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THESIS

**TACTICAL MEDICAL TRAINING FOR POLICE
OFFICERS: LESSONS FROM U.S. SPECIAL FORCES**

by

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December 2012

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**TACTICAL MEDICAL TRAINING FOR POLICE OFFICERS: LESSONS FROM
U.S. SPECIAL FORCES**

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ABSTRACT

This thesis examines the question: Can law enforcement officers across multiple jurisdictions benefit from lessons learned in combat environments about medical training? It compares the medical training requirements of U.S. military forces with those of various police units. It specifically investigates how military lessons in tactical medicine pertain to the various police departments' medical training requirements.

The study finds that the main lesson police officers can take from the military is to build community-specific medical training based on unique law enforcement needs and available assets. The military attempts to use hard data surrounding soldiers' work environments, access to medical care, and common modes of injury to design its medical training. Police officers should also design law-enforcement-specific medical training based on their assets and specific work environment. Additionally, a more detailed reporting system regarding police officer fatalities would support the officers' data collection, which would likely help improve police officer tactical medical training.

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LIST OF ACRONYMS AND ABBREVIATIONS

AED – Automated External Defibrillator

ATLS – Advanced Trauma Life Support

CJIS - Criminal Justice Information Services

CPR – Cardiopulmonary Resuscitation

DEA – Drug Enforcement Administration

EMS – Emergency Medical Services

FBI – Federal Bureau of Investigation

IV – Intravenous

IO – Intraosseous

IACP – International Association of Chiefs of Police

LEOKA – Law Enforcement Officer Killed and Assaulted

NTOA – National Tactical Officers Association

SWAT – Special Weapons and Tactics

TCCC – Tactical Combat Casualty Care

TEMS – Tactical Emergency Medical Support

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I. INTRODUCTION

This thesis examines the question: Can law enforcement officers across multiple jurisdictions benefit from lessons learned in combat environments about medical training? It compares the medical training requirements of U.S. military forces with those of federal, state, tribal, Forest Service, and conservation police units. (Forest Service and conservation police departments are referred to generally herein as “wilderness police departments.”) It specifically investigates how military lessons in tactical medicine pertain to the various police departments’ medical training requirements.

The study finds that the main lesson police officers can take from the military is to build community-specific medical training based on unique law enforcement needs and available assets. The U.S. Special Operations Command attempts to use hard data surrounding soldiers’ work environments, access to medical care, and common modes of injury to design its medical training. This method for designing military-specific medical training began after realizing that civilian medicine is insufficient for a soldier’s use. Police officers should also design law-enforcement-specific medical training based on their assets and specific work environment. Law enforcement personnel should be hesitant to adopt military tactical medicine solely on the grounds that police officers too work in a tactical environment, unsuitable for standard civilian emergency medical training. While portions of the military’s medical training curriculum are useful for police officers, some medical techniques used by soldiers are not suitable in the context of civilian law enforcement.

A. SIGNIFICANCE

Military tactical medicine has made major improvements in the last two decades. Tactical Combat Casualty Care (TCCC) is the name of a set of medical procedures or interventions developed by special operators to bridge the gap between military and

civilian emergency medical service (EMS) needs.¹ Since TCCC's development and adoption by special operators, its transition into use throughout the military has been expanding continuously. Due to TCCC's acknowledged value and success in saving soldiers' lives in a combat environment, various police departments have recognized its potential for saving the lives of their officers, who are often required to work in combative settings. Although some law enforcement agencies have adopted TCCC as a foundation for police officer tactical medicine, where it is often referred to as Tactical Emergency Medical Support (TEMS), not enough research has explored how TCCC should be adapted for civilian use. Furthermore, no standard tactical medical training has been adopted by police jurisdictions nationwide.

The National Tactical Officers Association (NTOA), with 30,000 members throughout the United States, is a leading organization dedicated to enhancing the performance of law enforcement personnel by providing a training resource and forum for the development of tactics and information exchange. NTOA and multiple law enforcement agencies, including the FBI, endorse the use of modified TCCC training to support law enforcement officers in carrying out their missions.²

In a law enforcement context, a tactical medical setting is often one that involves a prolonged-transport environment with minimal EMS assets; it may or may not involve an armed conflict component. Tactical medical training is useful for police officers during day-to-day operations as well as when their EMS resources are blocked or slowed. If injured in a combative tactical setting, officers must provide self-assessments/treatments or give care to teammates until hostilities have ceased. TCCC interventions are useful to know during daily operations, because certain wounds can

¹ This thesis uses the general term *special operators* to include a variety of soldiers, sailors, and marines in the special operations community. TCCC was originally developed and adopted by members of the U.S. Special Operations Command. The Department of Defense activated the Special Operations Command on 16 April 1987. The command is comprised of approximately 57,000 active duty, Reserve, and National Guard Soldiers, Sailor, Airmen, Marines, and DoD civilians. The primary training center for Special Operations' Combat Medicine is located at Fort Bragg, North Carolina. Here special operators from multiple branches of the service—including Air Force Parajumpers, Army Rangers and Special Forces, Navy SEALs, and Marine Forced Recon—come together to receive medical training. In this document, members from the U.S. Special Operations Command are referred to generally as *special operators*.

² Richard B. Schwartz, MD, et al., *Tactical Medicine—Competency-Based Guidelines*, Prehospital Emergency Care 2011, 15:67–82.

cause an officer to die in minutes. Other causes of death have a slower onset. Although many fatalities might be preventable by EMS in normal conditions, various elements can alter EMS response, including situations that put EMS providers in danger. One good example of a situation that delayed EMS backup occurred in 1997 in North Hollywood, California, where a gun battle lasted for 44 minutes. In this case it was the bank robber instead of the police officer who died from a gunshot wound to the leg because EMS units were restricted for safety, but it could have been the other way around.³

Although police officers might not have to deal with response times that are as delayed as the medical evacuation platforms can be in the military, they are often faced with extended EMS response time. Slow EMS response time is especially a frequent problem in rural areas and during mass casualty scenarios when EMS assets are overwhelmed. Even when EMS response time is reliable, dangers inherent in law enforcement combined with police officers working locations is often problematic. In tactical situations, a police officer must have the ability to administer basic life-saving medicine while minimizing the threat to others and controlling the scene. In short, tactical medical training enables police officers to accomplish their missions. News reports such as those surrounding the Fort Hood shooting, when an Army medic saved Officer Kimberly Munley's life by applying a Combat Application Tourniquet, confirm that tactical medicine will save police officers' lives. If not for the medic's training and quick access to a tourniquet, officer Munley might have died.⁴

Similar to how the military developed its medical training, police officers should focus their medical training on law enforcement specific injuries, medical assets, and work environment. Soldiers receiving medical training learn to weigh any TCCC intervention for importance based on two factors: first, how quickly the injury it is designed to treat can lead to death; and, second, how frequently that injury is likely to

³ John B. Alexander, *Convergence: Special Operations Forces and Civilian Law Enforcement*, Joint Special Operations University, 2010.

⁴ Frank K Butler, MD & Richard Carmona, MD, "Tactical Combat Casualty Care: From the Battlefields of Afghanistan and Iraq to the Streets of America," *The Tactical Edge*, (Winter 2012): 86-91, <http://www.ntoa.org/massemail/CarmonaW12.pdf>; John B. Alexander, *Convergence: Special Operations Forces and Civilian Law Enforcement*, Joint Special Operations University, 2010.

occur. For example, a soldier is trained to recognize and treat a life-threatening extremity bleed as a primary intervention, because casualties can die in minutes from this wound and because this injury is the leading cause of preventable death among battle casualties. Law enforcement medical training should be influenced by the same two criteria. Each officer has the potential to be wounded; his or her response afterward will depend on the officer's training and could result in life or death consequences for the officer as well as innocent civilians. It is essential that police officers learn the tactical medicine that is best suited to their individual role.

