

## Emergency Medical Services

In September of 2009, the National Highway Traffic Safety Administration (NHTSA) released data from a survey conducted in 2007, that outlined the use of Emergency Medical Services (EMS) in the United States. The survey revealed that two out of every five Americans that are 16 years of age or older, have called 9-1-1 for help and that one out of every three of these people had made a 9-1-1 call for help within the previous year. The final data indicated that one out of every seven people that are 16 or older in the United States had called 9-1-1 for help at least once within the past year (Block, A.W., 2009).

The United States EMS system is a critical aspect to the population's health. Each year, more than 200,000 Emergency Medical Technicians (EMT) work to provide effective medical care to people in critical and emergent need. These health care workers are exposed to high stress situations, in uncontrolled environments, where the consequences of their actions could impact the life another human being. It is a difficult job, that is, consequently, marred by a high attrition rate, but, as it has been for centuries, it is an integral part of promoting the health of human beings.

### History

The concept of transporting patients in need of medical attention to appropriate facilities and providing appropriate treatment, en route, has been around for centuries. In The Bible story of The Good Samaritan, a Samaritan provided bandages for an injured Jewish man's wounds and provided oils to reduce his pain. The Samaritan then transported the injured man to a local inn where he paid for him to rest and recover from his wounds. The actions of this Samaritan, exhibited characteristics of the typical practices of an EMS worker. Even this far back in time, accounts of people helping others and transporting them to locations where their health is best served is a common theme. The true origin of EMS can not truly be pinpointed, as helping one's neighbor may be a factor of basic evolution. However, important periods in the evolution of this process and the refinement of medical care provided, that have led us to its current system, can be identified throughout human history.

One of the most significant steps in the evolution of the modern Emergency Medical Service came about during the French Napoleonic Wars. Appalled by the treatment of injured soldiers on French battlefields, the military surgeon, Jean Larrey suggested an intervention that changed the practice of military medicine throughout the world. Prior to Larrey, mobile hospitals (ambulances) were large mobile facilities that were required to stay one league away from battle, while military battles took place. This meant that injured soldiers were regularly left untreated on the battlefield for times that would, commonly, exceed 24 hours. Larrey felt that this practice was inhumane and suggested the construction and use of "flying ambulances." Larrey's "flying ambulances" were wooden carts, with roofs, that had room for two people to be treated and transported inside. French soldiers would no longer have to wait to be medically treated until the battle was over. Introduction of Larrey's "flying ambulances" on the battlefield were credited with the preservation of the lives of several French soldiers, that would have otherwise died. His

methods were respected by both friends and foes and inspired other armies to mimic his practices. His success has led many to credit Baron Dominique Jean Larrey as the father of the modern ambulance (Skandalakis, 2006).

Adopted by many, Larrey's methods were practiced and refined continuously throughout the years. In the United States, Larrey's methods were first used during the Civil War. Corpsmen were trained to treat and transport patients from the battlefield to medical tents and were even transported to hospitals via railroad, if needed. Following the war, these practices were translated to the public sector with the creation of the first hospital run, public EMS system in Cincinnati, Ohio. Shortly thereafter, EMS systems began developing throughout the country and the United States EMS system was born.

During World War I, further medical developments helped improve the survival rates of soldiers and increased the efficiency of the EMS service. Medical interns were sent out in vehicles driven by truck drivers to treat patients in the field. Staffing these ambulances with qualified medical interns ensured that there was personnel that was trained in providing medical care. These practices were brought back to the United States public systems and improved the standard of care that the EMS system could provide their patients. However, World War II experienced a shortage of qualified doctors and resulted in the recall of interns back to the hospitals on bases. As a result, the standard of care in the ambulances dropped considerably, as the trucks were no longer staffed by medically educated medical interns.

The 1950s and early 1960s marked a period of time where EMS systems evolved into two separate systems. One system was run by the hospitals, while another was privately owned. Neither of these two organizations were subject to significant oversight, characteristic of today's medical system, and were not provided with standardized practices of emergency care (Kuehl, A., 2002).

