

TACTICAL MEDICINE—COMPETENCY-BASED GUIDELINES

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ABSTRACT

Background. Tactical emergency medical support (TEMS) is a rapidly growing area within the field of prehospital medicine. As TEMS has grown, multiple training programs have emerged. A review of the existing programs demonstrated a lack of competency-based education. **Objective.** To develop educational competencies for TEMS as a first step toward enhancing accountability. **Methods.** As an initial attempt to establish accepted outcome-based competencies, the National Tactical Officers Association (NTOA) convened a working group of subject matter experts. **Results.** This working group drafted a competency-based educational matrix consisting of 18 educational domains. Each domain included competencies for four educational target audiences (operator, medic, team commander, and medical director). The matrix was presented to the American College of Emergency Physicians (ACEP) Tactical Emergency Medicine Section members. A modified Delphi technique was utilized for the NTOA and ACEP groups, which allowed for additional expert input and consensus development. **Conclusion.** The resultant matrix can serve as the basic educational standard around which TEMS training organizations can design programs of study for the four target audiences. **Key words:** tactical medicine; tactical combat casualty care; hemorrhage control

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INTRODUCTION

Over the course of the last 40 years, law enforcement units have identified the need for specialized teams

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to deal with unique problems.¹ These teams have developed a variety of subject matter experts in negotiations, weapons, explosives, and medicine. Those who provide medical support during tactical operations represent a unique segment of prehospital care providers, working in hazardous and austere environments. This type of prehospital medicine, known as *tactical medicine*, is an evolving discipline.

Tactical medicine is broad based and includes care provided not only by traditional medical providers (emergency medical technicians [EMTs], physicians, physician assistants, and nurses), but also by the operators themselves. Additionally, it impacts the tactical and medical command structure in which the unit operates. The goal of effective tactical medicine support is to enable law enforcement to operate more efficiently, more effectively, and with reduced risk. Traditional emergency medical services (EMS), nursing, and medicine require practitioners to undergo standardized testing and licensure procedures. In addition, various standardized educational curricula have been developed for aspects of medical care such as the use of Advanced Cardiac Life Support (ACLS) for the management of cardiac arrest. No such standardized curricula exist for tactical emergency medical support (TEMS). There is a need for defined and consistent skill competencies that are expected for TEMS providers. The lack of a tool of this nature has limited standardization through our nation's law enforcement organizations. Consistency with regard to core competencies would provide standards from which training and protocols could be developed.

The provision of trauma care in the tactical environment has been guided by the U.S. Defense Health Board Committee for Tactical Combat Casualty Care (TCCC). This committee comprises military and civilian subject matter experts in tactical medicine. The committee meets regularly to update and incorporate battlefield experience and research into best practices for traumatic casualty care in the tactical environment. The American College of Surgeons (ACS) and the National Association of Emergency Medical Technicians (NAEMT) have endorsed the military's guidelines for TCCC. This set of best practices for military care on the battlefield is published in the manual *PHTLS: Prehospital Trauma Life Support*, sixth edition.² The guidelines specify the trauma care to be delivered in a hostile environment to mitigate the risks inherent in combat and are utilized as a base for most tactical medicine

training programs. These TCCC best practices could be developed into competency-based TEMS education programs; however, they are limited and do not address other areas that are considered to be essential for the delivery of a comprehensive TEMS program.^{1,3-10} Therefore, a more broadly defined competency base is needed for TEMS training curricula.

Currently many well-experienced providers and educators share the desire to see best practices brought into this aspect of prehospital emergency care. Several tactical medicine training courses exist. However, the educational model has been based on a *process-oriented* educational model rather than a *competency-based*, outcome-oriented educational model. Competency-based training is described as a way to produce reliable and reproducible roles and responsibilities.^{11,12} Process-oriented training is focused on the delivery of material, whereas competency-based training focuses on the attainment of specific educational objectives. For instance, process-oriented training would assign credit for attending a one-hour lecture on hemorrhage control. Alternatively, a competency-based program would focus on the student's ability to demonstrate the identification of hemorrhage, the proper application of a tourniquet, and the application of combat gauze to a wound with life-threatening hemorrhage. It is essentially the difference between receiving a card or certificate for course attendance after attaining a certain level of performance on a written test and receiving a card or certificate for course completion after the demonstration of skills in a simulated environment. When no demonstration of skills or knowledge is required, the attendee may or may not have gained the ability to perform the skills that were taught. As an example, in training physicians, the Accreditation Council for Graduate Medical Education (ACGME) recently adopted six core competencies to ensure that residents in training conformed to uniform guidelines. This transition to competency-based education has changed the focus of education from course or process completion to task or competency completion.