B. PROBLEMS AND HYPOTHESES

Officers who are not trained in tactical medicine will lack necessary tools to perform their job when put in a disaster scenario. If an officer is injured in the line of duty but does not know how to respond, the officer's life and the lives of others are in immediate danger. One problem is that no comprehensive study using definitive medical or forensic data has been conducted to understand the common injuries that officers will likely encounter. Another is that no standard police officer medical training has been developed. The dissimilarities between jurisdictional training programs surpass minor nuances like the length or depth of training programs for individual units. The differences are vast and often based on uninformed local EMS training standards, which vary state to state and are frequently not tested in a field environment.⁵

Another problem is that some officers do not understand the importance of tactical medical training. Without receiving this training, they do not know that hemorrhage from their leg could result in death in three minutes and are instead falsely comforted with the knowledge that EMS capabilities are in relatively close proximity. Police officers who perceive medical training as trivial can add to the problem of developing a standard set of medical procedures for their community by resisting

⁵ Emergency Care Coordination Center, *Emergency Care Coordination Center Strategic Plan FY 2012 – FY 2016*, Assistant Secretary for Preparedness and Response at Health and Human Services, 2012; American Medical Association, *Improving Health System Preparedness for Terrorism and Mass Casualty Events: Recommendations for Action*, 2007; California Emergency Medical Services Authority, <http://www.emsa.ca.gov/>; Institute of Medicine Committee on the Future of Emergency Care in the United States Health System, *Emergency Medical Services: At the Crossroads (Future of Emergency Care)*, Institute of Medicine, 2006.

cooperation with medical researchers. Furthermore, even when research supports training and the adoption of a particular medical intervention or technique, restricted departmental funding and lack of spare training time can serve as obstacles to making any real change.

Non-tactical civilian EMS training programs have restrictions that are designed to protect patients from potential injuries that can be caused by emergency medical procedures. For instance, to protect the patient's cervical spine, medical responders must take great precautions to immobilize the neck before transporting the patient. Tourniquets have long been avoided due to fears that they can cause injury to the affected extremity; therefore, more complicated pressure dressings are often preferred over tourniquets. These precautions add time to the treatment process that can risk care providers' and patients' lives in a tactical environment.

Although many law enforcement agencies have ignored the caution of civilian EMS authorities and adopted controversial TCCC interventions like the tourniquet, there remain problems with applying military medicine to police units. Military professionals designed TCCC to be used in different scenarios than many law enforcement officers generally encounter and with a different level of assets. In terms of performing a medical procedure, soldiers who work in teams, even small ones, have an advantage over members of a police force who patrol alone. On the other hand, soldiers usually operate with less direct support from EMS teams and can have a more delayed transport to advanced medical care. These discrepancies need to be measured and evaluated. This study addresses the issue that more research must be done concerning TCCC's relevancy, especially for single-unit patrol officers.

C. LITERATURE REVIEW

The military medical training known as TCCC developed after the lack of helicopter support during the Battle of Mogadishu, Somalia, in 1993 resulted in a fifteen-hour delay in transporting the casualties. That incident indicated to military medical experts that standard civilian EMS training and procedures, such as those taught in Advanced Trauma Life Support (ATLS)—which up until then had been used in the military—were not applicable to the combat environment. These lessons were presented

along with historical data concerning mechanisms of injury among military casualties in a groundbreaking paper published in 1996, *Tactical Combat Casualty Care in Special Operations*. Since civilian medical training was determined insufficient, the military adopted methods that challenged and defied civilian medicine. Since then, U.S. military after-action reports from Iraq and Afghanistan continue to provide support for TCCC, while its interventions remain disputed in the civilian sector.⁶

A research paper endorsed by NTOA, *The Relevance of Tactical Combat Casualty Care (TCCC) Guidelines to Civilian Law Enforcement Operations*, argues that TCCC training is necessary for SWAT team members because the officers' missions put them into scenarios in which standard EMS training is insufficient. The paper supports TCCC's basic approach to tactical medicine by stressing that casualties should first remain in the fight after being injured; it explains that, contrary to the many stereotypes surrounding gunshot wounds, most non-lethal injuries sustained during active operations do not debilitate the operator. The writers, like military medical experts, believe that medical training instructors teaching tactical medicine should avoid running training scenarios in which student operators incur incapacitating injuries, because such scenarios will create training scars. They warn that officers who practice playing dead after simulating being shot during training will likely abandon the mission after being shot in an actual scenario.⁷

⁶ Frank K. Butler, et al., *Tactical Management of Urban Warfare Casualties in Special Operations*, *Military Medicine*, 165, Suppl. 1, (2000): 1-48, http://www.valorproject.org/uploads/Tact_Mgmt_Urban_Warfare.pdf; Lowell W. Chambers, MD, et al., *Initial Experience of U.S. Marine Corps Forward Resuscitative Surgical System During Operation Iraqi Freedom*, *Archives of Surgery*, Vol. 140, (January 2005): 26-32, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA480500>; Center for Disease Control and Prevention, *Guidelines for Field Triage of Injured Patients: Recommendations of the National Expert Panel on Field Triage*, 2011; CAPT Frank K. Butler, Jr., MC USN (Ret.), et al., *Tactical Combat Casualty Care 2007: Evolving Concepts and Battlefield Experience*, *Military Medicine*, Vol. 172, no. 11, (2007): 1-19, http://valorproject.org/uploads/butler_military_medicine_tccc_2007.pdf; Robert L. Mabry, MD, et al., *United States Army Rangers in Somalia: An Analysis of Combat Casualties on an Urban Battlefield*, *The Journal of Trauma, Injury Infection, and Critical Care*, Vol. 49, no. 3, (2000): 515-29, <http://www.dtic.mil/dtic/tr/fulltext/u2/a480509.pdf>; Frank K. Butler, Jr., MC, USN Lieutenant Colonel John Haymann, MC, and USA Ensign E. George Butler, MC, USN, *Tactical Combat Casualty Care in Special Operations*, *Military Medicine*, 161, Suppl. 3, (1996): 2-16, http://valorproject.org/uploads/TCCC_Special_Operations.pdf.

⁷ Kevin Gerold, DO, JD, Capt. Mark Gibbons, EMT-P, and Sean McKay, EMT-P, *The Relevance of Tactical Combat Casualty Care (TCCC) Guidelines to Civilian Law Enforcement Operations*, http://ntoa.org/site/images/stories/tccc_guidelines_ntoa.pdf.

The advice to avoid potentially harmful training scenarios is also supported by other authors who write about operating in tactical scenarios. Body response to an exciting event, such as being shot during an arrest, is covered in detail in Lieutenant Colonel Dave Grossman's book, *On Combat, The Psychology and Physiology of Deadly Conflict in War and in Peace*. In times of stress, people lose fine motor skills and resort back to rehearsed training; therefore, a way to deal with this should be established in any law enforcement training process. Instead, according to *Tactical Medicine—Competency Based Guidelines*, a paper written by a team of doctors dedicated to the development of standard police officer tactical medical training, many TEMS courses that exist today are based on a process-oriented training model that, for instance, assign credit for attending a lecture on hemorrhage control, as opposed to participating in hands-on training. The authors of the competency based guidelines paper explain that this type of unrealistic, process-oriented training does not prepare law enforcement officers for the emergency medical scenarios they will encounter in the field.⁸

The Institute of Medicine's report, *Emergency Medical Services At the Crossroads*, explains that America's disparate EMS agencies are not governed by standard training and, furthermore, EMS procedures are not necessarily based on evidence of proven results in field trials. This impedes efforts to establish universal police officer tactical medicine training protocols, because local police department medical training is often founded on each state's EMS standards. The dependent relationship between EMS and law enforcement medicine means that police officer medical training also varies widely.⁹

At least one state, California, has recently established laws in an attempt to mandate TEMS exposure to its SWAT teams. California's emergency medical services

⁸ Richard B. Schwartz, MD, et al., *Tactical Medicine—Competency-Based Guidelines*, Prehospital Emergency Care, (2011): 1-15, <http://www.coalition tactical medicine.org/wp-content/uploads/TEMS%20Competency%20Paper%20published.pdf>; Dave Grossman & Loren W. Christensen, *On Combat, The Psychology and Physiology of Deadly Conflict in War and in Peace*, PPCT Research Publications, 2nd Edition, 16 August 2007.

⁹ California POST and EMSA, *Tactical Medicine: Operational Programs and Standardized Training Recommendations*, POST 2009 EXE-0309; Institute of Medicine Committee on the Future of Emergency Care in the United States Health System, *Emergency Medical Services: At the Crossroads (Future of Emergency Care)*, Institute of Medicine, 2006.

authority teamed up with its Commission on Peace Officer Standards and Training to develop a standard TEMS curriculum for its 58 counties, but TEMS training is more of a concept than a set of nationally agreed upon procedures. Unlike TCCC, TEMS has no guidelines and no national certificate. Having no certification program presents a problem; the fact that officers are provided TEMS training by a jurisdiction in California does not mean that their training will be recognized, compatible, or otherwise have meaning among other departments across the United States.¹⁰

A critique of TEMS training is presented in, *Effectiveness of Tactical Emergency Medical Support: A Systematic Review*. To examine the effectiveness of tactical emergency medicine, the authors of the critique conduct a search of Medline and HealthStar databases from 1966 to 2005 and the EMBASE database from 1980 to 2005 for articles that discussed police officer tactical medicine. They also use a hand search of *The Tactical Edge*, the official publication of the National Tactical Officers Association, for the years 1989 to 2005 to find articles pertaining to TEMS. Their primary critique throughout the paper in regards to the different TEMS programs that exist is that little evidence verifies that TEMS training is successful; however, since typical EMS training does not address the requirements of law enforcement, the authors still support tactical medical training for police. After noting wide variability in TEMS training, implementation, and outcomes, the authors conclude: “Until further research into the value of civilian TEMS is available, tactical emergency medical support modeled on the military system should comprise part of every civilian tactical law enforcement unit.”¹¹

Not all literature supports TCCC training as the foundation for civilian law enforcement tactical medicine. Matthew Sztajnkrzyer’s study, *Tactical Medical Requirements for Law Enforcement Officers: A Ten Year Analysis of Line-of-Duty Deaths*, argues that TCCC’s use for police officers could have only limited value.