In 1966, United States government released The White (Accidental Death and Disability: The Neglected Disease of Modern Society) Paper to address EMS discrepancies. It identified 24 specific disparities in the practice of all emergency medical care throughout the United States that congress felt needed immediate attention. The paper established guidelines, that were paramount in reforming the failing system. In particular congress used this paper to promote a focus on providing standardized medical care for patients in both the prehospital and hospital settings, that would best promote the health of patients. In addition, it also established the need for the creation of the Highway Safety Act, which identified the need for EMS systems in all areas of the country and began establishing oversight for the practice of EMS care. Arguably, the most important of all of the identifications that the report made was that EMS workers needed to receive education in order to effective providers of care (emt-resources.com, 2009). Prior to this report, no standards of minimal education were necessary to practice as an Emergency Medical Technician (EMT). The White Paper marks the beginning of regulation and standardization of medical care in the modern EMS system we are accustomed to today.

During the Korean and Vietnam Wars, further advancements in EMS practices were established, including the use of alternative vehicles for extraction. In particular, the Vietnam War had soldiers battling in dense, treacherous terrain. As a result, helicopters were used to extract

wounded soldiers and provide them with appropriate medical care (Mistovich, J. J. et. al., 2004). This marked the birth of EMS air transport and identified a resource that could provide access to appropriate medical care to people that were not in close proximity to necessary care. This evolution in the EMS system allows people that live in rural environments the ability to be treated for time sensitive maladies at a much more rapid pace.

Currently, the EMS system is regulated by the National Highway Traffic Safety Administration (NHTSA) of the Department of Transportation. Each state has its own requirements for certification, but all require the minimum outlined by the NHTSA. As education of the EMT becomes more comprehensive, so does the EMT's scope of practice. The current scope of practice for EMS personnel includes ambulances, in-hospital ICUs and emergency departments, air transport, medical education specialists, disaster preparedness experts and much more.

### Public and Private EMS Systems

The EMS system is divided into two main systems. One system is public funded and managed, while the other system is privately funded and run for profit. In a study conducted by the second largest private ambulance company in the United States, Rural/Metro Corporation, it was estimated that the EMS system was worth \$13 billion in gross revenue annually. The study also identified that 44% of EMS was provided by the public sector, 40% private sector, 9% hospitals, and 7% public utilities (IBISWorld Inc., 2009). Although the system is primarily managed by the public, it is clear that the private sector does play an important role in providing EMS in the United States.

Public service EMS, found in metropolitan areas, is usually a separate entity from fire departments, while in rural areas and suburbs, the EMS system is mostly comprised of paramedics that also act as the area's fire services. Publicly provided EMS services are primarily subsidized by local and state funding collected through taxes. Each system has their own governmentally approved budget that varies on demand and the systems ability to provide appropriate care to their patients. What separates these two methods of providing public EMS care is funding and demand for services. In major cities, the demand for both fire services and EMS services is high, as a result of the large population base and area that these services must cover. Therefore fire and EMS services are provided separately. Contrastingly, in suburban and rural communities, the area and population that is served is much smaller than in the cities and the demand for Fire and EMS services is not nearly as high. In order to serve the public's needs on the smaller budget, dictated by the decreased demand, Fire and EMS services merge as one city-provided service. These paramedics are forced to remain well versed on both fire protocols and EMS standards that govern their combined practices. The public sector of EMS is primarily the first responder in any medical event and is provided to the citizens at their 911 request.

Private ambulance services are also provided to patients throughout the country. These services are, usually, managed for-profit and provide transportation to patients that require medical supervision in transit. In 2009, privately run EMS systems accounted for more than 17,000 of the EMS establishments in the country, and employed more than 150,000 workers. These organizations provide care through several different practices (IBISWorld Inc., 2009). Unlike public sector EMS, privately funded EMS are used in many non-emergent transport situations.

When patients are discharged from medical facilities, but still need medical assistance to reach their destination safely, private EMS systems are called for transportation. In many cases, hospitals contract a specific company to provide these services to their patients. The competition for these contracts is very intense. This allows hospitals to establish contracts with reliable providers at competitive prices, but limits the revenue that ambulance companies receive for providing their services. These contracts are also common with nursing home patients that tend to demand more medical care, which is not always emergent. Private EMS is also used, in some instances, where cities and towns have determined that their publicly provided EMS is not affordable or efficiently run. These private services are contracted with the city to provide care for the public's 911 needs. Private ambulance companies have experience at providing efficient care to communities and hospitals across the country. Therefore, some communities feel that their needs would be best served through public sector utilization of these services (IBISWorld Inc., 2009).