Competency can be broadly defined as the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served.¹³ Competency is context dependent. A physician's rank in medical school, a pilot's rank in flight school, or an officer's standing at a military academy will not predict how he or she will perform with a given patient, during an in-flight emergency, or in a unique tactical situation. Attaining acceptable grades on a normative test or completion of a course of study alone does not necessarily prove that the practitioner has the needed skills. Rather, a demonstration of mastery of a set of criteria forms the basis for qualification and the mark of a

competent provider. Competency-based training may allow for greater standardization of training with a focus on outcomes.¹¹⁻¹³

The National Tactical Officers Association (NTOA) and its academic partners assert that tactical medicine programs should be developed utilizing competency-based, outcome-oriented education programs. Further, if accountability is to be enhanced, objectives, standards, and criteria must be clearly stated and open for inspection by colleagues, administration, experts, and students.¹⁴ The goal of this project was to develop educational competencies for TEMS as a first step toward enhancing accountability. The same approach was taken by the ACGME in 1999 through its Outcomes Project.¹⁵

METHODS

To meet this need, the NTOA assembled an 11-member working group of subject matter experts to review existing course curricula, to identify gaps, and to assemble a competency-based educational framework for TEMS curricula. This working group was made up of four physicians, one physician assistant, and six out-of-hospital providers (Appendix 1). All members of the working group had previously collaborated in the development of national level TEMS curricula (NTOA TEMS curricula and the Tactical Operator Care [TOC] curriculum that was developed for the Federal Bureau of Investigation [FBI]). The working group was selected by the leadership of the NTOA based on their national reputation and to ensure that there was representation from all stakeholder groups (physicians, EMS, law enforcement, military, fire rescue). The TEMS experience of the group included military as well as local, state, and federal civilian law enforcement. The members of the working group are listed in Appendix 1 along with the individual expertise of each member.

Prior to initiating their work, the members of the working group reviewed the Core Competencies for Health Professionals in a Disaster developed by the American Medical Association (AMA) under a grant from the Assistant Secretary for Preparedness and Response (ASPR) as an example of how to develop competencies for selected population groups.¹⁶ The working group then drafted a TEMS competency matrix utilizing a similar methodology as the prior AMA work. They incorporated the practices from the TCCC guidelines into the matrix along with additional competencies relevant to the civilian law enforcement environment. The draft TEMS competency matrix was then reviewed by the American College of Emergency Physicians (ACEP) Tactical Emergency Medicine Section using a modified Delphi procedure. The *Delphi procedure* is a method for obtaining group consensus by making revisions to a list or document based on group feedback until all agree

that the final list or document is complete or a set number of feedback cycles are completed. The Delphi procedure is based on the assumption that the consensus from a structured group is more accurate than that from an unstructured group. A “mini” Delphi procedure (also called *talk estimate talk*) has been developed for use during face-to-face meetings. This project used a modified Delphi procedure by utilizing both the traditional Delphi procedure (ACEP TEMS leadership and general membership) and the mini Delphi procedure (NTOA working group).

The specific steps for this project are provided in detail. An initial draft of the competencies was developed by a single author (RBS), who then acted as the facilitator for the modified Delphi review. The competencies were provided in written form to the NTOA working group and they had a face-to-face meeting where several rounds of review were facilitated until consensus on the competencies was achieved.

The revised competency document was then provided to the leadership of the ACEP TEMS Section. The leaders of the TEMS Section reviewed the document and provided suggested revisions. The facilitator (RBS) reviewed the recommendations and integrated them into the competency document. The revised document was provided to the leaders of the TEMS Section for a review and approval that that version should be sent to the general membership of the ACEP TEMS Section for review. Once the revised document was approved by the section leaders, it was provided via e-mail to the general membership the ACEP TEMS Section, which consists of 275 physicians. All feedback was reviewed by the facilitator (RBS) and integrated into the document. The revised document was sent to the general membership of the section for review and concurrence that consensus was established. The document was then circulated among the NTOA working group for a final review, and there was agreement that the document was complete.

RESULTS

The initial draft document included 11 competency domains along with 30 separate core crosscutting competencies. The core crosscutting competencies were intended to apply to all levels of TEMS providers. The initial draft document also included 184 specific competencies for TEMS providers. These were competencies that would apply to a given target audience. The specific target audiences were operator/agent/officer, medical provider, team commander, and medical director.

The expert NTOA working group utilized the mini Delphi procedure to modify the initial draft document. They increased the number of competency domains to 14. They also increased the core crosscutting competencies to 43, and the specific competencies to 285.

TABLE 1. The 18 Identified Competency Domains

1. Tactical Combat Casualty Care Methodology
2. Remote Assessment and Rescue/Extraction
3. Hemostasis
4. Airway
5. Breathing
6. Circulation
7. Vascular Access
8. Medication Administration
9. Casualty Immobilization
10. Medical Planning
11. Human Performance Factors/Health Surveillance
12. Environmental Factors
13. Explosions and Blast Injuries
14. Injury Patterns and Evidence Preservation
15. Hazardous Materials Management
16. Remote/Surrogate Treatment
17. Less Lethal Injuries
18. Special Populations

The leadership of the ACEP TEMS Section used the Delphi procedure and increased the number of competency domains to 17, along with the number of core crosscutting competencies to 46 and the number of specific competencies to 314.

Finally, on review by the ACEP TEMS Section general membership, using the Delphi procedure, one additional domain was added, along with two core crosscutting competencies and 44 specific competencies.

The final TEMS competency matrix includes 18 competency domains (see Table 1), 48 core crosscutting competencies, and 358 specific competencies. As shown in Table 2, the specific competencies are defined for each level of TEMS provider: operator/agent/officer, medical provider, team commander, and medical director.

