Law enforcement is an inherently dangerous occupation. According to Federal Bureau of Investigation statistics, 341 peace officers were feloniously killed and 98,344 officers were injured as a result of assaults occurring in the line of duty in the 2000–2005 period, not including an additional 72 law enforcement officers who lost their lives as a result of the September 11, 2001 terrorist attacks. Among law enforcement injuries, members of special weapons and tactics (SWAT) teams are at high risk for injury, sustaining an injury rate of approximately 33 per 1,000 officermissions.

Although beginning as medical support to SWAT teams, tactical emergency medical support (TEMs) now encompasses the provision of preventive, urgent, and emergent medical care during high-risk, extended-duration, and mission-driven law enforcement special operations. Recognizing the benefit of medical support in these volatile situations, the National Association of EMS Physicians endorsed the concept of integrating EMS capability into law enforcement special operations in 2001, and TEMs remains an evolving discipline within prehospital medicine.

HISTORY OF TACTICAL TEAMS AND TACTICAL EMERGENCY MEDICAL SUPPORT

The military has long recognized the value of early and definitive medical care in areas of operations. The creation of Special Forces units was accompanied by the development of specially trained medics with enhanced scopes of practice. Because these units operate remote from supporting elements for prolonged periods, they are required to provide their own medical support to sustain their operational effectiveness. The success of this approach to embedded medical support has resulted in the refinement of codified treatment strategies, a specialized medic certification program that meets the needs of the military, and an expansion to units other than special operations.

The civil unrest and disorder of the 1960s saw the advent of tactical units as a part of civilian law enforcement. These teams are composed of highly trained officers capable of assuming varied roles and prepared to handle high-risk situations. Although they encountered situations similar to their military counterparts, the benefit of medical support to such activities in the civilian arena remained unrecognized and undeveloped.

To address the issue of TEMs for civilian law enforcement, national conferences were held in 1989 and 1990. With representatives from law enforcement, emergency medicine, and EMS, these conferences developed concepts relating to the provision of medical support to civilian tactical teams.

In 1994, and again in 2007, the National Tactical Officers Association (NTOA) issued position papers supporting TEMs by stating, “[T]he provision of TEMs has emerged as an important element of tactical law enforcement operations.... [T]he NTOA endorses and supports the incorporation of a well-trained and equipped Tactical Emergency Medical Support (TEMS) element into all tactical teams.”
LIMITATIONS OF TRADITIONAL EMS RESPONSE

Hostile conditions are commonly encountered in the tactical arena. Barricaded subjects, hostage taking, military-type weapons, and organized opposing forces are some of the dangers that tactical teams face in the performance of their missions. Relying on standard EMS resources in these situations places the officers and the prehospital care providers at risk. Unprepared and unequipped to deal with these dangers, EMS providers may become patients rather than caregivers.

The typical uniform worn by EMS personnel will not provide the personal protection necessary to function safely in a tactical law enforcement environment. The tactical team or supporting law enforcement units will likely need to secure the operational perimeter. Entry into this secured area will be controlled, and access may be denied to non-law enforcement personnel. Furthermore, standard EMS protocols prohibit entry of traditional providers into unsecured, threatening environments. While these policies minimize the risk of injury to responders, they may prevent medical evaluation and treatment of casualties in a tactical situation until the conclusion of the event and the elimination of ballistic or violent dangers. Although the operational scene may be in an urban setting, the treatment environment can be functionally austere. The increased morbidity and mortality caused by an increase in the time interval between injury and operative intervention may be mitigated by urgent prehospital surgical interventions performed by skilled providers, including EMS physicians who may serve with TEMS units. Recent military combat experience demonstrates improved survival with skilled prehospital interventions, with a 44% improvement in battle casualty survival despite a 46% greater rate of casualties sustained.

Planning for medical contingencies requires knowledge of the planned operation of the tactical team. Law enforcement officials are reluctant to share details of their operational plan due to security concerns. Breaches in security during tactical operations have had catastrophic consequences. In the 1993 high-risk operation at the Branch Davidian Compound near Waco, Texas, local EMS assets were put on alert by the agency serving a warrant. Through an unfortunate chain of events, the security of the operation was compromised by the EMS agency and the element of surprise was lost. Four law enforcement officers were killed and several wounded. A more integrated or intrinsic medical support structure for law enforcement operations improves communication, allows for better contingency planning, and preserves the security of sensitive information.

A 1995 survey of SWAT commanders found that the most common form of medical support for their team was a civilian ambulance on standby at a predesignated location. Ninety-four percent of these out-of-hospital care providers had no specialized training in tactical issues and 78% did not have a medical director. These findings suggested a need for established TEMS protocols, medical oversight, and specialized training.

The medical support of law enforcement tactical operations creates an environment with unique attributes (Table 17.1). Medical oversight enhances the development of appropriate protocols and teaching of additional skills (Table 17.2).