¹⁰ California POST and EMSA, *Tactical Medicine: Operational Programs and Standardized Training Recommendations*, POST 2009 EXE-0309.

¹¹ Michael J. Feldman, MD, PhD, FRCPC, Brian Schwartz, MD, CCFP-EM, and Laurie J. Morrison, MD, FRCPC, *Effectiveness of Tactical Emergency Medical Support: A Systematic Review*, http://www.attorneygeneral.jus.gov.on.ca/inquiries/ipperwash/policy_part/research/pdf/Feldman_Tactical_EMS_Review.pdf.

According to this evaluation of open-source Federal Bureau of Investigation (FBI) data from 1998–2007, more research should be done to understand how police officers are injured when investigating the application of military tactical medical training for civilian law enforcement.¹²

Sztajnkrycer’s study reveals that, of the 341 officer deaths included in the study, 123 officers had injuries that could have *potentially* been remedied with TCCC. This number does represent a significant percentage; however, of the 123 deaths, only two occurred from isolated extremity hemorrhage that potentially could have been prevented with a tourniquet. This characterizes 1.6 percent of the injured officers in the study who had potentially preventable causes of death, and it differs widely from the same statistic in military deaths. Compared to the number of soldiers with potentially preventable causes of death who died from extremity exsanguination in the 1996 TCCC study, which was 60 percent, many fewer officers are dying from the same cause. This finding is important, because a tourniquet is a leading intervention endorsed by military medicine.¹³

Of the line-of-duty deaths discussed in the Sztajnkrycer study, 129 of the victim officers sustained trauma to the chest, but their specific causes of death are unknown. If they were shot through the heart and died instantly, TCCC interventions would not have been helpful. Conversely, if they were shot through a lung and died later of complications surrounding a tension pneumothorax, TCCC interventions could have saved their life. The number of preventable injuries found in the study can, therefore, only be estimated due to the incomplete forensic data that is available. Although this study is limited by deficient medical data, it is still worthwhile because it uses causes of police officer deaths to determine TCCC’s validity among the law enforcement communities. By expanding

¹² Matthew D. Sztajnkrycer, MD, PhD, FACEP, *Tactical Medical Skill Requirements for Law Enforcement Officers: A 10-Year Analysis of Line-of-Duty Deaths*, *Prehospital and Disaster Medicine*, Vol. 25, no. 4, (2010): 346-52, http://www.medicalsci.eu/files/tccc_sztajnkrycer_tccc_in_tems_prehosp_dis_med_2010.pdf.

¹³ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010; Matthew D. Sztajnkrycer, MD, PhD, FACEP, *Tactical Medical Skill Requirements for Law Enforcement Officers: A 10-Year Analysis of Line-of-Duty Deaths*, *Prehospital and Disaster Medicine*, Vol. 25, no. 4, 2010.

the study using the most recent data available, the follow-on evaluation in this thesis helps determine which training elements of TCCC are more beneficial to police officers.¹⁴

The literature that investigates TCCC's applicability for police departments is sparse and insufficient. Some writers argue that the military's TCCC training should play a major role in influencing police officer tactical medical training, because soldiers and police officers can be in comparably dangerous situations;¹⁵ however, others point out that different types of injuries sustained by each population show that more research should be done to determine the usefulness of TCCC interventions.¹⁶ Those that support teaching TCCC interventions to police officers, despite their history of sustaining different causes of death, do not necessarily agree on which officers need the training.¹⁷ NTOA is a prominent advocate for TEMS training for all special weapons and tactics (SWAT) teams and argues that TCCC should serve as a foundation for TEMS protocols,

¹⁴ Matthew D. Sztajnkrzyer, MD, PhD, FACEP, *Tactical Medical Skill Requirements for Law Enforcement Officers: A 10-Year Analysis of Line-of-Duty Deaths*, Prehospital and Disaster Medicine, Vol. 25, no. 4, 2010.

¹⁵ Kevin Gerold, DO, JD, Capt. Mark Gibbons, EMT-P, and Sean McKay, EMT-P, *The Relevance of Tactical Combat Casualty Care (TCCC) Guidelines to Civilian Law Enforcement Operations*, http://ntoa.org/site/images/stories/tccc_guidelines_ntoa.pdf.

¹⁶ Matthew D. Sztajnkrzyer, MD, PhD, FACEP, *Tactical Medical Skill Requirements for Law Enforcement Officers: A 10-Year Analysis of Line-of-Duty Deaths*, Prehospital and Disaster Medicine, Vol. 25, no. 4, 2010.

¹⁷ California POST and EMSA, *Tactical Medicine: Operational Programs and Standardized Training Recommendations*, POST 2009 EXE-0309; Michael J. Feldman, MD, PhD, FRCPC, Brian Schwartz, MD, CCFP-EM, and Laurie J. Morrison, MD, FRCPC, *Effectiveness of Tactical Emergency Medical Support: A Systematic Review*, http://www.attorneygeneral.jus.gov.on.ca/inquiries/ipperwash/policy_part/research/pdf/Feldman_Tactical_EMS_Review.pdf.

but not until recently have its members begun to investigate the training's potential use for patrol officers.¹⁸

Although many law enforcement experts have recognized the benefits of TCCC training, it is still most widely adopted by SWAT and other tactical teams. The possible benefit of its implementation among other departments, such as highway, wilderness, and individual rural and urban patrol officers, is relatively unexplored by the literature. This represents a gap in the standardization process. Advocacy for tactical police officer medicine, beyond standard civilian EMS training, combined with a relative absence of unified acceptance of standard protocols, highlights a need for increased research into the field of police medicine.

D. A RECENT PUBLICATION

Just before this thesis was completed, the International Association of Chiefs of Police (IACP) published a series of Training Keys to guide how police officers across the nation develop and administer tactical medical training. The new set of instruction published by IACP is a step forward in police officer tactical medical instruction. IACP is an organization that serves as the professional voice for law enforcement and is composed of over 20,000 law enforcement professionals from over 100 countries.¹⁹ Like the military's combat medical training, the Training Keys developed by IACP occasionally conflict with conventional civilian emergency medical training procedures. The keys are designed to help instruct law enforcement officers who arrive first on a scene and need to balance tactical and medical issues. The Training Keys were developed, in part, because law enforcement officers frequently arrive on the scene of injured officers before other emergency responders; IACP acknowledges in its publication that police officers' interventions in tactical scenarios can be lifesaving.²⁰

¹⁸ Kevin Gerold, DO, JD, Capt. Mark Gibbons, EMT-P, and Sean McKay, EMT-P, *The Relevance of Tactical Combat Casualty Care (TCCC) Guidelines to Civilian Law Enforcement Operations*, http://ntoa.org/site/images/stories/tccc_guidelines_ntoa.pdf; David Rathbun & Kevin Gerold, "Council Works on Establishing a National TEMS Curriculum," *The Tactical Edge*, (Summer 2012): 86-95, <http://www.ntoa.org/massemil/SU12Rathbun.pdf>.

¹⁹ International Association of Chiefs of Police, <http://www.theiacp.org/>.

²⁰ International Association of Chiefs of Police, Training Key #667, 2012.

The IACP Training Keys are useful for not only underlining the importance of teaching police officers tactical medicine but also for showing the differences between U.S. soldiers' and U.S. police officers' professional duties and medical training requirements. The Training Keys, for instance, emphasize the value of teaching police officers how to use an automated external defibrillator (AED) on victims who are suffering from cardiac arrest. According to the IACP publication, studies show that AED “use by law enforcement is associated with a doubling of survival rates in shockable cardiac arrests that occur outside of a hospital.”²¹ Similar AED statistics are not included in military tactical medical training documents, because the military and police have different overall missions. Most military tactical medicine is designed primarily to treat members of the U.S. or its allied armed forces. Although medical procedures can, and are, used also to treat enemy combatants, the basic procedures are designed to care for friendly military combatants, who sustain battle wounds, not non-combatants suffering from non-tactical wounds like cardiac arrests.²²

After mentioning the positive influence that police officers can have in their community by acting as medical first responders, the Training Keys move forward to examine police officer roles in providing care to themselves and their colleagues in tactical scenarios. “Law enforcement officers,” according to the publication, “may find themselves providing care to colleagues, either during periods of active threat when conventional EMS cannot enter the scene due to safety concerns or prior to the arrival of EMS.”²³ It explains that once a scene is safe, EMS providers will take the leading role in caring for casualties. Until the scene is safe, however, officers need to understand the basics of tactical medicine.²⁴

The Training Keys suggest three stages for medical care in a tactical environment: Care Under Threat, Tactical Field Care, and Casualty Evacuation. The titles of these three phases are nearly identical to those phases advocated by TCCC; only minor wording

²¹ Ibid.