In both systems, EMS care is provided at the direction of a physician medical director. These physicians are, usually, local emergency physicians that outline protocols for EMS patient treatment and provide direction to EMS when deviation from protocols is necessary. EMS workers provide care under the direction of that physician's medical license.

#### How EMS is funded

The emergent nature of many EMS transportations, mandates the undivided attention of the personnel that arrives. The ability of the patient to pay for services or the identification of reimbursable services should never be a priority to EMS personnel. As a result, laws have been enacted that dictate full Medicare reimbursement of medically necessary ambulance services. In order to control ambulance costs, the Medicare Ambulance Fee Schedule Final Rule was established in 2002. The Final Rule stipulates that total costs for ambulance services be no greater than the cost that Medicare is willing to fully reimburse. Using this value, Medicare then covers 80% of this cost and leaves the last 20% to be reimbursed by a secondary insurance provider, or the patient. Medicare accounts for almost 1/3 of all EMS revenue annually. In addition, patients that are insured through Medicaid are fully covered for all medically necessary EMS use. Medicaid patients are not responsible for any charges that exceed what Medicaid is willing to reimburse. Funding can also be subsidized by state and local governments. Some public systems, ignore the patient's financial responsibility for EMS use. These systems tend to use tax revenue to account for the community's annual use of EMS instead of requiring individual payment for each use (IBISWorld Inc., 2009). This funding process hopes to ensure that reimbursement is not a factor in providing appropriate medical care to a patient and that costs for care do not become extravagant and exceed Medicare identified values.

#### What happens when you call 9-1-1...

An emergency begins with a call received by dispatch to EMS services. In this call dispatchers try to collect pertinent data about the scene EMS will be heading towards and the chief complaint and description of the patient. The dispatcher then notifies EMS in their facility that they have a call by ringing an alarm in their station while giving information over the radio notifying the EMT personnel that are staffing the ambulance of the emergency, chief complaint, description of

the patient, and the scene they are heading towards. The crew and ambulance heading to the emergent situation is referred to as a “squad,” with each squad representing a different EMT crew and ambulance. The dispatcher then returns to the call, trying to acquire more pertinent information for EMS. Immediately following the alarm, EMS assembles, identifies where they need to go, and prepares for the situation they are heading towards. As the squad heads towards the emergency, dispatch informs them of any additional information EMS needs to be aware of upon arrival. If additional information is provided, or the initial information provides the members of the squad with sufficient knowledge, many EMS personnel will refer to their reference guides of protocols that outline what the squads medical director has instructed them to do in their anticipated situation.

Squads usually comprise of three members to treat the patient. The driver of the squad determines whether lights or sirens are necessary in reaching the destination in a safe and timely manner. Upon arrival EMS enters the scene of the emergency taking great lengths to be aware of their surroundings and ensuring their safety so they can best treat the patient. EMS identifies themselves to the patient and surrounding pedestrians/family and inquires about the emergency. One person documents and tries to gather as much information as possible about the emergency, while the others tend to the patient directly. While one EMS worker is collecting the information, the others assess the patient beginning with their airway, breathing and circulation making special note to keep the patient aware of what is happening. After the necessary assessment is completed, protocols are commenced regarding care of the patient. If deviation from these protocols needs to take place, medical command is expressly called. If warranted, the patient is brought into the squad via stretcher and further medical actions take place. The EMS worker talking with the family lets them know where they are headed and keeps the family aware of what measures are being done regarding the safety of their loved one. The squad then departs for the appropriate care center (hospital) for the complaint, after making sure that the hospital is accepting patients with dispatch. While en route, further medical attention is given, if warranted, and the hospital of destination is called, making them aware of what type of patient the hospital is about to receive. This allows the hospital to prepare appropriately for the medical emergency the patient is experiencing. Upon arrival a report of the events is given to a hospital representative of equal or greater ability of care (i.e. paramedic to paramedic report, paramedic to nurse report, or paramedic to physician report). Care is then transferred to the hospitals services. In some cases, EMS may be asked by the physician to assist in care of the patient. If medical command has made the request for them to stay and assist or if their presence does not impede their responsibility to the community they serve, they may stay to assist. Otherwise, EMS leaves a written copy of the events that took place and heads back to their quarters. After returning to quarters, the squad is restocked of all the materials used in the previous run and appropriate cleaning measures are initiated. The EMS worker that took report on scene completes a thorough report of the events that took place and the report is submitted for review by the chief and review board if warranted. The run is discussed for efficiency.