### TABLE 17.1

<table>
<thead>
<tr>
<th>Unique TEMS Attributes</th>
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<tr>
<td>Zones of care/care under fire</td>
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<tr>
<td>Weapons safety/specialized weapons</td>
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<td>Hazardous materials</td>
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<td>Forensic evidence collection</td>
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<td>Unconventional patient situations—hostages</td>
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<td>Preventive medicine</td>
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<td>Primary care</td>
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<td>Special equipment and training</td>
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### TABLE 17.2

<table>
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<th>TEMS Unique Additional Skills</th>
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<tr>
<td>Medical threat assessment</td>
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<tr>
<td>Remote assessment methodology</td>
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<tr>
<td>Sensory deprived/overload patient assessment</td>
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<tr>
<td>Medicine across the barricade</td>
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<tr>
<td>Hasty decontamination procedures</td>
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UNIQUE ATTRIBUTES OF TEMS

An understanding of the characteristics that make medical care in the tactical environment unique, and the proper training to operate in that environment,
are essential to a successful tactical medical support program, and provide the necessary framework to enhance mission accomplishment, reduce morbidity and mortality, avoid liability, diminish disability costs, and maintain good team morale.\textsuperscript{18}

**Zones of Care and Care under Fire**

The areas of operation for a tactical mission are usually based on the threat level. Traditionally, terms such as inner and outer perimeter have been used. The inner perimeter is generally the tactical area of operations controlled by the tactical team. Entry or exit in this area is tightly controlled, and the personnel functioning within this location are at the highest risk of injury. The outer perimeter is the larger area of law enforcement operations, and encompasses the inner perimeter. While the concept of static inner and outer perimeters is useful in planning tactical operations, its application to tactical medical support is limited. As the incident evolves, areas of safe refuge or egress may rapidly change. Stratifying the medical areas of operations based on risk better reflects the dynamic process of treating the injured in the tactical arena.

The area with the greatest risk is the hot zone, where an immediate threat of injury is present. This risk may be secondary to a known threat in the area or due to hazardous materials. Patient assessment and treatment in the hot zone is inherently dangerous. Usually, patient extraction, opening an airway, or applying a tourniquet for life-threatening hemorrhage are the only acceptable interventions in this situation, and even these procedures may be delayed because of the potential risk for further injury to both the patient and the rescuer.

The cold zone is the area with neither significant danger nor threat. Medical care in this area parallels that in the routine EMS world; patients may be assessed and treated without risk to either the patient or the EMS personnel.

The warm zone is the area of a potential, but not an immediate or direct, threat. Medical care provided in this zone is dictated by assessing the risk/benefit ratio. Decisions regarding spinal immobilization, intubation, or intravenous therapy rather than immediate extraction depend on the perceived level of threat. Thinking in terms of graduated zones provides a basis to critically analyze medical treatment options in a highly dynamic environment.\textsuperscript{19}

The military has developed a similar classification that also divides the area of care into three zones, which can be applied to tactical law enforcement operations. “Care under fire” is analogous to the hot zone. Preventing further injury, stopping life-threatening bleeding with a tourniquet, and evacuation are the only acceptable interventions. “Tactical field care” is similar to the warm zone and includes airway management, and breathing and circulation assessment and intervention. Needle chest decompression and other immediately life-saving procedures are performed, and intravenous access obtained. “Combat casualty evacuation care” includes more definitive management as the patient is evacuated away from the threat and is analogous to the cold zone.\textsuperscript{20}

**Weapons Safety and Less Lethal Weapons**

The tactical medical provider will likely encounter a variety of weapons in the performance of his or her duties, and TEMS team members should be familiar with the types of weapons in the arsenal of the tactical team, their associated medical risks and effects, and appropriate treatment strategies for team members, bystanders, or subjects that have been exposed to them.

The casual and improper handling of a firearm can have devastating consequences. One strategy to prevent a firearms accident is to adopt a policy that prohibits handling of weapons by the medical provider. This, however, leaves the provider untrained to manage an injured, armed individual. A weapon in the hands of a wounded, distressed, possibly obtunded patient increases the likelihood of injury to the provider and team members.

Prudence dictates training in weapons safety. The ability to render a weapon “safe” allows the provider to proceed with her or his duties in relative safety. Handling of unfamiliar weapons poses a greater threat, and a protocol for the safe transfer of such a weapon to the custody of a tactical law enforcement team member is encouraged.

A variety of specialized weapons are available to tactical teams, including those that are designed to incapacitate suspects while minimizing the risk of death or serious injury. As a group these are known as less lethal weapons (LLW). They include chemical irritants such as tear gas and pepper spray, kinetic impact projectiles such as beanbags, noise/flash diversionary devices (NFDDs), and conducted energy weapons (CEWs). The term “less lethal” indicates that lethal
Effects are less likely than with traditional firearms, and serves as a reminder that serious and even lethal effects are possible.

