

History of Emergency Medical Services

EARLY EMS

1500 B.C. - The development of EMS has been based on tradition and, to some extent, on scientific knowledge. Its roots are deep in history. For example, the Good Samaritan bound the injured traveler's wounds with oil and wine at the side of the road, and evidence of treatment protocols exist.

1797 - Although the Romans and Greeks used chariots to remove injured soldiers from the battlefield, most credit Baron Dominique-Jean Larrey, chief physician in Napoleon's army, with institution of the first prehospital system designed to triage and transport the injured from the field to aid stations.

1860's - Flying ambulances (dressing stations) were made to effect transport, and protocols dictated much of the treatment. In the United States, organized field care and transport of the injured began after the first year of the Civil War, when neglect of the wounded had been abysmal.

1865 & 1869 - Civilian ambulance services in the United States began in Cincinnati and New York City, respectively. Hospital interns rode in horse drawn carriages designed specifically for transporting the sick and injured.

1922 - The first volunteer rescue squads organized in Roanoke, Virginia, and along the New Jersey coast. Gradually, especially during and after World War II, hospitals and physicians faded from prehospital practice, yielding in urban areas to centrally coordinated programs. These were often controlled by the municipal hospital or fire department, whose use of "inhalators" was met with widespread public acceptance. Sporadically, funeral home hearses, which had been the common mode of transport, were being replaced by fire department, rescue squad and private ambulances.

1960's - New advances to care for the sickest patients were being made.

1732 - The first recorded use of mouth-to-mouth ventilation, involving a coal miner in Dublin.

1896 - The first major publication describing the resuscitation of near drowning victims.

1958 - That Dr. Peter Safar demonstrated mouth-to-mouth ventilation to be superior to other methods of manual ventilation. Of note, Dr. Safar used Baltimore firefighters in his studies to perform ventilation of anesthetized surgical residents.

1960 - Cardiopulmonary resuscitation (CPR) was shown to be efficacious. Shortly thereafter, model EMS programs were developed based on successes in Belfast, where hospital-based mobile coronary care unit ambulances were being used to treat prehospital cardiac patients. American systems relied on fire department personnel trained in the techniques of cardiac resuscitation. These new modernized EMS systems spurred success stories from cities such as Columbus, Los Angeles, Seattle, and Miami.

Military conflicts have provided the impetus for many of the innovations for treating and transporting injured people. Among the most obvious of these is the use of aircraft for medical transport.

1915 - The first known air medical transport occurred during the retreat of the Serbian army from Albania. An unmodified French fighter aircraft was used.

WWI - Mortality was linked to the time required to get to a dressing station. Additionally, application of a splint devised by Sir Hugh Owen-Thomas resulted in a reduction of mortality due to femur fractures from 80% to 20%.

Korea/Vietnam - The use of rotary wing aircraft for rapid evacuation of casualties from the field to treatment areas was demonstrated during later conflicts, especially in Korea and Vietnam.

MODERN EMS IN THE U.S.

Demonstration of the effectiveness of mouth-to-mouth ventilation in 1958 and closed cardiac massage in 1960 led to the realization that rapid response of trained community members to cardiac emergencies could help improve outcomes. The introduction of CPR provided the foundation on which the concepts of advanced cardiac life support (ACLS), and subsequently EMS systems, could be built. The result has been EMS systems designed to enhance the “chain of survival”.

1966 - The white paper, *Accidental Death and Disability: The Neglected Disease of Modern Society* prepared by the Committee on Trauma and Committee on Shock of the National Academy of Sciences— National Research Council, provided great impetus for attention to be turned to the development of EMS. This document pointed out that the American health care system was prepared to address an injury epidemic that was the leading cause of death among persons between the ages of 1 and 37. It noted that, in most cases, ambulances were inappropriately designed, ill-equipped, and staffed with inadequately trained personnel; and that at least 50% of the nation’s ambulance services were being provided by 12,000 morticians.

