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Chapter 1 : Advances in prehospital trauma care

Handy spiral reference guide for common emergency and prehospital drugs. The index is cross-referenced, providing both the generic and trade names.

This article has been cited by other articles in PMC. Abstract Prehospital trauma care developed over the last decades parallel in many countries. Most of the prehospital emergency medical systems relied on input or experiences from military medicine and were often modeled after the existing military procedures. Some systems were initially developed with the trauma patient in mind, while other systems were tailored for medical, especially cardiovascular, emergencies. The key components to successful prehospital trauma care are the well-known ABCs of trauma care: Establishing and securing the airway, ventilation, fluid resuscitation, and in addition, the quick transport to the best-suited trauma center represent the pillars of trauma care in the field. While ABC in trauma care has neither been challenged nor changed, new techniques, tools and procedures have been developed to make it easier for the prehospital provider to achieve these goals in the prehospital setting and thus improve the outcome of trauma patients. The treatment that patients receive in the field can significantly alter their outcome. Prehospital Emergency Medical Service EMS systems rely on advances in therapy and management, often developed for patient care in the hospital setting, but over time, has reached prehospital care providers. All modern EMS systems still follow this early idea of either bringing the physician to the patient or bringing the patient to the physician. Civilian systems were often developed for specific patient groups such as trauma patients or patients with myocardial infarction. Nevertheless, these prehospital systems were responsible for all emergency patients and had to be staffed and equipped accordingly. In Germany, a surgeon developed the first physician based EMS system in Heidelberg with the idea to bring not just a surgeon, but a whole operating room and its staff to the scene of an accident. The trauma patients did not require surgery, but rather stabilization, at the scene. In the same year, the city of Cologne introduced a similar system. Using a much smaller vehicle driven by a firefighter, one physician attended the scene of the accident and transported the patient back to the hospital. Consistent with this, surgeons played a large role in the initial setup of these systems. The first ground-based paramedic systems in the US are often attributed to an article from Ireland in by Frank Pantridge and John Geddes, published in the Lancet. The unit was staffed with personnel from the cardiac intensive care unit and a junior physician. Following this article, physician staffed mobile intensive care units were introduced in New York and Charlottesville. This setup provides first responders with very basic training to perform early simple techniques such as chest compressions, automatic defibrillation or basic airway management until advanced interventions can be performed by either paramedics or emergency physicians at the scene. Some countries like Germany and France are still using EMS systems which are based on the idea of bringing the physician to the patient. The transport to the hospital comes second in this concept, as patients often undergo prolonged treatment at the scene. On the other hand, EMS systems in the US are based on the premise of bringing paramedical providers, who are trained to perform a limited number of medical procedures in the field to the patients. The emphasis is focused on rapid transport to the hospital, after the basic rescue techniques, such as airway management and fluid resuscitation, were performed at the scene. All EMS systems have been undergoing changes over the years. The care of trauma patients is significantly influenced by military conflicts. While the Korean and Vietnam wars saw the first airborne rescue missions by helicopters at a large scale, the civilian EMS systems quickly implemented this new concept into the rescue of civilian trauma patients. Recent changes in military field medicine, such as low volume resuscitation, the revival of tourniquets, and of blood stopping granules, will clearly influence the care of civilian trauma patients in the future. The aim of this article is to give a brief overview of the advances in military and civilian EMS systems which are currently happening and which will affect the way trauma patients are treated, both in the field and in the emergency rooms receiving these patients. The airways of severely injured patients need to be secured

as soon as possible. Airway management in the field is often more difficult than intubations in the operating room or the emergency department. This is caused by different provider training and experience, patient location, and coexisting medical or surgical problems. Over the years, different devices used in anesthesiology have been introduced to prehospital care providers. These devices range from laryngoscopes and different laryngoscope blades to oral and nasal airways. More recently introduced devices include the Eschmann elastic bougie, and even more recently, supraglottic devices. The Eschmann or gum elastic bougie has been used by anesthesiologists, especially in Europe, since its introduction by Macintosh in In a cadaver study, the bougie was placed through an LMA and an endotracheal tube ETT was then placed over the bougie. This technique shows good success rates amongst providers otherwise inefficient in intubation with direct laryngoscopy[27] as a backup intubation tool after the other intubation attempts have failed,[28 , 29] or in cases of difficult airways, such as limited access to the patients airway. So far, most publications of video-assisted laryngoscopes include case reports in trauma patients[33] and mannequin simulations,[34] but not randomized trials. Nevertheless, these studies have shown that the success rate and speed of intubation with video laryngoscopy is comparable in providers, experienced with direct laryngoscopy, due to a steeper learning curve with the video laryngoscopes. Video-assisted devices have shown to reduce cervical spine movement in comparison to direct laryngoscopy. While the video-assisted laryngoscopes offer advantages over direct laryngoscopy for difficult airways and for providers with minimal training or experience, they also provide the disadvantage of providers losing their skills in direct laryngoscopy, therefore giving up a time-honored and proven technique to intubate a patient. Nevertheless, given the low national requirement of intubation for new paramedics, we will very likely see a widespread use of video-assisted devices in the prehospital systems. This will hopefully reverse the current trend of abandoning prehospital intubation due to the lack of intubation skill in some paramedics. The need to administer fluids and medication makes circulatory access essential. In certain patients such as hypovolemic patients, intravenous drug abusers, burn patients, and children, peripheral intravenous access may not be possible. While the concept of intraosseous access is quite old and has been used for pediatric patients for a long time, only recently this technique was introduced to the adult patients. The technique is supported by the European Resuscitation Council and has shown comparable plasma concentrations of injected drugs, similar to injection through a central venous catheter. The mechanical devices Bone Injection Gun, FAST 1 showed to be equivalent in terms of success rates as compared to standard intraosseous needles, but differed in the time required to secure circulatory access. This means that once at the hospital, the patient still requires intravenous access and the intraosseous needle or needles needs to be removed. For this reason, intraosseous access is often used as a last resort when peripheral IV access can not be established and central venous access is not possible either. Central venous access has been used in some prehospital systems, but has a higher risk of serious side effects and complications compared to peripheral IV access. The most common risks are pneumothorax, vascular injury, and infection. For reasons of infection control, all the lines placed in the field need to be considered contaminated and should be replaced at the earliest possible time. BLEEDING CONTROL Tourniquets are experiencing a revival after they were all but eliminated in the early 80s when the fear of extended soft tissue damage, nerve damage and the potential loss of the extremity was feared if the tourniquet was used for too long or was not indicated in the first place. The different injury pattern experienced by the US military in the latest conflicts in Iraq and Afghanistan showed that tourniquets save lives in cases of severe blast injuries to the extremities. These findings even translated into tourniquets built into tactical gear by some manufacturers. While these types of injuries are less frequently encountered in the civilian EMS systems, there has been a change of policy regarding tourniquet use in many civilian EMS systems. The different types of tourniquets rubber, cloth, and windlass are successful in eliminating distal pulses when applied above and below the knee or elbow. Accurate documentation regarding time of tourniquet application is necessary with their use. Other forms of hemorrhage control include advanced hemostatic dressings where a clotting agent is impregnated into the dressing and granular agents. Examples of hemostatic dressings are: Two examples of granular agents are