Chemical irritant agents are a common tool used by law enforcement officers for incapacitation and crowd control. The most common is oleoresin capsicum (OC), which is derived from hot peppers and is commonly known as pepper spray. Another common chemical irritant is ortho-chlorobenzylidene malonitrile, a synthesized chemical irritant commonly known as tear gas and abbreviated as CS.

The agents are chemically unrelated, but produce similar effects. Both OC and CS are skin and mucosal irritants. They produce an intense burning sensation on exposed skin and mucous membranes within moments of contact. Ocular pain, lacrimation, and blepharospasm are prominent, hence the name “tear gas.” Rhinorrhea and a sensation of dyspnea are also common, although true bronchospasm is rare. Incapacitating symptoms last roughly 10 to 15 minutes and resolve over 30 to 60 minutes. Medical treatment should include removal of contaminated clothing and irrigation of irritated areas with water (OC) or moving air (CS). Formal medical evaluation is rarely needed following exposure to either of these agents.

Both of these agents can be delivered in a variety of ways. Pepper spray is commonly delivered via handheld aerosol containers, but can also be delivered to a suspect or group via vehicle-mounted systems or launched projectiles. Tear gas is commonly delivered via pyrotechnic devices that are placed, thrown, or launched into the desired area.

These agents can be highly effective, with rapid and complete incapacitation in many subjects. However, they do not act instantaneously and are not uniformly effective; a substantial number of individuals can tolerate or “fight through” the irritant effects.

“Rubber bullets” and wooden batons were initially fired from firearms as less lethal projectiles in the 1960s in response to violent civil unrest and riots. A variety of specialized munitions have been developed since that time. These include wood, plastic, and foam batons, and flexible fabric containers in a variety of shapes containing small metallic beads. The projectiles are commonly fired from 12-gauge shotguns or specialized 37/40-mm rifle-like launchers.

Kinetic impact projectiles are larger and heavier than traditional bullets, but travel more slowly. They present a large surface area, which distributes the force of impact and makes them less likely to penetrate the skin. Contusions at impact sites are expected. Rib fractures and other bone injuries may be seen. Internal injuries such as hepatic and splenic lacerations, other intra-abdominal injuries, pulmonary contusions, and intracranial injuries are also a risk with these weapons. Fatalities are most common with head, neck, and precordial impacts.

Although the projectiles are designed not to penetrate skin, unintentional penetrating injuries can and do occur. These can range from mild to life-threatening. Impact sites from these weapons should be evaluated carefully, both for unintentional penetration and for serious underlying injuries.

Noise/flash diversionary devices (NFDDs) are explosive devices designed to surprise and temporarily disorient subjects in their vicinity. Detonation of the devices produces a bright flash and loud explosion. They are also known as distraction devices and flash/bang grenades. NFDDs are typically activated and placed by hand at close range, though launched projectiles are also used.

NFDDs can produce major blast trauma and burns if they explode in close proximity to or in contact with a subject or officer. The blast pressure wave can cause tympanic perforation at close range. In addition, NFDDs are an ignition risk and have ignited furniture and other items.

Although electrical stun gun weapons have been available for decades, modern conducted electrical weapons (CEWs) are a relatively recent addition to the police arsenal of LLWs. CEWs are similar to pistols in appearance and deliver a series of brief electrical pulses that produce pain and involuntary muscular contractions. The low-current, high-voltage pulses are delivered either by direct contact with the weapon or via a pair of insulated wires attached to sharp metal probes. The barbed probes are fired by compressed gas and are designed to puncture and remain imbedded in skin or clothing to allow completion of an electrical circuit.

The most commonly used CEW is the TASER®, whose name is an acronym for Thomas A. Swift’s Electric Rifle, after the children’s books of the 1950s and 1960s. The electrical pulses of the TASER X26 CEW each contain approximately 0.36 joules of energy (in contrast to defibrillation or cardioversion therapy, which delivers 50 to 360 joules), at variable voltage up to 50,000 volts. Nineteen pulses per second are delivered for a period of 5 seconds; the discharge can be truncated or repeated by the operator.

Common risks of CEWs include puncture wounds from the sharp probes and blunt trauma from
falls. The overall risk of CEWs is very low; a large multicenter trial found that 99.7% of real-world suspects exposed to CEWs had mild injuries or none at all, while 0.3% had significant injuries. Minor puncture wounds of the skin are common and expected; although rare, ocular and bony penetrations have also been reported. The muscular contractions and loss of normal protective reflex motions caused by CEWs commonly result in falls. This can result in varying degrees of injury, but rarely causes serious or fatal blunt trauma. Less common risks from CEWs include direct musculoskeletal injuries such as vertebral compression fractures from muscle contractions and ignition of flammable liquids or vapors by electrical arcing.

