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Development of a Standard and Functional Tactical Emergency Medical Curriculum -- TEMS Medic

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Introduction

Violent crime causes death and injury regularly in the United States. Some events such as the Newtown shootings, the Oklahoma City bombings, or the Washington, DC sniper case acutely focus the entire nation's attention while other, less contemporary events fade away. The public safety apparatus – police, fire, and emergency medical services – always respond to save lives. On December 11, 2012 a man opened fire at a mall in Clackamas County, Oregon. The 9-1-1 dispatchers sent units to a shooting at the mall and then quickly reported that the shooter was still firing in the mall. One of the police officers responded with apprehension in his voice to confirm that he was arriving to an active shooter. Officers next confirmed that the subject was firing with an automatic weapon and wearing body armor. Police established a team to enter the building and a team to secure the perimeter. All of the emergency responders knew they needed medical help at the mall.[1] Ultimately, three people died in this shooting.[2] High-risk incidents like this active shooter incident change standard emergency medical services. Despite the calls coming in from officers about dead and injured people throughout scene, paramedics and emergency medical technicians cannot enter the mall to treat and rescue victims. It takes time to organize teams and to understand the chaos of a major incident especially a tactical incident that can only be entered by highly trained law enforcement officers. Tactical Emergency Medical Support (TEMS) units attempt to hybridize law enforcement and emergency medical services to bring medical care into these types of chaotic situations.

[1] Clackmas County Communicaitons, n.p.
[2] Shoichet and Martinez, n.p.

Threats from hostile subjects armed with weapons or explosives define the tactical environment. During such incidents, standard emergency medical services will be distanced from the scene leaving law enforcement to conduct medical care at the center of the incident or wait until the scene can be fully secured. TEMS providers are trained to bring patient care capabilities into the fray of a tactical incident before the scene has been secured. Unlike their colleagues on an ambulance, tactical medics work "during high-risk, extended duration and mission-driven law enforcement special operations,"[3] which demand a skill set beyond that of traditional prehospital emergency care.

In order to save both law enforcement and civilian lives during violent events such as execution of warrants, hostage situations, and active shooter scenes, public safety officials must implement a standard and functional TEMS curriculum. TEMS training courses have been developed by numerous organizations but no nationally adopted standard and functional TEMS course exists in the United States.[4] Medical and tactical experts have adapted many of the lessons learned from foreign wars and continued violence at home to create usable medical protocols. The curriculum included in this paper combines these findings and conclusions with research on human performance under stress to create an effective tactical emergency medical curriculum designed specifically to meet the needs of the law enforcement community nation-wide.

Tactical medicine balances law enforcement operational goals and health care delivery. Tactical mission commanders will not typically place medical care as the primary objective. During the operations, the tactical team primarily seeks to save lives.[5] In incidents with an existing threat, ending the threat can save the most lives. Medical

[3] Gerold, Gibbins, and McKay 1
[4] Rathbun and Gerold 86; Schwartz et al. 67
[5] National Tactical Officers Association 16

and rescue operations often serve as a component of the contingency plan or as a secondary objective to ending the threat. The military identified problems with fitting medical care into the tactical situation during operations in Somalia in 1993. Injuries during tactical operations present both a tactical and a medical problem because care must both help the patient while allowing the mission to continue if possible.[6] Law enforcement special operations must also balance the tactical flow of the mission with care for an injured person. A 2011 panel on tactical medicine training concluded that an effective TEMS program can "enable law enforcement to operate more efficiently, more effectively, and with reduced risk" by providing a designated team member who treats the injured party (or parties) and allows the remainder of the team to complete the mission.[7]

TEMS providers must be able to operate under high levels of physical and mental stress. Few can fully comprehend the rigors of providing patient care in a tactical environment. Mass casualties, equipment limitations, dim lighting, loud background noise, and constant situational awareness all call for the tactical medic's attention. Simultaneously, the tactical medic may experience physical exhaustion from maneuvering with heavy equipment and fighting to secure the scene. When all of these factors collide, stress may begin to impact analytical thinking or fine motor skills causing degradation of the TEMS provider's medical skill, whether cognitive or psychomotor. Imagine the pressure of performing a life-saving procedure, such as a surgically inserted airway, in the dark with your hands shaking from the physical exertion and stress of nearby gunfire.

[6] Butler, Hagmann, and Richards 6
[7] Schwartz et al. 67

The Training Gap

Given the austere nature of the tactical operating environment, tactical medicine training programs must be specifically designed. The U.S. military realized this demand after combat in Mogadishu, Somalia in 1993. The U.S. Special Operations Command decided that standard civilian emergency care was not sufficient for combat operations.[8] The resulting paper, titled "Tactical Combat Casualty Care in Special Operations," promoted a new set of guidelines. The military and law enforcement agencies have widely adopted the Tactical Combat Casualty Care guidelines due to their success during the Global War on Terror and methodology for dividing patient care by threat and risk.[9] Medical and tactical experts have questioned direct applicability of the Tactical Combat Casualty Care guidelines in the civilian sector on the basis that law enforcement injury patterns do not match those seen in the military.[10] Additionally, the authors of the Tactical Combat Casualty Care guidelines do not suggest methods or formatting for civilian tactical medicine training.[11]

There is no uniform and functional civilian tactical medical training course despite efforts of numerous organizations. The Committee on Tactical Emergency Casualty Care has adapted the stratification of care by threat and many military patient care procedures to meet civilian emergency medical needs in a variety of high-risk situations.[12] These guidelines, however, do not include a way to train providers in their use. In 2009 and in 2011, two committees met to develop and finalize a national TEMS

[8] Butler, Haymann, and Butler 3
[9] Butler et al. 1; Gerold, Gibbons, and McKay 1
[10] Gerold, Gibbons, and McKay 2; Sztajnkrycer 58
[11] Butler, Haymann, and Butler 3
[12] Shapiro, n.p.

curriculum. Both attempts have made significant progress in the development of competency criteria but fail to make programmatic recommendations.[13] The impact of limited programmatic standards can be seen in current textbooks and courses. For example, *Tactical Emergency Medicine,* which attempts to include both military and law enforcement operations, contains competency criteria for each chapter and covers most of the recommended criteria as identified by the TEMS curriculum committees.[14] But, as previously discussed, the military combat and law enforcement tactical environments are different, so a comprehensive yet appropriate TEMS text should focus on the specifics of law enforcement operations. The National Park Service tactical medicine and the Internal School of Tactical Medicine courses both boast federal agency endorsements but the later course is 24 hours of instruction time longer.[15] This significant difference in instruction time, even with federal agency endorsement, demonstrates a lack of programmatic standardization. Overall, the current literature lacks a uniform and functional TEMS curriculum that can be implemented in courses and texts.

Standardization gives validity to a certificate and allows those who complete a course to use it in multiple different jobs, cities, or states. Standardization also allows different agencies to work together more efficiently in the event of a disaster or large emergency. Yet, standardization has its drawbacks. A nationally standardized course may not fit the needs of every area of the United States. The United States is a geographically large country with diverse populations and varying access to resources. For this reason, there will be some gaps in this curriculum. Individual states, cities, or agencies will need to fill in those gaps to fit their needs. A national curriculum aims to standardize the

[13] Rathbun and Gerold 95; Schwartz et al. 81
[14] Schwartz, McManus, and Swienton, n.p.
[15] International School of Tactical Medicine, n.p.; National Park Service, n.p.

fundamentals so that when a TEMS provider from southern Maine interacts with one from New Hampshire they can readily assist each other and focus on caring for patients instead adopting a "just in time" learning of each other's scope of practice.