Celox and WoundStat. HemCon is a positively charged chitin-based wafer which bonds strongly with negatively charged blood cells upon contact. Military comparisons of these agents show better control of hemorrhage in swine models. But the success is limited in critically ill or unstable patients. A further indication is the assessment of effectiveness of cardio pulmonary resuscitation CPR , as larger volumes of end-tidal CO2 indicate not only effective ventilation but also better cardiac output. Furthermore, correlation withPaCO2 should be obtained as soon as possible, which usually occurs shortly after arrival at the receiving hospital. Other devices, such as the single use colorimetric end-tidal CO2 detectors, are still used frequently. One must remember that these devices are of single use and early exposure to ambient air prior to their use can render them useless. These devices can be removed from the breathing circuit as soon as confirmation of tube placement is made. A new development in patient monitoring is the transcutaneous measurement of tissue hemoglobin oxygenation. Unlike other monitoring devices, the tissue hemoglobin oxygenation measurement has already found access to the prehospital field and seems to give the prehospital provider a tool to assess hypoperfusion in the field. There are trauma courses for medics including firefighters , nurses, and physicians. Some trauma courses conducted in North America are as follows: It is very important in trauma management systems for all participants to be fluent in order to provide the best care for patients. The use of muscle relaxants in patients undergoing ETI facilities and improves the suc cess rate of intubation. In the prehospital setting, the use of muscle relaxants for rapid sequence intubation RSI was first described by Hedges in To safely use these potentially dangerous medications, advanced airway training is needed and has been proven to be effective in improving intubation success and decreasing cricothyroidotomy rates when implemented. The training of new students or medical residents has been undergoing numerous changes over the last years. The most recent development is the use of simulation programs in which the student is exposed to real-life scenarios and realistic time constrictions. The idea of the simulation is to give the student not just vital parameters or other physiologic data, but also to mimic real scenarios including interaction with patients and other team members. These simulations were first used in the training of anesthesiology residents and first described in Other medical specialties and paramedic training programs have been using simulation-based learning. Simulation is a means where difficult, and sometimes rare, events can be reproduced in a safe setting. Participants can then get multiple exposures to scenarios which occur infrequently. Studies indicate that simulation-based learning programs improve crisis management skills, especially behavioral skills, necessary in the team approach to injured patients. This training requires substantial resources and clinical opportunities, which may not be available to many training programs. The purpose of these scores is to predict and identify the most critical of patients and guide with patient transport to the appropriate hospital. It has been shown that organizing a prehospital advanced live support system in combination with the transport of the patient to the most suitable hospital decreases the mortality of trauma patients. This result is attributed to improved quality of care and reduced time to definite treatment. The AIS underwent a total of six revisions. The current AIS dictionary lists approximately injuries. The AIS is commonly used to assign monetary values to injuries for cost-benefit analysis. More current scores such as the Revised Trauma Score RTS look at physiologic data, but are often cumbersome to calculate. This scoring system looks at variables in the following settings: Logistic regression of these variables showed that in the prehospital phase, age, blood pressure BP , heart rate HR , GCS, and anisocoria were the significant survival predictors. Compared to other trauma score systems, the STS is collecting data from numerous data points to predict patient survival at different stages.