A current controversy related to CEWs is whether there is a significant risk of producing sudden death due to ventricular dysrhythmias. Current research, including studies of cardiac rhythm during and after CEW exposure, indicates that the risk of this occurring is low. However, there are ongoing concerns about numerous deaths in police custody that have occurred after CEW exposure, and the safety of CEWs remains under active investigation.

**Hazardous Materials**

An array of hazardous materials can be found in the tactical environment, especially in clandestine drug laboratories. The increasing role played by tactical units in drug interdiction poses a special problem to both law enforcement and emergency medical crews. Many of the materials used to produce illicit drugs are flammable or explosive, increasing the possibility of burn and blast injuries. Weapons fire, distraction devices, and sparks generated by light switches, flashlights, or photography equipment can ignite a volatile atmosphere resulting in an explosion. Contact with some of these materials by inhalation or dermal exposure may cause toxic consequences.

Illicit drug operations rarely use safe hazardous materials, handling procedures. In the absence of proper safety precautions, law enforcement agents may experience both acute and chronic adverse health effects as a result of exposure to solvents, reagents, precursors, by-products, and drug products improperly used or generated during the manufacture of illegal drugs.

Additionally, today’s criminals are more sophisticated in the methods they choose to protect themselves. Boobytraps have the potential to cause both routine and unusual wounding patterns, thus placing an additional burden on those providing medical support.

**Forensic Evidence Collection**

Evidence collection and preservation are of significant importance during law enforcement operations. Evidence may help to identify the suspect, prove an element of a crime, or prove the theory of a case. Loss of evidence because it was unrecognized, not stored properly, or was not maintained in a chain of custody can damage an investigation. One study concluded that emergency care providers often overlooked, lost, or discarded forensic evidence that required appropriate securing, handling and documentation. The tactical medical provider must have knowledge of principles and procedures used to maintain evidence integrity.

The medical evaluation of a patient injured during an operation must include documentation of forensic findings. This includes evidence that may be lost in the transport and continuing care of the victim such as soot from a firearm on clothing or skin.

**Special Patient Populations**

Individuals with acute medical conditions are often encountered during the course of law enforcement operations, resulting in a complicated situation for police, EMS, and the individual as responders attempt to determine whether a medical problem is the cause of the suspect’s behavior. An example that has received a great deal of attention in the professional and lay press is excited delirium.

Excited delirium is a condition characterized by acute onset of bizarre and violent behavior, which may be accompanied by paranoid delusions, combativeness, extraordinary strength, hyperthermia, hallucinations, and incoherent shouting. This state of extreme physiologic excitement has been associated with abuse of cocaine, methamphetamine, other sympathomimetic drugs, and anticholinergics. It is also associated with psychiatric illness, like schizophrenia or mania, in the absence of intoxication. Police and TEMS personnel who confront these delirious individuals will find they become increasingly confrontational, paranoid, and aggressive, often requiring several individuals to subdue them. Responding officers may approach this situation with the simple paradigm of controlling an unruly subject, unaware of the exist-
ing serious medical emergency. Caution must be exercised as physical altercation and restraint may quickly be followed by respiratory or cardiac arrest. The acute exacerbation of excited delirium in individuals being subdued by police, and its attendant mortality, has been cause for high-profile scrutiny of law enforcement restraint and custody procedures, often resulting in allegations of excessive force or negligence.32–34

The incidence and true mortality rate of excited delirium are unknown. The cases that result in death are likely disproportionately reported. It has been estimated that excited delirium may be a factor in 50 to 125 in-custody deaths per year in the United States.35

The law enforcement and EMS approach to these individuals is problematic. The individual's bizarre and unruly behavior is often what has prompted a public safety response, and there is a need to control the individual, often by force. The ensuing interventions of officers and EMS personnel, however, are likely to aggravate the subject's condition. Violent struggle exacerbates the underlying condition and is followed by a sudden labored and shallow breathing pattern, which proceeds to respiratory and cardiac arrest.

Ideally, patients suffering excited delirium should be approached with calm and caution. This presents a difficult challenge given the irrational behavior of the individual, and the need to gain control and provide for the safety of the subject, the public, and the responders. There is no definitive methodology that can be recommended for subduing the individual suffering excited delirium. Law enforcement officers often receive special training on diffusing techniques and strategies for de-escalation similar to those necessary to manage individuals who are mentally ill, disturbed, or of otherwise diminished capacity. Routine methods used to gain control of an individual, such as impact techniques (baton, bean bag round) or OC, may not be effective given the subject's irrational and altered state. By whatever means officers gain control and restrain an individual, careful monitoring must follow, with an ability to identify and address medical concerns. Coordination between officers and TEMS providers is crucial as excited delirium is a medical emergency and requires acute medical care. Such patients should be transported by ALS ambulance, and not in a police vehicle. Restrained patients should be transported on their sides, not prone.36 Chemical restraint should be considered with benzodiazepines, to sedate the patient and blunt the sympathomimetic response. Monitoring of pulse oximetry, to guard against asphyxia and hypoxia, and of cardiac rhythm, to recognize sudden cardiac collapse, is recommended. Intravenous fluids should be considered if rhabdomyolysis is suspected. Active cooling is indicated for patients with recognized hyperthermia. Death due to excited delirium is not universally preventable, but aggressive intervention including removal of restraints, cooling, sedation, volume resuscitation, adequate ventilation, hospitalization, and access to critical care must be employed to have a chance of saving the patient's life.