The competencies were defined to represent basic tasks and information for which the different provider types are responsible. In some instances, the tasks pertain to medical procedures and skills. For the commander and medical director, unique tasks address specific command functions. For example, one role defined for the commander is ensuring that key equipment and training are available. Recurring medical director tasks include ensuring competency in the performance of medical skills by operators and medical providers, creating medical protocols, and advising the team commander.

DISCUSSION

This competency-based matrix represents the initial version of a dynamic document meant to change and grow with the evolution of medical technology, as well as with the collective experience of those who practice medicine in this unique environment. The matrix represents a framework on which training curricula and medical protocols can be based.

There is an inherent inability to routinely employ traditional assets (i.e., ambulances, EMTs, and

TABLE 2. The 18 Competency Domains and the Specific Competencies in the Field Tactical Emergency Medical Support Matrix

Domain	Competency	Operator	Medical Provider	Team Commander	Medical Director
1. Tactical Combat Casualty Care (TCCC) Methodology	1.1 Demonstrate proficiency in tactical medical skills in the care under fire (CUF) phase of TCCC	1.1.1 Perform efficient and appropriate casualty care and immediate action drills (IADs) in the CUF phase of TCCC	1.1.2 Perform appropriate casualty care and IADs at your level of training in the CUF phase of TCCC	1.1.4 Describe the IADs required in the event of casualties (friendly and unfriendly) during an operation	1.1.6 Create tactical emergency medical support (TEMS) protocols that allow operators and medics to best function in the CUF phase of TCCC
			1.1.3 Explain the key elements of handoff to the next level of care	1.1.5 Ensure that operators are equipped with individual first-aid kits (IFAKs) and medics are equipped with IFAKs and medic aid bags	1.1.7 Describe the principles of CUF, and design local training to teach IADs and tactical medical skills in the CUF phase of TCCC
					1.1.8 Recommend equipment to be included in IFAKs and medic aid bags
1.2 Demonstrate proficiency in tactical medical skills in the tactical field care (TFC) phase of TCCC	1.2.1 Describe appropriate IADs and casualty care, assistance, and protection of the medical provider and the casualty collection point (CCP)		1.2.2 Perform appropriate IADs and casualty care at your level of training in the TFC phase of TCCC	1.2.3 Describe the roles, responsibilities, and IADs of operators to support and secure the medical provider(s) and CCP	1.2.5 Create TEMS protocols that allow operators and medics to best function in the TFC phase of TCCC
				1.2.4 Ensure that medics are equipped to allow for appropriate TFC	1.2.6 Describe the principles of TFC, and design local training to teach IADs and tactical medical skills in the TFC phase of TCCC
					1.2.7 Recommend equipment to be included in the medic aid bags to allow for appropriate TFC
1.3 Demonstrate proficiency in tactical medical skills in the tactical evacuation (TACEVAC) phase of TCCC	1.3.1 Describe appropriate assistance and protection of the medical provider and the CCP		1.3.2 Perform appropriate casualty care at your level of training in the TACEVAC phase of TCCC	1.3.6 Describe the roles and responsibilities prior to and during evacuation of casualties	1.2.8 Ensure medic competency in medical skills required in the TFC phase of TCCC
			1.3.3 Describe the actions to arrange casualty evacuation by both ground and air	1.3.7 Ensure that medics are equipped to allow for appropriate tactical field care	1.3.8 Create TEMS protocols that allow medics and operators to best function in the TACEVAC phase of TCCC
					1.3.9 Describe the principles of casualty evacuation, and design local training to teach IADs and tactical medical skills in the TACEVAC phase of TCCC

1.3.10 Recommend equipment to be included in the medic aid bags to allow for appropriate TACEVAC care				
1.3.11 Ensure medic competency in medical skills required in the TACEVAC phase of TCCC				
1.4.7 Evaluate each operational plan, assess the medical threats, and make recommendations to the commander on the most appropriate positioning and allocation of medical assets		1.4.5 Describe the use of operator-level first responders and medical providers in the scope of TCCC and the proper placement of a CCP and its security	1.4.6 Create and evaluate policies that include medical training and medical scenarios as a part of the unit's preparedness	
1.3.4 Describe the key elements of handoff to the next level of care		1.3.5 Summarize the field triage process and evacuation priorities	1.4.3 Describe the importance of training the operators in the unit to provide immediate lifesaving interventions	
1.4 Demonstrate proficiency in the use of TCCC as a system in the tactical environment	1.4.1 Describe the process of casualty extraction and evacuation	1.4.2 Describe the components of the IFAK and their proper application techniques	1.4.4 Describe the components of the IFAK and the medic aid bag	
2. Remote Assessment and Rescue/Extraction	2.1 Demonstrate proficiency in remote assessment methodology (RAM)	2.1.1 Perform a remote assessment of a casualty	2.1.2 Perform a remote assessment of a casualty	2.1.3 Describe RAM and its role in mission planning and execution
2.2 Demonstrate proficiency in high-threat extraction techniques	2.2.1 Perform IADs and high-threat extraction techniques	2.2.1 Perform IADs and high-threat extraction techniques	2.2.2 Perform IADs and high-threat extraction techniques	2.1.5 Advise the commander on the integration of the remote assessment findings into the tactical plan
2.3 Demonstrate proficiency in casualty extraction utilizing full 360° multidimensional tactical space	2.3.1 Describe the multidimensional tactical space and methods for extraction, infiltration, and exfiltration	2.3.1 Describe the multidimensional tactical space and methods for extraction, infiltration, and exfiltration	2.3.2 Describe the multidimensional tactical space and methods for extraction, infiltration, and exfiltration	2.2.5 Describe the importance of IADs, high-threat extraction, and the need for specialized equipment and skills
				2.2.6 Recommend equipment to be used for high-threat extraction
				2.3.4 Provide an awareness-level brief of the concept of multidimensional tactical space and its implications for successful casualty extraction
				2.3.5 Recommend equipment to be used for casualty extraction