The paper made 29 recommendations for ultimately improving care for injured victims; related directly to out-of-facility EMS. They were:

Extension of basic and advanced first aid training to greater numbers of the lay public;

Preparation of nationally acceptable texts, training aids, and courses of instruction for rescue squad personnel, policemen, firemen, and ambulance attendants;

Implementation of recent traffic safety legislation to ensure completely adequate standards for ambulance design and construction, for ambulance equipment and supplies, and for the qualifications and supervision of ambulance personnel;

Adoption at the state level of general policies and regulations pertaining to ambulance services;

Adoption at district, county, and municipal levels of ways and means of providing ambulance services applicable to the conditions of the locality, control and surveillance of ambulance services, and coordination of ambulance services with health departments, hospitals, traffic authorities, and communication services;

Pilot programs to determine the efficacy of providing physician-staffed ambulances for care at the site of injury and during transportation;

Initiation of pilot programs to evaluate automotive and helicopter ambulance services in sparsely populated areas and in regions where many communities lack hospital facilities adequate to care for seriously injured persons;

Delineation of radio frequency channels and of equipment suitable to provide voice communication between ambulances, emergency department, and other health-related agencies at the community, regional, and national levels;

Pilot studies across the nation for evaluation of models of radio and telephone installations to ensure effectiveness of communication facilities;

Day to day use of voice communication facilities by the agencies serving emergency medical needs; and

Active exploration of the feasibility of designating a single nationwide telephone number to summon an ambulance.-

In the same year, the Highway Safety Act of 1966 which established the Department of Transportation (DOT) was passed. The DOT was given authority to improve EMS, including program implementation and development of standards for provider training. States were required to develop regional EMS systems, and costs of these systems were funded by the Highway Safety Program. Over the next 12 years the DOT contributed more than \$142 million for EMS system development.

The Highway Safety Act of 1966 included funds to create an appropriate training course for emergency care providers, as recommended in Accidental Death and Disability:

1969 - The Neglected Disease , and the first nationally recognized EMT-A curriculum was published. Shortly thereafter paramedic education began, but training focused heavily on cardiac care and cardiac arrest resuscitation, almost to the exclusion of other problems. Although national curricula have been developed and revised, training standards and certification requirements have continued to vary significantly in communities throughout the nation.

1972 - The Department of Health, Education, and Welfare allocated \$16 million to EMS demonstration programs in five states. Funds were used to develop regional EMS systems.

1973 - The Robert Wood Johnson Foundation appropriated \$15 million to fund 44 EMS projects in 32 states and Puerto Rico.

Title XII to the Public Health Service Act, The Emergency Medical Services Systems Act of 1973 , provided additional federal guidelines and funding for the development of regional EMS systems.³³ In total, more than \$300 million were appropriated for EMS feasibility studies and planning, operations, expansion and improvement, and research.

1978 - States had identified 304 EMS regions. The law established that there should be 15 components of the EMS systems. They are commonly referred to as:

Manpower
Training

- Communications
- Transportation
- Facilities
- Critical care units
- Public safety agencies
- Consumer participation
- Access to care
- Patient transfer
- Coordinated patient record keeping
- Public information and education
- Review and evaluation
- Disaster plan
- Mutual aid

1981 - Funding under the EMS Systems Act essentially ended with the Omnibus Budget Reconciliation Act of 1981 , which consolidated EMS funding into state preventive health and health services block grants. Thus, states gained greater discretion in funding statewide EMS activities and regional EMS systems, and many of the regional EMS management entities established by federal funding quickly dissolved. Others continued, becoming more the part of technical assistants and enablers while seeking improved EMS quality.

1972 - The development of emergency medicine as a medical specialty has paralleled that of EMS. The first residency program to train new physicians exclusively for the practice of emergency medicine was established at the University of Cincinnati.