PREVENTIVE MEDICINE AND PERFORMANCE INTEGRITY

While most tactical activities are of short duration, operations may last several days or longer, and one of the most important components of a comprehensive TEMS program that is often the least appreciated is that of wellness and prevention activities.37 Because of their medical background, TEMS personnel are well situated to plan and provide for personal hygiene, meals, hydration, and the consequences of operating in extremes of temperature. Operational deployment while wearing full tactical gear can increase the effective temperature by 10°F. In addition, the performance decrement of team members from engaging in sustained or continuous operations can increase the likelihood of injury. Providing advice to the tactical commander regarding appropriate work–rest cycles may prevent unnecessary injuries.

Primary Care

A large number of injuries sustained in the course of tactical operations are sprains, strains, abrasions, and contusions.7 EMS providers are certainly familiar with these injury patterns, but their scope of practice generally does not allow for definitive care. When injuries can be expeditiously evaluated and definitively treated, further injury can be prevented and time off work for the officer and the agency can be reduced. In remote tactical team operations, where access to other medical care is limited, the importance of on-scene medical care is critical.

One means to manage these injuries is by expanding a provider’s scope of practice. The ability to accomplish this will vary regionally, depending on governing legislation and state regulations. It also will
require additional training and continuing education, and close medical oversight. Alternatively, an independent licensed practitioner, such as a TEMS physician, can provide these services.

**Special Equipment**

Equipment for the tactical medical provider can be divided into personal and medical. Personal protection is essential. If the provider is working as part of the team and the team is dressed in full body armor, then the medic should have the same level of protection. At a minimum, this should include kevlar helmet, ballistic eye armor, ballistic vest, gloves, and supportive footwear. The mission will dictate additional equipment, such as a protective mask. Water should be carried to maintain personal hydration and a radio should be provided to monitor the tactical channel, and communicate with the tactical team and local EMS assets.

The equipment worn and used in the tactical environment is significantly different from what most medical providers are accustomed to wearing, even if they are actively involved in local EMS. The TEMS provider must be fitted, trained, and familiar with the equipment and its use, and must practice providing medical care while wearing the equipment.

The medical equipment used by the tactical medic must be functional and compact. Carrying a standard ambulance trauma kit in a hostile environment will burden the medic with excess weight and impede maneuverability. The usual containers are brightly colored, large, bulky, and not useful for covert movements. Much of the equipment in commercial kits will not be useful in a tactical situation where the time for an intervention is short and certain supplies that are not in the standard trauma kit may be necessary.

There are several considerations in choosing the most appropriate method for carrying the tactical medical equipment. Foremost is portability. The ideal device will allow the hands to remain free yet provide easy access. In addition, the pack should be soft-sided and waterproof. Coloring should be subdued with tactical black preferred. Shoulder-supported backpacks fulfill these requirements. Other options include “fanny packs,” or carrying supplies on a load-bearing vest; vests with modular pockets can be designed to accommodate mission-specific equipment.

The amount and type of medical supplies depend on the provider level and should be tailored to the mission. An inner-city raid may not require the same resources as a barricaded subject with hostages in a remote location. Therefore, a method of carrying the essential elements to provide initial treatment should be augmented by a rapid re-supply mechanism. This is accomplished by maintaining a larger kit in a central location, like the command post or tactical vehicle.

Emphasis should be placed on equipment that relates to the treatment of trauma and used in the treatment of airway, breathing, and circulation problems. Airways, intubation supplies, cricothyotomy, and needle thoracostomy equipment are required, as are pocket masks or bag-valve masks for respiratory support. The added weight and the danger of oxygen cylinder damage from projectiles make its utility limited in the hot or warm zone. Methods to control hemorrhage, such as direct pressure dressings, tourniquets, and hemostatic agents as well as intravenous access supplies and volume expanders are mandatory.

Medications used for resuscitation of cardiac arrest patients will seldom be used in the tactical situation. Arrests due to medical etiologies during tactical operations are rare: None have been recorded among the 679 casualty reports compiled from 4,139 incidents submitted to the Counter Narcotics Operational Medical Support (CONTOMS) Database. The hostile environment of tactical medical support precludes resuscitation. The burden added by carrying these items into the hot or warm zone is unwarranted. These items can be located at a command center or command vehicle.