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TABLE 2. The 18 Competency Domains and the Specific Competencies in the Field Tactical Emergency Medical Support Matrix

Domain	Competency	Operator	Medical Provider	Team Commander	Medical Director	
3. Hemostasis	3.1 Demonstrate proficiency in conventional hemorrhage control, including direct pressure, wound packing, wound dressing, and pressure dressing	3.1.1 Perform hemorrhage control techniques for self-aid, for buddy-aid, and to assist a medical provider	3.1.2 Perform hemorrhage control at your level of training and evaluate adequacy of hemorrhage control done by operators	3.1.3 Describe conventional hemorrhage control techniques and their role in mission planning	3.1.5 Evaluate and train operators and medics in conventional hemorrhage control	
		3.2.1 Describe the principles in identification of life-threatening and non-life-threatening hemorrhage	3.2.2 Identify and reassess casualties who require hemorrhage control	3.1.4 Ensure that operators are equipped with IFAKs and medic aid bags	3.1.6 Ensure competency in medical skills required in conventional hemorrhage control	
	3.2 Demonstrate proficiency in the identification of life-threatening hemorrhage	3.2.1 Describe the principles in identification of life-threatening and non-life-threatening hemorrhage	3.2.2 Identify and reassess casualties who require hemorrhage control	3.2.3 Describe the potential impact of life-threatening hemorrhage control on mission planning and completion	3.2.4 Ensure that medics and operators are adequately trained to identify life-threatening hemorrhage	
		3.3.1 Perform self-application of an effective TQ in both a light and dark environment, on each extremity, with one hand	3.3.4 Perform self-application of an effective TQ in both a light and dark environment, on each extremity, with one hand	3.3.9 Describe the importance of TQs in the control of extremity hemorrhage	3.3.11 Make recommendation to commanders on effective TQs for IFAKs and medic aid bags	
	3.3 Demonstrate proficiency in the application of a tourniquet (TQ), commercial and improvised	3.3.2 Perform application of a casualty in both a light and dark environment	3.3.5 Perform application of a commercial TQ on a casualty in both a light and dark environment	3.3.10 Ensure that IFAKs and medic aid bags are equipped with effective TQs	3.3.12 Evaluate operators' and medics' ability to control life-threatening hemorrhage	
		3.3.3 Perform application of an effective improvised TQ	3.3.6 Perform application of an effective improvised TQ		3.3.13 Create medical protocols for operators and medics that include the application of TQs utilizing TCCC principles	
	3.4 Demonstrate proficiency in the application of advanced hemostatic agents	3.4.1 Describe the indications and contraindications for the use of advanced hemostatic agents	3.3.7 Assess a TQ for adequacy of application	3.3.8 Assess casualty for TQ removal		3.3.14 Create medical protocols for operators and medics that include the removal of TQs
			3.4.2 Perform the proper application of advanced hemostatic agents	3.4.3 Describe the indications and contraindications for advanced hemostatic agents	3.4.6 Describe the use of advanced hemostatic agents in the control of life-threatening hemorrhage	3.4.8 Create medical protocols for operators and medics that consider the use of advanced hemostatic agents
		3.4.2 Perform the proper application of advanced hemostatic agents	3.4.4 Perform the proper application of advanced hemostatic agents	3.4.7 Ensure that hemostatic agents are available to medics and operators as medical protocols define		3.4.9 Make recommendations to commanders concerning the integration of advanced hemostatic agents into the IFAKs and medic aid bags
			3.4.5 Evaluate the effectiveness of advanced hemostatic agent hemorrhage control initiated by operators			

4. Airway	4.1 Demonstrate proficiency in casualty positioning (rescue, chin-lift, jaw-thrust) and basic airway clearance techniques (Heimlich, direct visualization)	4.1.1 Identify airway compromise	4.1.3 Identify airway compromise	4.1.5 Describe the principles related to casualty positioning	4.1.6 Create medical protocols for operators and medics that address casualty positioning
	4.2 Demonstrate proficiency in placement of a nasopharyngeal airway (NPA)	4.2.1 Perform proper positioning of an injured casualty (with and without airway compromise)	4.2.3 Describe the indications and contraindications for use of an NPA	4.2.5 Describe the tactical applications of NPA usage	4.2.7 Create medical protocols for operators and medics for the use of NPAs
	4.3 Demonstrate proficiency in placement of a supraglottic airway (SGA) device	4.3.1 Describe the indications for use of an SGA device	4.3.2 Describe the indications for use of an SGA device	4.3.4 Describe the role of an SGA device	4.3.6 Create medical protocols for medics for the use of SGA devices
	4.4 Demonstrate proficiency in endotracheal (ET) intubation	4.4.1 Describe ET intubation	4.4.2 Describe the medical indications for performing ET intubation	4.4.5 Describe the role of ET intubation	4.4.7 Create medical protocols for medics for ET intubation
		4.4.3 Describe tactical considerations that may render ET intubation dangerous	4.4.4 Perform ET intubation	4.4.6 Ensure that equipment for ET intubation is available to medics as medical protocols define	4.4.8 Make recommendations to commanders regarding equipment for ET intubation
				4.4.9 Ensure the competency of medics in performing ET intubation, including in low-light and no-light situations and other austere environments	