²² Ibid.

²³ Ibid.

²⁴ Ibid.

differences distinguish the headings in the two bodies of instruction. Much of the specific medical procedures explained in the Training Keys are also similar to TCCC procedures. Relationships between the Training Keys and Tactical Combat Casualty Care are discussed in detail in chapter three. Some problems still exist in the Training Keys' direction. In the concluding chapter of this thesis, glitches in the Training Keys are examined and suggestions are made for their improvement.²⁵

E. METHODS AND SOURCES

This thesis examines a number of the law enforcement agencies that operate in California to determine whether standard military medical training procedures would benefit different police departments across the state; and if so, which procedures could be useful for which agencies. California is a useful model, because its state and local agencies account for almost 10 percent of America's total number of state and local law enforcement agencies. Additionally, California encompasses several types of departments including local, state, tribal, wilderness, highway, and federal police agencies. These departments are studied to measure two variables: EMS response times and average patrol size (one or more police officers).

To establish whether a military supported medical procedure is applicable to the civilian police officer context, this study uses the police officers' work environment, common causes of death, and overall mission as determining factors. Determining mechanisms of law enforcement injury (how officers are injured) and comparing it to military injuries is useful because it provides a comparative analysis of how each are dying as well as reveals police officer vulnerabilities and strengths. Typical EMS response time is also studied to compare the difference between law enforcement and military assets, and because response time was a deciding factor in the incentive to develop military-specific medicine. An assessment of multiple jurisdictions' EMS response time and unit size is compared to common mechanisms of law enforcement officer injury and the role of various TCCC interventions. This comparison is beneficial

²⁵ International Association of Chiefs of Police, Training Key #667, 2012; Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10-44, May 2010.

for supporting attempts to establish a more standard national police officer tactical medicine curriculum.

Individual units were researched by direct contact and through information available online to determine their unit patrol size and working conditions. Response times were mapped by working with American Medical Response (the nation's leading medical transportation provider) and local dispatch agencies to determine the approximate EMS response time each department can expect on an average day; longer EMS response and transfer times impact the type of medical training that is relevant to individual departments.

Additionally, this thesis builds on the Sztajnkrzyer study, *Tactical Medical Skill Requirements for Law Enforcement Officers: A 10-Year Analysis of Line-of-Duty Deaths*, to determine if there have been any documented evolutions in police officer mechanisms of injury since the study was published. To continue Sztajnkrzyer's study, this thesis uses the same FBI resource that the original author used for open source data on police officer deaths. The revised analysis revealed only minor changes. Using response times and patrol size data for individual units, combined with data concerning common modes of injury that tactical preventative medicine can cure, this study provides insight into the TCCC procedures and other tactical medical techniques that can best benefit various agencies throughout California. With California as a model, it serves as a demonstration of how tactical medicine can be developed in multiple jurisdictions in other states across the nation.

F. THESIS OUTLINE

This introductory chapter discussed the importance of the research and expressed the need for a more standard tactical medical training program for police officers. It then covered the existing literature on the subject in terms of its significance to the thesis and concluded by explaining areas of the existing literature that are lacking and how they can be improved. The second chapter examines multiple law enforcement agencies in California to determine how their operational environments compare to military operational environments. It studies the officers' work settings and their predicted

response times. The third chapter focuses on TCCC training and common law enforcement causes of death. Sztajnkrzyca's law enforcement line-of-duty death study is expanded to review potential developments in law enforcement causes of death. Chapter three also provides a clear understanding of why TCCC was created by members of the military. It discusses the basic design elements of the TCCC procedures that have made it a useful training option for soldiers to emphasize useful concepts that can be embraced by the law enforcement community. The fourth, and final, chapter analyzes the findings expressed in the previous chapters in terms of specific TCCC procedures. It provides suggestions for the nation's local, state, tribal, wilderness, highway and federal law enforcement community, policy makers, and EMS professionals on how to improve police officer medical training based on lessons learned by military medical experts.

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II. CHALLENGES OF WORK ENVIRONMENT

A. INTRODUCTION

This chapter examines the work environment of the law enforcement agencies that operate in California. Like the pioneering study that was sponsored by the U.S. Special Operations Command in 1996, *Tactical Combat Casualty Care in Special Operations*, this chapter is concerned with the influence of the operators’—in this case the police officers’—operational environment. The operational environment of a military combatant as well as a police officer is controlled and restrained by a number of factors. Three of the influential factors that determine the type and extent of medical knowledge required by the operator are: team size, access to various stages of medical reinforcement, and limits imposed by a tactical situation. Each of these three factors is discussed below as it pertains to local, state, federal, tribal, and wilderness police departments in California. Like *Tactical Combat Casualty Care in Special Operations*, this study provides representative casualty scenarios that could be encountered by the operators.

The *TCCC in Special Operations* study offers four casualty scenarios to frame the context of medical care situations that soldiers can encounter. Two of those four are summarized here. The first scenario involves a ship attack operation carried out by Navy SEALs. The SEALs launch their attack from a large coastal patrol craft and conduct a one-hour transit on smaller rubber crafts before dismounting. Finally, they swim one-half mile and finish their approach to the target using closed-circuit diving equipment.²⁶ Once on target, a member of the team sustains a gunshot wound to the chest. A second scenario involves a twelve-man Army Special Forces team that performs a night interdiction operation on a weapons convoy. The team members perform a night parachute jump from a C-130 aircraft, followed by a four-mile hike over rocky terrain to reach their objective. The planned extraction is to be conducted by a helicopter near the target. While landing, one of the team members fractures his left fibula. The two other

²⁶ Closed-circuit diving equipment involves a breathing loop that scrubs the SEALs’ exhaled air and allows them to rebreathe it, which prevents bubbles from coming to the surface that could otherwise alert the target of their presence.

scenarios about special operators follow this same framework; they explain medical situations that occur in austere environments to show a need for tactical medical training.

Although police officers might not be put in situations as extreme as the two military examples, the police officers' tactical situations do require unique medical training that other civilian emergency medical responders might not need or train for. To highlight the need for tactical medical training for police officers, this chapter presents four law enforcement tactical medical situations, which are based on actual scenarios encountered by officers since 2008. The chapter presents the casualty scenarios on an individual basis following related sections; for instance, the description of a local police officer injury follows the section on state and local law enforcement. The same pattern of presenting casualty scenarios with their respective section is used throughout and occurs in the sections concerning wilderness police, federal law enforcement, and response times. These casualty scenarios are not meant to serve as all-inclusive representations of their respective sections but rather to offer examples of potential scenarios the various agencies can be faced with.

B. STATE AND LOCAL LAW ENFORCEMENT

State and local law enforcement agencies employ the largest majority of the nation's sworn police officers (those officers with general arrest powers). Today there are more than 900,000 sworn officers operating in the United States.²⁷ Local police departments in particular employ 60 percent of all sworn officers. Local sheriffs are the second largest employers of sworn officers, with 24 percent of the sworn officer population.²⁸ The latest available Department of Justice census, which was printed in 2011, reported a total of 17,985 state and local agencies in the United States. Almost half of these departments are fairly small in terms personnel; 49 percent of all state and local law enforcement agencies employ fewer than ten full-time officers. Due to the prevalence

²⁷ National Law Enforcement Officers Memorial Fund, Facts & Figures, <http://www.nleomf.org/facts/enforcement/>; Brian A. Reaves, PhD, *Census of State and Local Law Enforcement Agencies, 2008*, U.S. Department of Justice, July 2011.