**TACTICAL MEDICAL PROVIDERS**

**Training**

Before personnel undertake the challenges of providing emergency medical care in the tactical environment, additional specialized training is required. A basic understanding of tactical operations will assist the provider in appreciating the overall mission plan and the roles of each team member. The ability to plan for medical contingencies like patient evacuation is made easier if the medical provider can adequately assess the direction and objective of the mission. TEMS personnel should have a working knowledge of the tactics and tactical movements of the team. Teams practice different maneuvers and different approaches and a provider who is not familiar with stealth approaches, or who does not know when to use hand
signals, may not only jeopardize a mission, but also the lives of team members.

Familiarization should be accomplished by participation in training and missions with the team. Initially, this training is preferably accomplished with experienced tactical medical personnel. Attending a basic SWAT school will provide training in operations and tactics, but many civilian providers will not have the time nor interest. Through tactical medical courses, where medical and tactical issues are addressed and practiced, and “on-the-job” training, TEMS personnel can achieve the familiarity needed to function with a team.

**Provider Level**

The scope of practice of prehospital providers varies across the country. This scope of practice is generally defined by state statutes or regulations. To determine the desired scope of practice for the tactical medical provider, the mission and operations of the tactical team should be reviewed. Depending on the typical mission type, the desired skills of the tactical medic will be identified.

Whatever the desired range of skills, the training to properly perform skills in a safe and effective manner must be provided, and must be clearly delineated in a written protocol. Since the scope of practice of EMS providers may be regionally regulated, a review of the applicable statutes and governing regulations is essential in the development of tactical EMS protocols. Preventive medicine, primary care, and advanced intervention skills will require particular attention, and not all providers will be able to provide these skills.

Regardless of the provider level, tactical teams will benefit from the proximity of dedicated medical support to the operational area. EMS personnel trained to the first aid or EMT-Basic level currently provide most medical support to tactical operations. Therefore, the possibility of EMT-B’s using certain advanced procedures requires consideration. Paramedic skills may require changes in specific techniques, specially adapted for the tactical situation. The tactical environment is more than just “tactical 9-1-1,” and poses many unique scenarios and situations that can be barriers to providing “normal” emergency prehospital medical care. Even procedures that are performed on a daily basis can become difficult to a tactically challenged provider. This may be attributed to the inability of the provider to concentrate on assessing and treating a patient while maintaining a critical perspective of the overall mission’s progress. In addition, assessment and treatment may make the patient and provider vulnerable.

**Special Skills**

The tactical medical provider serves as the tactical commander’s medical conscience. The medical support unit is able to provide the tactical commander with real-time advice and action based on situational considerations. The health and medical care of the team and the public at large are part of the tactical commander’s decision and responsibility, and tactical medical providers furnish vital support. Factors and events that may impact the team’s health need to be addressed to the commander for his or her review.

An added benefit of medical personnel interacting with the tactical team is the ability of the TEMS personnel to provide a medical threat assessment. The medical threat assessment provides advice to the tactical commander about possible and expected potential health hazards inherent to an operation. The medical threat assessment also evaluates the local medical resources and prepares for evacuation of casualties. Information regarding terrain, site hazards, known disease threats, and forecasted weather should be included in the report. The medical threat assessment provides the tactical commander with the potential to increase mission effectiveness, command credibility, and team morale. It decreases personnel attrition, costs due to injuries, and legal liability.

At times, wounded individuals may be located in an area inaccessible to direct medical care. In this situation, the ability to accurately assess the patient from a distance may provide the tactical commander with needed information to direct the operation. Remote physical assessment is a method in which the care provider can attempt to ascertain injuries and condition by visualizing and talking to the victim from a remote location. The injured may be verbally directed in basic life saving interventions like hemorrhage control, or may be instructed to proceed to an area that provides greater protection. The medical provider may also be able to determine lethal injuries and obviate a rescue attempt in a hostile location.

The ability to perform an accurate physical assessment is a cornerstone of prehospital care. Providers spend a significant portion of their initial training mastering these skills. This training usually takes place in the controlled environment of the classroom.
and relies heavily on visual cues. In the tactical situation, assessment of the injured patient is problematic. The protective equipment worn by SWAT members impedes palpation and visual assessment. Poor lighting and the inability to safely illuminate the patient add restrictions. In an active, hostile mission, extraneous stimuli from weapons fire, distraction devices, and radio communications may interfere with concentration. All of these factors will force the provider to use additional techniques to accurately survey the patient.