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Domain	Competency	Operator	Medical Provider	Team Commander	Medical Director	
5. Breathing	4.5 Demonstrate proficiency in establishment of a surgical airway (cricothyroidotomy)	4.5.1 Describe the use of a surgical airway and how to recognize when it might be needed	4.5.2 Describe the indications for placement of a surgical airway	4.5.4 Describe the role of a surgical airway	4.5.6 Create medical protocols for performing surgical airways	
		4.5.3 Perform placement of a surgical airway using commercially available and improvised techniques	4.5.5 Ensure that equipment for surgical airway placement is available to medics as medical protocols define	4.5.7 Make recommendations regarding equipment for surgical airway placement	4.5.8 Ensure the competency of medics to perform surgical airway procedures	
		5.1.1 Identify the findings associated with open and tension pneumothorax	5.1.2 Identify the findings associated with open and tension pneumothorax	5.1.3 Understand that open and tension pneumothorax are preventable causes of death in combat and law enforcement operations	5.1.4 Ensure the competency of operators and medics in the recognition of open and tension pneumothorax	
		5.2.1 Describe what a needle thoracostomy is and when it might be needed	5.2.2 Assist appropriately trained medical personnel in the placement of a needle thoracostomy	5.2.3 Describe the indications for performing a needle thoracostomy	5.2.6 Describe the role of needle thoracostomy	5.2.8 Create medical protocols for medics to perform a needle thoracostomy
5.3 Demonstrate proficiency in the placement of a chest seal (commercially available and improvised)	5.3.1 Describe the indications for use of a chest seal	5.3.2 Perform placement of a commercial and an effective improvised chest seal	5.3.4 Describe the indications for use of a chest seal	5.3.7 Describe the use of the chest seal and its role in treating one of the preventable causes of death from trauma	5.3.9 Create medical protocols for operators and medics for the use of chest seals	
		5.3.3 Assess the adequacy of a chest seal after placement	5.3.5 Perform placement of a commercial and an effective improvised chest seal	5.3.8 Ensure that equipment for placement of an effective chest seal is available to operators and medics as medical protocols define	5.3.10 Ensure the competency of medics in the use of chest seals	
		6.1.1 Demonstrate the ability to do a basic assessment of the adequacy of circulation	6.1.2 Demonstrate the ability to do both a basic and an advanced assessment of the adequacy of circulation (e.g., monitoring, physical examination)	6.1.4 Describe the basic and advanced methods of assessing the adequacy of circulation	6.1.5 Ensure the proficiency of team members in the assessment of the adequacy of circulation in both tactical and nontactical environments	
		6.2.1 Demonstrate proficiency in basic treatment of circulatory compromise	6.2.2 Demonstrate proficiency in basic and advanced treatment of circulatory compromise (eg, CPR, AED)	6.2.3 Describe the basic and advanced methods to treat circulatory compromise	6.2.4 Create medical protocols related to treatment of circulatory compromise	

7. Vascular Access	7.1 Demonstrate proficiency in the establishment of an intravenous (IV) saline lock	7.1.1 Describe the potential need for IV access	7.1.2 Describe the indications for, and tactical considerations of, obtaining IV access	7.1.6 Create appropriate treatment protocols for IV access
	7.2 Demonstrate proficiency in establishment of an intraosseous (IO) device	7.2.1 Describe the potential need for IO access	7.2.2 Describe the indications for attempting IO access	7.1.7 Ensure the competency ofedics in IV access techniques in routine and tactical environments 7.2.6 Create appropriate treatment protocols for IO access 7.2.7 Ensure the competency ofedics in IO access techniques
8. Medication Administration	8.1 Demonstrate proficiency in IV/IO fluid resuscitation	8.1.1 Describe the potential need for IV/IO fluid resuscitation	8.1.2 Demonstrate proficiency in IV/IO fluid resuscitation	8.1.5 Create appropriate IV/IO fluid resuscitation protocols 8.1.6 Ensure the competency ofedics in IV/IO fluid resuscitation 8.2.5 Create appropriate protocols for analgesia
	8.2 Demonstrate proficiency in the administration of analgesia	8.2.1 Describe the need for analgesia	8.2.2 Demonstrate proficiency in analgesia administration	8.2.4 Ensure that IV analgesia medication is available toedics as medical protocols define 8.3.3 Describe the risks and benefits of antibiotic administration to mission completion 8.2.6 Maintain appropriate control and documentation of all schedule drugs 8.2.7 Ensure the competency ofedics in analgesia administration 8.3.5 Create protocols for emergency antibiotic administration for traumatic wounds
	8.3 Demonstrate proficiency in the administration of emergency antibiotics for traumatic wounds	8.3.1 Describe the potential need for emergency antibiotics to prevent wound infections	8.3.2 Demonstrate proficiency in antibiotic administration for traumatic wound prophylaxis	8.3.4 Ensure that IV antibiotics are available toedics as medical protocols define 8.4.4 Describe the indications for use and adverse side effects of commonly used OTC medications and the potential benefits and dangers they create in the tactical environment
	8.4 Demonstrate proficiency in appropriate and safe use of over-the-counter (OTC) medications in the tactical setting	8.4.1 Describe the indications for use and adverse side effects of commonly used OTC medications and the potential benefits and dangers they create in the tactical environment	8.4.2 Describe the indications for use and adverse side effects of commonly used OTC medications and the potential benefits and dangers they create in the tactical environment	8.3.6 Ensure the competency ofedics in antibiotic administration 8.4.5 Create protocols for the administration of OTC medications generally considered safe for use in the tactical environment 8.4.6 Create protocols foredics to exclude personnel from operations because of adverse medication side effects