1975 - There were 32 such programs, and there are currently 112 accredited emergency medicine residency programs graduating in excess of 800 emergency medicine physicians each year. Since the late 1970s, pediatric emergency medicine fellowships have provided physicians with specialized training in the management of childhood emergencies. Pediatric emergency medicine became officially recognized as a subspecialty of pediatrics and emergency medicine in 1992. To varying degrees, emergency physicians in training are exposed to the principles and practices of providing medical direction for EMS systems, and the Society of Academic Emergency Medicine has published a model EMS education curriculum for physicians. Although emergency physicians often fulfill the medical direction needs of EMS systems, other groups of physicians continue to significantly and positively influence EMS. They include pediatricians, cardiologists, surgeons, intensivists, family practitioners, and others.

Efforts to improve EMS care for specific groups of patients have included development and successful implementation of standardized courses as components of EMS curricula or to supplement personnel education in focused areas. These include cardiac, pediatric, and trauma life support courses.

The American Heart Association, through adoption and promotion of the “Chain of Survival” concept, has provided leadership to improve emergency cardiac care. It continues to explore ways to increase survival from cardiac emergencies.

1984 - Federal legislation established the Emergency Medical Services for Children (EMS-C) program, as issues relating to children’s emergency care required attention. Emergency Medical Services for Children projects have represented the largest federal funding outlay for EMS development since consolidation of funds in block grants. During the first 10 years of the EMS-C program, the Maternal and Child Health Bureau (MCHB) of the Health Resources and Services Administration (HRSA) funded projects in 40 states, Puerto Rico, and the District of Columbia. Project efforts have involved systems development, injury prevention, research and evaluation, improved training and education, and other aspects of EMS. The results have been

EMS improvements benefitting not only children, but the entire population. The program commissioned the 1993 Institute of Medicine Report, Emergency Medical Services for Children which pointed out continuing deficiencies in our health care system's abilities to address the emergency medical needs of pediatric patients. It noted that in 1988, 21,000 people under the age of 20 died from injuries; thousands more were hospitalized and millions more were treated in emergency departments. The report indicated that although EMS systems and emergency departments are widely assumed to be equally capable of caring for children and adults, this is not always the case. For too many children important resources were not available when needed. The EMS-C program continues to work to ensure that pediatric issues are better integrated into the EMS system.

1985 - the National Research Council's Injury in America: A Continuing Public Health Problem described deficiencies in the progress of addressing the problem of accidental death and disability. Development of trauma care systems became a renewed focus of attention with passage of the Trauma Care Systems Planning and Development Act of 1990. HRSA Division of Trauma and EMS (DTEMS) was created to administer this legislation, which supported the concept of a trauma system that addresses the needs of all injured patients and matches them to available resources. The act encouraged the establishment of inclusive trauma systems and called for the development of a model trauma care system plan, which was completed in 1992. More inclusive trauma care better serves the population's needs. Local EMS authorities assumed responsibility for establishing trauma systems and designating trauma centers in an effort to improve care for trauma victims. However, one survey concluded that by 1993 only five states met criteria for having a complete trauma system. Although interest in developing inclusive trauma care systems remains, DTEMS was disbanded in 1995.

The National Highway Traffic Safety Administration implemented a statewide EMS technical assessment program in 1988. During assessments, statewide EMS systems are evaluated based on 10 essential components. They are:

- Regulation and policy
- Resource management
- Human resources and training
- Transportation
- Facilities
- Communications
- Public information and education
- Medical direction
- Trauma systems
- Evaluation

1971 - It is impossible to overestimate the influence of the media on the evolution of EMS. The television program "Emergency" caught the attention of the country — it was visionary in itself. The program suggested to the public that paramedics existed everywhere. In reality, they did not. Additionally, it portrayed paramedics as frequent lifesavers when they were part of an integrated EMS system. In reality, they did save lives, though not as readily. The vision continues in current programs such as "Rescue 911", where all callers dial "911" for help and all calls are answered by personnel able to provide lifesaving instructions over the telephone. In fact, much of the country cannot access EMS help by calling "911" and pre-arrival instructions are not uniformly provided. As in the 1970s, the media continues to create public interest and effect perception and expectations regarding EMS. Responses to the public's expectations may secondarily prompt EMS system changes. However, the value of the media's effect is uncertain. While the media might hasten change, we cannot be certain that the changes created are those that would have been chosen had the impetus been different.