Two techniques, pioneered by the Uniformed Services University of Health Sciences and the U.S. Park Police, are additional tools that the provider can use to assess patients in these situations. The sensory-deprived physical assessment (SDPA) and the sensory-overload physical assessment (SOPA) were designed to reinforce physical examination skills with emphasis on using senses other than vision. During SDPA training, the examiner is blindfolded and is forced to rely on tactile and aural clues to complete the physical assessment. In SOPA training, flashing lights, loud noises, and crackling radios require increased concentration on the part of the provider and emphasize tactile examination.40

The tactical medical provider may encounter situations in which he or she needs to address medical problems occurring in individuals who are barricaded from law enforcement officials and medical personnel. The only means of evaluating patients in this environment may be via telephone or radio, through which assessments are made and instructions delivered to a care-giver on the other side, or “medicine over the barricade.” A template for this activity currently exists in the form of EMS dispatch prearrival instructions. An organized approach to evaluation and treatment of injuries with a protocol designed for this situation is the means to deliver immediate life-saving care, possible through a layperson, if extraction of the victim is not possible.

The incident commander oversees communication with the barricaded subjects. He may find an opportunity to negotiate for removal of ill or injured persons, or may possibly secure a peaceful resolution of the crisis using the information gathered via the “medicine over the barricade” exchange. It is important to note that the incident commander makes all the decisions and that when talking with the perpetrator the tactical medical provider should never agree to a demand, make a promise, or offer to enter the barricaded area. In many cases the tactical medical provider may need to talk through a police negotiator, as the negotiator is often the only person allowed to communicate directly with a hostage-taker. The TEMS provider must then provide advice to the negotiator about what advice to pass on to the hostage or the perpetrator.

Training in hazardous materials is essential for all members of any team raiding clandestine drug laboratories. Advance knowledge of possible contaminants, and their mechanisms of action, antidotes, and treatment will help ensure immediate and effective care of the contaminated patient. Techniques for field-expedient decontamination should be practiced routinely and will reduce the risk of spreading contamination during patient treatment and transport.

The position that the tactical medical provider holds within the team will vary.41 Current models include using SWAT officers who are also trained as medics, law enforcement officers other than SWAT as the tactical medic, and civilian personnel trained to respond with and support the tactical team. Using a commissioned officer lessens concerns over personal security, crime scene and evidence preservation, weapons handling, and operational security. SWAT officers have the added advantage of familiarity with tactical operations and the confidence of their team members. However, medical support for officers is usually an additional duty that may result in role confusion during an operation and pose logistical problems in skill maintenance. The concept of “one role–one person” in TEMS limits role confusion. Each team member should have one primary role for the mission. When team members have more than one primary role, it can be confusing which role to perform when both are needed. If one of the tactical team members is also considered the medic, an unnecessary decision has to be made when there is an injured officer needing medical attention. Treating a patient and engaging a hostile target simultaneously is impossible.

Using civilian medics who train with the team provides well-trained medical personnel. But the increased risk posed to operational security and lack of tactical experience or law enforcement powers is a potential drawback. The use of “standby” civilian EMS without any tactical exposure is an inadequate method of providing appropriate tactical medical support.

Where the medic functions is also an area of debate. Depending on the status with the tactical team, the TEMS provider may function anywhere from the hot zone to the command post. Arguably, the provider should be as close to the potentially injured person as
possible, to speed the provision of rapid medical care when needed. However, concerns about safety and security in those situations are valid.

Medical providers who are not sworn officers and who may only have limited, introductory law enforcement knowledge obtained through tactical medical training are best kept away from the hot zone. The inability to provide their own protection and the possibility of becoming a potential target are reasons that these providers should be excluded from the hot zone. However, restricting the medical support to the command post does not fully maximize the potential benefit of a TEMS provider, since evacuation of the casualty from the hot zone to the command post may require mission-essential personnel. Therefore, placing the provider somewhere close to, but protected from, the action is likely best. This also allows for direct observation of the activity, the possibility to foresee potential injuries, and an increased preventive role.

Perhaps the most controversial question concerning a tactical medicine program is whether TEMS personnel should carry firearms. While allowing the medical providers to carry weapons may provide them with the ability to protect themselves or patients during a mission, the consequences may be tragic. If the provider is an officer, carrying a weapon while on duty is usually a requirement. The area of concern is when a civilian is supporting the tactical team. Providers may be permitted to carry personal weapons under local laws and regulations. The level of training to acquire proficiency is difficult to maintain and liability issues will undoubtedly arise should an EMS provider be involved in the shooting of a suspect or innocent bystander, or a friendly-fire incident.

THE TACTICAL PHYSICIAN

Initial studies of SWAT teams in the 1980s and 1990s revealed that 78% to 91% of teams did not have a physician medical director, and only 10% of the respondent teams had physicians as medical support personnel. However, physician involvement in TEMS has steadily increased, and the physician role is varied. A recent study found that of the physicians who are involved with TEMS, more than half of them were sworn officers and carried firearms while supporting the team. Additionally, some performed dual roles as medical provider and member of the entry team, and one physician had a dual role as a sniper.