### Education and Training

In 1970, responding to the new standards of education that were required of EMS workers, the Committee on Highway Traffic Safety determined that it was necessary to establish a certification agency, called the National Registry of Emergency Medical Technicians (NREMT).

This organization proctored the first EMT-Ambulance certification examination in 1971, which marked the beginning of establishing standards of practice for EMTs throughout the country. Passing the EMT-Ambulance exam was the only requirement to becoming a certified EMT, which was the only designated title of an EMS worker at the time. In 1974, the EMT community collaborated to establish a standardized curriculum for the training of EMTs, which led to the first NREMT Paramedic certification exam, given in 1978. This exam covered necessary medical skills that were important for EMS personnel to master to provide appropriate medical care to their patients. The following year led to the creation of a curriculum for an additional EMT certification, called the EMT-Intermediate. EMT-Intermediates were not as advanced as EMT-Paramedics, but were considered functional members of EMS. This change was the first instance where EMTs were divided and categorized with differing scopes of practice. This occurred again in 1989, when the EMT-Basic curriculum and certification was established. This certification identified the EMTs with the smallest scope of practice and was considered a necessary step in becoming an EMT-Paramedic. The NREMT currently identifies five levels of certifications that EMTs can carry, each with varying scopes of practice and required education (NREMT, 2008).

Although the NREMT established government approved curricula for the training and certification of EMTs, these certifications do not ensure that an EMT can practice. In order to practice as an EMT, a certified EMT must apply for permission from their state. In many states, these applicants must have taken and passed an NREMT certification exam, but not all states have this requirement. All states require the completion of minimum guidelines outlined by the NHTSA, but some feel it is not necessary for EMTs to be NREMT certified. They feel there are other standards that are more appropriate for their EMTs. It is important that anyone interested in becoming an EMT identify the state requirements and meet those standards, so they are able to practice.

### Three Common Certification Levels of EMTs EMT - Basic

The Emergency Medical Technician - Basic (EMT - B) is trained in basic skills to manage and transport critical and emergent patients to an appropriate source of medical care. They are trained in basic assessment and interventional practices that serve to minimize the morbidity and mortality of the patients they treat and transport. The EMT - Basic is trained to be proficient in controlling life threatening situations like keeping a patient's airway patent, providing ventilation for a patient, provide semi-automated defibrillation, controlling severe bleeding, administering limited medications, and treating shock (Armstrong, E., et. al., 2007). In addition, the EMT - Basic must be able to bandage wounds, splint fractures, deliver infant care, deal with psychological stresses of the patient, family members and associates (Mistovich et. al., 2004). These skills act as a basis for further education and EMT certifications. In order to become certified as an EMT - Basic, the National Highway Traffic Safety Administration (NHTSA) has required that each applicant to a program be at least 18 years of age and be certified in Cardiopulmonary Resuscitation (CPR). The standard curriculum for EMT - Basics requires that they receive 110 hours of class instruction as well as some clinical experience. The students are mandated to preform a minimum of five clinical assessments, that are reviewed by their clinical preceptor for competent performance (Samuels, D.J. et. al., 1994). After successful completion of classroom and clinical requirements, students are usually required to complete a state

mandated certification exam. In most states, this exam is the NREMT EMT - B exam, but this requirement may vary based on state laws. After completion of this exam students must apply for a state license to practice.

