

EMS Systems: Roles, Responsibilities, and Professionalism

OBJECTIVES

Upon completion of this chapter, the paramedic student will be able to:

1. Outline key historical events that influenced the development of emergency medical services (EMS) systems.
2. Identify the key elements necessary for effective EMS systems operations.
3. Outline the five components of the *EMS Education Agenda for the Future: A Systems Approach*.
4. Describe the benefits of continuing education.
5. Differentiate among the training and roles and responsibilities of the four nationally recognized levels of EMS licensure/certification: Emergency Medical Responder, Emergency Medical Technician, Advanced Emergency Medical Technician, and Paramedic.
6. List the benefits of membership in professional EMS organizations.
7. Differentiate among professionalism, professional licensure, certification, registration, and credentialing.
8. List characteristics of the professional paramedic.
9. Describe the paramedic's role in patient care situations as defined by the U.S. Department of Transportation.
10. Describe the benefits of each component of off-line (indirect) and online (direct) medical direction.
11. Outline the role and components of an effective continuous quality improvement program.
12. Recognize EMS activities that pose a high risk for patients.
13. Describe actions paramedics may take to reduce the chance of errors related to patient care.

KEY TERMS

advanced life support The provision of care that paramedics or allied health professionals render, including advanced airway management, defibrillation, intravenous therapy, and medication administration.

basic life support Care provided by persons trained in first aid, cardiopulmonary resuscitation, and other non-invasive care.

certification A process by which authority is granted to a person to take part in an activity. This person has to meet certain qualifications.

code of ethics A set of guidelines that are designed to set out acceptable behaviors for members of a particular group, association, or profession.

continuous quality improvement A management approach to customer service and organizational performance that includes constant monitoring, evaluation, decisions, and actions.

credentialing A local process that allows a paramedic to practice in a specific EMS agency (or setting).

emergency medical services A national network of services coordinated to provide aid and medical assistance from primary response to definitive care; the network involves

personnel trained in rescue, stabilization, transportation, and advanced management of traumatic and medical emergencies.

extended scope of practice The expansion of health care services provided by emergency medical services personnel in the prehospital setting.

licensure A process of regulating occupations through licenses granted by a government authority.

managed care organizations Networks that provide patient care services to their members, including health maintenance organizations and preferred provider organizations.

medical oversight The ultimate responsibility and authority for the medical actions of an EMS system; usually provided by one or more physicians.

off-line (indirect) medical direction The establishment and oversight of all medical components of an EMS system, including protocols, standing orders, educational programs, and the quality and delivery of online (direct) medical direction.

online (direct) medical direction The medical direction physician or designee who directly supervises prehospital

care activities via radio or phone. Online (direct) medical direction also may be responsible for the activities of the emergency department staff and others at the medical direction hospital.

paramedic A person who has completed training consistent with the National EMS Education Standards, including advanced training in clinical decision making, patient assessment, cardiac rhythm interpretation, defibrillation, drug therapy, and airway management.

patient care report A document used in the prehospital setting to record all patient care activities and circumstances related to an emergency response.

peritracheal Situated or occurring in the tissues surrounding the trachea.

registration The act of enrolling one's name in a register, or book of record.

reciprocity The practice of granting an individual licensure or certification/registration based on licensure or certification/registration by another state, agency, or association.

standing orders Specific treatment protocols used by pre-hospital emergency care personnel in the absence of online (direct) medical direction.

treatment protocols Guidelines that define the scope of prehospital intervention practiced by emergency services personnel.

The role of the paramedic is different than that of the “ambulance driver” of the past. Today’s paramedics work in sophisticated **emergency medical services (EMS)** systems. They take part in an array of professional activities. These activities enhance the paramedic’s ability to provide quality service and state-of-the-art patient care in the field and in less traditional health care settings.

EMERGENCY MEDICAL SERVICES SYSTEM DEVELOPMENT

Assigning a time and place to the birth of organized pre-hospital emergency care is difficult. To understand EMS system development, one must first consider certain events from ancient times to the present.

Before the Twentieth Century

The ancient Egyptians used herbs and drugs as medicine. They also splinted fractured bones, and they performed some surgeries. The Edwin Smith papyrus (circa the seventeenth century BC) depicted medical practice in Egypt. This system referred to the pulsation of the heart, palpation, and abnormal motor functions associated with brain injury. Other ancient texts show that surgery was practiced by the Babylonians of Mesopotamia, an ancient region of southwest Asia, as early as 1700 BC.¹

Organized prehospital emergency care has its roots in military history. Paintings of Roman battlefields suggest that some of the warriors cared for the injured. The first “ambulance” is thought to have been a covered cart used by one of Napoleon’s surgeons, Dominique-Jean Larrey. He moved injured soldiers to treatment areas during the Napoleonic wars in the 1800s.¹ The first civilian ambulance services were established in Cincinnati and New York City in the 1860s. In the United States Civil War, there was scandal when Walt Whitman and Matthew Brady reported that



(Courtesy Ray Kemp, St. Charles, Mo.)

3000 wounded soldiers lay in the field for 3 days and 600 for a week during the 1862 Battle of Bull Run. In response, Surgeon General Jonathan Letterman created an ambulance service for each army corps. They evacuated 10,000 wounded soldiers within 24 hours at the Battle of Antietam in 1863.²



DID YOU KNOW?

Clara Barton was an American nurse who served as a frontline volunteer during the American Civil War. She saw first-hand the value of the Red Cross during the Franco-Prussian War of 1870. These experiences encouraged her to establish a society in the United States. Under her leadership, the American Red Cross became the premier disaster relief organization in the world. Clara Barton was the founder and first president of the American Red Cross, which was established on May 21, 1881, in Washington, D.C.³

Twentieth Century

During World War I, medical care made rapid progress. Wounded soldiers needed urgent care for their injuries, which often were caused by machine guns and bombs. Thus

the military developed battlefield ambulance corps. During World War II, the military moved wounded soldiers by airplane. Then during the Korean conflict, the military evacuated soldiers with helicopters. During the Vietnam conflict, the military improved urgent care and rapid evacuation with well-trained corpsmen. These efforts became the basis of the prehospital care of the injured today.

From the early twentieth century through the mid-1960s, prehospital care in the United States was provided in several ways. Care mostly was delivered by urban, hospital-based systems. These systems later developed into municipal services. Care also was provided by funeral directors and volunteers who had little or no training in emergency care. Most patients received minimal stabilization at the scene. Then they were transported quickly to the nearest hospital.



CRITICAL THINKING

How would you feel about moving to an area with this minimal level of emergency medical services?

Two landmarks in EMS development occurred in 1966:

1. The National Academy of Sciences–National Research Council Committee on Trauma and Shock published *Accidental Death and Disability: The Neglected Disease of Modern Society* (the “white paper”). This document lists recommendations to improve care for victims. Eleven of these recommendations are related directly to EMS (Box 1-1).
2. The U.S. Congress passed the Highway Safety Act of 1966. This act created the U.S. Department of Transportation. Congress also created the National Highway Traffic Safety Administration (NHTSA). The act provided legislative authority and funds to improve EMS and directed states to develop effective EMS programs. If the states did not develop effective EMS programs, they were subject to a loss of up to 10% of their federal highway construction funds. As a result of this act, states gave more than \$142 million between 1968 and 1979 to develop EMS and early **advanced life support** (ALS) pilot programs.

Emergency medical services also emerged as a nationwide system because of death rate comparisons from World War I to Vietnam. Death rates for battlefield casualties were 8% in World War I. In World War II, they were 4.5%. In Korea, they decreased to 2.5%. Then in Vietnam, they were less than 2%. This decline was due to advances in field care for trauma patients (Box 1-2).⁴ These and other factors helped formulate the blueprint for improving prehospital emergency medical care in the United States. During 1972 and 1973, federal and private sources provided \$31 million to fund EMS programs in 37 states and Puerto Rico.

In 1973, Congress passed the Emergency Medical Service Systems (EMSS) Act. This act paved the way for states to benefit from federal funds. The states could obtain the

BOX 1-1 Eleven Recommendations for Emergency Medical Services Identified in the White Paper

1. Extension of basic and advanced first aid training to greater numbers of the lay public
2. Preparation of nationally acceptable texts, training aids, and courses of instruction for rescue squad personnel, police officers, firefighters, and ambulance attendants
3. Implementation of recent traffic safety legislation to ensure completely adequate standards for ambulance design and construction, ambulance equipment and supplies, and the qualifications and supervision of ambulance personnel
4. Adoption at the state level of general policies and regulations pertaining to ambulance services
5. 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
6. Initiation of pilot programs to determine the efficacy of providing physician-staffed ambulances for care at the site of injury and during transportation
7. 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
8. Delineation of radio frequency channels and equipment suitable to provide voice communication between ambulances, emergency departments, and other health-related agencies at the community, regional, and national levels
9. Initiation of pilot studies across the nation for evaluation of models of radio and telephone installations to ensure effectiveness of communication facilities
10. Day-to-day use of voice communication facilities by the agencies serving emergency medical needs
11. Active exploration of the feasibility of designating a single nationwide telephone number to summon an ambulance

From National Academy of Sciences, National Research Council: *Accidental death and disability: the neglected disease of modern society*, Washington, DC, 1996, National Academy Press.

funds by forming regional EMS agencies. The act listed 15 vital parts of the EMS system (Box 1-3). Plus, the act required emergency care programs funded by the U.S. Department of Health and Human Services to plan and put into practice a regional approach for emergency response and immediate care for trauma patients. This act played a major role in creating regional EMS systems from 1974 to 1981.



CRITICAL THINKING

How does the “age” of the emergency medical services profession compare with the “age” of your parents’ or grandparents’ professions?