Science of Human Performance

Emergency medical care in any environment requires complex and precise motor skills along with cognitive abilities. Such skills are difficult to practice in stressful situations like those encountered by TEMS providers. The body's physiological reaction to these stressors can cause degradation of the analytical thinking and motor skills TEMS providers need to have intact so that they can save lives.[16] These stressors include pressure to save a life, time constraints, ambiguous situations, threatening environments, equipment difficulties, and presence of teammates.[17] Research from law enforcement agencies and the military has demonstrated that certain training methods can better prepare students to perform under pressure. First, use training methods that incorporate stressors to help trainees develop coping mechanisms. Second, simplify procedures and attempt to select skills that require less precise motor function and cognitive processing. Selection of simpler skills will not always be possible in TEMS because of the nature of medicine. Each skill should be considered carefully before expecting TEMS providers to execute complex or precise procedures in stressful environments.

Tactical medicine training should prepare students for operating in stressful environments so that they do not need to experience actual failures under stress to improve their coping skills. Many individuals who work in public safety or other high-

[16] Siddle, "Stress Paradox" 29
[17] Ibid

performance, high-stress industries have experienced the detrimental effects of stress. Many new emergency medical technicians (EMTs) have never practiced patient care outside of a well-lit, open room. They have never responded to a call in the pouring rain or hauled 20 pounds of equipment up three flights of stairs to get to a patient. The first time they respond to calls with environmental stressors, they make mistakes. They fumble with their hands, drop equipment, and miss important physical findings on injured patients. The common factor in most of these situations: their hearts were racing and the environment overwhelms them. The tactical environment has innumerable stressors and high consequences for failure so training must limit the impact of stress on performance.

Stress exposure or inoculation training allows tactical medical students to develop coping mechanisms for stressful operations. This training has been recommended for military training in highly ambiguous and stressful environments.[18] Stress exposure training aims to identify stressors and familiarize trainees with the environment and expectations, develop self-regulation of stress through coping skills, and finally, practice the coping skills under realistic settings. Inclusion of a constructive learning environment with expectation of errors will improve the transfer and adaptation of training to other environments.[19] This program is similar to the training technique suggested by Bruce Siddle, an experienced law enforcement and combat skills instructor, who uses four steps to develop training for any given skill. First, identify stressors that will impact the skill; second, select appropriate techniques to conduct the skill under stress; third, develop hands-on knowledge of the skill in a controlled environment; fourth, practice the skill in

[18] Delahaij, Gaillard, and Soeters 17A-1
[19] Ibid 17A-7

realistic exercises.[20] Stress exposure and Siddle's training allow students to become progressively more comfortable with the skills needed under stress.

Realistic scenarios provide an avenue to teach skills and critical thinking while providing stress inoculation. Reality-based training consists of different types of scenarios and theoretical exercises that require a student to focus on the details of functional application of their skills. High-level scenarios, the most dynamic and realistic type, involve scripted role-players and situations that simulate critical skills and challenging environments.[21] According to Kenneth Murray, Director of Training for the Armiger Police Training Institute, "high-level scenarios are used to test judgment, speed, and precision under stressful conditions."[22] Research has also demonstrated that instructors can reliably use scenario training to assess medical and non-technical skills like leadership.[23] Because high-level scenarios often create a stressful environment, they also provide the final phase of stress inoculation training.

In order for reality-based training to work it must be realistic and well defined. Creating realistic scenarios is more complex than it sounds. Instructors and trainers often leap to highly complex, worst-case scenarios but these scenarios fail to illuminate shortcomings in more common situations. Worst-case scenarios only train students for overwhelming worst-case situations.[24] Training scenarios should represent situations that have occurred or that are likely to occur.[25] Realistic scenarios should be highly structured. The student will still experience ambiguity because he or she does not know

[20] Siddle, *Sharpening the Warrior's Edge* 110
[21] Murray 125
[22] Ibid 124
[23] von Wyl et al. 126
[24] Murray 212
[25] Ibid 211

the script and structure. For any given scenario student could take an expected set of various actions based on their training. The scenario script should account for these variable actions. Instructors need structured and scripted scenarios to evaluate students effectively.[26] If scenarios are both realistic and structured then reality-based training will force students to practice skills under stress and allow instructors an opportunity to give constructive feedback.

Prerequisite Certification Level

Tactical emergency medical training should require advanced life support prerequisites to focus on application of medical skills and operations in the tactical environment. Prerequisites allow an instructor to cover more advanced tactical medical skills in a shorter amount of time. Health care and public safety both use many different certification and license levels. In prehospital emergency medicine, paramedic certification is the highest standard. These providers can administer numerous medications and perform a variety of advanced life support procedures. Other prehospital license levels include advanced EMTs, EMT-intermediates, and EMT-basics. The difference between basic and advanced life support is not always clear, but the latter is distinguished in part by invasive procedures such as the administration of fluids and medication via needles or catheters. Paramedic students also study anatomy and physiology in depth to better use their advanced life support skills.[27] Prior training in anatomy, physiology, and advanced life support skills would serve the tactical medic especially well.

[26] Ibid 124; von Wyl et al 125
[27] National Highway Traffic Safety Administration 19

Paramedics possess the fundamental skills, experience, and motivation for tactical emergency medicine. While not typically applied in a tactical environment, a paramedic's skills match those specified in the Tactical Emergency Casualty Care guidelines and in recent attempts to establish TEMS core competencies.[28] Most paramedics will have some field experience, which will likely assist them in transferring traditional emergency medicine to the tactical environment. There is growing evidence from the military that combat medics who are also certified as civilian paramedics provide better patient care than those just trained as combat medics because they serve a more diverse population, have a potentially higher patient volume, and have a wider array of experience in therapeutics.[29] Additionally, requiring a paramedic license will create some self-selection of students. Only those who already have a passion for prehospital and austere environment medicine and rescue will pursue the tactical medicine course. Michael Carunchio, a tactical medic and experienced paramedics, asserts that a successful tactical medic must choose to pursue TEMS out of their personal motivation.[30] Paramedics will come to a tactical medicine course with fundamental skills, experience, and motivation that permits the course to focus on applications in the tactical environment.

Paramedics are readily available for tactical medicine training. As of 2011, 48 U.S. states out of 48 responding state offices reported issuing paramedic licenses.[31] Other emergency medical license levels – such as EMT-Intermediate – are not used as widely in the United States. Paramedics tend to participate in numerous aspects of public safety as firefighters or police officers in addition to their medical duties. Many paramedics work

[28] Committee on Tactical Emergency Casualty Care, n.p.; Schwartz et al. 73-75
[29] Marby and De Lorenzo 94
[30] Carunchio, n.p.
[31] Mears et al. 90

on an ambulance and also take on a secondary on call position with other departments as they might with a tactical team. Paramedics are good candidates for TEMS providers because they can be found across the country in many facets of public safety.

A standard and functional TEMS course can expand upon and require current paramedic certification. Prehospital emergency care already uses many courses that build from the foundation of paramedic certification. Some programs like the wilderness EMT adjunct course have become well-accepted certificates. In Maine, the statewide prehospital treatment protocols permit the use of wilderness EMT scope of practice when transport times exceed two hours.[32] The organizations that teach wilderness EMT courses have worked to create standard scopes of practice to ensure acceptance of their training.[33] Tactical emergency medicine courses should follow the same model. A TEMS course should be a standard adjunct to a paramedic license.

The Way Forward

The concept presented here, which is the TEMS Medic curriculum, will provide tactical medical training that can be standardized nationwide and can be applied functionally in the field. TEMS Medic will draw its standardization from the existing attempts by numerous TEMS community members – including the National Tactical Officers Association and the Committee for Tactical Emergency Casualty Care – to create civilian tactical care standards. These organizations have invested time and research to promote the best practices for high-threat environments. The TEMS Medic course will be more readily adopted if the major governing bodies of tactical medicine

[32] Maine EMS, Brown 4
[33] Johnson et al. 1

have already vetted the science and procedures. Following the adjunct certification model, all candidates for the TEMS Medic certification need to be licensed paramedics. TEMS Medic will include about 50 hours of instruction and practical training time over six days and one night. TEMS Medic training must package the science and expertise in a way that graduates of this course can apply the material in the most demanding environments. Reality based training and stress exposure training serve as one branch of successful functional training. The other branch involves designing the course so that students learn the most important and frequently used skills first and can repeat them with supervision and in increasingly complex scenarios throughout the course.