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TABLE 2. The 18 Competency Domains and the Specific Competencies in the Field Tactical Emergency Medical Support Matrix

Domain	Competency	Operator	Medical Provider	Team Commander	Medical Director	
9. Casualty Immobilization	8.5 Demonstrate proficiency in the identification and consideration of medication allergies	8.5.1 Describe the importance of identifying and reporting medication allergies to medical support	8.5.3 Demonstrate proficiency in the identification and documentation of medication allergies	8.5.5 Describe the importance of identifying and reporting medication allergies to medical support and provide input into the reporting SOP	8.5.6 Create appropriate mechanisms for identifying and reporting medication allergies to medical support	
		8.5.2 Describe recognition of an allergic reaction to a medication	8.5.4 Describe recognition of medication allergies and proper treatment of allergic reactions	8.5.7 Create protocols for the treatment of allergic reactions to medications		
	9.1 Demonstrate proficiency in the management of suspected central nervous system (CNS) or spine injuries	9.1.1 Demonstrate proficiency in the recognition of common mechanisms of CNS/spine injuries	9.1.4 Demonstrate proficiency in the recognition of common mechanisms of CNS/spine injuries	9.1.7 Describe the importance of the management of suspected CNS/spine injuries	9.1.9 Create protocols for the protection of CNS/spine injuries	
		9.1.2 Demonstrate proficiency in providing basic CNS/spine protection	9.1.5 Demonstrate proficiency in providing advanced CNS/spine protection		9.1.10 Ensure the competency of operators and medics to protect CNS/spine injuries	
	9.2 Demonstrate proficiency in fracture splinting and extremity neurovascular assessment	9.2.1 Demonstrate proficiency in basic splinting	9.2.3 Demonstrate proficiency in basic and advanced fracture management, including splint application and traction splinting	9.2.5 Describe the principles of splinting	9.2.7 Create protocols for fracture splinting for operators and medics	
		9.2.2 Demonstrate proficiency in extremity neurovascular assessment before and after splinting	9.2.4 Demonstrate proficiency in extremity neurovascular assessment before and after splinting	9.2.6 Ensure that supplies are available to operators and medics for splinting and extremity neurovascular assessment as medical protocols define	9.2.8 Create protocols for fracture splinting for operators and medics	
	9.3 Demonstrate proficiency in the emergent reduction of joint dislocations	9.3.1 Describe the risks and benefits of joint dislocation reduction to mission completion	9.3.3 Describe the risks and benefits of joint dislocation reduction to limb salvage and mission completion	9.3.6 Describe the risks and benefits of joint dislocation reduction to mission completion	9.3.8 Create protocols for joint dislocation and fracture dislocation reductions	
		9.3.2 Describe the risks and benefits of joint dislocation reduction to mission completion	9.3.4 Demonstrate proficiency in joint dislocation and fracture dislocation reductions as medical protocols define			
						8.4.7 Ensure that medications are properly stored and assessed on a schedule for expiration and damage