### EMT - Intermediate

The Emergency Medical Technician - Intermediate (EMT - I) is trained in basic and a small number of advanced skills to manage and transport critical and emergent patients to an appropriate source of medical care. The EMT - Intermediate is versed in all skills of all EMT - Basics as well as intravenous therapy, medicine administration, and advanced airway devices (Mistovich et. al., 2004). These skills are important in reducing morbidity and mortality in critical and emergent patients and play a further role for the EMT - Paramedic. However, this certification is not a necessary step in earning a EMT - Paramedic certification. These skills are thoroughly reinforced in Paramedic training, making this certification unnecessary in a path to becoming a paramedic. The training to become an EMT - I is longer than that of an EMT - B, but much shorter than an EMT - P, making it appealing to many EMTs. In order to begin training, it has traditionally been necessary for a student to be a certified EMT-B, but this requirement varies from state to state. The NHTSA outlines a 300-400 hour educational program, comprised of class, clinical, and field experience. They recommend 175-225 class/lab hours, 50-75 clinical hours, and 75-100 field hours for successful EMT - I education (Stoy, W.A. et. al., 1998). After class, clinical, and field requirements are successfully completed, students are usually mandated by their state to pass a certification exam. Many states use the NREMT EMT - I exam for this standard, but this requirement may vary based on state laws. Upon successful completion of this exam students must apply for a state license to practice as an EMT - I.

### EMT - Paramedic

The EMT - Paramedic (EMT - P) is the level of EMT that indicates basic and advanced skills training in aspects of pre-hospital emergency care necessary for the treatment and transport of critical and emergent patients. The EMT - Paramedic is well versed in all the skills practiced by the EMT - Intermediate and the EMT - Basic. In addition to these skills EMT - Ps are required to be proficient in endotracheal intubation, medicine administration, chest decompression, manual defibrillation, EKG interpretation and Advanced Cardiac Life Support (ACLS) (Mistovich et. al., 2004). The NHTSA suggests that in order to take a class to become a certified EMT - P, you must first be certified as EMT - B as well as take an Anatomy and Physiology course. They recommend that the EMT - P course be comprised of 500-600 hours of class/lab instruction, 250-300 hours be devoted to clinical time, and 250-300 hours be dedicated to field experience (Stoy, W.A. et. al., 1998). After completing this course, most states require that the NREMT EMT-P exam be taken to demonstrate mastery of the necessary skills of a EMT - P. However, this may vary from state to state. It is necessary that those who have completed the EMT - P program, to apply for the ability to practice in their state.

### CONTINUING EDUCATION

For EMS personnel, education does not end when classes are over and the job begins. In order to maintain certification as an EMT, continuing education requirements must be met, based on the

level of certification. The NREMT has established protocols for re certification and minimum requirements for education at each level of EMT certification. However in order to remain practicing, it is important to ensure that the state requirements for continuing education are met in a timely fashion. Each states requirements vary

Link to NREMT certification requirements:

[https://www.nremt.org/nremt/about/reg\\_basic\\_history.asp](https://www.nremt.org/nremt/about/reg_basic_history.asp)

Link to website that links to state requirements:

[https://www.nremt.org/nremt/about/emt\\_cand\\_state\\_offices.asp](https://www.nremt.org/nremt/about/emt_cand_state_offices.asp)

### Cost Structure of EMS

The EMS system has a cost allocation structure that is unique from standard industries. In 2002, the Census Bureau conducted an “Economic Census” that revealed that 41% of US employer revenue was used towards payroll. The EMS system currently dedicates 61% of their revenue to wages. This large quantity is related to the fact that employees must be highly trained and are not constantly creating revenue. Emergency systems must have fast response times and are staffed to allow for this. Systems must be prepared for emergencies across entire communities, but emergencies are not guaranteed. As a result, profit accounts for only 2% of the total revenue of the EMS system. (IBISWorld Inc., 2009) This means that financially successful private ambulance companies must take advantage of economies of scale, while public sector EMS must rely on state and local funding in order to curb the high cost of labor and constant preparedness required of EMS personnel. In communities that are inefficient or unable to take advantage of economies of scale, heavy reliance is placed on the public to finance the systems inefficiencies using taxes. Garnering support for an increases in local taxes is usually difficult and changes based on the successes and failures of the local economy. When these tax increases do not pass, public EMS is forced to cut staff and budgets. These cuts can result in a system that is no longer able to effectively serve the needs of the public, making it necessary for communities to contract private ambulances as their public service and disband their failing system. Private ambulance companies have the advantage of being able to utilize their economies of scale in order to offset provider costs that may not be as lucrative in small or rural communities. Maintaining public support for the publicly financed EMS system is of paramount importance in sustaining its existence.