BOX 1-2 Medical Advances Made During Wartime

Civil War

- Railroads were used to evacuate casualties
- Army still used ambulances much like Napoleon's
- Death rate was very high because germs were unknown as the cause of infection; barns were used as hospitals
- U.S. Army set up the Medical Corps
- System-wide approach with ambulances on the battlefield transporting wounded to hospitals
Aid stations
Field hospitals
Rear general hospitals
This model was used until the Vietnam War

World War I

- Poor planning (no field hospitals) caused excessive evacuation times of 12-18 hours
- High mortality rates >20%
- Most died of hemorrhagic shock
- No antibiotics; sepsis was common
- Blood transfusions were just beginning to be used
- Thomas half-ring femur splint was considered the greatest advancement in trauma care at this time

World War II

- Evacuation time for wounded decreased to 4-6 hours
- Antibiotics were developed
- Plasma and blood transfusions became common
- Hospitals were located closer to the front to decrease time to surgery
- Fixed wing air transport began

Korean War

- Evacuation time averaged 2-4 hours
- Helicopter evacuation of wounded was introduced
- More use of electrolyte solutions
- Better antibiotics
- Surgical hospitals located closer to front lines

Vietnam War

- Casualties were taken directly from front lines to surgical hospitals by helicopter
- Average evacuation time was 35 minutes
- Average time to surgery was 1-2 hours
- Civilian systems have never matched these timeframes

Iraq War

- Tourniquets were reintroduced
- Hemostatic agents were developed
- Concept of CAB (circulation-airway-breathing) was developed for patients with exsanguinating hemorrhage⁵

In 1981, funding for EMS development changed due to the Consolidated Omnibus Budget Reconciliation Act (COBRA). This act consolidated EMS funding into state preventive health services block grants. As a result, funding under the EMSS Act was eliminated. These block grants

BOX 1-3 Fifteen Required Components of the Emergency Medical Services System

1. Manpower
2. Training
3. Communications
4. Transportation
5. Facilities
6. Critical care units
7. Public safety agencies
8. Consumers
9. Access to care
10. Transfer of patients
11. Medical record keeping
12. Consumer information and education
13. Review and evaluation
14. Disaster linkage
15. Mutual aid

BOX 1-4 The 10 System Elements of the National Highway Traffic Safety Administration

1. Comprehensive emergency medical services and trauma system legislation
2. Resource management and administration
3. Professional training
4. A communication system (9-1-1, communication centers, equipment, and the ability to communicate among ambulances, hospitals, fire departments, and police)
5. A transportation system (air, ground, and water)
6. Facilities (hospitals, trauma centers, specialty centers)
7. An inclusive trauma system fully integrated with emergency medical systems
8. Physician involvement (medical oversight)
9. Public information, education, and prevention
10. Data collection, quality improvement and evaluation, and research.

From National Highway Traffic Safety Administration: *Emergency medical services: NHTSA leading the way*, Washington, DC, 1995, The Administration.

were paid to state health departments instead of regional EMS organizations. Because these grants could be spent on projects other than EMS, the grants fell victim to politics. Thus direct funding for EMS declined. Through cuts in funding and staff, the ability of NHTSA to support the U.S. Department of Health and Human Services effort diminished. As a result, each state had to develop and fund their EMS systems. Thus the great growth that EMS experienced in the 1960s and 1970s declined. NHTSA continues to assist EMS development.⁶ In 1988 NHTSA established "10 System Elements" (the Statewide EMS Technical Assistance Program) as a recommended standard for EMS systems (Box 1-4).

In 1996 NHTSA and the Health Resources and Services Administration (HRSA) published a consensus paper that was held in high regard. This document, the *Emergency Medical Services Agenda for the Future*, was referred to as the *Agenda*. The *Agenda* was federally funded and completed by the National Association of EMS Physicians and the National Association of State EMS Directors. These organizations designed the *Agenda* to be used by government and private organizations at the national, state, and local levels. The intent of the document was to build a common vision for the future of EMS. The *Agenda* also was meant to help guide planning, decision making, and policy regarding EMS.

The *Agenda* made 14 suggestions for EMS focused on principles of public health and safety systems (Figure 1-1), including the EMS education system (described later in this chapter). The 14 attributes for EMS identified by the *Agenda* are the following:

1. Integration of health services
2. EMS research
3. Legislation and regulation
4. System finance
5. Human resources
6. Medical direction

7. Education systems
8. Public education
9. Prevention
10. Public access
11. Communication systems
12. Clinical care
13. Information systems
14. Evaluation

Box 1-5 outlines other landmarks in EMS development.

Changes in federal health care reform affect the way health care, including emergency care, is provided. Managed care and **extended scope of practice** are most relevant to EMS. *Managed care* refers to patient care services that are provided to members by **managed care organizations** (e.g., health maintenance organizations [HMOs], preferred provider organizations [PPOs], and other provider networks). These plans now cover about 60% of the U.S. population.⁷ This reform affects EMS systems in the way that they provide patient care choices for their clients (e.g., emergency versus nonemergency response, resources, and personnel; transportation modes; and health care facility options).

Extended scope of practice came out of the cost-containment setting of managed care. As it relates to EMS, extended

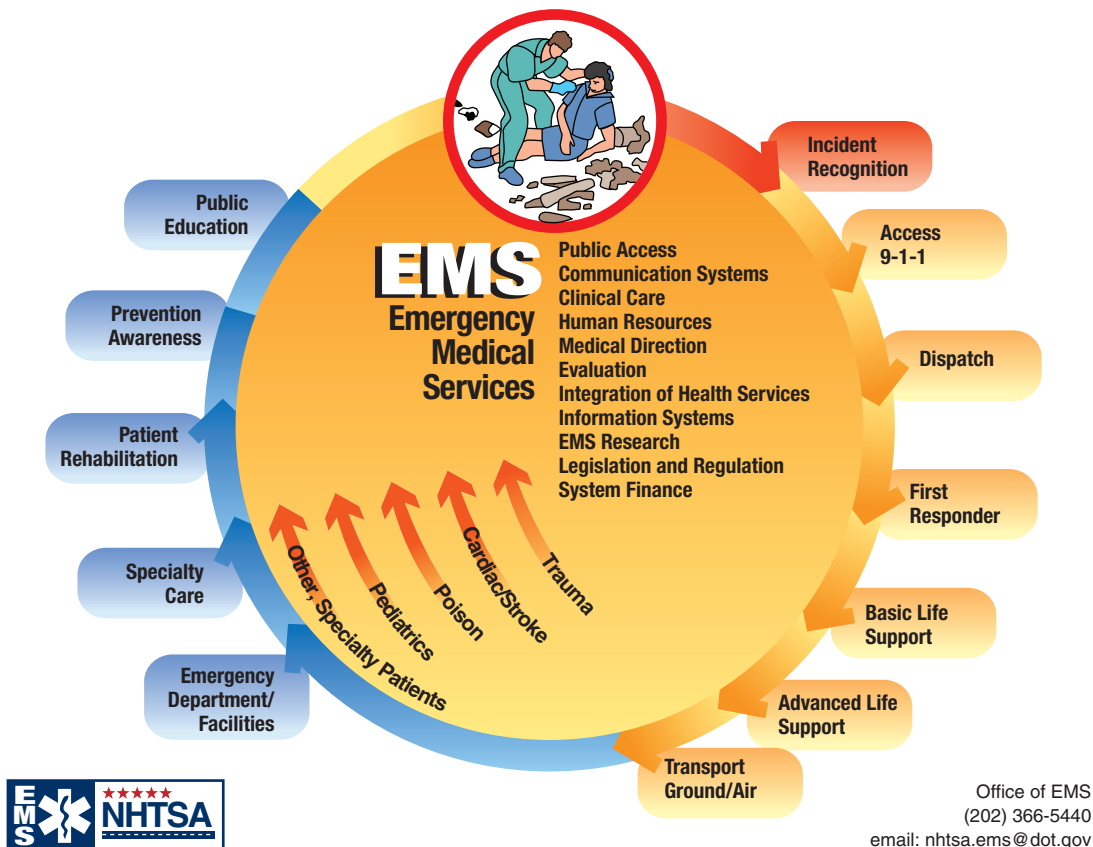


FIGURE 1-1 Emergency medical services: part of the health care system.

BOX 1-5 Other Landmarks in the Development of Emergency Medical Services

- Mid 1950s: The American College of Surgeons develops the first training programs for ambulance attendants.
- 1958: Dr. Peter Safar demonstrates the efficacy of mouth-to-mouth ventilation.
- 1960: Cardiopulmonary resuscitation is shown to be effective.
- 1967: Dr. Eugene Nagel trains Miami firefighters as paramedics at the University of Miami School of Medicine.
- 1968: The American Telephone and Telegraph Company designates 9-1-1 as the universal emergency telephone number.
- 1969: The U.S. Department of Transportation and National Highway Traffic Safety Administration (NHTSA) develop the basic training course for emergency medical technicians (EMTs).
- 1969: The Committee on Ambulance Design develops Ambulance Design Criteria, a report to the U.S. Department of Transportation and the NHTSA to complement the National Academy of Sciences–National Research Council Medical Requirements for Ambulance Design and Equipment (1968). This document recommends ambulance design standards and emergency equipment. The NHTSA agrees to issue matching federal funds to states that purchase vehicles meeting these standards.
- 1970: The National Registry of Emergency Medical Technicians is organized to standardize education, examinations, and certification of EMTs on a national level.
- 1972: President Nixon directs the U.S. Department of Health, Education, and Welfare to develop new ways to organize emergency medical services (EMS), which results in \$8.5 million in contracts being awarded to develop a model EMS system.
- 1972: The University of Cincinnati establishes the first residency program to train new physicians exclusively for the practice of emergency medicine.
- 1973: The star of life is adopted as the official symbol for EMS. The six blue bars of the star of life represent the six system functions of EMS: detection, reporting, response, on-scene care, care in transit, and transfer to definitive care.
- 1974: President Gerald Ford proclaims the first National EMS Week.
- 1975: The National Association of Emergency Medical Technicians is founded.
- 1975: The American Medical Association accepts and approves the Paramedic role as an emergency health occupation.
- 1977: More than 40 EMT training agencies throughout the United States develop and test the national training standards for the paramedic for 2 years.
- 1980: The U.S. Department of Health and Human Services releases the *Position Paper on Trauma Center Designation*, which describes trauma centers within EMS systems. The paper also categorizes facilities.
- 1984: The EMS for Children program, under the Public Health Act, provides funding for enhancing the EMS system to better serve pediatric patients.
- 1986: The 1979 Public Safety Officer's Act (SB 1479) is amended to expand the \$50,000 compensation to include survivors of rescue squads, ambulance crew members, and public safety department volunteers killed in the line of duty (amended in 1990).
- 1990: President George Bush signs the Trauma Care Systems Planning and Development Act (HR 1602), which provides for annual grants to states based on geographic and population size to help establish and improve trauma systems. In 1995 Congress does not reauthorize funding for this act.
- 1991: Occupational Exposure to Blood-Borne Pathogens; Final Rule (CFR 29 1910. 1030) establishes standards for workplace protection from blood-borne diseases.
- 1993: The Institute of Medicine publishes *Emergency Medical Services for Children*, which points out deficiencies in the ability of the health care system to address the emergency medical needs of pediatric patients.
- 1993: National Registry of EMTs publishes the *National EMS Education and Practice Blueprint*.
- 1995: Congress does not reauthorize funding under the Trauma Care Systems and Development Act.
- 1996: NHTSA and HRSA publish *EMS Agenda for the Future*.
- 1997: The NHTSA publishes *A Leadership Guide to Quality Improvement for Emergency Medical Services Systems*.
- 1998: The U.S. Department of Transportation revises the national standard curriculum for paramedics.
- 2000: *EMS Education Agenda for the Future* is published by NHTSA and HRSA.
- 2004: National Rural Health Association publishes *Rural and Frontier EMS Agenda for the Future*.
- 2005: NHTSA funds National EMS Core Content: The Domain of EMS Practice.
- 2007: *The National EMS Scope of Practice Model* published by NHTSA.