9.3.2 Demonstrate proficiency in extremity neurovascular assessment before and after joint dislocation reduction (performed by appropriate medical personnel)	9.3.5 Demonstrate proficiency in extremity neurovascular assessment before and after joint dislocation/ fracture dislocation reduction	9.3.7 Ensure that supplies are available to operators and medics for joint dislocation reduction and before and after reduction and management as medical protocols define	9.3.9 Ensure the competency of medics in emergent reduction of joint dislocations/ fracture dislocation, including extremity neurovascular assessment before and after reduction
10.1 Demonstrate proficiency in medical planning and analysis of medical intelligence	10.1.1 Understand the role of medical planning and its importance for individual health and mission completion	10.1.2 Define the components of a medical plan for tactical operations	10.1.4 Describe the role of medical planning and its importance for individual health and mission completion
10.1.1 Demonstrate proficiency in monitoring work/ rest cycles	10.1.3 Define the inherent risks in mission execution (to include infiltration, actions at the objective, and exfiltration) and their impact on medical planning	10.1.5 Describe the integration of information from medical planning into mission planning	10.1.7 Ensure the competency of medics in identifying risks and planning for mitigating steps (to include adequate PPE selection and use)
11.1 Human Performance Factors/Health Surveillance	11.1.1 Describe appropriate work/ rest cycles based on operational and environmental conditions and their impact on human performance	11.1.2 Monitor environmental and operational conditions	11.1.7 Create protocols concerning work/ rest cycles based on environmental and operational conditions
11.2 Demonstrate proficiency in health surveillance	11.1.3 Make recommendations to commander for work/ rest cycles	11.1.4 Make safe and appropriate use of medications for sleep-cycle adjustment of personnel involved in sustained and continuous operations	11.1.8 Create protocols for the safe and appropriate administration of medications to adjust the sleep cycle of personnel involved in sustained and continuous operations
11.2.1 Describe the importance of health surveillance for the individual and for mission completion	11.2.2 Implement appropriate health surveillance measures	11.1.6 Describe the importance of using input from medical personnel to integrate work/ rest cycles into mission planning	11.1.9 Make recommendations to the commander for work/ rest cycles
11.2.2 Advise the commander on the impact of team member health on mission readiness	11.2.3 Advise the commander and medical director on impact of team member health on mission readiness	11.2.4 Describe the importance of health surveillance for the individual and for mission completion	11.2.6 Create protocols to assist in health surveillance
11.2.3 Create protocols to assist in the determination of personnel's fitness for duty after illness or injury		11.2.5 Ensure that resources are available for health surveillance	11.2.7 Advise the commander on the impact of team member health on mission readiness

(Continued on next page)

TABLE 2. The 18 Competency Domains and the Specific Competencies in the Field Tactical Emergency Medical Support Matrix

Domain	Competency	Operator	Medical Provider	Team Commander	Medical Director
11.3	Demonstrate proficiency in preventive medicine	11.3.1 Describe the importance of preventive medicine for the individual and for mission completion	11.3.2 Describe the importance of preventive medicine for the individual and for mission completion	11.3.4 Describe the importance of preventive medicine for the individual and for mission completion	11.3.6 Create protocols regarding preventive medicine
		11.3.3 Implement appropriate preventive medicine measures	11.3.5 Ensure that resources are available for preventive medicine	11.3.5 Ensure that resources are available for preventive medicine	
11.4	Demonstrate proficiency in injury prevention (e.g., personal protective equipment [PPE])	11.4.1 Describe the importance of injury prevention for the individual and for mission completion	11.4.2 Describe the importance of injury prevention for the individual and for mission completion	11.4.4 Describe the importance of injury prevention for the individual and for mission completion	11.4.6 Create protocols regarding injury prevention (PPE selection and use)
		11.4.3 Implement appropriate injury prevention measures	11.4.3 Implement appropriate injury prevention measures	11.4.5 Ensure that resources are available for injury prevention	
12. Environmental Factors	Demonstrate proficiency in the management of specific threats from the environment (e.g., heat, cold, altitude, plants, animals, geography)	12.1.1 Describe the environmental threats from heat, cold, altitude, plants, animals, and geography	12.1.5 Demonstrate proficiency in the recognition of heat, cold, altitude, plants, animals, and geographically induced/related illnesses and injuries	12.1.9 Describe the environmental threats from heat, cold, altitude, plants, animals, and geography	12.1.11 Create appropriate protocols for the treatment of environmentally related illnesses/injuries (e.g., heat, cold, altitude, plants, animals, geography)
		12.1.2 Describe the signs and symptoms of heat and cold-induced illnesses/injuries	12.1.6 Demonstrate proficiency in the treatment of heat- and cold-induced illnesses and injuries		
		12.1.3 Describe the symptoms of altitude-induced illnesses	12.1.7 Demonstrate proficiency in the appropriate treatment of altitude-induced illnesses		
		12.1.4 Describe the symptoms of some injuries and illnesses associated with commonly encountered plants, animals, and geographic features	12.1.8 Demonstrate proficiency in the treatment of injuries and illnesses associated with commonly encountered plants, animals, and geographic features	12.1.10 Describe the impact of environmental threats on mission planning and completion	12.1.12 Ensure the competency of operators and medics in recognizing and treating environmentally related illnesses/injuries
		12.2.1 Describe the signs and symptoms of anaphylaxis	12.2.3 Demonstrate proficiency in the rapid recognition and treatment of anaphylaxis	12.2.5 Describe the signs and symptoms of anaphylaxis	12.2.8 Create appropriate treatment protocols for the treatment of anaphylaxis, including the rapid administration of epinephrine
		12.2.2 Describe the importance of rapid treatment with epinephrine for severe allergic reactions (anaphylaxis)	12.2.4 Demonstrate proficiency in the rapid administration of epinephrine for severe allergic reactions (anaphylaxis) as medical protocols define	12.2.7 Ensure that medications for anaphylaxis are available to medics as medical protocols define	12.2.9 Ensure the competency of operators and medics in rapidly recognizing and treating anaphylaxis, including the rapid administration of epinephrine
	Demonstrate proficiency in the identification and management of severe allergic reactions (anaphylaxis)			12.2.6 Describe the risks and benefits of treatment with epinephrine for anaphylaxis to mission completion	
				12.2.7 Ensure that medications for anaphylaxis are available to medics as medical protocols define	