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Precursors[edit] Emergency care in the field has been rendered in different forms since the beginning of recorded history. The New Testament contains the parable of the Good Samaritan , in which a man who has been beaten is cared for by a passing Samaritan. Then he put the man on his own donkey, took him to an inn and took care of him. The first known hospital-based ambulance service operated out of Commercial Hospital, Cincinnati , Ohio now the Cincinnati General by Another early ambulance service was founded by Jaromir V. Named the "Vienna Voluntary Rescue Society," it served as a model for similar societies worldwide. Also in the late 19th century, the automobile was being developed, and in addition to horse-drawn models, early 20th century ambulances were powered by steam , gasoline , and electricity , reflecting the competing automotive technologies then in existence. However, the first motorized ambulance was brought into service in the last year of the 19th century, with the Michael Reese Hospital , Chicago , taking delivery of the first automobile ambulance, donated by prominent local businessmen, in February Prior to World War II , there were some areas where a modern ambulance carried advanced medical equipment, was staffed by a physician , and was dispatched by radio. In many locations, however, ambulances were hearses â€" the only available vehicle that could carry a recumbent patient â€" and were thus frequently run by funeral homes. These vehicles, which could serve either purpose, were known as combination cars. With the severe manpower shortages imposed by the war effort, it became difficult for many hospitals to maintain their ambulance operations. City governments in many cases turned ambulance services over to the police or fire department. No laws required minimal training for ambulance personnel and no training programs existed beyond basic first aid. In many fire departments, assignment to ambulance duty became an unofficial form of punishment. Note the raised roof, with more room for the attendants and patients Advances in the s, especially the development of CPR and defibrillation as the standard form of care for out-of-hospital cardiac arrest , along with new pharmaceuticals , led to changes in the tasks of the ambulances. The report concluded that ambulance services in the US varied widely in quality and were often unregulated and unsatisfactory. The government reports resulted in the creation of standards in ambulance construction concerning the internal height of the patient care area to allow for an attendant to continue to care for the patient during transport , and the equipment and thus weight that an ambulance had to carry, and several other factors. In a progress report was published at the annual meeting, by the then president of American Association of Trauma, Sawnie R. Gaston reported the study was a "superb white paper" that "jolted and wakened the entire structure of organized medicine. This report is created as a "prime mover" and made the "single greatest contribution of its kind to the improvement of emergency medical services". Since this time a concerted effort has been undertaken to improve emergency medical care in the pre-hospital setting. In the United Kingdom, a law merged the municipal ambulance services into larger agencies and set national standards. This variation may lead to large differences in levels of care and expected scope of practice. Some countries closely regulate the industry and may require anyone working on an ambulance to be qualified to a set level , whereas others allow quite wide differences between types of operator. Government ambulance service[edit] A government-owned ambulance in Kiev , Ukraine Operating separately from although alongside the fire and police services of the area, these ambulances are funded by local, provincial or national governments. In some countries, these only tend to be found in big cities, whereas in countries such as the United Kingdom, almost all emergency ambulances are part of a national health system. Government Ambulance Services also have to take Civil service exams just like government fire departments and police. Fire- or police-linked service[edit] In countries such as the United States, Japan, France, and parts of India; ambulances can be operated by the local fire or police services.

Fire-based EMS is the most common model in the United States, where nearly all urban fire departments provide EMS [30] and a majority of emergency transport ambulance services in large cities are part of fire departments. It is somewhat rare for a police department in the United States to provide EMS or ambulance services, although many police officers have basic medical training. Charity ambulance service[edit] A volunteer ambulance crew in Modena , Italy Charities or non-profit companies operate some emergency medical services. They are primarily staffed by volunteers , though some have paid employees. These may be linked to a volunteer fire service , and some volunteers may provide both services. Some ambulance charities specialize in providing cover at public gatherings and events e. The International Red Cross and Red Crescent Movement is the largest charity in the world that provides emergency medicine. In the United States, volunteer ambulances are rarer, but can still be seen in both metropolitan and rural areas e. A few charities provide ambulances for taking patients on trips or vacations away from hospitals, hospices or care homes where they are in long term care. Private companies may provide only the patient transport elements of ambulance care i. This system has the benefit of keeping emergency crews available at all times for genuine emergencies. Their key feature is that all personnel are trained not only in ambulance EMT care, but as a firefighter and a peace officer police function. They may be found in smaller towns and cities, where demand or budget is too low to support separate services. This multi-functionality allows to make the most of limited resource or budget, but having a single team respond to any emergency. Hospital-based service[edit] Hospitals may provide their own ambulance service as a service to the community, or where ambulance care is unreliable or chargeable. Their use would be dependent on using the services of the providing hospital. Internal ambulances[edit] Many large factories and other industrial centres, such as chemical plants , oil refineries , breweries and distilleries have ambulance services provided by employers as a means of protecting their interests and the welfare of their staff. These are often used as first response vehicles in the event of a fire or explosion. Purpose[edit] Six points on the Star of Life Emergency medical services exists to fulfill the basic principles of first aid , which are to Preserve Life, Prevent Further Injury, and Promote Recovery. This common theme in medicine is demonstrated by the "star of life". Care in transit -â€” the emergency medical service load the patient in to suitable transport and continue to provide appropriate medical care throughout the journey Transfer to definitive care â€” the patient is handed over to an appropriate care setting, such as the emergency department at a hospital, in to the care of physicians Strategies for delivering care[edit] Training for EMS in Estonia. Although a variety of differing philosophical approaches are used in the provision of EMS care around the world, they can generally be placed into one of two categories; one physician -led and the other led by pre-hospital allied health staff such as emergency medical technicians or paramedics. These models are commonly referred to as the Franco-German model and Anglo-American model. The variation between countries. For example, a common arrangement in the United States is that fire engines or volunteers are sent to provide a rapid initial response to a medical emergency, while an ambulance is sent to provide advanced treatment and transport the patient. In France, fire service and private company ambulances provide basic care, while hospital-based ambulances with physicians on board provide advanced care. In many countries, an air ambulance provides a higher level of care than regular ambulances. Examples of level of care include: First aid consists of basic skills that are commonly taught to members of the public, such as cardiopulmonary resuscitation , bandaging wounds and saving someone from choking. Basic Life Support BLS is often the lowest level of training that can be held by those who treat patients on an ambulance. Commonly, it includes administering some drugs and a few invasive treatments. In English-speaking countries, BLS ambulance crew are known as emergency medical technicians or emergency care assistants. Advanced Life Support ALS has a considerably expanded range of skills such as intravenous therapy , cricothyrotomy and interpreting an electrocardiogram. The scope of this higher tier response varies considerably by country. Paramedics commonly provide ALS, but some countries require it to be a higher level of care and instead employ physicians in this role. Such services are a key element in regionalized systems of hospital care where intensive care services are centralized to a few specialist hospitals. A