scope of practice refers to expanding services of EMS personnel in the prehospital setting. Examples include providing health screenings, physical examinations, and immunizations. Expanded scope for paramedics will continue to evolve. EMS agencies and managed care programs will develop other useful patient services to enhance revenues, to further injury prevention programs, and to reflect changes in how medical care is delivered. Expanded scope also helps ensure that EMS remains a vital part of the health care system.⁸



NOTE

Medicare and Medicaid are the two insurance programs of the U.S. government. Together, these insurance programs cover about 25% of the U.S. population.⁷ These plans have rules that affect how patients qualify for emergency medical services transportation. The rules also decide the conditions under which reimbursement for transportation will occur. This reimbursement became standardized throughout the country in 2002. Standardization occurred through a consensus process involving national emergency medical services agencies and the Center for Medicare Services. The new Medicare fee structure caused major reductions in payment for some emergency medical services agencies but increased fees for others.

CURRENT MEDICAL SERVICES SYSTEMS

The EMS system of today is a network of coordinated services that provides medical care to the community. The coordination is defined by the NHTSA Technical Assistance Program Standards. This coordination ensures that patients are treated quickly and properly and that resources are used efficiently. Together these factors reduce health care costs (Figure 1-2). They also improve patient outcome and reduce hospital stays.⁹

State EMS systems usually are made up of local and regional agencies that manage the delivery of prehospital care. The local agencies are responsible for providing day-to-day EMS to the community. Local agencies also work with regional and state agencies to create protocols and help set standards and guidelines. Local agencies provide data collection services and coordinate mutual aid and disaster planning. Most state EMS agencies have advisory councils to help organize EMS programs and activities. These councils are made up of medical professionals, para-professionals, consumers, and public and private agencies with an interest in EMS. The state agency is responsible for licensing and/or certification. In addition, the state enforces state EMS regulations and develops public education programs. Moreover, the state agency acts as a liaison with national agencies. Some of these national agencies include NHTSA, the Federal Emergency Management Agency (FEMA), Homeland Security, and the Maternal Child Health Bureau of the Health Resources and Services Administration.

Emergency Medical Services System

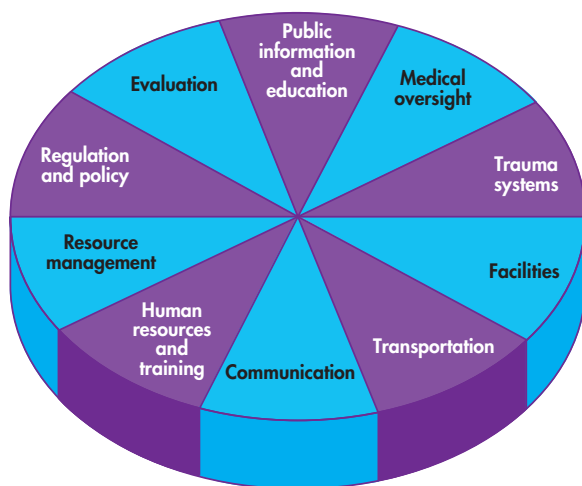


FIGURE 1-2 Ten components of the emergency medical services system. (National Highway Traffic Safety Administration, U.S. Department of Transportation: *Emergency medical services: NHTSA leading the way*, Washington, DC, 1995, The Administration; accessed at www.nhtsa.dot.gov/people/injury/ems/agenda/emsman.html#Services. Accessed April 13, 2011.)



DID YOU KNOW?

NEMSIS stands for the National Emergency Medical Services Information System. NEMSIS is the national repository that will be used to store EMS data from every state in the nation. Since the 1970s, the need for EMS information systems and databases has been well established, and many statewide data systems have been created. However, these EMS systems vary in their ability to collect patient and systems data and allow analysis at a local, state, and national level. For this reason, the NEMSIS project was developed to help states collect more standardized elements and eventually submit the data to a national EMS database. Such a database will be useful in:

- Developing nationwide EMS training curricula
- Evaluating patient and EMS system outcomes
- Facilitating research efforts
- Determining national fee schedules and reimbursement rates
- Addressing resources for disaster and domestic preparedness
- Providing valuable information on other issues or areas of need related to EMS care

Emergency Medical Services System Operations

The operations of an effective EMS system include citizen activation, dispatch, prehospital care, hospital care, and rehabilitation.

CITIZEN ACTIVATION

Emergency public safety services are highly visible in the community. However, the public is not always aware of the complex nature of these services. Citizens expect to have police and fire protection. They also expect to get a quick response with skilled personnel in a medical emergency. These expectations are due to years of available public safety service, public relations, press coverage, and national media. The public also expects such service because of public support in the form of taxes, donations, subscriptions for service, and user fees.



DID YOU KNOW?

In December 1971, the television show “Emergency!” made its debut to millions of viewers. The series starred Randolph Mantooth as paramedic John Gage and Kevin Tighe as his partner, paramedic Roy DeSoto. This popular TV series contributed to a change in public attitudes about fire service and prehospital emergency care. It was also during this time that many fire departments expanded their services to include EMS response.

Public involvement in EMS goes beyond funding. Citizens are often at the scene of an injury or illness. They play an important role in recognizing the need for emergency services. Citizens sometimes administer first aid, help secure the scene and gain access to the patient, and can be instrumental in managing a crisis. Educating the public is

fundamental to the development of an effective EMS system. Paramedics help prepare the public to respond to a medical emergency. They also build support for EMS by helping to develop and present public health care education and prevention programs (see Chapter 3).



CRITICAL THINKING

How is the emergency medical services system funded in your community?

Once citizens recognize that an emergency exists and a call for help is made, the response is coordinated. Citizens usually contact communication centers and dispatching services by emergency phone numbers. The number 9-1-1 offers access to public safety services in most of the country. These services include fire service, law enforcement, and EMS. The availability of emergency access through 9-1-1 continues to expand across the country as areas adopt the system. In areas that do not have 9-1-1, citizens should have easy access to other emergency phone numbers. These numbers can be promoted through public awareness programs, phone stickers, and phone book covers. Other ways of engaging an emergency response include firebox pull stations, citizen band radios, voice over Internet protocol (VOIP), and cell phones. Chapter 5 covers 9-1-1 in more detail.

PREHOSPITAL CARE

Ill or injured patients may need prehospital intervention and stabilization. Interventions may involve **basic life support** (BLS) and ALS skills. Depending on the situation (e.g., entrapment, distance to the hospital, and availability of ALS), initial prehospital care may be limited. The care may consist of giving only comfort and reassurance. Care also may require spinal immobilization, airway protection, endotracheal intubation, intravenous therapy, medication administration, defibrillation, and external cardiac pacing.

HOSPITAL CARE

When the patient is brought to the emergency department, patient care resources expand. This care may include physicians, physician assistants, nurse practitioners, nurses, technicians, ancillary support staff (allied health counselors, social workers, and others), secretaries, and medical record staff. Diagnostic tests are often performed. These services may be provided by laboratory, radiology, and cardiopulmonary departments. Resources available beyond the emergency department include surgery, cardiac catheterization, intensive care, physical therapy, pharmacy, nutrition services, and many others.

REHABILITATION

After hospital delivery and definitive care, many patients receive some type of rehabilitation services. Rehabilitation often occurs before and after hospital discharge. The

services may be in the form of education and physical and occupational therapy that help the patient to recover. Rehabilitation also can help the patient to maintain maximal independence. One example of such therapy is helping patients and families adjust to required changes in lifestyle after a myocardial infarction. Another example is retraining in activities of daily living (e.g., bathing and preparing meals). Job rehabilitation also allows patients to adapt to limb impairment or loss.

EMS EDUCATION

The national standard curriculum for paramedics was last revised in 1998. That same year, EMS leaders worked with NHTSA to revise a portion of the *Agenda* (the *National Emergency Medical Services Education and Practice Blueprint* [the *Blueprint*]). This revision revealed the future of EMS education. The text was titled the *EMS Education Agenda for the Future: A Systems Approach* (the *Education Agenda*). The *Education Agenda* named core content categories for each license level. The *Education Agenda* also stressed the integration of EMS within the overall health care system. Figure 1-3 is a diagram of a model that came from the revision.¹⁰ New to this revision was the definition of cognitive (knowledge), psychomotor (skills), and affective (attitude) objectives.

The NHTSA and HRSA also funded the *National EMS Core Content*, which was published in 2005. This document defined the entire domain of out-of-hospital practice. It also identified the universal body of knowledge and skills for EMS personnel. This project was led by the National Association of EMS Physicians and the American College of Emergency Physicians.

The *National EMS Scope of Practice Model* (*Scope of Practice*) was published in 2007. This consensus document defined the four levels of EMS personnel described in this chapter. It also defined the practices and minimum skills for each level. Each educational level assumes mastery of previous competencies for each license level. Each individual must demonstrate each skill within his or her scope of practice and for patients of all ages.