TEMS Medic Summary Syllabus

1. Day 1
    a. Course introduction and safety procedures (0.5 hours classroom)
    b. Tactical environment introduction (1 hour classroom). Instructors should provide a classroom session that introduces students to common tactical operations and medical care challenges.
    c. Tactical Emergency Casualty Care Methodology (1 hour classroom, 0.5 hours practicum). Students should become familiar with the concept of providing care based on the level of existing threat and the basics of the Tactical Emergency Casualty Care treatment guidelines. Hands-on training should allow students to identify the appropriate level of care based on simulated threat scenarios.

d. Mechanisms and patterns of injury (1 hour classroom, 0.5 hours practicum). Basic physical and kinematic principles allow emergency medical providers to predict the injuries associated with certain causes. This is referred to as the mechanism of injury. In the tactical environment, providers will encounter traumatic injuries from bullets and explosives more than accidental trauma, which is the norm in the civilian world.
e. Critical systems review: Bleeding control (1 hour classroom). Bleeding is a common cause of death from injuries caused by guns, knives, and explosives. TEMS providers should be trained to rapidly find and control any major bleeding.
f. Critical systems review: Airway (1 hour classroom). In the tactical environment, the traditional methods for ensuring an airway that permits the patient to breathe will not always be appropriate. Instructors should discuss methods for securing an open airway that reflect the environmental conditions.
g. Critical systems review: Breathing (1 hour classroom). Even with an open airway a patient may not be able to breathe. Instructors should discuss the common causes of breathing problems in the tactical setting and appropriate treatments. The most common tactical breathing emergency is a collapsed lung from air or fluid in the chest.
h. Critical systems review: Circulation (1 hour classroom). The circulatory system includes the heart, blood vessels, and blood. This section reviews

the assessment of the circulatory system in addition to causes and treatments in the tactical environment.

i. Assessment review (1 hour practicum). The previous section on day one have provided the student with a comprehensive review of critical systems, anatomy, physiology, and treatments introduced the student to care in the tactical environment. The day should end with patient assessment scenarios in which the student evaluates the threat level and assesses all critical system functions.

2. Day 2

   a. Review scenarios (0.5 hours practicum). Each student should have the opportunity to participate in realistic scenarios that emphasize the previous day's topics.

   b. Remote assessment and surrogate care (1 hour classroom, 1 hour practicum). Tactical emergency medical providers will often be separated from a patient. Students must develop excellent communication so that they are able to instruct other team members to perform basic lifesaving care. They must also be able to evaluate care provided by another team member.

   c. Mass casualties and triage (1 hour classroom, 1.5 hours practicum). When the number of patients exceeds the medical resources, providers face a mass casualty situation. Triage is the process of sorting and prioritizing patients in a mass casualty. TEMS providers are likely to face a mass

casualty because there are limited medical resources during a tactical emergency.

d. Rescue and extraction (1 hour classroom, 1 hour practicum). In the tactical environment, removing a patient from a threat permits a higher level of care and lowers risks to the rescuer. TEMS providers should be proficient in a wide variety of rescue techniques and have experience improvising based on the situation.

e. Casualty immobilization (1 hour classroom, 0.5 hours practicum). In situations where a patient may have a spinal injury, the patient should only be moved using full body immobilization. TEMS providers should be comfortable assessing for a possible spinal injury because it takes time and resources to use an immobilization device.

3. Day 3

    a. Review scenarios (0.5 hours practicum).

    b. Medication administration (1 hour practicum, 0.5 hours practicum). Paramedics are trained to administer many medications. Instructors should discuss the relevance of medications to the tactical environment and specific medications used in the tactical environment like pain management drugs.

    c. Medical planning (1 hour classroom, 1 hour practicum). Medical planning involves creating plans – in advance and on the spot – to react to a medical emergency during a tactical operation and conducting surveillance to determine likely medical threats.

d. Force protection (1 hour classroom, 1 hour practicum). From a medical perspective, force protection involves observation and monitoring of heir fellow tactical team members for medical emergencies before they occur. Tactical operators will be subjected to situations with extreme environmental conditions such as temperature extremes, limited food and water, and/or sleep deprivation, all of which can lead to medical emergencies.

e. Environmental factors (1 hour classroom, 1 hour practicum). Understanding assessment and treatment of emergencies associated with exertion and weather extremes is important in case health surveillance fails. Additionally, trauma patients will be especially susceptible to cold temperatures.

4. Day 4

    a. Review scenarios (0.5 hour practicum).

    b. Medico-legal issues (1 hour classroom). Paramedics already encounter many legal issues associated with provider liability. In the tactical environment, working with suspected criminals and crime scenes further complicates the legal issues.

    c. Tactical familiarization (2 hour classroom, 2 hours practicum). TEMS providers should have a basic understanding of law enforcement tactical operations. TEMS providers should recognize most tactical law enforcement terminology and be able to participate in tactical operations. This segment is not a full tactical operations course.

d. Hazardous materials (1 hour classroom, 1 hour practicum). A complete hazardous materials course cannot be covered in this section. TEMS providers need to know about hazardous materials situations that tactical teams are likely to encounter such as smoke, chemicals, and clandestine drug labs.
e. Field exercises 1 briefing (1 hour classroom). The field exercise briefing should provide the basic information and procedures for the field exercise.

5. Night 4
    a. Field exercise 1 (undefined time, approximately 6 hours). The field exercise should be a complete tactical operation that allows students to experience the ambiguity and stress of an actual tactical operation.
6. Day 5
    a. Field exercises 1 debriefing (undefined time, approximately 3 hours). Instructors and students should participate in a discussion about the previous nights operations. Video recordings from the field exercise will help review some of the night's actions.
    b. Field exercises 2 briefing (1 hour classroom). The field exercise briefing should provide the basic start information and procedures for the field exercise.
    c. Field exercise 2 (undefined time, approximately 3 hours). A second field exercise will simulate a second tactical operation in a short period of time.

7. Day 6
    a. Field exercises 2 debriefing (undefined time, approximately 1.5 hours). Instructors should facilitate a review of the second field exercise.
    b. Written exam and closing remarks (approximately 1.5 hours). The course should end with a written exam for certification and any closing remarks from the instructors.

Detailed Discussion of Course Topics

Day 1: Course and Tactical Environment Introductions

The course introduction must also include an important lesson on safety in addition to course logistics. Instructors need to find a compromise between safety practices and reality based training. Public safety (law enforcement, EMS, and fire/rescue) training often puts the trainee at risk of injury or death just as their jobs often do. The TEMS Medic student should not passively accept the risk of injury during training. Tactical teams encounter regular injuries during training. In a 2008 research study, 38% of surveyed tactical teams reported that over three-quarters of injuries occur during training.[34] In 2011, the National Tactical Officers Association recorded fourteen deaths law enforcement training.[35] Traditional emergency medical services students have also been injured during training. Currently, it is not unusual for EMT courses to prohibit the actual practice of lifting and moving patients during scenarios, with a goal to prevent injuries. Safety practices that prevent students from practicing their skills in austere situations limit the effectiveness of training for performance under stress.

[34] Gildea and Janssen 414
[35] Cruckleton 1

The TEMS Medic course can reduce the risk of tactical training by using inert weapons, those that cannot fire a projectile. Firearms are a common cause of injury during law enforcement training. Inert weapons offers a safe alternative to live or unloaded weapons.[36] TEMS Medic is not a tactical operations course, so drills with live weapons are unnecessary. Inert weapons come weighted to the specifications of a loaded weapon and are molded to fit holsters and retention devices.[37] The similarities between many inert weapons and real weapons allows TEMS Medic trainees to practice weapons handling and retention in reality-based scenarios without the risks of live firearms. Commercially available inert weapons are easily identified, typically in red or blue plastic. In the TEMS Medic course, the focus of training should be tactical medicine not tactical operations, thus the firing of projectiles is not necessary.