A LITTLE MORE HISTORY

Few people realize that modern emergency medical service has only been around for the past 70 years. This is the timeline of EMS from the very beginning when mankind started to provide pre-hospital care and its progression through the years.

1865 - America's first ambulance service is instituted by the U.S. Army.

1869 - America's first city ambulance service (utilizing horse drawn carriages) is instituted in New York City by Bellevue Hospital.

1870 - Prussian siege of Paris used hot air balloons to transport wounded soldiers. This was the first documented case of aeromedical transportation.

1899 - Michael Reese Hospital in Chicago began to operate an automobile ambulance which was capable of speeds up to 16 mph.

1910 - First known air ambulance aircraft was built in North Carolina and tested in Florida. The aircraft failed after flying only 400 yards and crashing.

1926 - Phoenix Fire Department begins "inhalator" calls.

1928 - Julien Stanley Wise implemented the first rescue squad (Roanoke Life Saving Crew) in the nation in Roanoke, VA.

1940's - Prior to World War II, hospitals provided ambulance service in many large cities. With the severe manpower shortages imposed by the war effort, it became difficult for many hospitals to maintain their ambulance operations. City governments in many cases turned ambulance service over to the police or fire department. No laws required minimal training for ambulance personnel and no training programs existed beyond basic first aid. In many fire departments, assignment to ambulance duty became an unofficial form of punishment.

1951 - Helicopters began to be used for medical evacuations during the Korea war.

1956 - Dr. Elan & Dr. Safar developed mouth-to-mouth resuscitation.

1959 - Researchers at Johns Hopkins Hospital in Baltimore, MD developed the first portable defibrillator as well as perfected CPR.

1960 - Martin McMahon experimented with various types of artificial respiration by paralyzing Baltimore City firefighters and seeing which method worked best.

Los Angeles County Fire Chief Keith Klinger proudly announced that every engine, ladder and rescue company in his department was equipped with a resuscitator. His department is believed to have been the first large department to adopt uniform medical emergency responsibility.

1965 - More people died this year in auto accidents (50,000) than in 8 years of the Vietnam War.

President L. Johnson signed into law the National Highway Safety Act which started the National Highway Traffic Safety Administration.

1966 - The National Research Council publishes a research paper, "Accidental Death & Disability - The Neglected Disease of Modern Society". Otherwise known as "The White Paper", this work was the catalyst for improving the delivery of pre-hospital care to this day. An excerpt from the report states: "Expert consultants returning from both Korea and Vietnam have publicly asserted that, if seriously wounded, their chances for survival would be better in the zone of combat than on the average city street."

1966 - Dr. Pantridge in Belfast, Ireland, started to deliver pre-hospital coronary care using ambulances. His research showed that his program significantly improved patient survivability in out-of-hospital cardiac events. In Pittsburgh, citizens demand an ambulance service to transport minority citizens. Freedom House Enterprises took 44 unemployed 18-60 year old men and gave them 3,000 hours of medical training. The program was deemed a success.

1967 - The American Ambulance Association publishes an article that states that as many as 25,000 Americans are either crippled or left permanently disabled as a result of the efforts of untrained or poorly trained ambulance personnel.

1968 - St. Vincent's Hospital in New York City started this nation's first mobile coronary care unit. The program at first used physicians, then paramedics.

The American Telephone and Telegraph starts to reserve the digits 9-1-1 for emergency use.

In Virginia, The Virginia Ambulance Law is passed and establishes the state's authority to regulate ambulances, verify first aid training, and issues permits.

1969 - The Miami,FL Fire Department started the nation's first paramedic program under Dr. Eugene Nagel. The very first out-of-hospital defibrillation occurred shortly thereafter (the patient survived and left the hospital neurologically intact).

In Seattle, Dr. Leonard Cobb at Harbor View Medical Center teams up with the Seattle Fire Department and creates Medic I. Medic I is a Winnebago, (called "Mobi Pig" by the firefighters manning it), based at the hospital and is dispatched only on cardiac related calls.