Development of the *National EMS Education Standards* (the *Standards*) was led by the National Association of EMS Educators (NAEMSE). The *Standards* replace NHTSA's national standard curricula that had been the cornerstone of EMS education since the 1960s. The *Standards* define the competencies, clinical behaviors, and judgments that must be met by entry-level EMS personnel at each licensure level. The goal was to meet practice guidelines as defined by the *National EMS Scope of Practice Model*. Content and concepts defined by the *National EMS Core Content* were also integrated within the *Standards*.¹¹ Box 1-6, EMS History, outlines the timeline of these publications and standards.



NOTE

Each EMS licensure level represents a *significant* difference in skills, risk, knowledge, level of supervision and autonomy, judgment, and clinical decision making.

PARAMEDIC: NATIONAL STANDARDS CURRICULUM
DIAGRAM OF EDUCATIONAL MODEL

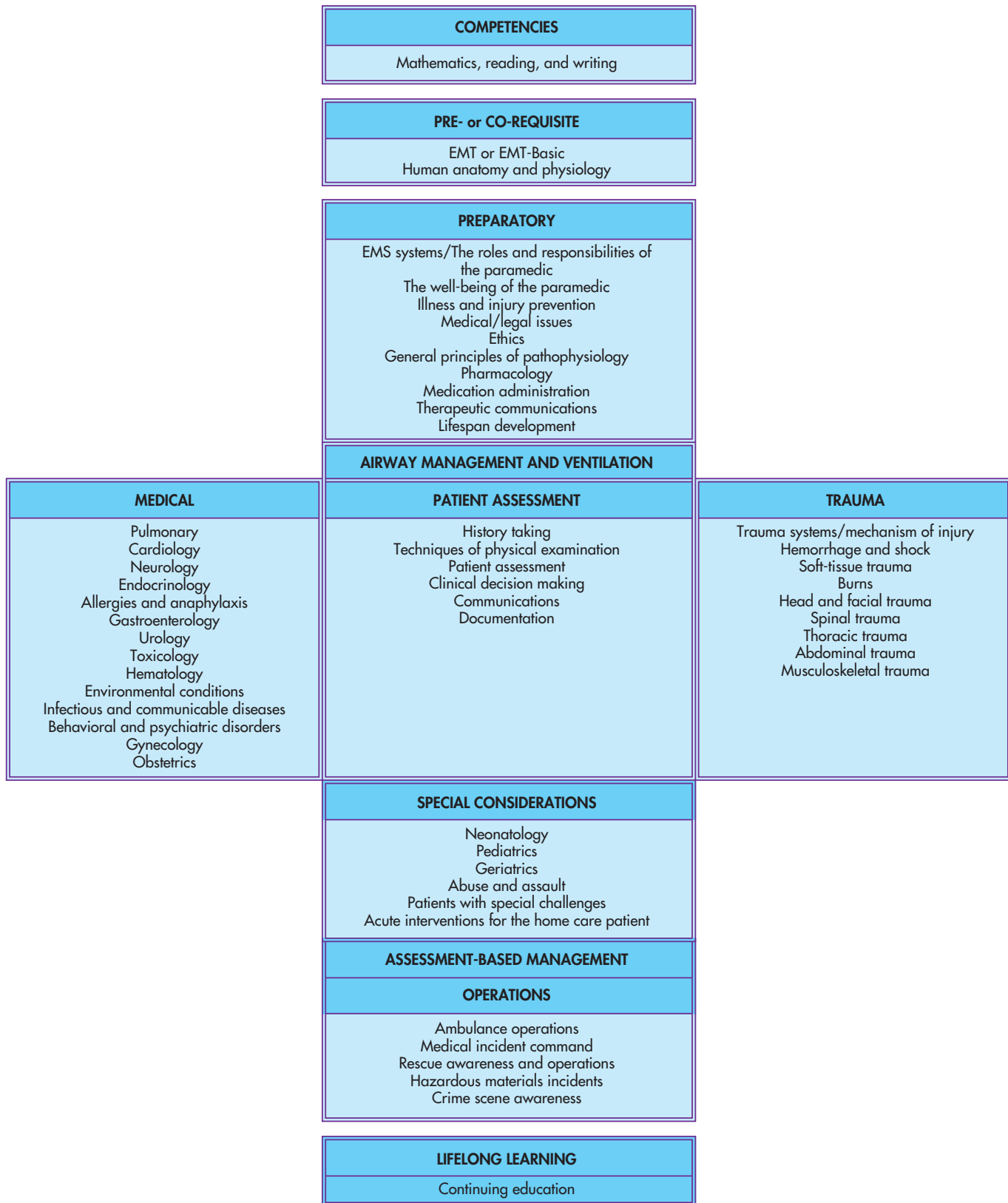


FIGURE 1-3 Diagram of Department of Transportation education model. (U.S. Department of Health and Human Services, Health Resources and Services, Health Resources and Services Administration, Maternal and Child Health Bureau: *Emergency medical services agenda for the future*, Washington, DC, 1999, The Administration.)

**NOTE**

The *Education Agenda* recommends that EMS students graduate from a nationally accredited EMS educational program to be eligible for National EMS Certification (Figure 1-4). This is to ensure consistency and quality of EMS personnel. National certification is the element critical to extend **reciprocity** to EMS personnel educated in other states. In the future, EMS educational programs will likely require review by the Committee on Accreditation of Educational Programs for Emergency Medical Services Professions (CoAEMSP). The goal of this accreditation is to ensure quality of education and to ensure that appropriate educational infrastructures and resources are available for students in EMS programs. For more information, see The Commission's website at www.caahep.org.

The Five Components of the EMS Agenda: <http://www.nhtsa.dot.gov/people/injury/ems/EdAgenda/final/agenda6-00.htm>, accessed 2-10-09.

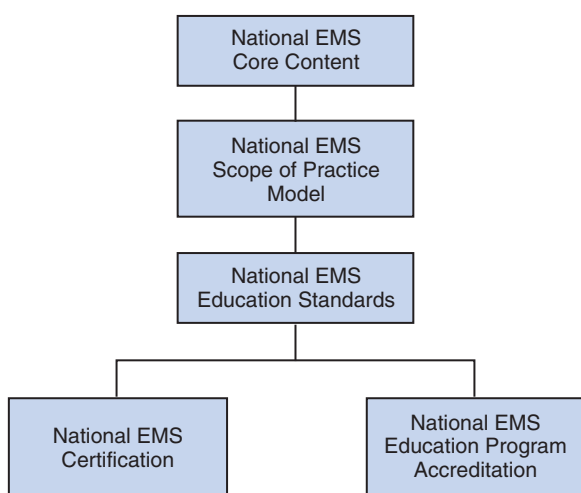


FIGURE 1-4 The five components of the EMS agenda. (National Registry of Emergency Medical Technicians; *Education Agenda for the Future, A Systems Approach*, Columbus, Ohio, 2000.)

BOX 1-6 Timeline of EMS Education Publications and Standards in the United States

- 1969: AAOS: Emergency Care and Transportation of the Sick and Injured (the “Orange Book”)
- 1996: EMS Agenda for the Future
- 1971: EMT-Ambulance National Standard Curriculum
- 1998: National Standard Curriculum for EMT-Paramedic (revised)
- 2000: Education Agenda for the Future: A Systems Approach
- 2004: National EMS Practice Analysis
- 2005: National EMS Scope of Practice
- 2006: EMS at the Crossroads (Institute of Medicine [IOM]) report
- 2007: National EMS Scope of Practice
- 2009: National EMS Education Standards
- Supported by NHTSA for future implementation
- National EMS Certification
- National EMS Program Accreditation

Continuing Education

Continuing education provides a way for all health care practitioners to retain primary technical and professional skills. It also helps the paramedic move from competency (at graduation) to higher, more expert levels of practice. Continuing education aids in learning new and advanced skills and knowledge. Some skills learned during the initial course of study are not used often. New information, procedures, and resources that enhance patient care are continuously being developed to help maintain skill proficiency. Continuing education can take many forms, including the following:

- Conferences and seminars
- Lectures and workshops
- Quality improvement reviews
- Skill laboratories
- Certification and recertification programs
- Refresher training programs
- Journal studies
- Multimedia presentations
- Internet-based learning
- Case presentations
- Independent study

EMERGENCY MEDICAL SERVICES PERSONNEL LEVELS

Various levels of personnel and medical direction come together to make an effective prehospital EMS system. The levels include dispatcher, Emergency Medical Responder (EMR), Emergency Medical Technician (EMT), Advanced Emergency Medical Technician (AEMT), and Paramedic. Each EMS level described here has satisfied training based on the *National EMS Education Standards*. They function as part of a comprehensive EMS response, under **medical oversight**. (The following descriptions of EMS practitioner levels are adapted from the *National EMS Education Standards*.)¹¹

Dispatcher

A dispatcher is a telecommunicator. This person serves as the primary contact with the public. The dispatcher directs the proper agencies to the scene. These agencies may include ground and air ambulances, fire departments, law enforcement, utility services, and others. The term *telecommunicator* applies to call takers, dispatchers, radio operators, data terminal operators, or any combination of such functions in a public service answering point located in a fire, police, or EMS communications center (see Chapter 5). An effective EMS dispatch communications system includes the following functions:

- *Receive and process calls for EMS assistance.* The dispatcher receives and records calls for EMS assistance and selects an appropriate course of action for each call. To do this, the dispatcher must obtain as much information as possible about the emergency event. This information

includes name, call-back number, and address. The dispatcher may also have to deal with distraught callers.

- *Dispatch and coordinate EMS resources.* The dispatcher directs the proper emergency vehicles to the correct address. This person also coordinates the emergency vehicles while en route to the scene, to the medical facility, and back to the operations base (Figure 1-5).
- *Relay medical information.* The dispatch center can provide a telecommunications channel among appropriate medical facilities and EMS personnel; fire, police, and rescue workers; and private citizens. This can consist of phone, radio, or biomedical telemetry.
- *Coordinate with public safety agencies.* The dispatcher aids communications between public safety (fire, law enforcement, rescue) and the EMS system. This coordinates services such as traffic control, escort, fire suppression, and extrication. The dispatcher must know the location and status of all EMS vehicles and whether support services are available. In larger systems, computer-aided dispatching is used. This provides for one or more of the following abilities:
 - Automatic entry of 9-1-1
 - Automatic interface to vehicle location with or without map display
 - Automatic interface to mobile data terminal
 - Computer messaging among multiple radio operators, call takers, or both
 - Dispatch note taking, reminder aid, or both
 - Ability to monitor response times, response delays, and on-scene times
 - Display of call information
 - Emergency medical dispatch review
 - Manual or automatic updates of unit status
 - Manual entry of call information
 - Radio control and display of channel status
 - Standard operating procedure review
 - Telephone control and display of circuit status



FIGURE 1-5 Computer dispatch screen.