### EMS Attrition

There are several hazards that an EMT is exposed to during their job that can impact their health, both mentally and physically. These factors play a role in maintaining an adequate, experienced EMS, staff needed for emergency care. In a study conducted by Grigsby and McKnew in 1988, it was observed that Paramedics had the highest burnout rate of all health care workers. In addition, a study conducted by Beaton and Murphy in 1993 observed that the average career of a paramedic has been reported to be less than 4 years long (Vettor & Kosinski, 2000). These statistics identify an important area of concern in the EMS system. It is important to address the issues that are leading to such high industry attrition.

Stress has been shown to be a major factor in the attrition rate of many industry workers. It has been observed that EMTs have a higher likelihood of being exposed to high stress situations. Of these situations the five that have been shown to have the highest likelihood of creating the most stress are catastrophic injury to ones self or co-worker, gruesome victim incidents, providing care for a seriously injured or vulnerable patient, minor injuries to ones self, and exposure to dying and death (NHTSA, 2007). These highly stressful situations increase the rates of post-traumatic stress disorder (PTSD) in ambulance personnel. An EMTs frequent exposure to death and despair makes them more susceptible to have high stress reactions to non traumatic situations (Jonsson, et. al., 2003). In a study conducted by Corneil et. al. (1999), it was determined that the rates of PTSD were 15 to 18 times greater in firefighters in Canada and the United States, than PTSD rates in the average Canadian man. These stress values were similar to Vietnam Veterans and were even, 4 to 6 times greater than victims of crime (NHTSA, 2007).

The psychological concerns and susceptibilities supplied by the stressors that EMTs experience on a daily basis, identify a significant problem in the ability of the United States to retain knowledgeable, experienced EMTs. It also puts an increased financial burden on paramedic companies and stations that must continuously use resources to train new EMTs that might not last in the profession.

In addition to psychological concerns that burden EMTs and contribute to the high rates of burnout in the profession, there are physical exposures that EMTs experience that can impact the longevity of an EMT. An EMT's exposure to blood born pathogens, disease, and highly resistant infections are of a major concern. Although personal protective equipment may reduce the likelihood of contracting disease, the exposure rates to these maladies are much higher health care workers. In a study conducted by Maguire et.al. (2002), it was estimated that nationally, there are 12.7 fatalities per 100,000 EMS workers annually. This value more than doubles the 5.0 per 100,000 average fatality rate of American workers.

Emergency services has one of the highest attrition rates amongst doctors, nurses, and healthcare workers. EMS workers are required to work long shifts, carrying heavy loads, remain constantly vigilant with their education, and constantly deal with the high stress situations of emergency medical care. Many people that originally believed EMS work to be their dream job, are proven wrong and leave the profession all together. This result has the potential to lead to an EMS staff that is not as experienced as they need to be to provide necessary medical care for their patients. This is especially true in inner city populations, where the workload and the danger is especially high, adding to stress and leading to transfers to suburbs with far less stress. Leaving the areas with the highest demand, with the most inexperience.

## Conclusion

Throughout history, the practice of emergency medical services have proven to be an important part of preserving life. It is important that the standards of care continue to improve with the increasing technology and availability of resources provided in appropriate medical care. The high attrition rate associated with EMS is a significant concern, in order to ensure a competent, experienced EMS provider in all areas of the United States. Promoting these goals will help to

ensure that all Americans will have access to emergency medical services when it is needed and that these services will be prepared for any medical situation they are exposed to.

## HELPFUL RESOURCES

Educational Textbooks for EMT certifications:

EMT-Basic:

Mistovich, J. J. et. al., (2007). Prehospital Emergency Care. Pearson Education, Inc. 2007.