²⁸ Brian A. Reaves, PhD, *Census of State and Local Law Enforcement Agencies, 2008*, U.S. Department of Justice, July 2011.

of local departments with ten or less full-time officers, and because police officers in small towns—like those working in large cities—must be prepared for tactical medical situations, this research covers departments of all size.²⁹

California, with 84,798 sworn officers, employs an unequal share of the nation's police officers.³⁰ There are over 550 separate state and local law enforcement agencies that operate in California. The size of these departments varies extensively. The Sutter Creek Police Department, in Amador County 40 miles east of Sacramento, has only five full-time police officers. In contrast to these smaller departments, the Los Angeles Police Department has the third largest police department in the United States with a total of 9,727 full-time sworn personnel. Working parallel to and sometimes alongside the Los Angeles Police Department, the Los Angeles Sheriff's Department employs 9,461 full-time personnel, making it the largest sheriff's office, by number of officers, in the United States.³¹

In terms of numbers, most police departments are situated somewhere in between the extreme examples of Los Angeles and Sutter Creek. The city of Morro Bay police department is useful for this study because, like many small to mid-sized departments, its officers take on multiple roles. Morro Bay employs around twenty full-time sworn officers. The police department is made up of a police chief, a commander, four sergeants, two corporals, nine officers (including two senior officers), and one part time officer, as well as various support services personnel and dispatchers. Despite having a small number of police officers, the department provides law enforcement services nonstop, 24 hours a day, seven days a week to the city. The city of Morro Bay is centrally located on the coastal boundary of San Luis Obispo County. It has a mixed population of 10,300 and covers a total land area of approximately ten square miles or 6,500 acres. Its

²⁹ Ibid.

³⁰ California POST, *Commission on Peace Officer Standards and Training: Current Employed Full-Time Sworn, Reserve & Dispatcher Personnel*, 29 June 2012.

³¹ Brian A. Reaves, PhD, *Census of State and Local Law Enforcement Agencies, 2008*, U.S. Department of Justice, July 2011.

geographic size and number of inhabitants force the police department to strategically manage its personnel in order to maintain stability and provide continuous law enforcement duties year-round.³²

To manage law enforcement activities that will sufficiently cover Morro Bay's population and size while maximizing patrol staffing during each shift, the police department has its officers patrol for 12-hour shifts, three days a week. Lone patrol officers handle all field calls during their shifts. Patrol officers are trained to deal with all types of criminals; they perform traffic stops day and night, handle disturbances, and make multiple arrests. Patrolling without a partner in their car, these officers must be trained to handle medical emergencies without immediate assistance from their colleagues. If injured on the job, patrol officers can only rely on the medical equipment that is carried on their person or in their squad car. For any emergency that requires outside support, a patrol officer needs to radio for help and wait for some form of medical backup.³³

In addition to their patrol operations, some Morro Bay Police Officers are part of the San Luis Obispo Regional SWAT Team. Regional SWAT Teams—also called multi-jurisdictional SWAT teams—are common across the United States. They allow agencies that are limited by size and capability to combine resources and deploy on tactical missions in their region.³⁴ SWAT team personnel have clear tactical advantages over single patrol officers. If a single patrol officer answers a call that leads to a combative, tactical situation, that officer is forced to handle the incident alone. In contrast, members of a SWAT team can rely on their teammates for additional medical support when in tactical situations.³⁵

³² The City of Morro Bay, <http://www.morro-bay.ca.us/>.

³³ Ibid.

³⁴ National Tactical Officers Association, *SWAT Standard for Law Enforcement Agencies*, 2011.

³⁵ Richard Hannabal, Partners in Safety; Morro Bay Peace Officer's Association Community Newsletter, Ed. 48, July 2012.

The San Luis Obispo Regional SWAT Team is composed of officers from several of the county's police departments and deploys to missions across the county.³⁶ Like other states, California has multiple regional SWAT teams. Regional SWAT teams often consist of officers who have other full-time duties at their local department. These regional teams are built in sparse districts and parts of the state with police departments that cannot support a full-time SWAT team and instead rely on the support of outside resources. Departments from these regions, which have a limited number of personnel but still desire the SWAT capability, enter into agreements with other departments in their region that have similar means.

California's regional SWAT teams are used to plan and execute arrests of groups as well as single individuals that law enforcement officials think will resist arrest or otherwise present a danger to the arresting officers. Although all police officers have the potential to be injured on the job, the criminals targeted by SWAT teams present, at least presumably, an amplified danger, which is why the SWAT team is called into operation.³⁷ The San Luis Obispo Regional SWAT Team is trained specifically to respond to the city of Morro Bay and other local communities when a dangerous situation takes place that requires a skilled tactical team.³⁸ Working in teams is advantageous in regards to tactical medicine; however, in less populated and rural areas of California, where regional SWAT teams are common due to limited resources, EMS response time is not required by code to be as expedient, which presents an amplified risk.³⁹

Other local agencies, such as the Los Angeles Police Department, are large enough to have SWAT teams comprised exclusively of the department's own full-time

³⁶ According to the Arroyo Grande Police Departments, members of the San Luis Obispo Regional SWAT Team include: Morro Bay, Arroyo Grande, San Luis Obispo, Pismo Beach, Grover Beach, Paso Robles, and the Polytechnic University San Luis Obispo Police Departments.

³⁷ According to the National Tactical Officers Association's guiding publication, *SWAT Standard*: "the primary characteristic of SWAT that distinguishes it from other units is the focus of effort. SWAT teams are focused on tactical solutions, as opposed to other functions, such as investigation. The purpose of SWAT is to increase the likelihood of safety resolving critical incidents . . . such as hostage situations, barricade incidents or other high-risk situations requiring specialized capability."

³⁸ Richard Hannabal, Partners in Safety; Morro Bay Peace Officer's Association Community Newsletter, Ed. 48, July 2012.

³⁹ The California Association of Tactical Officers, <http://www.catonews.org/>; California Health and Safety Code, Division 2.5, 1797.200.

officers who focus specially on SWAT.⁴⁰ The Los Angeles Police Department was the first police department in the United States to implement the concept of a SWAT team; it conceived of the idea for special weapons and tactics teams in the mid-1960s.⁴¹ Today it is one of the few departments in the state to have a SWAT team composed of members who have no other collateral duties. Like regional SWAT teams, the Los Angeles Police Department's SWAT team is called into action primarily in tactical situations such as when presented with a suspect that is excessively dangerous and refuses to submit to arrest.⁴²

Many customary, everyday police operations do not require the assistance of a SWAT team or any other specialized team. Despite having 250 different job opportunities—including SWAT, helicopter pilots, fixed-wing pilots, and K-9 units—the Los Angeles Police Department claims that patrol is the backbone of its department. All officers at the Los Angeles Police Department begin by working patrol. The reason patrol is considered the backbone, is that patrol officers are the department's primary provider of policing services to the community. This is the same for local police departments across the state. One job that is available at almost every local police department is that of the lone patrol officer. Patrol officers deal with subjects and make arrest often without the assistance of a partner. Working alone to handle and control enemy combatants occurs much less frequently among members of the military, including those in the special operations community. On the rare occasion that a soldier is forced to deal with enemy combatants without assistance or backup from a teammate, it is generally unplanned and occurs usually only after parts of the mission have gone wrong. Police officers who work alone require an altered type of medical training with only a few TCCC procedures.

⁴⁰ The City of San Jose, *Police Department Staffing: Opportunities to Maximize the Number of Police Officers on Patrol*, Office of the Auditor, Report 10–13, December 2010.

⁴¹ The California Association of Tactical Officers, <http://www.catonews.org/>.

⁴² For instance, the Los Angeles Police Department's official website says that its SWAT team is activated when, "faced with a barricaded or hostage incident when the subject is probably armed; the suspect is believed to have been involved in a criminal act or is a significant threat to the lives and safety of the public and/or police; the suspect is in a position of advantage, affording cover and concealment or is contained in an open area and the presence or approach of police officers could precipitate an adverse reaction by the suspect; and, the suspect refuses to submit to arrest."

1. Casualty Scenario 1, Local Officer, 2010

An example of the work environment and limited immediate medical assets that local law enforcement officers are regularly challenged with is presented in this first scenario, which occurred in Albany, Georgia in 2010. Just before 10 p.m., a 39-year-old lieutenant working in the city was killed while responding to a robbery call. Although other patrolmen had been called to the general area to find the suspect, the lieutenant was patrolling alone. When the lieutenant saw the suspect running through a dimly lit mobile home park near the incident of the crime, he exited his patrol car and began a foot pursuit. At some point during the chase, the suspect fired two rounds from a 9-millimeter semiautomatic pistol. One round hit the lieutenant in his upper thigh and exited through his lower back. Another round, the fatal one, entered just below the lieutenant's ballistic vest on the right side of his abdomen and exited through his lower back. Sometime in the process, the lieutenant fired two shots, but neither hit the suspect. *Environment and Assets: the officer was working at night in an urban setting with generally rapid EMS response time. He was alone with no other officers to immediately assist in his emergency/ tactical medical care.*⁴³

C. CALIFORNIA HIGHWAY PATROL

The California Highway Patrol is the largest state law enforcement agency in the country, with 7,417 full-time sworn officers.⁴⁴ These officers are spread across 11 operational divisions: the agency's eight Field Divisions, the Office of Air Operations, the State Security Division, and the Protective Services Division. The state is divided into eight sections by its respective Field Divisions, which employ the majority of the

⁴³ Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2010, Uniform Crime Report, October 2011.