Many EMS and public service agencies require specialized training for their dispatch personnel. The dispatcher then can give directions to the caller while the caller waits for EMS arrival. The training may include the USDOT training program for the emergency medical dispatcher, which is described further in Chapter 5.



CRITICAL THINKING

What type of dispatching is provided in your community? Are dispatchers trained to the level of emergency medical dispatcher?

Emergency Medical Responder (EMR)

The EMR (also known as First Responder) may be the first trained person in an EMS system to arrive on a scene. These responders may include personnel from fire departments and law enforcement agencies. They also may include designated commercial medical response teams, athletic trainers, and others. The primary focus of the EMR is to initiate immediate lifesaving care to critical patients who access the EMS system. This person has the basic knowledge and skills necessary to provide basic lifesaving interventions while awaiting additional EMS response. The EMR can also assist higher-level personnel at the scene and during transport. They perform basic interventions with minimal equipment. The EMR can do the following:

1. Recognize the seriousness of the patient's condition or extent of injuries.
2. Assess requirements for emergency medical care.
3. Administer appropriate emergency medical care for life-threatening injuries relative to airway, breathing, and circulation.

Emergency Medical Technician (EMT)

The EMT (formerly known as EMT-Basic) is trained in all phases of basic life support. This training includes the use of automated external defibrillators and the administration of some emergency medications. The primary focus of the EMT is to provide basic emergency medical care and transportation for critical and emergent patients who access the EMS system. They perform interventions with the basic equipment typically found on an ambulance. They also assist paramedics in the care of patients during transport.

Advanced Emergency Medical Technician (AEMT)

The AEMT was formerly known as EMT-Intermediate. The degree of training and skills that the AEMT practices varies between states and EMS systems. Training can include ALS procedures such as **peritracheal** airway adjuncts, intravenous therapy, defibrillation, cardiac rhythm interpretation,

and administration of some emergency medications. The primary focus of the AEMT is to provide basic and limited advanced emergency medical care and transportation for critical and emergent patients who access the EMS system.

Paramedic

The **paramedic** (formerly known as EMT-Paramedic) is trained in all aspects of basic and advanced life support procedures that are relevant to prehospital emergency care. The paramedic has advanced training in patient assessment, clinical decision making, cardiac rhythm interpretation, defibrillation, drug therapy, and airway management (Box 1-7). The paramedic provides emergency care based on advanced assessment skills and the formulation of a field diagnosis. The paramedic's specific roles and duties are discussed later in this chapter.

BOX 1-7 Description of the Paramedic Profession

The description of the paramedic profession provides the philosophy and rationale for the depth and breadth of coverage.

- Paramedics have fulfilled requirements prescribed by an accrediting agency to practice the art and science of out-of-hospital medicine under medical direction. Through performing assessments and providing medical care, their goal is to prevent and reduce mortality and morbidity caused by illness and injury. Paramedics primarily provide care to emergency patients in an out-of-hospital setting.
- Paramedics possess knowledge, skills, and attitudes consistent with the expectations of the public and the profession. Paramedics recognize that they are an essential component of the continuum of care and serve as linkages among health resources.
- Paramedics strive to maintain high-quality, reasonable-cost health care by delivering patients directly to appropriate facilities. As advocates for patients, paramedics seek to be proactive in affecting long-term health care by working with other provider agencies, networks, and organizations. The emerging roles and responsibilities of the paramedic include public education, health promotion, and participation in injury- and illness-prevention programs. As the scope of service continues to expand, the paramedic will function as a facilitator of access to care and as an initial treatment provider.
- Paramedics are responsible and accountable to medical direction, the public, and their peers. Paramedics recognize the importance of research and actively participate in the design, development, evaluation, and publication of research. Paramedics seek to take part in lifelong professional development, perform peer evaluation, and assume an active role in professional and community organizations.

From U.S. Department of Transportation, National Highway Transportation Administration: *EMT-Paramedic national standard curriculum*, Washington, DC, 1998, The Department.

NATIONAL EMERGENCY MEDICAL SERVICES GROUP INVOLVEMENT

Many groups and organizations help to set the standards of EMS (Box 1-8). These groups exist at the national, state, regional, and local levels. They take part in development, education, implementation, lobbying, and setting standards for EMS. Membership and participation in professional organizations help promote the professional status of the paramedic. These groups expose the paramedic to trends in emergency care, continuing education, and to resource experts. The organizations also provide for national representation. They have a unified voice in other health care organizations and issues of national matters. The EMS standard-setting groups have many roles. Their primary role, however, is to set standards with input from members of the profession and the community. By doing so, they help ensure that the public is protected from individuals and agencies that do not meet professional standards for licensure and/or certification.

One such organization is the National Registry of Emergency Medical Technicians (NREMT). The National Registry helps develop professional standards in the EMS industry. This organization verifies competencies for EMTs and paramedics by preparing and conducting certification examinations. The organization also simplifies the process of state-to-state mobility and reciprocity for its members.

BOX 1-8 Sampling of National Emergency Medical Services Organizations and Associations

American Ambulance Association
 American College of Emergency Physicians
 American College of Surgeons
 Association of Air Medical Services
 Emergency Nurses' Association
 National Association of EMS Educators
 National Association of EMS Physicians
 National Association of Emergency Medical Technicians
 International Association of Fire Chiefs
 International Association of Fire Fighters
 National Association of Search and Rescue
 National Association of State EMS Officials
 National Flight Nurses' Association
 National Flight Paramedic Association
 National Registry of Emergency Medical Technicians



DID YOU KNOW?

Every five years, the NREMT conducts a *National EMS Practice Analysis*. This has been done since 1994. The purpose of the study is to gather data on what EMS personnel actually do as part of their practice in providing emergency care. This helps the NREMT to revise and tailor their certification examinations. These data are also used in developing the EMS curricula that affect current practice.

The LEADS project is another important area of research conducted by the NREMT. LEADS stands for the *Longitudinal Emergency Medical Technician Attributes and Demographics Study*. The study is hosted by the NREMT and is conducted once each year. It is designed to describe the EMT population in the United States, their work activities, working conditions, and job satisfaction. The project began in August 1998. It is led by a team of researchers made up of state EMS directors, state EMS training coordinators, EMS system managers, emergency physicians, EMS educators, survey researchers, and staff of the NREMT. The NREMT is a leader in the areas of research in EMS education and practice. For more information about the Practice Analysis or LEADS study, see <http://www.nremt.org>.



CRITICAL THINKING

What issues do you think your national emergency medical services association should address to enhance patient care in your area?

LICENSURE, CERTIFICATION, AND REGISTRATION

Paramedics are granted permission to practice their skills by three processes: licensure, certification, and registration. The exact wording of granting this permission varies by state.

Licensure

Licensure is a process of regulating occupations. In this process a license is granted by a government authority. The license allows a person to engage in a profession or activity that otherwise would be unlawful. Some states and local authorities require that paramedics have a license.

Certification

Certification grants authority to a person to take part in an activity. The person receives a document from a government or nongovernment entity showing that the person has met the requirements to practice an activity. Some states or local authorities require that paramedics be certified.



NOTE

Some persons believe that licensed professionals have greater status than those who are certified or registered. This belief is unfounded. A certification granted by a state and conferring a right to engage in a trade or profession is in fact a license.

Registration

Registration is the act of enrolling one's name in a register, or book of record. For example, paramedics can be licensed or certified in their state and can be registered with the National Registry of Emergency Medical Technicians.

Credentialing

Credentialing is a local process that allows a paramedic to practice in a specific EMS agency (or setting). Credentialing processes are typically guided by the local medical director (Figure 1-6).

PROFESSIONALISM

Training and performance standards have helped to define EMTs and paramedics as health care professionals. The term *profession* refers to a body of knowledge or expertise. The members of such a field are often self-regulated through licensing or certification that confirms competence. In addition, most professions adhere to standards. These standards include initial and continuing education requirements. *Professionalism* refers to the way in which a person follows the standards of a profession. These standards may include conduct and performance standards. These standards also usually include adhering to a **code of ethics** approved by the profession (see Chapter 7).

Health Care Professionals

Health care professionals conform to the standards of their profession. By providing quality patient care and striving for high standards, they instill pride in the profession and earn the respect of others. EMS professionals occupy positions of public trust and are highly visible role models. As

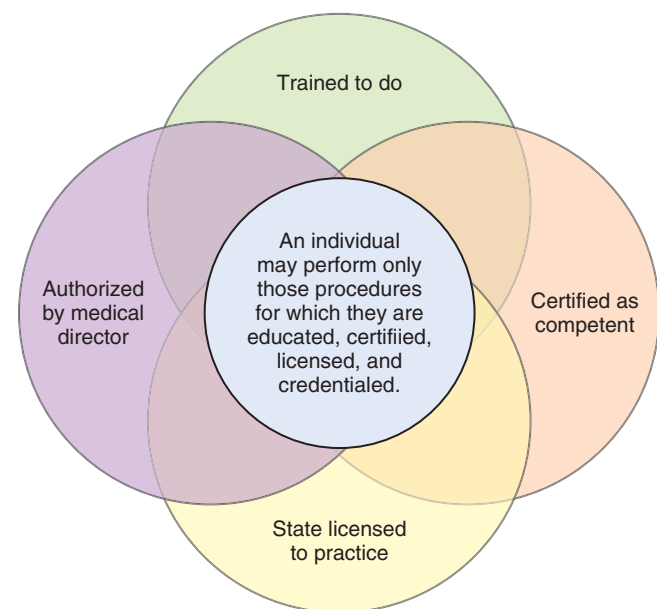


FIGURE 1-6 The relationship among education, certification, licensure, and credentialing.

such, the public has high expectations of EMTs and paramedics while they are both “on” and “off” duty. Therefore, professional conduct at all times and a commitment to excellence in daily activities complement the image of the EMS professional. Image and behavior are vital to establishing credibility and instilling confidence. The professional paramedic represents his or her employer; the EMS agency; the state, county, city, or district EMS office; and his or her peers.