This textbook covers necessary functions and responsibilities of an EMT-Basic and serves as a training text that meets the U.S. Department of Transportation's EMT-B national standard curriculum. It is important that the most recently published text is used. This will ensure that outdated practices are not taught to EMTs and that their standard of care is consistent with the most recent medical data.

EMT-Paramedic or EMT-Intermediates:

Bledsoe, B. E., et. al., (2006). Paramedic Care: Principles and practice. Pearson Education, Inc. 2006.

This textbook covers necessary functions and responsibilities of an EMT-Paramedic and serves as a training text that meets the U.S. Department of Transportation's EMT-P national standard curriculum. This text is also an appropriate text for EMT-Intermediates, as many of their skills are similar to those used by EMT-Ps. If being used to teach EMT-Is, it is important for the instructor to differentiate the sets of skills necessary for an EMT-P and an EMT-I. It is important that the most recently published text is used. This will ensure that outdated practices are not taught to EMTs and that their standard of care is consistent with the most recent medical data.

Walraven, G., (2006). Basic Arrhythmias. Pearson Education, Inc. 2006.

This book outlines the interpretation of EKGs. This skill is an important aspect of being an EMT-P. It provides examples of the rhythms as it explains the morphology of the PQRST complex. In addition, the text provides the reader with hundreds of sample rhythm strips that will help students master and refine their EKG interpretational skills. It is important that the most recently published text is used. This will ensure that outdated practices are not taught to EMTs and that their standard of care is consistent with the most recent medical data.

Garcia, T.B. and Miller, G.T., (2004). Arrhythmia Recognition: The art of interpretation. Jones and Bartlett Publishers. 2004.

The book is a very thorough analysis of the EKG morphology. In addition, the book attempts to explain the pathophysiology related to EKG changes a EMT might observe. The book is an excellent resource for those interested in learning more about EKGs and the heart. The book is not necessary in learning how to interpret EKGs, but can prove to be an invaluable resource in explaining how certain clinical interventions can act on the heart correct cardiac abnormalities. It is important that the most recently published text is used. This will ensure that outdated practices are not taught to EMTs and that their standard of care is consistent with the most recent medical data.

Information provided by the Nationally Registered Emergency Medical Technicians (NREMT):

State requirements for certification and re certification:

[https://www.nremt.org/nremt/about/emt\\_cand\\_state\\_offices.asp](https://www.nremt.org/nremt/about/emt_cand_state_offices.asp). State EMS agency information. National Registry of Emergency Medical Technicians: The nation's EMS certification. (2001-2008).

This link connects you to the NREMT website for national EMT certifications. The map that it opens to will connect you to the EMS website of the state that you choose. These websites will outline requirements for certification, state re certification requirements, and other important information that is specific to the state that you are an EMS provider in. Researching the state requirements for certification is important, so you can make sure that you have met or will be meeting all the requirements to practice or continue practicing as an EMS provider. This is an excellent resource for those who are unsure of how to find your state's EMS website.

NREMT Website:

[https://www.nremt.org/nremt/about/nremt\\_news.asp](https://www.nremt.org/nremt/about/nremt_news.asp). National Registry of Emergency Medical Technicians: The nation's EMS certification. (2001-2008).

This link navigates you to the NREMT homepage. From here you can learn information about applying to become an NREMT and history behind the certification. It is also a resource for a slew of EMS information, pertinent to those wanting to become EMTs, who currently practice as EMTs, or those just interested in learning about the EMS system.

## Resources

Block, A.W., (2009). 2007 Motor Vehicle Occupant Safety Survey: Use of and Support for Emergency Medical Services Systems. NHTSA's Office of Behavioral Safety Research.

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Stoy, W. A. et. al., (1998). EMT-Paramedic: National standard curriculum. United States Department of Transportation: National Highway Traffic Safety Administration.

[http://www.nhtsa.gov/people/injury/ems/EMT-P/disk\\_1%5B1%5D/Intro.pdf](http://www.nhtsa.gov/people/injury/ems/EMT-P/disk_1%5B1%5D/Intro.pdf). Accessed on November 15, 2009.

National Registry of Emergency Medical Technicians.

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