1970 - The Charlottesville-Albemarle Rescue Squad in Charlottesville, VA starts the nation's first volunteer paramedic program under Dr. Richard Crampton. One of their first patients was President Lyndon Johnson, who suffered a heart attack while visiting his son-in-law Chuck Robb at UVA.

1971 - The television show Emergency! debuted. Emergency contributed to changed public attitudes concerning the fire service and emergency medical care. At the start of the show, there were only 12 medic units in the entire country. Four years later at least 50% of the population of this country was within 10 minutes of a medic unit.

1972 - The Department of Transportation and Department of Defense team up to form a helicopter evacuation service.

In Seattle, Medic II is instituted. Medic II is a program to train 100,000 citizens in CPR.

Harbor View Medical Center starts up the nation's most intensive training program for paramedics. The course is 5,000 hours long, compared to 3,600 hours a medical student endures to become a doctor!

1973 - St. Anthony's Hospital in Denver starts the nation's first civilian aeromedical transport service. (The program was called "Flight for Life").

The Star of Life is published by the DOT.

The EMS Systems Act (public law 93-144) is passed by Congress, which funds 300 regional EMS systems.

1974 - A Federal report discloses that less than half of the nation's ambulance personnel had completed the Department of Transportation 81-hour basic training course or its equivalent.

1975 - The American Medical Association recognizes emergency medicine as a specialty.

The University of Pittsburgh & Nancy Caroline MD, is awarded a contract to develop the first nationwide paramedic training course.

The National Association of EMT's is formed.

1977 - The National Council of EMS Educators is formed.

1978 - Phoenix Fire Department implements paramedic engine companies.

1979 - The Journal of Emergency Medical Services (JEMS) starts publication.

The American Ambulance Association is formed.

1980 - The National Registry of EMT's published its first national standard exam for EMT-Intermediate.

1981 - Direct funding of EMS systems by the Federal Government is replaced by block grants.

A study shows that 73 percent of all American fire departments, career and volunteer, are involved in some level of EMS service.

In Salt Lake City, Jeff Lawson, MD, comes out with an emergency medical dispatcher program and priority dispatching.

Nationwide, the medical community first recognizes AIDS.

1983 - Jack Stout starts systems status management in Denver.

"One for Life" law is passed in Virginia. This law assesses one dollar from each motor vehicle license and replaces all other state funding for emergency medical services. This provides funds to each city and county in Virginia and substantially increases support for regional EMS Councils, Rescue Squad Assistance Fund and EMT instructors.

1985 - The National Association of EMS Physicians is formed.

1986 - The Comprehensive Omnibus Budget Reconciliation Act (COBRA) is passed by Congress. This affected transfers of patients from ED to ED and prevented "dumping" (financially motivated transfers of patients).

1987 - Automatic Vehicle Locators (AVL) debuts.

1990 - The Trauma Care System Planning & Development Act is passed by Congress.

Fire Department organizations join together in a resolution to expand into EMS.

1991 - The Commission on Accreditation of Ambulance Services sets standards and benchmarks for ambulance services to obtain.

1992 - American Medical Response starts to sell stock on the NYSE and starts a nationwide consolidation of the private ambulance industry.

A public opinion survey conducted for the American College of Emergency Physicians found that nearly half of adult Americans could not identify 9-1-1 as the emergency number, or confused it with 4-1-1, the directory assistance number.

1993 - It is proposed that EMT-P's assume an expanded role in primary care of non-emergent patients by learning expanded skills.

1995 - Los Angeles City Fire Department institutes EMT Assessment & Paramedic Engine companies.

1996 - New York City EMS is absorbed by FDNY.

1997 - San Francisco and Chicago institute paramedic engine companies.

Information on the progression of EMS was obtained from the following sources:

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Making a Difference - The History of Modern EMS (1997) by James O. Page

The Paramedics (1979) by James O. Page

15 Years of Paramedic Engines (1993) by Gary Morris