The TEMS Medic course should employ a designated safety officer to reduce the risk of medical emergencies. Surveillance of students' physical and mental health is the most important aspect of safety. Many of the reported law enforcement training deaths occurred during physical activity as a result of cardiac arrest.[38] Some people might question how a group of experienced medical providers and first responders could miss the impending signs of heat stroke or a heart attack during a training exercise but many factors could cause such an oversight. Humans have a "tendency toward denial" that allows them ignore ominous signs of illness or safety violations.[39] Without designated safety procedures, denial can quickly result in injury or death. One method for ensuring safety designates buddy pairs that are responsible for each other. Participants of mutual

[36] Murray 149
[37] ASP USA, n.p.; Ring's Blue Guns, n.p.
[38] Cruckleton 2-5
[39] Murray 115

supervision often assume that procedures were done correctly. As a result, they do not find potential risks. According to Kenneth Murray, Director of Training for the Armiger Police Training Institute, a dedicated safety officer provides superior training risk management.[40] The safety officer's responsibilities should only be related to training safety, not teaching.

The second part of the course introduction must demonstrate the rigors of the tactical environment. Instructors will convey the physical fitness demands of moving with equipment as a team. They must also discuss the stressors such as noise, light restrictions, rapid transitions from routine to emergency, and extended operations. Finally, instructors should communicate the issues of equipment and personnel limitations to their students. Lectures, videos, audio recordings, and images can serve as a starting point. Ultimately, this section is only an introduction but it should lay the foundation for all future scenarios and topics. Subsequent topics will tie into the fundamental austerity and danger of the tactical environment.

Day 1: Tactical Emergency Casualty Care Methodology

Tactical Emergency Casualty Care guidelines convert lessons learned from military engagements to civilian high-threat emergencies. In the past, military guidelines called Tactical Combat Casualty Care have served as a cornerstone for TEMS protocols.[41] The military guidelines provide a method for weighing the risks of patient care in an austere and mission focused environment, which is a fundamental component

[40] Ibid
[41] Gerold, Gibbons, and McKay 2

of TEMS operations.[42] The civilian version maintains the fundamental goal "to minimize provider risk while maximizing patient benefit" and stratifying threat level during "atypical emergencies."[43] Tactical Emergency Casualty Care reorients the military care paradigm and lessons learned from foreign engagements to fit the civilian population, scope of practice, and operating environment.

Tactical Emergency Casualty Care divides treatment into three risk level categories: direct threat, indirect threat, and evacuation care.[44] During the direct threat phase, providers and team members must focus on engaging the threat. Therefore, care should be limited to treating life threatening with simple interventions such as tourniquets and manually positioning patient's airway. All other care should be delayed until the threat is reduced. Indirect threat care emphasizes preparing the patient for evacuation to further medical assets. All care still requires a risk and resource assessment. The Committee for Tactical Emergency Casualty Care states that providers should conduct a complete assessment, address life-threatening injuries, establish situational control over the casualties, and prepare to move them to the next level of care through packaging and communication. Indirect threat care includes advanced life support procedures unlike direct threat care. During evacuation, the provider should reassess all previous interventions and focus on moving the patient out of the dangerous environment.[45] During each phase of Tactical Emergency Casualty Care, the guidelines emphasize treatment interventions that address the most common causes of preventable death in a tactical setting. The complete details of Tactical Emergency Casualty Care have been

[42] Sztajnkrycer 58
[43] Committee for Tactical Emergency Casualty Care, n.p.
[44] Ibid
[45] Ibid

published in a readable format that includes skill criteria that instructors can evaluate in the TEMS Medic course.[46] Many of the skills required in Tactical Emergency Casualty Care will be discussed in greater detail in other sections of the course.

Tactical Emergency Casualty Care attempts to accommodate the high-risk environment and the mission focus of tactical operations. TEMS Medic instructors should introduce guidelines for disarming fellow law enforcement officers during the discussion on Tactical Emergency Casualty Care. Ideally, even an injured law enforcement officer can remain in the operation and protect him or herself.[47] The TEMS Medic must assess the patient's ability to remain armed because not all injuries will incapacitate an officer.[48] All patients should be disarmed after the threat has been neutralized or when they have been removed from the threat environment.[49] If an active threat still exists, patients with altered mental status (those who are disoriented, lethargic, withdrawn, or suffering other types of mental status changes) should be disarmed.[50] This protocol allows the most tactical resources to remain active without compromising the safety of TEMS providers or other team members.

The implementation of reality-based scenarios will allow trainees to practice identifying threat levels and gain confidence in the basic risk management needed for Tactical Emergency Casualty Care. Low-level scenarios should emphasize identifying the appropriate phase of care using case study presentations or audio/visual aids. Scenarios should then move to complex, realistic practical sessions. As with all scenario-based training, each scenario should have a specific goal. The top priority of any scenario

[46] Ibid
[47] Ibid
[48] Gerold, Gibbons, and McKay 3
[49] Committee for Tactical Emergency Casualty Care, n.p.
[50] Ibid; Gerold, Gibbons, and McKay 4

should be identification of the zone of care. Here is a sample scenario involving an improvised explosive device:

> *Goal:* Identify the scene as having indirect threat. Conduct appropriate life-saving interventions and prepare the patient for evacuation.
>
> *Briefing:* The trainee responds with a three-person high-risk rescue team after an improvised explosive device detonation. The explosive ordinance disposal team has entered the building and determined a clear path to the location of the primary device. The explosive ordinance disposal team is now sweeping for secondary or multiple devices. The explosive ordinance disposal team has indicated that there are multiple injured people in the room where the first device was located.
>
> *Narrative:* The rescue team enters the room to find three visible patients. Two are identified as not breathing and without a pulse. These patients should not receive care based on the current threat level and available resources. The third patient has significant blast injuries and facial trauma. The trainee should address threat to life by having a compromised airway caused by facial trauma using the most basic interventions possible. In this situation, a surgical airway should be placed after manual positioning and simple airway devices fail to maintain a clear and open airway. Once the life threat has been addressed, the trainee should immediately begin packaging the patient to be evacuated away from the threat of secondary explosive devices.

Review: Ensure that the student correctly identified the appropriate phase of care and applied interventions based on the current risk level. Instructors should use the review to go over the transfer of care documentation and communication. Immediately debriefing after a scenario provides a great opportunity to identify skill gaps.

Instructors can develop similar scenarios to elicit different responses and to train students to identify the phase of care without conditioning them to favor one phase over another. Such conditioning may happen when instructors find one topic more interesting or challenging than another, so they focus their efforts and introduce their bias. The outcome of this bias is that complementary material would fall to the wayside.

Teaching Tactical Emergency Casualty Care methodology early allows students to build off of this framework. Students will be asked to identify the phase of care and appropriate interventions during other parts of the course.

Day 1: Mechanisms and Patterns of Injury

Different types of forces cause different types of injuries. Prehospital providers use their knowledge of the physics from an accident, called the mechanism of injury, to determine the types of injuries to expect before they arrive at a scene. If you compare an unrestrained automobile passenger in a motor vehicle collision to a patient who has fallen from a ladder, you will find that the pattern of injuries differs. The vehicle passenger likely struck the windshield with his or her head while the ladder fall victim likely impacted with his or her lower extremities or lower body first. Most prehospital providers have extensive experience with many blunt force trauma mechanisms and patterns of

injuries. They have some experience with penetrating trauma mechanisms commonly seen in tactical situations.