⁴⁴ Brian A. Reaves, PhD, *Census of State and Local Law Enforcement Agencies, 2008*, U.S. Department of Justice, July 2011; California POST, *Commission on Peace Officer Standards and Training; Current Employed Full-Time Sworn, Reserve & Dispatcher Personnel*, 29 June 2012.

agency's law enforcement officers.⁴⁵ The divisions are further broken into area offices that represent local regions. Officers who work from a division office generally patrol alone to cover long stretches of the state's highways. No other state law enforcement agency covers a greater jurisdiction than the Highway Patrol. California Highway Patrol Officers have the opportunity to work in almost every region of every county throughout the state. Their job is inherently dangerous because not only do they deal with subjects without a partner, but also they are forced to approach vehicles on the side of highways day and night with traffic traveling by at speeds in excess of 65 miles per hour.

A Los Angeles Times article published in 2010, "CHP Death Toll a Grim Reminder of the Job's Dangers," illustrates some of the hazards associated with working as a highway patrol officer, not only in the state of California but also across the nation. According to the editorial, new safety laws, such as the 2007 "move over" law, which requires motorists to shift to the empty lane opposite of the stopped highway patrol car, are not doing enough to protect the lives of these officers. California Highway Patrol statistics confirm that between two and four officers are killed in the line of duty each year. The article was published after five California Highway Patrolmen were killed in six weeks in May and June of 2010. Officers working for the highway patrol are trained to avoid dangerous situations whenever possible, but standing on the side of a highway in close proximity to fast-moving vehicles without a protective guard rail or a partner to stand watch and/or give buddy aid in the case of an injury is inherently dangerous. After being seriously injured, highway patrol officers without backup are forced to apply self-aid and wait for reinforcement.⁴⁶

⁴⁵ According to the California Highway Patrol, <http://www.chp.ca.gov/>, the Southern Division has 10 area offices and 1,123 uniformed officers; the Border Division has 12 area offices and 900 uniform officers; the Inland Division has 11 area offices and 602 uniformed officers; the Coastal Division has 11 area offices and 530 uniformed officers; the Central Division has 15 area offices and 667 uniformed officers; the Golden Gate Division has 12 area offices and 1,043 uniformed officers; the Valley Division has 17 area offices and 785 uniformed officers; and the Northern Division has 15 area offices and 542 uniformed officers.

⁴⁶ Sam Allen & Richard Winton, "CHP Death Toll a Grim Reminder of Job's Dangers," *Los Angeles Times*, 29 June 2010, <http://articles.latimes.com/2010/jun/29/local/la-me-chp-20100629>.

D. TRIBAL POLICE DEPARTMENTS

In 1953, Congress passed Public Law 280, which granted California and five other states—Alaska, Minnesota, Nebraska, Oregon, and Wisconsin—state authority over “Indian Country.”⁴⁷ These states are now commonly referred to as *280 states*. Until this law was passed, tribal lands were under the jurisdiction of federal law enforcement. The new statute mandated shifting federal authority over criminal offences that are committed in Indian Country to the 280 states. When this shift occurred, federal money was not allocated to the 280 states to support the modification; instead, the states’ budgets shouldered the burden. Rural sheriff’s offices that were already stressed for resources were required to patrol and enforce state laws on the vast Indian reservations. Recently Indian tribes in California have begun to reassert local law enforcement within their communities. State and local officials partially embrace this move by the tribes, as it reduces the workload of local sheriffs and frees up the sheriffs’ resources. Still, inadequate funding for the police departments on Indian reservations persists throughout California.⁴⁸

Lack of funding for tribal law enforcement in California presents an immediate safety issue for the police officers working in Indian Territory. The Los Coyotes Police Department in San Diego County has jurisdiction over 25,000 acres of Indian Land, the largest Indian Reservation in the county.⁴⁹ As recently as 2010 the department did not

⁴⁷ Carole Goldberg & Heather Valdez Singleton, *Public Law 280 and Law Enforcement in Indian Country—Research Priorities*, U.S. Department of Justice, Office of Justice Programs, National Institute of Justice, December 2005. In this report, *Indian Country* is defined as “all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and including the rights-of-way through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the titles to which have not been extinguished, including rights-of-way running through the same.

⁴⁸ Dave Sossaman, Chief of Police, “Deputy Special Officer U.S. DOI Bureau of Indian Affairs Authority,” Los Coyotes Police Department, BIA SLEC, <http://catpca.org/sitebuildercontent/sitebuilderfiles/ICLESAPL280.pdf>; Chief of Police Dave Sossman, “Los Coyotes Police Department, A Federally Deputized Police Agency,” to Bob Chaney U.S. Department of Justice, 26 August 2010, <http://catpca.org/sitebuildercontent/sitebuilderfiles/WPTPDI.pdf>; Carole Goldberg & Heather Valdez Singleton, *Public Law 280 and Law Enforcement in Indian Country—Research Priorities*, U.S. Department of Justice, Office of Justice Programs, National Institute of Justice, December 2005.

⁴⁹ Tribal Police law enforcement is relatively new. The Los Coyotes Police Department became the second federally recognized and deputized Tribal Police Agency in San Diego County in 2006.

have adequate funding to provide 24-hour dispatchers; its sole police officer, Police Chief David Sossaman, is responsible for patrolling a 40 square-mile area without a single partner to act as a backup in emergency situations. Police officers who work without 24-hour dispatch are forced to respond to calls and approach vehicles or residences without warning of the perpetrators' history. Due to lack of funding, California's tribal police officers are among the most poorly equipped police officers in the state in terms of medical assets and access to secondary medical care.⁵⁰

E. WILDERNESS POLICE DEPARTMENTS

Wilderness police departments in California operate at both the state and federal level. The California Department of Fish and Game is an example of a state-level wilderness police department. The department has 348 full-time sworn conservation officers, commonly called game wardens, employed throughout the state. Although their primary job is to enforce Fish and Game code, the wardens have the authority to enforce any of California's state or local laws. Game wardens are required to carry firearms as they patrol California's backcountry to enforce laws at the many lakes, rivers, beaches, wetlands, and desert locations across the state. The game wardens' unique operational environment demands that they carry out arrests day and night from unconventional platforms, such as jet skis, boats, airplanes, horseback, canoes, and all-terrain vehicles. The duty to enforce hunting laws can put wardens at an exceptional risk, because suspects in hunting situations are often carrying some sort of weapon. Like many officers in this study, Fish and Game officers work alone. They often patrol with minimal backup and in remote parts of the state where emergency medical services' response times are not required to be as prompt as they are in urban environments.⁵¹

⁵⁰ Edward Sifuentes, "Region: Tiny Tribal Police Department Tackles Big Obstacles, Police Chief on Los Coyotes Helps Quell Crime," *North County Times*, 05 September 2010, http://www.nctimes.com/news/local/sdcounty/region-tiny-tribal-police-department-tackles-big-obstacles/article_065e66d8-448a-5e70-9d99-75361f414587.html.

⁵¹ California POST, *Commission on Peace Officer Standards and Training: Current Employed Full-Time Sworn, Reserve & Dispatcher Personnel*, 29 June 2012; California Department of Fish and Game, <http://www.dfg.ca.gov/>.

An example of federal-level wilderness police officers working in California is that of officers working for the U.S. Department of Agriculture. The U.S. Department of Agriculture's Forest Service has 130 officers in California, divided between federal investigators and wilderness patrol officers. These officers enforce federal laws across California's 25 million acres of National Forest land. Like the game wardens working for the Department of Fish and Game, Forest Service officers sometimes patrol by horseback, all-terrain vehicles, watercraft, and foot while enforcing the law. Forest Service officers assist the California Department of Fish and Game in the enforcement of wildlife laws but also have special jurisdiction over federal statutes.

The objectives of the Forest Service officers vary. They are tasked with protecting the public, Forest Service employees, and the natural resources and property under the jurisdiction of the Forest Service. To do this, the officers investigate and enforce laws that affect the national forests and work to prevent criminal violations. Part of the U.S. Department of Agriculture's responsibility is to ensure the safety of the guests visiting public lands; this requirement puts the Forest Service officers in contact with members of Mexican drug cartels and criminal gangs, because much of the marijuana grown on public lands in California is directly related to criminal groups.