motorcycle ambulance in South Sudan. The most basic emergency medical services are provided as a transport operation only, simply to take patients from their location to the nearest medical treatment. This was historically the case in all countries. It remains the case in much of the developing world, where operators as diverse as taxi drivers [11] and undertakers may transport people to hospital. Transport-centered EMS[edit] Ambulances parked outside a local emergency room. The Anglo-American model is also known as "load and go" or "scoop and run". They have specialized medical training, but not to the same level as a physician. In this model it is rare to find a physician actually working routinely in ambulances, although they may be deployed to major or complex cases. The physicians who work in EMS provide oversight for the work of the ambulance crews. This may also include on-line medical control, in which the physician is contacted to provide advice and authorization for various medical interventions. In some cases, such as in the UK, South Africa and Australia, a paramedic may be an autonomous health care professional, and does not require the permission of a physician to administer interventions or medications from an agreed list, and can perform roles such as suturing or prescribing medication to the patient. Similar to online medical control, this practice allows paramedics to remotely transmit data such as vital signs and 12 and 15 lead ECGs to the hospital from the field. This allows the emergency department to prepare to treat patients prior to their arrival. The strategy developed for prehospital trauma care in North America is based on the Golden Hour theory, i. This appears to be true in cases of internal bleeding , especially penetrating trauma such as gunshot or stab wounds. Thus, minimal time is spent providing prehospital care spine immobilization; "ABCs", i. The "Scoop and Run" is a method developed to deal with trauma , rather than strictly medical situations e. In such conditions, the gold standard is the door to balloon time. The longer the time interval, the greater the damage to the myocardium , and the poorer the long-term prognosis for the patient. The physicians will attempt to treat casualties at the scene and will only transport them to hospital if it is deemed necessary. If patients are transported to hospital, they are more likely to go straight to a ward rather than to an emergency department. In some cases in this model, such as France, there is no direct equivalent to a paramedic. Other ambulance personnel are not non-medically trained and only provide driving and heavy lifting. In other applications of this model, as in Germany, a paramedic equivalent does exist, but is an assistant to the physician with a restricted scope of practice. They are only permitted to perform Advanced Life Support ALS procedures if authorized by the physician, or in cases of immediate life-threatening conditions. High-speed transport to hospitals is considered, in most cases, to be unnecessarily unsafe, and the preference is to remain and provide definitive care to the patient until they are medically stable, and then accomplish transport. In this model, the physician and nurse may actually staff an ambulance along with a driver, or may staff a rapid response vehicle instead of an ambulance, providing medical support to multiple ambulances. EMT staff at an emergency call in New York City A patient arriving at hospital Ambulance caregivers are generally professionals and in some countries their use is controlled through training and registration. Their duties include the provision of immediate life-saving care in the event of a medical emergency; commonly advanced first aid, oxygen administration, cardio-pulmonary resuscitation CPR , and automated external defibrillator AED usage. The first responder training is considered a bare minimum for emergency service workers who may be sent out in response to an emergency call. First responders are commonly dispatched by the ambulance service to arrive quickly and stabilize the patient before an ambulance can arrive and to then assist the ambulance crew. Examples of this include Community First Responder schemes run by ambulance services the UK and similar volunteer schemes operated by the fire services in France. In some countries such as the US, there may be autonomous groups of volunteer responders such as rescue squads. Police officers and firefighters who are on duty for another emergency service may also be deployed in this role, though some firefighters are trained to a more advanced medical level.

Chapter 3 : Paramedic - Wikipedia

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The following is a definition of frequently used terms: Critical Care Transport Technician or Advanced Paramedic - Person currently registered as an EMT-Paramedic by the Department of Health who has completed an approved Critical Care Transport course and who has been approved by the medical director to function at this advanced level of care. Only the portion of the guidelines which are designated "standing orders" may be undertaken before contacting on-line medical control. Critical Care Transport Units may include both ground and aerial rotary and fixed-wing units. These protocols are NOT to be used for routine advanced life support care. Quality out-of-hospital care is the direct result of comprehensive education, accurate patient assessment, good judgement, and continuous quality improvement. All EMS personnel are expected to know the protocols and understand the reason for their use. EMS personnel should not perform any step or steps in a standing order or protocol if they have not been trained to perform the procedure or treatment in question. Medical Control System may not utilize these standing orders outside of their work with the contracted agency or company unless such work is with another agency or company contracted with the system. All EMS personnel must adhere to the standards defined in these protocols, or face revocation of medical control if these standards are violated. It is not necessary to speak with a medical control physician concerning treatment modalities that are considered to be standing orders except if a question arises concerning the planned treatment. In the event medical control cannot be contacted, and treatment protocols were carried out as standing orders, the record should be pulled for review by the medical director. Following review, the record will be signed by the medical record indicating retroactive approval. Life-threatening problems detected during the primary assessment must be treated first. Cardiac arrest due to trauma is not treated by medical cardiac arrest protocols. Trauma patients should be transported promptly with CPR , control of external hemorrhage, cervical spine immobilization, and other indicated procedures attempted en route. In patients with non-life-threatening emergencies who require IVs, only two attempts at IV insertion should be attempted in the field. Further attempts must be approved by medical control. Patient transport, or other needed treatments, must not be delayed for multiple attempts at endotracheal intubation. Verbally repeat all orders received prior to their initiation. Any patient with a cardiac history, irregular pulse, unstable blood pressure, dyspnea, or chest pain should be placed on a cardiac monitor. Intraosseous infusion may be performed on pediatric patients up to six years of age. This procedure should be limited to cardiac arrest and unresponsive patients after 2 unsuccessful peripheral IV attempts. All pediatric peripheral IVs should be started with a minidrip administration set. All IV attempts are to be peripheral. The external jugular vein is considered a peripheral vein. Placement of an intraosseous needle is permitted in children less than 6 years of age who have a life-threatening emergency where immediate fluid or medication administration is necessary. Only paramedics who have obtained the required education in intraosseous needle placement and who have been approved by the system medical director may place intraosseous needles. Persons who are designated "Critical Care Transport Technicians" may place intraosseous needles. This procedure should only be performed with permission of medical control except in the case of pediatric cardiac arrest or pediatric multiple trauma. Access of indwelling central lines i. Note, many of these catheters require special access needles. Do not attempt access if special needles are required unless the patient has access needles available. Each IV bag should be labeled with the following data: Endotracheal Intubation Proper endotracheal tube placement must be documented by at least three different methods. Following endotracheal intubation, tube placement should be re-verified every minutes by noting bilateral breath sounds and continuing end-tidal carbon dioxide readings. Endotracheal Drug Administration Only the following four drugs can be administered via an endotracheal tube:

Chapter 4 : Drugs and Protocols Common to Prehospital and Emergency Care | Medical Books

Note: Citations are based on reference standards. However, formatting rules can vary widely between applications and fields of interest or study. The specific requirements or preferences of your reviewing publisher, classroom teacher, institution or organization should be applied.