Attributes of the Professional Paramedic

Many aspects of being professional can be applied to the role of the paramedic. Eleven of these attributes follow:¹⁰

1. *Integrity.* Integrity means being honest in all actions. Integrity may be the most important behavior for EMS professionals. The public assumes EMS professionals have integrity. Actions that show integrity include being truthful, not stealing, and providing complete and correct documentation.
2. *Empathy.* Empathy is identifying with and understanding the feelings, situations, and motives of others. EMS professionals must always show empathy to patients, families, and other health care professionals. Behavior that demonstrates empathy includes showing caring, compassion, and respect for others; understanding the feelings of the patient and family; being calm and helpful to those in need; and being supportive and reassuring of others.
3. *Self-motivation.* Self-motivation is the internal drive for merit and self-direction. Self-motivation can mean taking the lead to finish tasks, to improve behavior, and to follow through without supervision. Some marks of self-motivation are showing enthusiasm for learning, being committed to **continuous quality improvement** or CQI (described later in this chapter), and accepting constructive feedback.
4. *Appearance and personal hygiene.* Paramedics are aware of how they present themselves as representatives of their profession. They must ensure that their clothing and uniforms are clean and in good repair. They must be aware of the importance of personal hygiene and good grooming.
5. *Self-confidence.* Paramedics must trust and rely on themselves, often in difficult situations. One key task is to assess personal and professional strengths and weaknesses. The ability to trust personal judgment shows self-confidence.
6. *Communications.* An important part of the paramedic’s job is communicating. Paramedics must be able to convey key information to others verbally and in writing. They must demonstrate communication skills by speaking clearly, writing legibly, and listening actively. Finally, paramedics must be able to adjust communication strategies to various situations.
7. *Time management.* Time management refers to organizing and prioritizing tasks to make the best use of time.

Examples include being punctual and completing tasks and assignments on time.

8. *Teamwork and diplomacy.* The paramedic must be able to work well with others to achieve common goals. As a member of the EMS team, the paramedic must place the success of the team above personal success. This is done by supporting and respecting other team members, being flexible and open to change, and communicating with co-workers to resolve problems. (See Chapter 5.)
9. *Respect.* Respect means having regard for others and showing consideration and appreciation. Paramedics are polite to others and avoid the use of derogatory or demeaning terms. They know that showing respect brings credit to themselves, their association, and their profession.
10. *Patient advocacy.* The paramedic must always act as the patient’s advocate, even when the patient disagrees with the care. Paramedics should not attempt to impose their personal beliefs on patients or allow personal biases (religious, ethical, political, social, legal) to impact patient care. The needs of the patient are always placed above self-interests. The paramedic also must protect the patient’s confidentiality.
11. *Careful delivery of service.* Paramedics deliver the highest quality of patient care. With this care comes attention to detail and proper prioritization of care. They also must evaluate their performance and attitude on every call. As part of the careful delivery of service, paramedics master and refresh their skills; perform full equipment checks; and ensure safe ambulance operations. Paramedics also follow policies, procedures, and protocols and comply with the orders of their supervisors.



CRITICAL THINKING

Which of these professional attributes represent your strengths? Which ones do you think you need to work on?

ROLES AND RESPONSIBILITIES OF THE PARAMEDIC

The paramedic may practice patient care at an emergency scene, from an emergency scene to the hospital, between health care facilities, or in other health care settings as permitted by state and local laws. The paramedic’s roles and duties can be divided into two groups: primary responsibilities and additional responsibilities¹⁰ (Box 1-9).

Primary Responsibilities

The paramedic must be prepared physically, mentally, and emotionally for the job. Preparation includes being committed to positive health practices (see Chapter 2). It also includes having the proper equipment and supplies

BOX 1-9 Roles and Responsibilities of the Paramedic

Primary Responsibilities	Additional Responsibilities
Preparation	Community involvement
Response	Support of primary care efforts
Scene assessment	Advocation of citizen involvement in emergency medical services
Patient assessment	Participation in leadership activities
Recognition of injury or illness	Personal and professional development
Patient management	
Appropriate patient disposition	
Patient transfer	
Documentation	
Returning to service	

and maintaining adequate knowledge and skills of the profession. The paramedic must respond to the scene in a safe and timely manner. Scene assessment must consider personal safety; safety of the crew, patients, and bystanders; and the mechanism of injury or probable cause of illness.

The paramedic must quickly perform patient assessment to determine the injury or illness. Integrating assessment findings with knowledge of disease or injury helps the paramedic formulate a field impression. It also helps set priorities of care and transportation. Managing an emergency often entails following protocols and interacting with medical direction as needed. The care provided by the paramedic should minimize secondary injury. After stabilizing the patient in the field, the paramedic should provide for transport to an appropriate facility. Transportation may include a ground or air ambulance. The type of transport needed for optimal patient care is based on the patient's condition, distance from the hospital, travel time, and other factors. Choosing the most appropriate facility requires knowledge of available resources, hospital designations, and categorization (Box 1-10). The hospital destination decision should be made jointly between the paramedic and the patient in cooperation with medical oversight. Knowledge of transfer agreements and local transport protocols is also helpful.

The paramedic is the patient's advocate as responsibility for care shifts to the staff at the receiving facility. The staff must be briefed about the patient's condition at the scene and during transport. The paramedic also needs to provide thorough and accurate documentation in the **patient care report (PCR)**. The PCR should be completed in a timely manner so that the EMS crew can return to service. The crew should prepare the ambulance for return to service by

BOX 1-10 Sampling of Specialized Care Facilities

Burn specialization center
 Cardiac treatment center
 Clinical laboratory service
 Emergency department
 Facility with acute hemodialysis capability
 Facility with acute spinal cord or head injury management capability
 Facility with reperfusion capability
 Facility with special radiological capabilities
 High-risk obstetrical facility
 Hyperbaric treatment center
 Intensive care unit for trauma patients
 Neurology center
 Operating suite
 Pediatric facility
 Postanesthesia recovery room or surgical intensive care unit
 Psychiatric facility
 Rehabilitation facility
 Stroke center
 Toxicology (including hazardous material or decontamination) service
 Trauma center

replacing equipment and supplies (per agency protocol). The crew also should review the call openly. This can help to identify ways to improve the patient care services that were provided at the scene and during transport.

Additional Responsibilities

Other duties of the paramedic include community involvement, support of primary care efforts, advocating citizen involvement in the EMS system, participation in leadership activities, and personal and professional development.

A paramedic can be involved in the community and can be a role model for the profession in many ways. The paramedic can advocate illness and injury prevention programs (see Chapter 3) and can participate as a leader in community activities. A few ways to improve the health of the community include teaching CPR, first aid, and injury prevention. These activities help to ensure proper use of EMS resources. They can also improve the integration of EMS with other health care and public safety agencies.

Communities and their health care organizations often enlist paramedics to support primary care efforts, and prevention and wellness programs. Paramedics can help to inform the public of the best use of prehospital and other non-EMS health care resources. Examples include alternatives to ambulance transportation, nonhospital emergency department clinical providers, and freestanding emergency clinics. These programs that teach when, where, and how to use EMS and emergency departments promote the best use of health care resources.

Encouraging citizens to be involved in EMS improves the system as a whole. Citizens can help to set the needs and parameters for EMS use in the community. They can offer an objective view into quality improvement and problem solving. In addition, having involved citizens creates informed, independent advocates for the EMS system.



NOTE

Some EMS agencies organize community emergency response teams (CERTs). These teams help prepare citizens to respond to disaster-type emergencies. Members are trained to provide instant help to victims, organize volunteers, and support first responder efforts.

Paramedics can take part in leadership activities in their communities in many ways. One example is conducting primary injury prevention initiatives (activities and risk surveys). Another example is assisting media campaigns to promote EMS issues and other health programs. (See Chapter 3.)

Finally, a paramedic has a responsibility for personal and professional development. There are many methods to accomplish this. Examples include continuing education, student mentoring, membership in professional organizations, and joining professional teams. Other methods include becoming involved in work-related issues that affect career growth, exploring alternative career paths in the EMS profession, conducting and supporting research initiatives, and being actively involved in legislative issues related to EMS.

MEDICAL DIRECTION FOR EMERGENCY MEDICAL SERVICES

The medical direction physician is the medical leader for the EMS system. The physician serves as a resource and as a patient advocate. This relationship between medical direction and the paramedic is critical to an effective EMS system. It allows for the delivery of advanced prehospital care. The ideal medical direction physician is properly educated as an EMS medical director. The physician also is motivated to provide the following¹²:

- EMS system design and operations
- Education and training of EMS personnel
- Participation in personnel selection
- Participation in equipment selection
- Development of clinical protocols in cooperation with expert EMS personnel
- Participation in CQI and problem resolution
- Direct input into patient care
- Interface between EMS systems and other health care agencies
- Advocacy within the medical community
- Guidance as the “medical conscience” of the EMS system (advocating for quality patient care)



SHOW ME THE EVIDENCE

Researchers asked nationally registered EMS professionals how much contact they had with their medical director in the previous 6 months. For that period 62.5% of respondents indicated contact with the medical director during education, a call review, or on the scene. Paramedics were more likely (78.5%) than EMT-Intermediates (62.3%) or EMT-Basics (47.6%, $p < 0.001$) to have had contact with the medical director. Urban EMS professionals were more likely to have had MD contact than rural respondents (64.9% vs. 59.2%, $p < 0.001$).

From: Studnek JR, Fernandez AF, Margolis GS, O'Connor RE: Describing the amount of medical director contact among nationally registered emergency medical services professionals. Abstract published in *Prehosp Emerg Care*, 12(1): 115, 2008.

Types of Medical Direction

The two types of medical direction are **online (direct) medical direction** and **off-line (indirect) medical direction**.¹³ Both types ensure the quality of medical care in an EMS system. Most prehospital care is provided through standing orders and patient care protocols (varies by state). There are times, however, when a patient care issue falls outside the scope of standing orders or an unusual situation at the scene arises. When this occurs, the paramedic may need to contact online medical direction by radio or phone to convey the patient's information and to receive orders through direct consultation with a physician or physician designee. This designee may be a registered nurse or physician assistant. The designee also may be a paramedic trained to give ALS orders in the medical direction system. Online medical direction allows for instant and specific care, telemetry, and CQI while paramedics are on the scene. As a rule, online medical direction supersedes off-line medical direction.¹⁴

An advisory group often is the voice behind the off-line direction, but it also can be provided by one or more medical directors. A director must have full medical direction authority. He or she also must have knowledge of how the EMS system operates. This type of direction can be *prospective* or *retrospective*. Prospective off-line direction covers the authority to set **treatment protocols** and **standing orders** (Box 1-11). Such knowledge includes training for care and triage in the prehospital arena, as well as the choice of equipment, supplies, and personnel. Retrospective off-line direction includes any actions that take place after the EMS call. An example is reviewing a patient care report and providing CQI.