TABLE 2. The 18 Competency Domains and the Specific Competencies in the Field Tactical Emergency Medical Support Matrix

Domain	Competency	Operator	Medical Provider	Team Commander	Medical Director
15.4	Demonstrate proficiency in immediate lifesaving interventions for the victims of CBRN exposure	15.4.1 Describe the importance of antidotes to treat victims of CBRN exposure	15.4.3 Demonstrate proficiency in selection and administration of antidotes for CBRN exposure	15.4.4 Have an awareness of antidotes for CBRN exposure	15.3.5 Ensure the competency of operators and medics in field-expedient decontamination
		15.4.2 Describe the indications for use and appropriate use of autoinjector antidote kits	Describe the indications for use and appropriate use of autoinjector antidote kits	15.4.5 Ensure that antidotes are available to medics as medical protocols define	15.4.6 Create protocols for the use of antidotes for CBRN exposure
16. Remote/Surrogate Treatment	Demonstrate the skill of providing medical care by proxy or surrogate	16.1.1 Describe the concept of surrogate care	16.1.2 Demonstrate the ability to perform assessment of illness/injury and to provide treatment via a surrogate without the use of one's hands or visual cues	16.1.3 Describe the benefit of surrogate care and the role this interaction plays in gathering medical and other intelligence	15.4.7 Ensure the competency of medics in antidote selection and administration
		16.1.1.1 Describe the risks and benefits of using less-lethal weapons	16.1.2.1 Describe potential illness and injury patterns associated with the use of less-lethal weapons	16.1.4 Develop appropriate resources to allow medics to provide step-by-step instructions for surrogates rendering care in emergencies	16.1.5 Ensure the proficiency of medics in providing instruction for surrogate-rendered assessment and care
17. Less Lethal Injuries	Demonstrate proficiency in the recognition and treatment of illness and injury associated with less-lethal weapons	17.1.1 Describe the risks and benefits of using less-lethal weapons	17.1.2 Describe the risks and benefits of using less-lethal weapons	17.1.6 Describe the risks and benefits of using less-lethal weapons	17.1.7 Describe the risks and benefits of using less-lethal weapons
		17.1.1.1 Describe the risks and benefits of using less-lethal weapons	17.1.2.1 Describe potential illness and injury patterns associated with the use of less-lethal weapons	17.1.3 Describe potential illness and injury patterns associated with the use of less-lethal weapons	17.1.8 Create protocols for the diagnosis and treatment of potential injuries and illnesses resulting from the use of less-lethal weapons
18. Special Populations	Understand the unique aspects related to children, pregnant women, frail elderly, and the disabled when working in the tactical environment	18.1.1 Describe the vulnerabilities of special populations and the potential medical and tactical implications they present	18.1.2 Demonstrate proficiency in the diagnosis and treatment of illnesses and injuries caused by, or exacerbated by, these weapons	18.1.3 Describe special populations and their impact on mission planning	17.1.9 Create protocols that identify patients who will require hospital evaluation after being struck with less-lethal weaponry
		18.1.1.1 Describe the risks and benefits of using less-lethal weapons	18.1.2.1 Advise the commander when less-lethal weapons, such as conductive energy devices (CEDs), may be contraindicated based on medical protocols	18.1.4 Create protocols for the management of the agitated suspect, including the immediate aftercare of any such suspect who has been managed with a CED	17.1.10 Create protocols for the management of the agitated suspect, including the immediate aftercare of any such suspect who has been managed with a CED

AED = automated external defibrillation; CBRN = chemical, biological, radiological, and/or nuclear; CCP = casualty collection point; CED = conductive energy device; CNS = central nervous system; CPR = cardiopulmonary resuscitation; CUF = care under fire; ET = endotracheal; IAD = immediate action drill; IFAK = individual first-aid kit; IO = intraosseous; IV = intravenous; NPA = nasopharyngeal airway; OTC = over-the-counter; PPE = personal protective equipment; RAM = remote assessment methodology; SGA = supraglottic airway; SOP = standard operating procedure; TACEVAC = tactical evacuation; TCCC = tactical combat casualty care; TEMS = tactical emergency medical support; TFC = tactical field care; TQ = tourniquet.

paramedics) in law enforcement operations due to the hazardous environment and risk involved in active law enforcement operations. Because of these risks, it could be argued that without tactical medicine, the standard of care practiced in the prehospital environment is not consistently applied in the tactical environment. There is a pressing need to provide a mechanism by which the standard of prehospital care can be delivered in this environment.

The provision of tactical medicine allows all members of our society access to the best available practices of prehospital care by specially trained individuals, prepared and equipped for the unique hazards of the tactical environment. Defining the roles and responsibilities of these providers and creating educational programs of study based on a set of competency-based standards will aid in ensuring the provision quality care. While these competencies will allow for competency-based training programs, the application of the training is obviously also subject to appropriate state law and local protocols.

CONCLUSION

The TEMS competency matrix presented here can provide a structure around which competency-based TEMS courses for four target audiences (operator, medic, team commander, and medical director) can be developed.

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APPENDIX 1

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