Generally, the type of physician support falls into one of three categories: medical director, TEMS operational team member, and a combination of the two. Each role has advantages and disadvantages.

The majority of physician team members perform as volunteers. Therefore, time availability and practice constraints are significant determinants of how involved the physician will be. In a primarily oversight role, the time commitment can average a few hours per week. Functioning as an operational team member can be a much larger commitment. A mission or call-out can last several hours to days. Having the ability to schedule time to perform these missions is essential to deploying with a team. Few physicians who have a full-time practice have the ability to provide direct medical oversight or deploy on actual missions. Functioning with a busy team in this role could develop into a full-time commitment.

Medical Oversight

Medical oversight is a standard and essential component of any EMS system. The tactical medical director should be a physician knowledgeable in the development of treatment protocols, EMS law, and management of the acutely ill or injured. Additionally, the medical director should have training in direct and indirect medical oversight, familiarity with communication plans, and the requisite medical knowledge to train EMS personnel at all levels. Knowledge of law enforcement tactical operations is extremely desirable.

Requisites for initial training and continuing education for traditional EMS providers also vary greatly based on local and state requirements, despite the efforts being made toward a recognized national standard. The training and continuing education of tactical medics is part of the medical oversight of a tactical medical support program; the medical director should be actively involved in the training of personnel. It is the duty of the medical director to maintain the quality of care provided by field providers. It is essential for physicians to remain involved in this process. Core components of the quality improvement process include reviews of protocol compliance, documentation, overall patient management, and patient outcomes.

Supporting tactical law enforcement operations is a unique practice environment requiring skills beyond the scope of traditional physician education, and even beyond medical oversight of the standard civilian EMS system. National educational programs...
for physicians and other EMS personnel exist to address this body of knowledge, and completion of this training is highly recommended. A variety of courses are available and a national standard for training is emerging. The medical director should review the curricula of the programs and select one that provides the best training suited to the mission requirements of the team that he or she will be overseeing.

The completion of a core curriculum course cannot guarantee concept and skill retention, so a continuing education curriculum should also be developed for TEMS personnel, with oversight from the medical director.

An understanding of potential expanded-scope activities, care of patients in various zones, and other influences of the operational environment on patient management is necessary. If many physicians are involved in this process, a standardized review process should be established to ensure uniformity. Training and recertification standards must be addressed and are essential in maintaining quality in the program.

Quality improvement should be a prospective activity to continually improve the quality of service delivered to the patient. Tactical medical support programs are, with few exceptions, much smaller than their traditional EMS counterparts, and therefore provide a unique opportunity for a close relationship between the medical director and providers. Perhaps the best argument for physicians at the scene, in support of field operations, is the establishment and nurturing of this relationship between medical oversight and prehospital provider. This interface is most rewarding to all participants and will have the greatest yield in improving the quality of care.

Direct medical oversight is the real-time involvement of the physician in the management of prehospital care via radio or telephone, or by physical presence at the scene. Aside from allowing closer supervision of prehospital activity and assistance in the management of difficult cases, direct medical oversight may allow deviation from protocols. The dynamic environment of tactical operations necessitates greater flexibility in the management of casualties. However, unlike traditional EMS systems, radio contact with a medical oversight physician is frequently not feasible. Constraints of the tactical environment may make radio and phone communications difficult and patient management may be modified based on real or perceived threats to ensure safety for the healthcare provider. There is no substitute for visualizing the scene and understanding the unique practice environment of each scenario. For this reason, on-scene participation of the tactical physician may enhance the quality and scope of service provided by the medical support team. For direct medical oversight to be effective, the physician must be familiar with and knowledgeable of the environment. Whether the medical director or any physician becomes actively involved in the operational role of a medical support team is a complex decision. Input from local EMS, law enforcement, medical, and legal communities should be sought. All of these agencies will be potentially affected by the deployment of physicians on medical support teams.

**Operational Team Member**

The physician has the potential to enhance care in the field by bringing a broader scope of practice than most out-of-hospital providers. The ability to provide direct medical oversight and advanced procedures are the most obvious advantages. On-scene, direct medical oversight can obviate the need to use the radio to call for guidance: a possible source for breach of security. The physician can also perform the more frequent, routine care such as sick call. The ability to perform preventive medicine skills, such as hydration and work-rest cycle recommendations, will keep a team healthy and have a greater impact on team integrity and effectiveness than the rarely used thoracostomy or rapid-sequence intubation.

**SUMMARY**

Unconventional hazards are commonplace in tactical law enforcement. Barricaded suspects, hostage taking, clandestine drug lab raids, and high-risk warrant services are some of the missions that are carried out every day that put the law enforcement officers, perpetrators, and the general public at special risk. Manpower maintenance and appropriate medical support are essential to mission accomplishment. The tactical physician can play several important roles in ensuring such medical support.
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