On-Scene Physicians

Some of the first ambulance personnel were physicians. Yet, rarely is a medical direction physician on the scene providing direct field supervision of EMS personnel. At times, however, a physician (*physician intervenor*) may witness the injury or illness. Perhaps the patient's private physician is on the scene when EMS arrives. When this occurs, positive

BOX 1-11 Protocols

Treatment protocols are written guidelines that define the scope of prehospital care for emergency medical services (EMS) personnel. The medical director of the EMS or members of a regional EMS advisory group create them. The paramedic must adhere to these protocols. The paramedic must follow the protocols unless advised otherwise by medical direction.

Standing orders are more specific than protocols. Standing orders usually are included in a protocol when a delay in treatment would harm the patient. Most protocols and standing orders comply with national standards. They also comply with state EMS medical practice acts and regional guidelines. An example of a national standard is the American Heart Association guidelines for advanced cardiac life support. Another is the American College of Surgeons standards for advanced trauma life support. Protocols define the standard of care for paramedic crews and online physicians. The cases in which the paramedic acts strictly by standing orders usually are few. These situations may include intubation of a nonbreathing patient or first-line medication administration in cardiac arrest. Situations also may include events in which radio contact has failed and a delay could threaten the patient outcome.

interaction between the on-scene physician and the EMS crew is essential.



NOTE

An on-scene physician may not be familiar with functions of emergency medical services or medical oversight responsibilities. The lines of authority and responsibility for these physicians vary from state to state. Each EMS agency should have a policy that defines interaction with physicians on the scene.

If a nonmedical direction physician or the patient's physician is on the scene, EMS personnel must follow protocols. If no protocols are in place, the paramedic should immediately contact online medical direction. The policies of many EMS agencies require that the physician on the scene can assume responsibility for patient care and provide medical direction.¹⁵ Together the physicians can make choices about the patient's care. With permission of medical direction, a physician on the scene may take control of the patient's care. If a physician on the scene tries to direct care in opposition to medical direction, EMS personnel should have law enforcement intervene. This will ensure that the scene is safe and the EMS care goes uninterrupted.

IMPROVING SYSTEM QUALITY

A major goal of any EMS system is to evaluate and improve care continually. One way to meet this goal is through a modified form of quality assurance. This form of quality assurance is known as *continuous quality improvement* (CQI), which is the ongoing study and improvement of a process, system, or organization (Box 1-12).

BOX 1-12 Quality Assurance and Continuous Quality Improvement

Quality assurance (QA) is a system of quality management that by tradition was linked with spotting deviations from a standard (e.g., protocols). Quality assurance also altered these deviations through some type of punitive action. Continuous quality improvement (CQI) is a modified form of QA. Continuous quality improvement focuses on the system and not the individual, thus removing much of the punitive aspect associated with a QA program. Continuous quality improvement is less rigid than QA. In addition, CQI considers many factors that often apply to EMS. Continuous quality improvement includes the entire medical direction system and involves all health providers in the problem-solving process.

The EMS worker should use input from CQI activities to adapt treatment protocols and educational activities when needed. The goal of CQI is to find and fix problems in a positive manner. Continuous quality improvement also is aimed at improving the overall system. CQI activities include a review of the following:

- Outcome measures of prehospital care (e.g., scene times, procedure completion rates, and mortality reviews)
- Care while treatment is ongoing (concurrent reviews)
- Written EMS patient care paperwork (retrospective reviews)
- Random or selected radio communication tapes
- New procedures, equipment, or therapies

A CQI program identifies and attempts to improve problems in certain areas. Key areas that are monitored in most EMS systems include:

- Medical direction
- Financing
- Training
- Communications
- Prehospital management and transportation
- Interfacility transportation
- Receiving facilities
- Specialty care units
- Dispatch
- Public information and education
- Audit and quality assurance
- Disaster planning and mutual aid

Continuous quality improvement is a process that involves all caregivers in the problem-solving aspect (Figure 1-7). Continuous quality improvement stresses the value of enabling frontline personnel to perform their jobs well. With this group approach, all parties can be involved in elaborating on the cause of the problem. They can work together to develop remedies and can design a course of action to correct the problem. Then they can enforce the plan and reexamine the issue to see whether the problem has been resolved.



CRITICAL THINKING

The number of needle-stick injuries in your agency has increased. How might the continuous quality improvement process affect this situation?

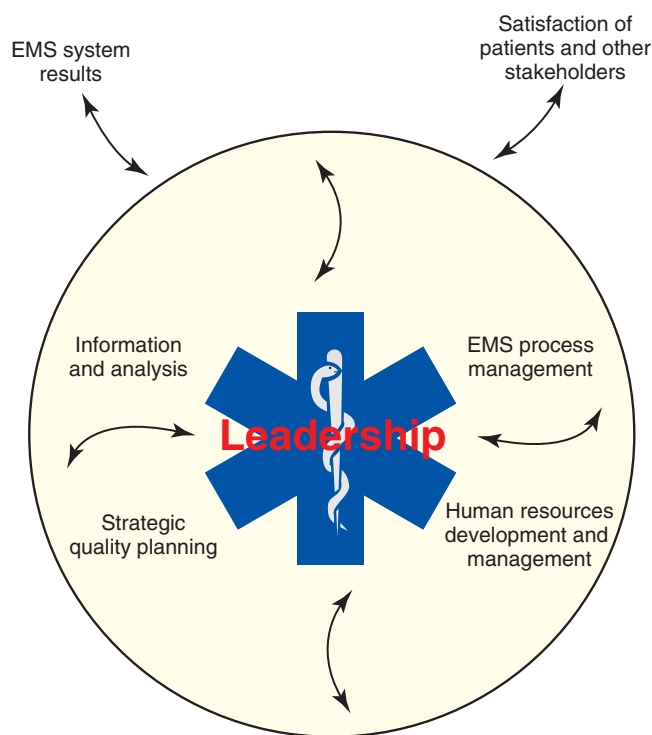


FIGURE 1-7 Leadership guide to quality improvement for EMS. (U.S. Department of Transportation, Health Resources and Services Administration, Maternal and Child Health Bureau, *A leadership guide to quality improvement*, Washington, DC, 1999, The Administration.)

Key actions or categories for EMS leaders to improve quality within their organization are as follows⁹:

1. *Leadership* involves efforts by senior leadership and management. These persons lead by example to integrate CQI into the strategic planning process and throughout the entire organization. Such integration promotes quality values and CQI techniques in work practices.
2. *Information and analysis* deal with managing and using the data needed for effective CQI. Continuous quality improvement is based on management by fact. Thus information and analyses are critical to CQI success.
3. *Strategic quality planning* has three main parts. The first is developing long- and short-term goals for structural, performance, and outcome quality standards. The second is finding ways to achieve those. The third is measuring the effectiveness of the system in meeting quality standards.
4. *Human resource development and management* refers to developing the full potential of the EMS workforce. This effort is guided by the principle that the entire EMS workforce is motivated to achieve new levels of service and value.
5. *Emergency medical services process management* concerns the creation and maintenance of high-quality services. Within the context of CQI, process management refers to the improvement of work activities. Process

management also refers to improving work flow *across* functional or departmental boundaries.

6. *Emergency medical systems results* entail assessment of the quality results achieved and examining the success of the organization in achieving CQI.
7. *Satisfaction of patients and other stakeholders* involves ensuring ongoing satisfaction. Those internal and external to the EMS system must be satisfied with the services provided.

Benefits gained by applying these seven guidelines and recommendations are many. They include improvements in service and patient care delivery, economic efficiency, and profitability. They also help improve patient and community satisfaction and loyalty, and healthful outcomes.



SHOW ME THE EVIDENCE

The 2007 U.S. Metropolitan Municipalities' EMS Medical Directors' Consortium describe an evidence-based model to measure quality within suburban and urban EMS systems. They include specific key interventions and numbers-needed-to-treat that should be measured in the areas of ST-elevation myocardial infarction (STEMI), pulmonary edema, asthma, seizure, trauma, and cardiac arrest. The interventions to be evaluated in CQI are those that have been demonstrated by research to have a positive impact on patient outcome. For example, in a patient with trauma, prehospital records should be evaluated for scene time <10 minutes and transport to a trauma center.

From: Myers JB, Slovis CM, Eckstein M, et al: Evidence-based performance measures for emergency medical services systems: a model for expanded EMS benchmarking, *Prehosp Emerg Care* 12(2): 141-151, 2008.

PATIENT SAFETY

Patient safety is one of the most urgent health care challenges. In 1996, the Institute of Medicine (IOM) launched an ongoing effort to assess and improve the nation's quality of care. The report brief of this initiative is titled *To Err is Human: Building a Safer Health System*. This study found that¹⁶:

- Health care in the United States is not as safe as it should be—and can be.
- At least 44,000 people, and perhaps as many as 98,000 people, die in hospitals each year as a result of medical errors that could have been prevented.
- Preventable medical errors in hospitals exceed attributable deaths to such feared causes as motor-vehicle wrecks, breast cancer, and AIDS.
- High error rates with serious consequences are most likely to occur in intensive care units, operating rooms, and emergency departments.
- Most errors are caused by faulty systems, processes, and conditions (Box 1-13).

High-Risk Activities

There are many activities that can lead to medical errors in EMS. Some of the more high-risk activities include:

BOX 1-13 Types of Errors

Diagnostic

- Error or delay in diagnosis
- Failure to employ indicated tests
- Use of outmoded tests or therapy
- Failure to act on results of monitoring or testing

Treatment

- Error in the performance of an operation, procedure, or test
- Error in administering the treatment
- Error in the dose or method of using a drug
- Avoidable delay in treatment or in responding to an abnormal test
- Inappropriate (not indicated) care

Preventive

- Failure to provide prophylactic treatment
- Inadequate monitoring or follow-up of treatment

Other

- Failure of communication
- Equipment failure
- Other system failure

Types of Errors from IOM report, <http://www.iom.edu/Object.File/Master/4/117/ToErr-8pager.pdf>, accessed August 26, 2010.