Forest Service officers are severely understaffed. Only eight officers in the state are dedicated to drug enforcement on 20 million acres. Therefore, like the other wilderness officers discussed herein, Forest Service officers commonly patrol alone in remote areas of the state. Denese Stokes and Ken Harp, two Forest Service officers who work together to patrol San Bernardino National Forest south of Los Angeles, were quoted in a 2010 National Geographic article regarding the limited forces available for battling the drug cartels. In reference to the gangs, Harp explained, "one cartel" can have up to "60 or 80" individuals.⁵² Stokes, a special agent for drug investigations in four national forests, says Forest Service Officers are, "fighting a huge fight with just a small amount of people."⁵³ This is especially dangerous in remote areas of California with

⁵² "Marijuana War Smolders on U.S. Public Lands," *National Geographic*, 28 October 2010. http://news.nationalgeographic.com/news/2003/11/1103_031104_marijuana_2.html

⁵³ Ibid.

slow EMS backup and highlights the need for special medical training among Forest Service Police Officers.

1. Casualty Scenario 2, Conservation Officer, 2010

At 10:30 p.m., a conservation officer was investigating report of illegal poaching of deer. Upon hearing gunfire, the 31-year-old officer traveled toward the source of the noise, where he found a pickup truck with at least two individuals in it. The officer called dispatch with the license plate number and requested backup. Before backup could arrive, the driver of the pickup exited his truck and approached the officer. The officer attempted to handcuff the man to control the scene, but the suspect resisted. A struggle broke out, and the officer and suspect exchanged gunfire. The suspect shot the officer in the back of his legs and in the back of his neck with a .45-caliber semiautomatic handgun. The passenger later told police that the driver had illegally shot a deer shortly before the officer had arrived, and that the driver told the passenger that he was not going back to jail. *Environment and Assets: the officer was alone and working at night in a rural setting with generally slower EMS response time. Officers were dispatched to assist in the arrest and could have been the first to aid in his emergency/ tactical medical care.*⁵⁴

F. OTHER FEDERAL LAW ENFORCEMENT IN CALIFORNIA

Multiple federal agencies with law enforcement functions operate in California. The state's Commission on Peace Officer Standards and Training lists 22 separate federal agencies that perform some type of law enforcement task within the state's boundaries.⁵⁵ Three agencies that exercise wide-ranging police authority in California are the Federal

⁵⁴ U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2010, Uniform Crime Report, October 2011.

⁵⁵ According to the Commission on Peace Officer Standards and Training, the following federal agencies have law enforcement activities in California: American Correctional Association; Bureau of Alcohol, Tobacco, Firearms, and Explosives; Centers for Disease Control and Prevention; Central Intelligence Agency; Center for Problem-Oriented Policing (U.S. DOJ); Community Oriented Policing Services (U.S. DOJ); Computer Crime and Intellectual Property Section (U.S. DOJ); Drug Enforcement Administration; Department of Justice; Federal Bureau of Investigation; Federal Government Agency Index; Federal Law Enforcement Training Center; Department of Homeland Security; Justice Technology Information Network; National Criminal Justice Reference Service; National Institute of Justice; National Highway Traffic Safety Administration; Presidio of Monterey Police Department; U.S. Attorney Central California District; U.S. Attorney Southern California District; U.S. Marshals Service; and the Secret Service.

Bureau of Investigation (FBI), the U.S. Marshals Service, and the U.S. Drug Enforcement Administration (DEA).

Of the duties federal law enforcement agencies perform, this section covering federal law enforcement focuses on a relatively new trend emerging in the law enforcement community that directly influences the type of medical training that federal and state agencies should receive. Unlike many of the law enforcement operations studied in this thesis, which involve law enforcement officers working alone, this new trend allows agencies across all levels of the government to combine their forces and work in teams to conduct investigations and carry out arrests. The operational units that emerge from these multi-agency agreements are often referred to as multi-agency task forces.

In past few years, the FBI has made California headlines a number of times for its operations that involve multi-agency task forces. For instance, in January 2011, San Diego FBI Special Agent in Charge Keith Slotter announced the arrest of a U.S. Border Patrol agent who was caught thanks to the work of a multi-agency task force. In the statement, Slotter explained that an FBI SWAT Team arrested the Border Patrol agent with the assistance of the suspect's own agency. The arrest was made possible by a joint investigation conducted by the agency's Border Corruption Task Force.⁵⁶ The Border Corruption Task Force is only one of many task forces that are involved in this ongoing development in multi-agency cooperation. According to Special Agent Keith Byers from the Chicago branch of the FBI, combining multiple agencies into task forces is a trend that was initiated in only, "the last 10 years or so."⁵⁷ Yet due to the success of multi-agency task units, the trend has caught on. Today many law enforcement agencies are embracing cooperation both horizontally and vertically across all levels of the government.

⁵⁶ Darrell Foxworth, *Border Corruption Task Force Arrests Border Patrol Agent*, FBI San Diego, 11 January 2011.

⁵⁷ See: *Combating Border Corruption*. Available in the news videos on the Federal Bureau of Investigation's Official website, <http://www.fbi.gov/news/videos/combating-border-corruption/>.

In three consecutive months from August to October of 2012, the FBI conducted numerous successful investigations and follow-on arrests using this task force technique. Eight people were arrested in August 2012 and indicted on sex trafficking charges for allegedly forcing teenage girls into prostitution. Six of the people detained were arrested by the Inland Child Exploitation/Prostitution Task Force. The Inland Child Exploitation/Prostitution Task Force is comprised of agents, deputies, and officers from the FBI and a number of local California law enforcement agencies, such as the Riverside County Sheriff's Department, Riverside Police Department, San Bernardino Police Department, Pomona Police Department, and the Ontario Police Department.⁵⁸

During the two months following the Inland Child Exploitation/Prostitution Task Force's arrests, September and October of 2012, the Border Corruption Task Force struck again, arresting corrupt Border Patrol agents at least twice more.⁵⁹ Members of the Customs and Border Protection were arrested for trafficking illegal aliens into the United States. Drug cartels have the resources to bribe U.S. border officials and in doing so gain the agents' loyalty. Corrupt officials then provide intelligence to the cartels, which poses a national security threat to America. To combat this, the FBI established the Border Corruption Initiative in 2009. Since 2009, the FBI stood up 21 Border Corruption Task Forces across the nation in high-risk cities along American land borders. Timothy Delaney, Special Agent in Charge of the FBI's Los Angeles Field Office says that, "in recent years, dozens of task forces throughout the United States have charged over 1,000 defendants."⁶⁰

The U.S. Marshals Service has four Fugitive Task Forces that operate in California. These task forces, like the FBI's task forces, work with authorities at federal, state, and local levels of the government. Their primary mission is to apprehend fugitives

⁵⁸ The FBI Central District of California, *Los Angeles-Area Gang Members Among Eight Indicted on Sex Trafficking Charges for Allegedly Prostituting Teenage Girls*, U.S. Attorney's Office, 09 August 2012.

⁵⁹ Darrell Foxworth, *Customs and Border Protection Officer Arrested by Border Corruption Task Force Agents*, FBI San Diego, 10 September 2012; Darrell Foxworth, *Chula Vista Woman Arrested in Connection with Corruption Investigation*, FBI San Diego, 05 October 2012.

⁶⁰ The FBI Central District of California, *Los Angeles-Area Gang Members Among Eight Indicted on Sex Trafficking Charges for Allegedly Prostituting Teenage Girls*, U.S. Attorney's Office, 09 August 2012; Federal Bureau of Investigation, *FY 2012 Authorization and Budget Request to Congress*, Department of Justice, February 2011.

and clear state and local felony warrants. On 31 January 2012, one of the U.S. Marshals Fugitive Task Forces operating in California arrested a man wanted for homicide in Oakland, CA. The arrest was made possible by combining the forces of the U.S.

Marshals Service, the California Department of Corrections and Rehabilitation's Fugitive Apprehension Team, the Oakland Police Department, and the San Francisco Police Department.⁶¹

A recent agreement between the U.S. Drug Enforcement Administration and the Santa Clara County Sheriff's Office illustrates how these task forces work intimately with one another on all aspects of the arrest. In the agreement dated 30 September 2012, the Santa Clara County Sheriff's Office contracted two of its experienced officers to the DEA's San Jose Resident Office Task Force, where they are working along side the federal agents while pursuing and apprehending criminals. This arrangement was made to disrupt the illicit drug traffic in Santa Clara County, gather and report intelligence data related to trafficking, and to enable the task force to conduct undercover operations and other methods of investigation. In the event that one or both of the officers is unable to perform the duties required of the job, the Santa Clara County Sheriff's Office agrees to find a replacement to ensure continuity of operations. The DEA matched the sheriff's office contribution by assigning three of its special agents to the task force and providing funds to support the group's effort. As federal agencies increasingly work together with state and local law enforcement agencies to combat crime, the need for standardized medical training increases. Tactical medicine is focused on saving as many lives as possible in a combative setting by teaching tactics that are valuable in medical emergencies. In order to save more lives, it is necessary that all members of the team to be familiar with the training.⁶²

⁶¹ U.S. Marshals Service, <http://www.justice.gov/marshals/>, Northern District of California District News.