Early history[edit] Throughout the evolution of paramedic care, there has been an ongoing association with military conflict. One of the first indications of a formal process for managing injured people dates from the Imperial Legions of Rome , where aging Centurions , no longer able to fight, were given the task of organizing the removal of the wounded from the battlefield and providing some form of care. John of Jerusalem filling a similar function; this organisation continued, and evolved into what is now known throughout the Commonwealth of Nations as the St. Early ambulance services[edit] While civilian communities had organized ways to deal with the care and transportation of the sick and dying as far back as the bubonic plague in London between and , such arrangements were typically ad hoc and temporary. In time, however, these arrangements began to formalize and become permanent. During the American Civil War , Jonathan Letterman devised a system of mobile field hospitals employing the first uses of the principles of triage. After returning home, some veterans began to attempt to apply what had they had seen on the battlefield to their own communities, and commenced the creation of volunteer life-saving squads and ambulance corps. Ambulance of the Magen David Adom in Israel, 6 June These early developments in formalized ambulance services were decided at local levels, and this led to services being provided by diverse operators such as the local hospital, police, fire brigade, or even funeral directors who often possessed the only local transport allowing a passenger to lie down. In most cases these ambulances were operated by drivers and attendants with little or no medical training, and it was some time before formal training began to appear in some units. An early example was the members of the Toronto Police Ambulance Service receiving a mandatory five days of training from St. John as early as In terms of advanced skills, once again the military led the way. The Korean War also marked the first widespread use of helicopters to evacuate the wounded from forward positions to medical units, leading to the rise of the term " medivac ". These innovations would not find their way into the civilian sphere for nearly twenty more years. Pre-hospital emergency care[edit] By the early s experiments in improving care had begun in some civilian centres. One early experiment involved the provision of pre-hospital cardiac care by physicians in Belfast , Northern Ireland, in As a result of The White Paper, the US government moved to develop minimum standards for ambulance attendant training, ambulance equipment and vehicle design. These new standards were incorporated into Federal Highway Safety legislation and the states were advised to either adopt these standards into state laws or risk a reduction in Federal highway safety funding. The "White Paper" also prompted the inception of a number of emergency medical service EMS pilot units across the US including paramedic programs. The success of these units led to a rapid transition to make them fully operational. Other cities and states passed their own paramedic bills, leading to the formation of services across the US. Many other countries also followed suit, and paramedic units formed around the world. In the military, however, the required telemetry and miniaturization technologies were more advanced, particularly due to initiatives such as the space program. It would take several more years before these technologies drifted through to civilian applications. In North America, physicians were judged to be too expensive to be used in the pre-hospital setting, although such initiatives were implemented, and sometimes still operate, in European countries and Latin America. Cinader , working for Jack Webb , happened to encounter "firemen who spoke like doctors and worked with them". This concept developed into the television series Emergency! The show gained popularity with emergency services personnel, the medical community, and the general public. When the show first aired in , there were just six paramedic units operating in three pilot programs in the whole of the US, and the term paramedic was essentially unknown. By the time the program ended in , there were paramedics operating in all fifty states.

Evolution and growth[edit] Throughout the s and 80s, the paramedic field continued to evolve, with a shift in emphasis from patient transport to treatment both on scene and en route to hospitals. This led to some services changing their descriptions from "ambulance services" to " emergency medical services ". Bicycle paramedics in Los Angeles indicate the changing nature of the job. The training, knowledge-base, and skill sets of both paramedics and emergency medical technicians EMTs were typically determined by local medical directors, what it was felt the community needed, and what was affordable. There were also large differences between localities in the amount and type of training required, and how it would be provided. This ranged from in-service training in local systems, through community colleges, and up to university level education. This emphasis on increasing qualifications has followed the progression of other health professions such as nursing , which also progressed from on the job training to university level qualifications. The variations in educational approaches and standards required for paramedics has led to large differences in the required qualifications between locationsâ€”both within individual countries and from country to country. Comparisons have been made between Paramedics and nurses; with nurses now requiring degree entry BSc the knowledge deficit is large between the two fields. This has led to many countries passing laws to protect the title of "paramedic" or its local equivalent from use by anyone except those qualified and experienced to a defined standard. This usually means that paramedics must be registered with the appropriate body in their country; for example all paramedics in the United Kingdom must by registered with the Health Professions Council in order to call themselves a paramedic. As paramedicine has evolved, a great deal of both the curriculum and skill set has existed in a state of flux. Requirements often originated and evolved at the local level, and were based upon the preferences of physician advisers and medical directors. Recommended treatments would change regularly, often changing more like a fashion than a scientific discipline. Associated technologies also rapidly evolved and changed, with medical equipment manufacturers having to adapt equipment that worked adequately outside of hospitals, to be able to cope with the less controlled pre-hospital environment. Physicians began to take more interest in paramedics from a research perspective as well. By about , the fluctuating trends began to diminish, being replaced by outcomes-based research. This research then drove further evolution of the practice of both paramedics and the emergency physicians who oversaw their work, with changes to procedures and protocols occurring only after significant research demonstrated their need and effectiveness an example being ALS. Such changes affected everything from simple procedures such as CPR , to changes in drug protocols. As the profession grew, some paramedics went on to become not just research participants, but researchers in their own right, with their own projects and journal publications. In , the American Board of Emergency Medicine created a medical subspecialty for physicians who work in emergency medical services. In the early days medical control and oversight was direct and immediate, with paramedics calling into a local hospital and receiving orders for every individual procedure or drug. While this still occurs in some jurisdictions, it has become increasingly rare. Day-to-day operations largely moved from direct and immediate medical control to pre-written protocols or standing orders, with the paramedic typically seeking advice after the options in the standing orders had been exhausted. Canada[edit] Firefighters assist while Toronto Paramedic Services Paramedics load a patient into an ambulance. While the evolution of paramedicine described above is focused largely on the US, many other countries followed a similar pattern, although often with significant variations. The program, which intended to upgrade the then mandatory hours of training for ambulance attendants, was found to be too costly and premature. The program was abandoned after two years, and it was more than a decade before the legislative authority for its graduates to practice was put into place. An alternative program which provided 1, hours of training at the community college level prior to commencing employment was then tried, and made mandatory in , with formal certification examinations being introduced in Similar programs occurred at roughly the same time in Alberta and British Columbia , with other Canadian provinces gradually following, but with their own education and certification requirements. Advanced Care Paramedics were not introduced until , when Toronto trained its first group internally, before the process spread across the country. By the Ontario system involved a two-year