The TEMS Medic course should emphasize penetrating trauma mechanisms. In the tactical environment, medical providers will encounter higher rates of penetrating trauma than in other emergency medical care. In the United States, there were 37,402 transportation deaths and 30,814 violence related firearm deaths in 2010.[51] Blunt trauma, such as the automobile collisions, kills over half of the trauma patients. In law enforcement, blunt trauma only caused 36% of line-of-duty deaths.[52] Penetrating trauma from firearms, edged weapons, and explosives causes the majority line-of-duty deaths.

When discussing penetrating trauma patterns of injury, instructors should emphasize preventable deaths so that providers can conduct appropriate risk assessments based on interventions that statistically save lives. The causes of preventable death (bleeding, airway obstruction, breathing compromise, and circulatory failure) have been emphasized in the lesson on Tactical Emergency Casualty Care methodology. During this lesson, instructors should unpack the evidence and logic that has led to knowledge of patterns of injury and the treatments.

In most cases, experts have used a combination of statistical frequency and ease of treatment to develop treatment guidelines. For example, military data shows that extremity hemorrhage is the most common preventable killer.[53] Tactical medicine providers can easily and quickly apply a tourniquet in almost any situation and it will likely prevent further exsanguination. While law enforcement data does not suggest that extremity hemorrhage accounts for the same high proportion of deaths, tourniquets are

[51] U.S. Centers for Disease Control and Prevention, n.p.
[52] Sztajnkrycer 54
[53] Butler, Haymann, and Butler 5; Sztajnkrycer 56

simple and cheap so they should still be included and emphasized.[54] Presenting the evidence and logic for patterns of injury and respective interventions helps to reinforce the logic of patient care.

Scenarios for mechanism and patterns of injury should focus on general familiarization and continued reinforcement of previous lessons. Instructors can fragment training by ending a scenario after the trainee has had an opportunity to hear dispatch or briefing information and to see the scene and patient. The instructor cuts off further assessment and forces the student to verbalize the injuries he or she expects from the basic information he or she has obtained. Students can easily overlook rapid assessment of a patient based on mechanism of injury when they are allowed to conduct a thorough patient assessment so instructors must creatively ensure that their students engage with the tactical mechanisms of injury. An example scenario is included below:

> *Goal:* Force the student to think critically about expected injuries and interventions based on the mechanism of injury and typical patterns.
>
> *Briefing:* The student enters a warehouse to execute a high-risk arrest and search warrant. The subject is wanted on charges of illegal firearms trafficking and murder with a firearm. The subject opens fire on the team at the door injuring a law enforcement officer. The team moves to cover and engages the target before the student can move to the patient. The student can see blood pooling below the patient's torso. The instructor should stop the student and ask him or her what kind of injuries he or she expects, what the most likely life-threatening injuries are, and the most likely interventions he or she will perform.

[54] Sztajnkrycer 55

Instructors will be able to reinforce the material and evidence for the Tactical Emergency Casualty Care guidelines during this section. The bulk of this section will focus on penetrating trauma injuries but instructors should briefly review blunt trauma such as motor vehicle accidents and medical conditions such as heart attacks. Both blunt trauma and non-traumatic medical emergencies occur in the tactical environment so they cannot be ignored.[55] Completion of this section will easily transition to a critical systems review.

Day 1: Critical Systems Review

The critical systems review must cover four major topic areas as identified by the national TEMS curriculum committee: hemostasis, airway, breathing, and circulation. These four areas represent the body systems associated with life-threatening tactical injuries. As in traditional emergency medicine, TEMS Medics should always assess the critical systems first. Paramedics should already have an understanding of anatomy and physiology as it relates to the airway, respiratory system, and cardiovascular system. TEMS Medic instructors should review each of these systems and discuss how they relate to tactical medicine.

Hemostasis or bleeding control is the first critical system a tactical medical provider should assess. After a review of the body system, this section will conduct a lesson on bleeding control interventions. Some interventions such as tourniquets and chemicals that stop bleeding, called hemostatic agents, have been controversial in their civilian implementation. The military and many civilian systems now endorse the use

[55] Cruckleton 2-5; Sztajnkrycer 54

tourniquet for any bleeding that does not stop rapidly with direct pressure.[56] The national TEMS curriculum committee cites tourniquets as the first form of hemorrhage control, and numerous outside experts recommend the immediate use of tourniquets for extremity bleeding.[57] Tourniquet use and patient self-application of direct pressure are the only methods recommended for bleeding control in the direct threat environment.[58] Hemostatic agents help to improve and accelerate natural hemostasis. Many medical providers have questioned the efficacy of these agents in part due to reports of burning and tissue damage.[59] The newest versions of hemostatic agents create less heat. The military and some traditional EMS protocols recommend the use of hemostatic agents in cases where tourniquets cannot be used such as bleeding from the groin or armpits.[60] Tactical Emergency Casualty Care recommends the use of hemostatic agents during indirect threat and evacuation care.[61] Instructors should be clear that hemostatic agents are designed to work with direct pressure so they should be used with a secure pressure dressing.[62]

TEMS Medic instructors should teach airway after hemostasis. The human airway consists of multiple anatomical features that allow the respiratory system to function including the mouth, nose, trachea, and lungs. When medical providers make a distinction between airway and breathing, they primarily discuss airway compromise as a physical barrier to respiration and ventilation. These barriers can be anything from a patient's tongue position to swelling of the throat to the presence of fluids like blood and

[56] Butler et al. 7; Maine EMS, green 11; McSwain et al. 199
[57] Carunchio, n.p.; Schwartz et al. 72; Shapiro, n.p.; Taillac and Doyle 24
[58] Committee on Tactical Emergency Casualty Care, n.p.
[59] Butler et al. 9; McSwain et al. 201
[60] Butler et al. 5; Maine EMS, green 11; McSwain et al. 201
[61] Committee for Tactical Emergency Casualty Care, n.p.
[62] Butler et al. 5; Committee for Tactical Emergency Casualty Care, n.p.

vomit. As the TEMS Medic students already hold paramedic certification, they will be familiar with airway anatomy and numerous interventions to maintain an unobstructed airway. TEMS Medic instructors should review the anatomy of the airway and then review airway interventions in the context of the tactical environment.

In the tactical environment, simpler airway management tends to be more appropriate. During the direct threat phase, positioning is the only recommended care.[63] Positioning a patient to maintain an open airway consists of manually adjusting the head and rolling an unconscious patient to his or her side so that obstructing fluids can flow out with gravity. Progressing from positioning, the next management technique involves placing adjunct devices that fit in the mouth or nose to the back of the throat. These devices can be rapidly and easily sized so they are ideal for care in austere environments. Positioning and simple adjuncts represent the preferred method of airway management in all tactical settings.[64]

After a review of basic airway management techniques, TEMS Medic instructors can discuss advanced and invasive airway management. Paramedics use three different types of airway devices that are more complex than adjuncts. Endotracheal intubation is the placement of a tube into the upper airway just below the vocal cords. This procedure has often been left out of tactical protocols because it requires time, resources, and proper illumination to be done correctly. The provider must see the vocal cords with a white light to ensure placement.[65] Alternatively, a supraglottic airway device requires less precision because it is inserted without direct visualization of the vocal cords but has

[63] Committee for Tactical Emergency Casualty Care, n.p.
[64] Ibid
[65] Butler, Haymann, and Butler 6

slightly less airway security than endotracheal intubation.[66] Finally, cricothyroidotomy is a surgical procedure that involves making an incision just below the Adam's apple and placing a tube directly into the upper airway.[67] Many prehospital providers consider this procedure a last resort, but tactical providers consider it valuable so it should be reviewed in detail.[68]

Each advanced airway intervention has a different place in the Tactical Emergency Casualty Care guidelines. Combat data presents airway obstruction as the third most common cause of preventable battlefield death at 6%. Law enforcement data does not give a perfectly clear image but suggests that close to 6% of preventable law enforcement deaths occurred after airway obstruction and many of these deaths would have required surgical cricothyroidotomy to prevent.[69] During the indirect threat phase cricothyroidotomy is the first advanced option if positioning and simple adjuncts fails.[70] Intubation and supraglottic devices follow in that order as options. This recommended order might change in the near future as supraglottic airways become more widely used in trauma care. The medical community will likely weigh the risks and frequency of failed cricothyroidotomy against the number of lives saved.[71] During evacuation care, all three options are listed equally if basic management fails.[72] During the evacuation phase, students should defer to their local prehospital treatment protocols on airway management.

