their career.

Med-Evac pilots and medical observers face life-and-death situations every day. Whatever reason they are attracted to the job — whether it be a love of flying or a desire to help save other human beings — their job demands a strong sense of duty and sacrifice. In reality, their jobs are not thrilling or glamorous, but downright grueling.

The pilot must be concerned with operation of the aircraft. Landing the helicopter can be one of the biggest problems. A Bell Jet Ranger needs only a 50-foot square in which to land, but approaches to landing and taking off

require more space for a safety margin. If possible, the pilot will land the helicopter in an open space, but sometimes the only landing site may be a resident's backyard. This can increase the risk.

Weather can also be a crucial factor. The pilot checks weather conditions at least every two hours and always before a mission. In difficult and even normal weather conditions pilots often rely on their instincts to sense danger. Maryland state police trooper 1/C Ed Hanna, a division pilot, recounts how on one mission he made an extremely dangerous vertical ascent when forced to land his aircraft on a small field ringed by wires and trees. At takeoff, when faced with the decision whether to make the vertical ascent (which was dangerous because of the added strain on the engine) or take off toward the back of the lot (which conditions were unknown at the time), Hanna chose to make the vertical ascent. This proved the better of the decisions, for the next day wires at the back of the lot, which would have been impossible to see at night, were discovered.

The Med-Evac system, with its sophisticated mode of patient transportation, may be expected to be costly — not so. Because use of the aircraft is shared by both medical and law enforcement authorities, its operation remains cost-effective. The helicopters are used for Med-Evac missions 45 percent of the total helicopter patrol time, although Med-Evac missions have first priority. The other 55 percent of use is for routine police work — 1) criminal investigation searches; 2) highway and traffic patrol; 3) search and rescue for missing persons, aircraft, and boats.

The helicopters transport only patients with major life-threatening conditions to avoid competing with surface ambulances, transport only to medical facilities that provide the necessary sophisticated level of treatment, and maintain communications with police departments, ambulance units, and treatment centers to ensure maximum utilization.

Is the Med-Evac program effective? Statistics show that the program has had a definite impact on reducing the death and disability rate of victims of life-threatening injuries. From its beginning in 1970 through 1979, Med-Evac helicopters transported a total of 10,268 patients, 8,466 of whom survived. The overall survival rate is thus 82 percent for those transported through the program. This is double the 40 percent rate the American Medical Association, found to be the average national survival rate. Prior to the existence of the Med-Evac program, statistics show that approximately 90 percent of victims injured in similar life-threatening circumstances would have died. Thus the Med-Evac program has completely reversed the death rate for such victims. In calendar year 1979, 1,800 patients were transported by Maryland Med-Evac helicopters. Based on the number of transports from January to May 1980, it is projected that the number of transports for calendar year 1980 will be even higher.

The Med-Evac program has proven these past 10 years that helicopters can be used successfully and efficiently to bring the critically injured to specialty referral centers. The Maryland State Police Aviation program will continue to be an essential element in Maryland's integrated system of EMS care. □

Denise Calabrese frequently writes for the Maryland Institute for Emergency Medical Services Systems.