community college based program, including both hospital and field clinical components, prior to designation as a Primary Care Paramedic, although it is starting to head towards a university degree-based program for example, the joint degree in paramedicine offered by BizTech College , Centennial College and the University of Toronto. Some services, such as Toronto Paramedic Services , continue to train advanced care paramedics internally. Israel[edit] In Israel, paramedics are trained in either of the following ways a three-year degree in Emergency Medicine B. Paramedics manage and provide medical guidelines in mass casualty incidents. They operate in MED evac and ambulances. They are legalized under the Doctors Ordinance Decree. Training was frequently conducted internally, although national levels of coordination led to more standardization of staff training. Ambulance services were merged into county-level agencies in , and then into regional agencies in The regional ambulance services, most often trusts, are under the authority of the National Health Service and there is now a significant standardization of training and skills. The UK model has three levels of ambulance staff: Initially, paramedics were mainly trained internally, with experienced ambulance technicians often progressing to the role of paramedic. Increasingly, however, university qualifications are being expected for paramedics, with the entry level being an Honours Bachelor of Science degree in Pre-Hospital Care or Paramedic Science. As the title "Paramedic" is legally protected, those utilising must be registered with the Health and Care Professions Council HCPC , [10] and in order to qualify for registration you must meet the standards for registration, which include having a degree obtained through an approved course. Some paramedics have gone on to become Paramedic Practitioners, a role that practices independently in the pre-hospital environment in a capacity similar to that of a nurse practitioner , but with more of an acute care orientation, and Critical Care Paramedics who specialise in acute emergency incidents. In , the UK government changed legislation allowing Paramedics to independently prescribe, [13] which will open new pathways to Paramedics to progress into. This will came into force on the 1st of April , but has yet to affect practice due to guidance still being written. Paramedic education programs typically follow the U. It is required to be a certified Emergency Medical Technician prior to starting paramedic training. Paramedicine continues to grow and evolve into a formal profession in its own right, complete with its own standards and body of knowledge, and in many locations paramedics have formed their own professional bodies. This means that after 11 years of school, in order to become a paramedic, he needs to study for another three years. For a person with basic nine-year education, the term of training will be four years. They work in ambulances with EMTs. Paramedics by country Firefighter paramedics assist a simulated burn victim during a US Navy mass casualty drill. Paramedics are employed by a variety of different organizations, and the services they provide may occur under differing organizational structures, depending on the part of the world. A new and evolving role for paramedics involves the expansion of their practice into the provision of relatively basic primary health care and assessment services. Some paramedics have begun to specialize their practice, frequently in association with the environment in which they will work. Some early examples of this involved aviation medicine and the use of helicopters , and the transfer of critical care patients between facilities. While some jurisdictions still use physicians, nurses, and technicians for transporting patients, increasingly this role falls to specialized senior and experienced paramedics. Other areas of specialization include such roles as tactical paramedics working in police units, marine paramedics, hazardous materials Hazmat teams, Heavy Urban Search and Rescue , and paramedics on offshore oil platforms , oil and mineral exploration teams, and in the military. The majority of paramedics are employed by the emergency medical service for their area, although this employer could itself be working under a number of models, including a specific autonomous public ambulance service, a fire department, a hospital based service, or a private company working under contract. In Washington , firefighters have been offered free paramedic training. In the specific case of an ambulance service being maintained by a fire department, paramedics and EMTs may be required to maintain firefighting and rescue skills as well as medical skills, and vice versa. In some instances, such as Los Angeles County , a fire department may provide emergency medical services, but as a rapid response or rescue unit rather than a transport ambulance. The provision of municipal ambulance services and paramedics, can vary by area, even

within the same country or state. For instance, in Canada, the province of British Columbia operates a province-wide service the British Columbia Ambulance Service whereas in Ontario , the service is provided by each municipality, either as a distinct service, linked to the fire service , or contracted out to a third party. Common skills[edit] While there are varying degrees of training and expectations around the world, a general set of skills shared by essentially all paramedics and EMTs includes: Advanced cardiac life support , or ACLS, treats areas involving cardiac injury or compromise; the most common is cardiac arrest. Since the heart and nervous system begin to degrade in as little as 4â€”6 minutes, early recognition and treatment in the pre-hospital setting is very effective in life saving treatments.

Chapter 5 : Emergency medical services - Wikipedia

Drugs and Protocols Common to Prehospital and Emergency Care (Folger Library Edition of the Works of Richard Hooker) University of North Carolina, Wilmington. Medical books Drugs and Protocols Common to Prehospital and Emergency Care.