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[66] McSwain et al. 143
[67] Ibid 152
[68] Butler, Haymann, and Butler 6; Committee for Tactical Emergency Casualty Care, n.p.; Farr 8-5; McSwain et al. 152
[69] Sztajnkrycer 56
[70] Committee on Tactical Emergency Casualty Care, n.p.
[71] Defense Health Board 9; Otton 7-9
[72] Ibid

Table 1. Airway Management Procedures in Tactical Emergency Casualty Care		
Direct Threat	Indirect Threat	Evacuation

• Basic positioning	• Basic positing or airway adjunct
	• If unsuccessful:
	  o Cricothyroidotomy
	  o Endotracheal intubation
	  o Supraglottic device
		• Basic positing or airway adjunct
		• If unsuccessful:
		  o Cricothyroidotomy, Endotracheal intubation, or supraglottic device per protocol

Completing a review of the airway in a tactical context leads conveniently to a discussion on breathing. Without an open and intact airway a patient will not breathe. Without adequate breathing an airway will serve no purpose. Paramedics will have an in-depth understanding of numerous different causes of respiratory compromise but in the tactical environment a collapsed lung called a pneumothorax is the most important. Data from law enforcement line-of-duty deaths suggests that chest trauma and pneumothoraces are extremely common.[73] Paramedics already know to treat pneumothoraces using an occlusive dressing over any penetrating chest trauma. If the condition is leading to shock, paramedics place a needle between two ribs to allow air that is compressing the lung to escape outside of the body, called a needle decompression. In the tactical environment, pneumothorax treatment should be conducted during the indirect threat and evacuation care phases.[74]

Finally, the TEMS Medic course should include a review of the circulatory system, which includes the heart and blood vessels. Paramedics will be competent in assessment of circulation through basic physical assessment and cardiac monitoring as

[73] Sztajnkrycer 56
[74] Committee for Tactical Emergency Casualty Care, n.p.

described in the proposed national TEMS competencies.[75] They will also be trained to use medications and fluids to treat circulatory compromise. TEMS Medic instructors will need to reinforce the time and place for these treatments in the tactical environment. Vascular access and fluid administration are hallmarks of trauma care for shock but these should be delayed to the indirect threat and evacuation care phases. Cardiopulmonary resuscitation, the treatment for cardiac arrest, should also be withheld until the indirect threat or evacuation care phases.[76] Even then, cardiopulmonary resuscitation requires numerous resources, has limited success even with advanced care in trauma related arrests, and loses effectiveness rapidly with any delay.[77] Cardiopulmonary resuscitation should only be initiated when the TEMS Medic decides there are enough available resources and the risk to providers is minimal.

The primary assessment of a patient to find critical system problems is performed identically in tactical and traditional emergency care. In tactical care, the threat level dictates the sequence and emphasis.[78] Scenarios should emphasize rapid assessment and intervention for these critical systems as dictated by the tactical situation. Similar to scenarios designed for emphasis on mechanism of injury, instructors can use truncated scenarios as building blocks to emphasize the primary assessment of critical systems.

Day 2: Remote Assessment and Surrogate Care

Because of the constraints of tactical threats, the TEMS Medic may need to use another person, such as a team member, as his or her eyes, ears, and hands. The TEMS

[75] Schwartz et al. 74
[76] Committee for Tactical Emergency Casualty Care, n.p.
[77] Butler, Haymann, and Butler 6; Isaac and Johnson 53; Lockey, Crewdson, and Davies 240; Morrissey and Johnson 10
[78] FitzGerald 33

Medic still conducts the same assessment as before but he or she will need to include questions normally answered by direct physical examination. For example, the TEMS Medic normally could see any major bleeding or identify it by sweeping his or her hands over the patient. In a remote assessment, he or she will need to ask the surrogate provider, "Do you see any blood? Run your hands head-to-toe checking for blood. Do you see any on your hands?" TEMS Medics must also learn to evaluate another person's interventions. In any transfer of care the receiving provider should reevaluate any care that had been given previously.

Training for remote assessment and care should be conducted with the student at one end of a radio or other communication device. The role players on the other end can serve as the surrogate care provider and the patient. The surrogate provider should follow directions from the student as closely as possible and give constructive feedback on which kinds of directions are specific and understandable enough to be used.

Example Scenario: Surrogate Assessment and Care

Goal: Allow the student to demonstrate communication of assessment and treatment principles to a third party for immediate implementation.

Briefing: The tactical team arrives on scene after an active shooter at a high school. Various patrol units have entered the building and partially secured it. While the tactical team prepares to enter the building, the medic is requested to communicate with a patrol officer attempting to save an injured teenager.

Narrative: The patrol officer surrogate announces to the trainee that the patient is bleeding a lot. The trainee will then need to pose specific

questions to elicit additional information. The trainee will determine that the patient is bleeding profusely from the upper leg but has no other injuries and is breathing. The patrol officer does not have a tourniquet with him but does have a pair of nitrile gloves. The trainee should direct the surrogate to apply pressure directly to the wound. Ideally, the trainee will communicate with the surrogate to determine that he has equipment such as a belt that could be used to improvise a tourniquet and direct its proper application.

Day 2: Mass Casualties and Triage

Triage – from the French word meaning 'to pick'[79] – is the process of prioritizing and sorting patients when the resources a provider has are inadequate for the number of patients on a scene. All emergency medical services personnel currently learn the principles of triage but there is limited emphasis placed on its practice. TEMS providers will not have the luxury of large numbers of resources on hand so triage becomes critical. Having a TEMS provider in the hostile zone conducting good triage prioritizes which patients get immediate interventions and which ones get evacuated first. This speeds assessment and treatment at the emergency medical services staging area and the hospital.

TEMS Medic students must understand the application of triage in high-threat situations. The U.S. military's *Special Operations Forces Medical Handbook* contains a clear protocol on triage in the tactical environment called SALT.[80] SALT stands for sort,

[79] "triage, n.". OED Online
[80] Farr 1-4

assess, life-saving interventions, and transport or treatment. The SALT triage method includes useful organization of steps that can help clarify the entire triage process and the divisions by zone of care. First, the provider sorts patients into order of assessment from a distance. Sorting from a distance allows providers to move with a purpose towards the patients with the highest need. Patients who are inert or have an obvious life-threatening injury should be assessed first.[81] These patients are the only ones that should be addressed during the direct threat care phase. The subsequent groups to be assessed are non-ambulatory patients who can respond and ambulatory patients.

Once patients have been broadly sorted, each individual patient should be rapidly assessed and categorized. Any life-saving interventions should be provided. Between the TEMS Medic training so far and previous paramedic training, the students should have a grasp on rapid assessment and appropriate interventions based on threat level. TEMS Medic students will also understand emergency treatment and transportation for the final step of SALT.

The SALT triage algorithm provides specific criteria for classification into four categories: immediate, delayed, minimal, and dead. In a mass casualty setting, any patient that is not breathing after positioning the airway should be classified as "dead." The peripheral pulse, such as a radial pulse found in the wrist, is considered an indicator that the patient is adequately moving blood through their body. The provider should assess for adequate circulation, hemostasis, and breathing. Any patient, not classified as "dead," who has negative indicators in these systems is classified as an "immediate"

[81] Ibid 1-5

patient. The "delayed" and "minimal" categories are more subjective but generally patients sorted as ambulatory are "minimal."[82]

Triaging can be extraordinarily stressful because providers may feel that they are judging who lives or dies. TEMS students should be reminded that triage identifies where the limited resources will do the most good for the most patients. Furthermore, TEMS instructors must emphasize trust in the triage protocol. The SALT protocol reduces the number of provider judgments, which reduces overall ambiguity and stress.