- Ambulance crashes
- Dropping patients
- Hand-offs
- Communication issues
- Medication issues
- Poor sterile technique
- Airway issues
- Spinal immobilization



DID YOU KNOW?

Hand-offs involve the transfer of rights, duties, and obligations from one person or team to another. Hand-offs should include the continuity and safety of the patient's care. For hand-offs to be effective, a solid foundation in communications is necessary. Face-to-face communications through a standardized process is the best way to transfer patient care. This should include an opportunity to ask and respond to questions. The hand-off includes current information about the patient, such as care, treatment, condition, and recent or anticipated changes in the patient's condition. A memory aid that can be used to provide structure in handoffs is *I Pass the Baton* (Figure 1-8).¹⁷

Most errors can be avoided by maintaining skill proficiency; by following established rules and protocols; by maintaining team communications; and by ensuring an adequate knowledge base in patient care procedures and related EMS duties. Patient safety issues will be discussed throughout this text.



SHOW ME THE EVIDENCE

Researchers in the UK surveyed four emergency departments and one ambulance service to investigate the hand-over process from ambulance personnel to the ED staff. They found a lack of active listening skills in the ED staff led to frustration of the EMS crews. They report that ambulance staff should be prepared to repeat their report, especially for seriously ill or injured patients. Reports for critically ill patients should be delivered in two phases: with essential information reported at the time of handoff and more detailed information conveyed after initial care of the patient in the ED has begun. They recommend more ED education on this process.

From: Jenkin A, Abelson-Michell N, Cooper S: Patient handover: time for a change? *Accid Emerg Nurs* 15(3): 141-147, 2007.

I PASS the BATON

I	Introduction	Individuals involved in the handoff identify themselves, their roles and jobs
P	Patient	Name, identifiers, age, sex, location
A	Assessment	Present chief complaint, vital signs, symptoms, and diagnosis
S	Situation	Current status and circumstances, including code status, level of certainty or uncertainty, recent changes, and response to treatment
S	Safety concerns	Critical lab values and reports, socioeconomic factors, allergies and alerts, such as risk for falls
the		
B	Background	Comorbidities, previous episodes, current medications, and family history
A	Actions	Detail what actions were taken or are required and provide a brief rationale for those actions
T	Timing	Level of urgency and explicit timing, prioritization of actions
O	Ownership	Who is responsible (nurse/doctor/team), including patient and family responsibilities?
N	Next	What will happen next? Any anticipated changes? What is the plan? Any contingency plans?

FIGURE 1-8 Transferring patient care safely.

Preventing Medical Errors

Patient safety solutions have been developed by the World Health Organization (WHO), in collaboration with the Joint Commission, and The Joint Commission International. This group defined *patient safety solutions* as: “Any system design or intervention that has demonstrated the ability to prevent or mitigate patient harm stemming from the processes of health care.” In 2007, the International Steering Committee approved nine solutions for patient safety (Box 1-14).¹⁸

BOX 1-14 Nine Patient Safety Solutions

- 1. Look-Alike, Sound-Alike Medication Names:** Confusing drug names is one of the most common causes of medication errors and is a worldwide concern. With tens of thousands of drugs currently on the market, the potential for error created by confusing brand or generic drug names and packaging is significant.
- 2. Patient Identification:** The widespread and continuing failures to correctly identify patients often leads to medication, transfusion, and testing errors; wrong person procedures; and the discharge of infants to the wrong families.
- 3. Communication During Patient Hand-Overs:** Gaps in hand-over (or hand-off) communication between patient care units, and between and among care teams, can cause serious breakdowns in the continuity of care, inappropriate treatment, and potential harm for the patient.
- 4. Performance of Correct Procedure at Correct Body Site:** Considered totally preventable, cases of wrong procedure or wrong site surgery are largely the result of miscommunication and unavailable, or incorrect, information. A major contributing factor to these types of errors is the lack of a standardized preoperative process.
- 5. Control of Concentrated Electrolyte Solutions:** Although all drugs, biologics, vaccines, and contrast media have a defined risk profile, concentrated electrolyte solutions that are used for injection are especially dangerous.
- 6. Assuring Medication Accuracy at Transitions in Care:** Medication errors occur most commonly at transitions. Medication reconciliation is a process designed to prevent medication errors at patient transition points.
- 7. Avoiding Catheter and Tubing Misconnections:** The design of tubing, catheters, and syringes currently in use is such that it is possible to inadvertently cause patient harm through connecting the wrong syringes and tubing and then delivering medication or fluids through an unintended wrong route.
- 8. Single Use of Injection Devices:** One of the biggest global concerns is the spread of human immunodeficiency virus (HIV), the hepatitis B virus (HBV), and the hepatitis C virus (HCV) because of the reuse of injection needles.
- 9. Improved Hand Hygiene to Prevent Health Care-Associated Infection (HAI):** It is estimated that at any point in time more than 1.4 million people worldwide are suffering from infections acquired in hospitals. Effective hand hygiene is the primary preventive measure for avoiding this problem.

Methods to Help Prevent Medical Errors in EMS

Methods to avoid medical errors in EMS can be grouped into environmental methods and individual methods.

Environmental methods that can help prevent medical errors include having clear and established protocols for procedures; ensuring that there is sufficient lighting for patient assessment and patient care procedures; and performing patient care duties with minimal interruptions. Organizing and packaging drugs (e.g., separating adult and pediatric drugs) to avoid confusing the medications is another example of an environmental method to reduce medical errors. Another example of a safety method to reduce medical error is securing equipment in the patient compartment of the ambulance. Another is safely securing adult and pediatric patients during transport.



DID YOU KNOW?

Medication Error Survey: Paramedic Self-Reported Medication Errors

BACKGROUND: Continuing quality improvement (CQI) reviews reflect that medication administration errors occur in the prehospital setting. These include errors involving dose, medication, route, concentration, and treatment.

METHODS: A survey was given to paramedics in San Diego County. The survey tool was established on the basis of previous literature reviews and questions developed with previous CQI data.

RESULTS: A total of 352 surveys were returned, with the paramedics reporting a mean of 8.5 years of field experience. They work an average of 11.0 shifts/month with an average of 25.4 hours and 6.7 calls/shift. Thirty-two (9.1%) responding paramedics reported committing a medication error in the last 12 months. Types of errors included dose-related errors (63%), protocol errors (33%), wrong route errors (21%), and wrong medication errors (4%). Issues identified as contributing to the errors include failure to triple check, infrequent use of the medication, dosage calculation error, and incorrect dosage given. Fatigue, training, and equipment setup of the drug box were not listed as contributing factors. The majority of these errors were self-reported to the CQI representative (79.1%), with 8.3% being reported by the base hospital radio nurse, 8.3% found upon chart review, and 4.2% noted by paramedic during call but never reported.

CONCLUSIONS: Nine percent of paramedics responding to an anonymous survey report medication errors in the last 12 months, with 4% of these errors never having been reported in the CQI process. Additional safeguards must continue to be implemented to decrease the incidence of medication errors.

From: Vilke GM, Tornabene SV, Stepanski B, et al: Paramedic self-reported medication errors, *Prehosp Emerg Care* 11(1):80-84, 2007.

Individual methods include personal activities to improve patient safety. These include:

- **Reflection in action:** Think during an event (during action) when things do not go as planned. Reflection in action allows us to reshape what we are working on *while*

we are working on it. It helps us as we complete a task. Reflection in action promotes critical thinking and bridges the gap between “knowing and doing.”

- **Question assumptions:** Apply critical thinking to continuously look for good ideas and new solutions. This will help to set priorities and to problem solve.
- **Reflection bias (“hindsight” bias):** Avoid the tendency to judge an event, because a bad outcome is known from a previous experience you had. (“*I knew that was going to happen.*”) Reflection bias is the inclination to see events that have occurred in the past as more predictable than they really were. Review the events after the fact and you

might foresee the outcome as more preventable. Replace hindsight with insight.

- **Use decision aids:** Use evidence-based decision aids and guidelines (e.g., algorithms, pocket guides) to simplify decision making and improve patient safety. Decision aids can also facilitate patients’ participation in decisions about their care, when appropriate.
- **Ask for help:** You are functioning as part of a team. Don’t be hesitant to ask your crew members or medical direction for help or advice, if the need arises. If you are unsure about a decision, drug dose, or procedure, remember that patient safety comes first.

SUMMARY

- The roots of prehospital emergency care may date back to the military.
- In the early twentieth century through the mid-1960s, prehospital care in the United States was provided in a few ways. Care was provided mostly by urban hospital-based systems. These systems later developed into municipal services. Care also was provided by funeral directors and volunteers who were not trained in these services.
- The operations of an effective EMS system include citizen activation, dispatch, prehospital care, hospital care, and rehabilitation.
- Each level of EMS personnel have their own distinct roles and duties. These roles include telecommunicators (dispatchers), emergency medical responders, EMTs, advanced EMTs, and paramedics. These levels combine to make an effective prehospital EMS system.
- Many professional groups and organizations help to set the standards of EMS. These groups exist at the national, state, regional, and local levels. The groups take part in development, education, and implementation. Being active in such a group helps to promote the status of the paramedic.
- Continuing education is crucial. It provides a way for all health care personnel to maintain basic technical and professional skills.
- Professionalism refers to the way in which a person conducts himself or herself. Professionalism also refers to how one follows the standards of conduct and performance established by the profession.
- The roles and duties of the paramedic can be divided into two categories: *primary* and *additional* duties.
- The two types of medical direction are online (direct) and off-line (indirect). Both are equally important. They help to ensure that the components of quality medical care are in place in an EMS system.
- A CQI program identifies and attempts to resolve problems in areas such as medical direction, financing, training, communication, prehospital management and transportation, interfacility transfer, receiving facilities, specialty care units, dispatch, public information and education, audit and quality assurance, disaster planning, and mutual aid.
- Patient safety should be a high priority during every call. Errors that may cause injury or illness often involve handoffs, communication issues, medication issues, airway issues, lifting or moving patients, ambulance crashes, and immobilization.

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