Ensure an adequate day-to-day response capability. Conduct broad, inclusive planning and exercises. Participants also shared lessons learned that may be applicable to CSC planning. Several participants identified the need for EMS agencies to engage with other partners, such as the Department of Veterans Affairs VA , the military, and the private sector, for resource sharing and to view regionalization of care as an opportunity to expand resources and facilitate partnerships. Specific suggestions for states also were made for consideration in disaster planning from a rural perspective: Establish command and control systems that integrate local, state, and federal emergency response using a common operating structure. Assess rural dispatch center capabilities, and enhance the development of priority dispatch training, prearrival instructions and protocols, and alternate dispatch capabilities for disaster response. Develop a safe, secure, and redundant communications system that can function without the commercial power grid. Define authority for rapidly altering standards of care and scopes of practice. Determine skill sets for large-scale response, and provide appropriate just-in-time training. Stockpile surge assets, including equipment and medical supplies, and identify surge personnel. Establish a quality improvement process for reviewing the system. The last of these suggestions is relevant for all stakeholders in CSC planning and implementation. It is important not only to review after-action reports from disaster exercises and responses but also to review patient care data collected during a CSC incident. The evaluation process will provide an opportunity to improve relevant standards of care, plans, policies, statutes, and guidelines. Workshop participants identified several metrics that could be used to evaluate a CSC response, including frequency of incidents, time to ICS role, rural-specific patient outcome data, access to trauma care, ability to treat patients with special needs, triage and treatment guidelines, alternate care sites, extent of integration with public and private resources, and safety of transportation assets; geographic location of ground and air ambulances, clinics, hospitals and trauma centers, and personnel and equipment; education, training, skill expansion, medical supervision, and quality improvement; and risk-adjusted mortality, injury severity scores, interfacility transports, transport times, and referrals. Evaluation capacity is a requirement for the federal funding available through the Centers for Disease Control and Prevention CDC for public health response, as the Pandemic and All Hazards Preparedness Act mandates that certain benchmarks be met. While limited federal disaster planning grants and programs are available to EMS agencies and state EMS offices, inclusion of an evaluation component in the CSC plan may enhance future funding opportunities by providing justification for addressing gaps in response capabilities identified through the evaluation process and established metrics. However, it is essential for the state EMS office to be engaged in the process as well. To ensure incorporation of EMS-related CSC considerations in the plan, the state EMS office may find it helpful to review and utilize the state and local government templates found in Chapter 5 , as well as the EMS-specific templates at the end of this chapter. These functions and tasks are described below. Assessment of Jurisdictional Authority and Planning Resources. A crucial aspect of planning for CSC is collaboration, cooperation, and inclusivity across jurisdictions and all emergency health care system stakeholders, including the public see Chapter 9. The development of plans for the implementation of CSC with respect to EMS should begin with a review of the salient legal authorities and existing mutual-aid agreements. Legal considerations should include liability protection for EMS personnel and agencies when CSC are in effect, changes in dispatch protocols, use of disaster triage protocols, altered staffing and transportation modes, just-in-time training, and scope-of-practice modifications for EMS personnel. In general, state EMS offices have the statutory authority to license EMS agencies ambulances , license or certify personnel emergency medical responder, emergency medical

technicians, paramedics , designate hospitals as trauma specialty centers, and establish statewide standardized protocols and guidelines for EMS. State EMS offices also may have the statutory authority, scope, and jurisdiction to develop disaster plans and to oversee and coordinate the provision of EMS within the state during a disaster. Therefore, it is imperative for the state EMS office, in conjunction with state legal counsel, to review legal and regulatory authorities for the protection of agencies and personnel during a disaster. This review should encompass provider liability, licensing and credentialing alternatives, and mutual-aid agreements. The state EMS office should understand how authorities and protections can be used to facilitate CSC strategies, including the modification of treatment, triage, and dispatch protocols; staffing and operational standards; and destination policies. Inclusion of the community paramedicine program may be helpful during a CSC incident, especially for providing more comprehensive medical care in rural communities IOM, The liabilities and protection for this function should be reviewed with legal counsel and the state EMS medical director. During a disaster, it provides ongoing advice to the state health department and medical authority on the implementation of CSC, as well as on a variety of health and medical issues. The SDMAC should include broad representation from the state emergency health care system and be multidisciplinary, including specialists in pediatric, trauma, mental health, and palliative care, as well as the needs of at-risk populations. The committee should also address the ethical considerations in CSC planning as discussed in Chapter 4. Several states have developed surge capacity plans through the ASPR cooperative agreement and may also have mass casualty incident plans. After-action reports from functional and tabletop exercises may provide some guidance for CSC planning as well. Stakeholder and Public Engagement. Ensuring that the public and other stakeholders understand and provide input into CSC planning is essential. The public and other stakeholders need to understand the difficult decisions that will have to be made by various health care providers and how principles of fairness and equity can be applied to the distribution of scarce resources. While responsibility for public engagement may reside with state and local health departments, EMS stakeholders should have an opportunity to provide input on the CSC plan. The state EMS medical director can play an important role in this regard, utilizing the expertise and input of medical directors for EMS agencies, medical directors consulted via telemedicine, EMS personnel, and agency supervisors. All stakeholders within the emergency health care system should understand and assess the application of CSC plans and policies. Stakeholders should know when the plan will be implemented, and partners at all levels should have a copy of the plan. The state EMS office, in collaboration with the state health department and emergency management agency EMA , should routinely exercise the plan, track changes, educate the public and stakeholders about any changes, and continue to solicit input from the public and stakeholders once the plan has been implemented. It is understood that while disasters happen locally, resources at various jurisdictional levels are needed during a disaster. Note that no distinction is made here between public and private EMS ambulance providers. All means of ambulance transport should be planned for and integrated into a coordinated state CSC plan for response to a catastrophic disaster. Contract and union issues should be addressed and resolved as part of the planning process prior to the implementation of the CSC plan. EMS Systems Function 1. The state EMS office should assume a lead role in collaboration with the state public health agency and state EMA regarding the response to a disaster. It is the responsibility of the state EMS office to assist local agencies in recognizing the magnitude of the incident and determining whether it is necessary to implement the state CSC plan. Each state EMS office should strive to develop and utilize a statewide integrated communications system to provide and receive timely alerts during a CSC incident. The state EMS office may also need to provide information directly to the public or the news media, a role that should be managed in a timely manner and with prescripted messages, if possible. To ensure immediate notification, the system should be redundant and interoperable with the systems of all first-response agencies, including law enforcement, public health, EMS, and hospitals. The implementation of electronic incident management systems may assist in the notification process while also enabling monitoring of resources and patient destinations. The regional infrastructure and local providers need to understand what actions to take