Scenario training for triage can cover a vast number of topics as the principles of resource management apply to numerous tactical situations. Reality-based scenarios should attempt to illustrate application in a wide variety of incidents and numbers of patients. After the triage section of a course is complete, students should continue to use triage in scenarios. Triage is a key component of assessing a situation and will be used again in a TEMS Medic's career.

Example Scenario: Explosion

Goal: Implement and use triage in a team setting with a large number of patients.

Briefing: The student is responding to an explosion at an office building. A bomb threat was called in simultaneously with the first detonation. TEMS and the special operations response team enter the room with the explosion while the bomb squad investigates suspicious packages at the other end of the building. The student and three other TEMS providers will make their way to the blast area.

[82] Ibid

Narrative: Upon arrival at the room, the team leader states that he or she is coordinating additional arriving resources and instructs the student to conduct triage of one half of the room. The student identifies eight patients. Two are walking toward the student, four are calling for help and moving, one appears still, and one appears to be in respiratory distress. The patient who appears to be in respiratory distress has a penetrating shrapnel injury to the chest and is displaying tracheal deviation. These signs and symptoms suggest a pneumothorax. The student should conduct a needle decompression as a life-saving intervention. This patient continues to have respiratory distress and should be classified as "immediate." The second patient is unresponsive to pain with no respirations or pulse. There is no change with an attempt to open the airway. This patient is classified as "dead." The other four patients have various musculoskeletal injuries and burns and are all classified as "delayed." The two walking patients should be classified as "minimal."

Review: This scenario has many different working elements. The student should demonstrate effective global sorting followed by effective assessment into four different categories. Instructors should discuss the potential for added stress from classifying a patient as "dead" without conducting resuscitation measure.

Day 2: Rescue and Extrication

Often in the tactical environment, the medic provides the best care by removing the patient from the point of injury. The TEMS Medic can advance the level of care given if he or she can move the patient into a lower threat zone and ultimately to definitive care in a hospital. Many paramedics will be unfamiliar with high-threat extrication so TEMS Medic instructors should cover this section in detail.

Patient rescue and extrication from the tactical threat zone can occur using many different methods and equipment from direct handling drags to webbing drag assists to carrying with stretchers. The most basic form of extrication is a manual drag, involving pulling a patient along his or her long axis to remove him or her from a dangerous situation. Webbing handles or slings that can be attached to a patient to assist in the drag. Alternatively, soft plastic or nylon stretchers might be employed to drag a patient from a dangerous location.[83] Drags allow for minimal resource use and allow the rescuing provider to stay low to avoid threat exposure.

Patient drags and carries do not permit complete spinal immobilization. In traditional emergency medical training, paramedics learn to secure most major trauma patients to a backboard or other immobilization device. Spinal immobilization is designed to prevent further injury to the spinal column by preventing unnecessary movement. Most emergency medical systems use suggestive or significant mechanism of injury as the indicator for spinal immobilization.[84] The most recent Prehospital Trauma Life Support Manuel suggests that "a more selective approach to performing spinal immobilization"

[83] Campbell et al. 209-213
[84] McSwain et al. 255

should be used.[85] In Maine and some other states, emergency medical services providers use a clearance protocol. This evaluation takes time that TEMS providers do not have in the direct threat environment. TEMS Medic instructors will cover immobilization in the next lecture but they should discuss a few details of it in conjunction to extrication and rescue. First, penetrating trauma rarely causes spinal injuries.[86] Second, extrication techniques such as in-line drags from the head or feet do offer minimal spinal protection.[87] Third, extrication is a good risk management practice because being shot again or not receiving care because of the threat level is worse than a potential spinal injury.

Due to the wide variety of circumstances and potential differences in team procedures, TEMS Medic instructors should provide scenario opportunities for students to develop immediate action drills and implement them. Immediate action drills are preplanned responses to unplanned events.[88] TEMS Medics should work with their respective team to develop appropriate response plans for medical and rescue situations. The immediate action drill should include specifics on providing security and the rescue equipment to be used. Many different extraction tools have the disadvantage of requiring additional time and may not work on civilian patients who do not wear tactical equipment. Additional team members should provide security to improve the speed and safety of the rescue.[89] TEMS Medic instructors should emphasize the importance of a well-rehearsed and tested plan for rescue and extraction.

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[85] Ibid
[86] Butler, Haymann, and Butler 5
[87] Campbell et al. 209
[88] Hubbs 10
[89] Tactical Medical Solutions, n.p.

Day 2: Casualty Immobilization

Beyond the brief discussion of immobilization in the context of extrication and previous paramedic training, the TEMS Medic student must acquire a detailed understanding of the procedures used in immobilization for both extremity fractures and spinal injuries. TEMS Medic instructors should teach how traditional prehospital techniques fit into the tactical environment as well as additional skills for the extended duration of tactical operations.[90] As discussed during rescue and extrication, immobilization does not fit into the direct threat environment. During direct threat care, providers should move quickly to minimize exposure to the threat.[91] Once in the indirect threat environment, spinal and extremity immobilization should be applied as necessary.[92]

In order to minimize the negative impact of immobilization on patients and provider resources, TEMS Medics should carefully evaluate the need for immobilization. In consideration of spinal immobilization, a thorough physical and neurological exam can largely rule out a spinal injury despite suspicious mechanisms of injury.[93] Currently, most wilderness medical training and some EMS systems permit EMT level providers to conduct spinal clearance protocols.[94] TEMS Medics should draw on this training and use a clearance protocol to limit the need for spinal immobilization. This would be applicable during the indirect threat and evacuation phases of care. TEMS Medics can also save resources by reducing dislocated joints – putting the out of place joint back into its socket. While this skill is not commonly used in emergency medical services, it is

[90] Schwartz 76-77
[91] Committee for Tactical Emergency Casualty Care, n.p.
[92] Ibid
[93] Isaac and Johnson 44
[94] Ibid; Maine EMS, green 6

recommended for tactical operations.[95] In wilderness medicine, EMT level wilderness providers are trained to reduce shoulders, kneecaps, and fingers. These dislocations can be evaluated relatively easily. Reduction can prevent the rare complication of tissue death in the dislocated extremity.[96] Joint reductions reduce the danger to the patient, alleviate patient pain, and reduce the resources needed to evacuate a patient.

Unlike many other skills in the TEMS Medic course, many students will not have experience with spinal clearance and joint reduction. As such, instructors should start with low pressure, slow speed scenarios and walkthroughs before progressing to complex reality-based training.

Day Three Topics

On day three, TEMS Medic instructors will teach medication administration, medical planning, force protection, and environmental factors. TEMS Medic students already know how to administer medications using injections, intravenous lines, and other methods. At some level depending on the type of medical service and location of services, a medical director or panel of medical directors will ultimately dictate which medications can be used. This course should provide knowledge of all the medications recommended in Tactical Emergency Casualty Care including selection of fluid type and specific pain management drugs. Medical planning should focus on threat assessments and the development of immediate action drills. Medical threat assessment consists of using surveillance and intelligence data to determine the inherent risks on a given

[95] Schwartz 76
[96] Isaac and Johnson 84

mission.[97] Based on this assessment, an immediate action drill can be designed to access and rescue an injured person. Force protection is a key aspect of the TEMS Medic skill set. The TEMS Medic should be able to monitor sleep cycles, work levels, caloric intake, and water consumption for the entire team.[98] Preventative medicine will be new to most paramedics. Health monitoring will likely be conducted during the relatively low stress portions of tactical operations. Finally, day three should include a lecture on environmental factors. The environment impacts force protection and trauma care. Many patients with traumatic injuries quickly become hypothermic.[99] Treatment to protect patients from weather and geographic factors such as altitude is relatively basic and the TEMS Medic course can draw from the wilderness medical community that works extensively with environmental emergencies.