when the state EMS office or lead ESF-8 agency sends notification of a crisis or potential crisis situation. They may also need to provide consistent messages and notifications to the public or the media. They should understand that communication with the state EMS office is essential for authorizing CSC strategies as additional resources will be scarce. Dispatch and call centers also play a key role in the alert and notification process, and should understand when to send messages to stakeholders regarding the activation and termination of the CSC plan. The state emergency management agency is responsible for implementing the ICS and will work with the state EMS office in activating appropriate emergency operations centers EOCs during a disaster. All staff should be trained and exercised in the use of CSC strategies, such as alternate destinations, transportation modes, and staffing configurations. The state EMS office staff should be well trained in and understand incident action planning and how to incorporate appropriate technical experts into the planning process for long-term incidents. The state EMS office also should ensure that staff have the job aids needed to guide decisions to activate, implement, and terminate the CSC plan. All stakeholders should understand the role of the ESF-8 lead agency in a CSC incident and how the chains of command of the state EOC and agency internal coordination center coordinate the development, communication, and implementation of new CSC strategies in response to incident-specific demands. It is the ultimate responsibility of the state EMS office staff to understand how to request additional medical resources from the federal government. They also should know how to integrate and track the requested assets within jurisdictions, regional structures, and local emergency management and public health systems. The state EMS office should ensure that EMS providers utilize triage, treatment, transport, and transfer protocols approved by the medical director within the response area as required during a CSC incident. Medical direction at the state and local levels is key to the successful implementation of CSC strategies. The regional EMS infrastructure and local EMS agencies should work in cooperation with local law enforcement and understand the EMS options for security and access control during a disaster. This consideration should be integrated into the planning process as well. The state EMS office, in coordination with the state joint information center JIC , should have the staff and resources to ensure the real-time exchange of information among stakeholders necessary to assess the magnitude of the incident and evaluate ongoing resource needs and requests. This function is essential when federal resources may be needed and when the necessity of implementing the CSC plan must be determined. The state EMS office also should ensure that policies and procedures are in place to provide and receive situational communications among staff, facilities, and agencies within the affected region. This means having the ability to use e-mail, text messaging, paging, telephone, amateur radio, satellite phone, and other devices. Communication with stakeholders and the public should be both transparent and timely. Other means of communicating with the public and the news media should be established, such as announcements, handouts, postings, traditional media, and web-based and social media. State, regional, and local EMS agencies, as well as PSAPs dispatch or call centers , should utilize interoperable and redundant systems to communicate with each other. The system should be able to access EOCs, hospitals, and law enforcement and public health entities. Through the planning process and in cooperation with the state EMA and state health department, the state EMS office should know how to integrate these outside assets with existing resources. The ability to utilize an electronic incident management system may be beneficial in tracking assets and patients. All stakeholders should be familiar with the incident management system, using it daily and exercising its capacity to manage assets and patients during a disaster. Therefore, it is essential for state and local EMS agencies to understand the authority, scope, and jurisdiction for all response organizations within a region and how they interface within the ICS during a CSC incident. All EMS system providers and stakeholders need to be proactive in communications to the public see Chapter 9. The public may need to receive instructions, coordinated through the state, on how to care for patients at home, where to seek alternate care, how to call a referral center, and what limitations may be set on EMS response. With the implementation of the ICS, all stakeholders within the emergency health care system should coordinate information with other response organizations through the joint information system JIS and JIC to ensure accuracy and consistency of

messaging. As discussed at the beginning of this chapter and in greater detail in Chapter 2 , there are three levels of emergency care: Medical direction for determining which level of care to provide is essential for EMS personnel. Each level of care requires that stakeholders understand their roles and what strategies to implement and protocols to follow. With conventional care, it is important for the state EMS office, regional infrastructure, and local EMS providers to understand their roles and authority in providing routine care through medically approved triage, treatment, and transport protocols and the use of normal modes of transportation, staffing, and equipment, including mutual-aid resources. Under CSC, the state EMS office and local EMS providers should understand and know how to declare and operate under emergency orders to facilitate the provision of sufficient care. As with conventional and contingency care, it is critically important during CSC to coordinate with regional health care coalitions to ensure a common operating picture and coordinated care delivery strategies. Within the medical branch of the ICS, the state EMS office should understand when to shift from contingency to crisis care based on the assessment and recommendation of the SDMAC and should know how to identify specific needs of response organizations and resources at risk. This includes understanding the process for requesting resources and coordinating these resources with federal partners and regional and local response organizations. Agency responsibilities may include waivers of regulatory standards for transportation and staffing modes, activation guidelines and triggers, medical records, and triage decisions. Mental health care under CSC will require specific competencies of mental health, social services, and health care staff discussed in the mental health section of Chapter 4. One-shot, one-size-fits-all approaches, such as some stress debriefing once common in EMS, are no longer recommended and may result in exacerbating the mental health problems of those most affected by a disaster Bisson et al. The replacement for those outmoded approaches is more integrated efforts to enhance the resilience of the workforce specifically with respect to mass casualty events, including CSC, as part of CSC preparedness Schreiber and Shields, Other recommended features include a common operating picture of population-level mental health risks traumatic loss, multiple traumatic losses using a common rapid mental health triage system across disaster systems of care, including EMS; mental health risk among EMS and health care workers; and mental health resources, including emerging national models of Internet-based intervention Ruggiero et al.

Chapter 6 : Critical Care Paramedic Protocols

Taking careful drug histories, understanding how drugs work, and observing and documenting drug effects are all part of the: A. "right time" of medication administration. B. EMT's standard of care for drug administration. Your answer is correct.C. EMT's care of the overdose victim. D. considerations when deciding to withhold a drug.

Chapter 7 : Prehospital Care Emergency Medical Services (EMS) - Crisis Standards of Care - NCBI Books

These percentages are probably higher in the patient groups that need prehospital emergency care. With the ubiquity of drugs now, it's easy to overlook how recent a phenomenon this is.