Day Four Topics

Day will cover medico-legal issues, tactical familiarization, and hazardous materials. Variations in state laws and tactical team structure make these topics difficult to teach in a national standard course. Medico-legal issues vary based on state licensing rules and individual service protocols. All tactical medical providers will encounter legal issues from interacting with crime scenes and suspected criminals. The TEMS Medic course will only conduct tactical familiarization, not a complete law enforcement tactics course. Some tactical teams require all TEMS providers to be sworn and armed law enforcement officers, while others remain unarmed or only carry less-lethal weapons like

[97] Carunchio, n.p.
[98] Schwartz 77
[99] Smith, n.p.

TAZERs.[100] The National Tactical Officers Association recommends that a basic Special Weapons and Tactics course last a minimum of 40 hours.[101] Given the variation in TEMS provider standing, the TEMS Medic course does not take the time and incur the cost of conducting a complete tactics course. Instead, TEMS Medic students should be familiar with tactical jargon and basic tactical movement. A complete hazardous materials operations course would also add a significant amount of time to the TEMS Medic course. Instead the TEMS Medic course will provide hazardous material awareness and familiarization with common tactical hazardous materials encounters such as smoke, chemicals, and drug labs. The day four topics highlight the weaknesses of a national level course. Because separate special weapons and tactics and hazardous materials courses already exist, and because certification practices vary by state and by team, the TEMS Medic course seeks to provide only an introduction to these topics. Students will be encouraged to seek additional certifications.

Night 4, Day 5, and Day 6: Field Training Exercises and Final Examination

The final two sections of the course consist of detailed field training and evaluation scenarios. These exercises should push students to their physical, mental, and emotional limits while giving them an opportunity to demonstrate and practice many aspects of tactical medicine. Safety will be paramount during these exercises, as students may become sleep deprived, dehydrated, and hungry. The safety officers that have been present for every other scenario will be extremely important in supervising these scenarios.

[100] Bozeman et al. 363; Carunchio, n.p.
[101] National Tactical Officers Association 26

The first field exercise should take place overnight starting with the exercise briefing at the end of day four. While the actual rescue and delivery of medical care may not take the entire night, instructors should induce delays that accurately portray a tactical team operation. Many tactical team callouts, especially hostage rescue, barricaded subjects, bomb threats, and executive protection, involve extended periods of waiting before a high-stress incident begins.[102] Different courses and instructors can design any number of scenarios for an extended duration and overnight scenario. Instructors should film as much of students' medical actions as possible during the field exercise for review. Here is a sample field exercise scenario:

> *Goal:* Allow students to demonstrate the full scope of TEMS skills in a realistic, high-stress testing environment. Allow instructors to evaluate and review students' performance.
>
> *Briefing:* The law enforcement tactical team responds to a domestic disturbance investigation in which a suspect has taken hostage an officer along with the suspect's wife and child.
>
> *Narrative:* The tactical team arrives on scene along with the crisis negotiation team. The tactical team starts surveillance operations. The suspect is known to have access to firearms and a dog is in the house. While the crisis negotiation team attempts to communicate with the suspect, the TEMS unit should conduct a medical threat assessment and establish immediate action drills. The scenario will continue for many hours and the TEMS Medic should continue health surveillance of the tactical team to ensure that they are ready for deployment. After six hours,

[102] Carunchio, n.p.

the suspect agrees to surrender. The suspect exits the house and is taken into custody. The tactical team and the TEMS element enter the house to clear it of secondary threats (an indirect threat environment). The officer is found to be unconscious with bleeding from his head. The suspect's wife has numerous bruises and cuts as well as an extremity fracture. The TEMS Medic student should remain aware of potential threats, assess, treat, and evacuate the two patients from the scene and transfer them to EMS.

In the morning of the fifth day, instructors should review the exercise by watching footage from the night before encouraging discussion among all of the students. This debrief will serve to give constructive feedback and perpetuate the stress of sleep deprivation as a tactical team might experience in real life. After completion of the first exercise review, instructors should prepare students for the second exercise. The second exercise can occur in the afternoon of the fifth day and does not have to be as long as the first but should continue to test the TEMS Medic students in high-stress situations.

Goal: Allow students to demonstrate the full scope of TEMS skills in a realistic, high-stress testing environment. Allow instructors to evaluate students on their TEMS skills.

Briefing: The tactical team responds to a high-risk warrant execution at a cabin. The suspect is wanted for drug charges and may be running a clandestine drug lab. The tactical team should respond to the staging area and prepare their plan. The TEMS Medic students can then prepare a medical threat assessment and immediate action drills.

Narrative: The entry team breaches the door and moves into the house. As they move into the kitchen, a large explosion goes off. Three tactical team members are injured with shrapnel wounds and burns. The tactical team hazardous materials expert rapidly decontaminates the patients before the TEMS Medics gain access to them. The patients are located directly in front of the cabin (indirect threat zone). As the TEMS Medics begin assessment and treatment, gunshots are fired from within the house. The TEMS Medics should rapidly extricate their patients from the now direct threat environment while the rest of the tactical team engages the shooter. Once clear, the TEMS Medics should resume their assessment and treatment and move the patients towards the staging area where they can meet an ambulance.

Students should return on the sixth day for a debriefing of the second field exercise. Instructors should use the video footage and their own observations to evaluate and grade each student for the practicum segment of the course. There should also be a written examination. Instructors can combine these grades to determine if each student has earned their TEMS Medic certification.

Conclusion

Highly dangerous tactical emergencies occur across this country in small towns and big cities. All of these situations overwhelm the standard public safety response. Law enforcement responds with special tactical teams who are trained to operate in threatening and stressful situations. Emergency medical services must react with a

tactical emergency medical team. Otherwise, they will be separated from casualties until law enforcement has secured the scene. Standard emergency medical services providers are not prepared to operate in this environment. There is currently no standard and functional TEMS course in the United States.

Recent wars and major violent domestic incidents have produced knowledge of medical, tactical, and training practices that can contribute to an effective tactical emergency medical training course. Organizations such as the National Tactical Officers Association and the Committee for Tactical Emergency Casualty Care have published extensive research and guidelines for tactical medical protocols. Recent efforts from working groups have provided competency criteria that help convert protocols to training objectives. Still, no uniform, functional TEMS training program exists.

The TEMS Medic curriculum present here is designed to serve as the national standard curriculum for tactical emergency medicine. The TEMS Medic course trains previously certified paramedics to operate in the tactical environment. This course draws upon the research of tactical operators, trainers, human performance experts, and medical professionals to create the curriculum. In order to combine good medicine and good operational tactics, the Tactical Emergency Casualty Care guidelines serve as the framework for the course. The TEMS Medic course uses a building approach that teaches the fundamental and critical skills first so that students can progressively add to their skill set. Based on the features of stress inoculation training, the TEMS Medic course emphasizes realistic scenarios to help students perform under stress, while providing them with opportunities to develop confidence and coping skills. The final test during the TEMS Medic course consists of two extensive field exercises and a written exam. The

exercises should closely mimic all of the stresses of a tactical team callout and provide students with an opportunity to demonstrate many key TEMS skills, while the written test covers all of the course content.

Tactical emergency medicine will continue to evolve and change. Every major incident produces new lessons on procedures that succeed or fail. As the understanding of tactical response changes, the TEMS Medic course should continue to evolve as well to adopt new practices based on recent research. Minor adjustments to the format might be necessary after student and instructor feedback. The course outlined here will prepare students with the basic skills to be effective care providers in the most demanding and dangerous tactical situations.

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