⁶² DEA Task Force Agreement with Office of the Sheriff, Program-Funded State and Local Task Force Agreement Between the Santa Clara County Sheriff's Office and DEA Task Force Group 1 (San Jose), 30 September 2012.

1. Casualty Scenario 3, Federal Officer, 2008

At 6 a.m., a FBI agent was attempting to serve an arrest warrant as part of a multi-agency arrest team. Members of the multi-agency team knocked on the suspect's front door and rang the doorbell. As the suspect approached the front door, officers notified him of law enforcement presence and told the suspect that the officers had a warrant for his arrest. Instead of opening the door, the suspect ran in the other direction. Officers initiated a forced entry using a battering ram to open the door. The FBI agent was the first officer to enter the house once the door was forced open. As he entered, the suspect's wife fired a single round from a .38-caliber revolver. The round struck the agent in the front upper torso/ chest above his bulletproof vest. *Environment and Assets: the officer was in an urban setting with generally rapid EMS response time. There were multiple officers to assist in his emergency tactical medical care.*⁶³

G. ACCESS TO MEDICAL REINFORCEMENT: CALIFORNIA EMS RESPONSE TIME

Delayed access to definitive medical care in 1993 during the Battle of Mogadishu, Somalia, was a determining factor in the military's decision to revamp its medical training. The 15-hour delay in transporting casualties occurred during that battle because helicopters could not land amidst hostilities to transport the wounded. Police officers seldom face delays of this length. On the contrary, emergency medical response times are minimal in comparison in most circumstances throughout the state of California. Still, tactical scenarios, mass casualty events, emergency location, and EMS or dispatcher mishaps can significantly lengthen the time between the initial emergency call and the arrival of the first medical support personnel.

The state of California authorizes each of its counties to develop individual emergency response programs and to designate a local agency to respond to emergency

⁶³ U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2008, Uniform Crime Report, October 2009.

medical calls.⁶⁴ The Emergency Medical Services Authority explicitly defines the minimum response time standards that should be achieved in agreements between response agencies and their counties. Response time requirements are determined by the location of the emergency: urban, rural, or wilderness setting.⁶⁵ The response time for advanced life support is not to exceed 8 minutes in urban areas, 20 minutes in rural areas, or, “as quickly as possible” in wilderness areas of the state. The emergency medical services providers in certain counties, however, do not always adhere to time standards.⁶⁶

Delayed response times are a frequent problem in rural areas of the state where staffing and poorly maintained roads make rapid response difficult. The Sutter Creek Police Department mentioned earlier, which is 40 miles east of the state’s capital city and employs only five full-time police officers, is located in rural Amador County. In its 2008 Municipal Services Review, an Amador local commission determined that all fire departments surveyed exceeded the National Fire Protection Association’s six-minute guideline 90 percent of the time they responded to a call. The local ambulance agency, American Legion Ambulance, exceeded California’s emergency medical services response times in three of its designated response zones. In one community, the average ambulance response time was approximately one hour. The first responders commonly offered distance and road conditions as explanations for the delays.⁶⁷

⁶⁴ California Health and Safety Code, Division 2.5, 1797.200: “Each county may develop an emergency medical services program. Each county developing such a program shall designate a local EMS agency which shall be the county health department, an agency established and operated by the county, an entity with which the county contracts for the purposes of local emergency medical services administration, or a joint powers agency created for the administration of emergency medical services by agreement between counties or cities and counties pursuant to the provisions of Chapter 5 (commencing with Section 6500) of Division 7 of Title 1 of the Government Code.”

⁶⁵ Urban is defined as, “all census places with a population density of 101 to 500 persons per square mile; or census tracts and enumeration districts without census tracts which have a population density of 101 to 500 persons per square mile.” Rural is defined as, “all census places with a population density of 7 to 50 persons per square mile; or census tracts or enumeration districts without census tracts which have a population density of 7 to 50 persons per square mile.” And wilderness is defined as, “census tracts or enumeration districts without census tracts which have a population of less than seven persons per square mile.” Emergency Medical Services Authority, *EMS System Standards and Guidelines*, EMSA #101, June 1993.

⁶⁶ Amador Local Agency Formation Commission, *Municipal Services Review: Volume I*, Public Review Draft, July 2008; Robert Davis, “Six Minutes to Live or Die,” *USA Today*, 20 May 2005, <http://usatoday30.usatoday.com/news/nation/ems-main.htm>.

⁶⁷ Amador Local Agency Formation Commission, *Municipal Services Review: Volume I*, Public Review Draft, July 2008; Los Angeles County Code, *Ambulances*, Chapter 7.16.

1. Casualty Scenario 4, Local Officer, 2009

A sergeant with a local county sheriff's office was working with a deputy on an undercover burglary operation. Around 4:30 a.m., a lone male entered the cabin where the officers were working. A struggle ensued. The officers were able to handcuff the suspect, but he pulled out a .357-caliber revolver and fired five rounds at the officers. The victim sergeant was shot in his arms, hands, and below his waist (severing his right femoral artery). Despite his wounds, the sergeant was able to return fire, killing the suspect instantly. The sergeant and deputy were working in a rural, mountainous setting, which increased the time it took EMS to evacuate the injured officer. The victim sergeant did not arrive at the hospital until 6:48 a.m., approximately two hours after being shot. *Environment and Assets: the officer was in a rural setting with poor EMS response time. There was one other officer to assist in his emergency/ tactical medical care.*⁶⁸

Even in urban areas where response time should be optimal, human error can cause needless deaths. An example of human error made Los Angeles headlines in 2005 with the case of Andrew Redyk. The 64-year-old man collapsed at the Los Angeles International Airport and waited nearly 30 minutes for medical support to arrive in an area that should have received an eight-minute response. Although Redyk's coworkers immediately took the appropriate actions by calling 911 and administering CPR, Redyk passed away. The Los Angeles Fire Department sent a fire truck and ambulance to the scene, which supposedly arrived in less than eight minutes, but some involved claim it took almost 30 minutes. The Los Angeles EMS medical director later admitted that the increased delay was caused by communication problems in dispatch.⁶⁹

Response times are not specific to each department but, instead, to the locations that members of a department are working when faced with an emergency. The areas of the state with the longest delays in response time are usually the rural areas. Rural, tribal,

⁶⁸ U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2010, Uniform Crime Report, October 2011; Colleen Heild & Rozanna M. Martinez, "Details on Standoff, N.M. Deputy's Death Emerge," *PoliceOnline*, 28 July 2009, <http://www.policeone.com/officer-shootings/articles/1860245-Details-on-standoff-N-M-deputy-death-emerge/>.

⁶⁹ Robert Davis, "Six Minutes to Live or Die," *USA Today*, 20 May 2005. <http://usatoday30.usatoday.com/news/nation/ems-main.htm>.

and wilderness police officers should be able to provide self-aid for long periods of time and know how to respond to tactical medical situations alone. This is also true for highway patrol officers and other state law enforcement officials who work in parts of the county that have reduced population density. The reality that response times are usually slowest in rural areas does not necessarily mean that members of an urban force should relax their medical training. Response times are strained during local emergencies. If an earthquake were to hit San Francisco, for instance, its police officers will not be able to rely on normal response times. Tactical or combative situations can also slow EMS response. For each of these reasons, police officers should not count on waiting for emergency medical backup when injured. Instead, law enforcement medical training must address the possibility of an extended delay before transport to a medical facility.

H. WORK ENVIRONMENT SUMMARY

The vast majority of California's police officers work at state and local agencies. There are only approximately 16,000 federal law enforcement officers in California compared to nearly 85,000 officers at the state and local levels of government.⁷⁰ The various law enforcement agencies working in California demonstrate that group affiliation in many circumstances does not dictate operational environment. Not all officers working for large cities are guaranteed to be working in more dangerous situations than the police officers working in small towns. At times it is the contrary. Many police officers from large cities work daytime patrol shifts and might see little action in a day at work. Meanwhile, some police officers from smaller departments work on a regional SWAT team or even a federal task force. Instead of driving a patrol car in the daylight, these small town officers have the opportunity to breach a drug dealer's door in the middle of the night or arrest federal fugitives.

Most police officers patrol alone. Almost all police officers are frequently susceptible to dangerous situations. Patrol officers working on busy highways need to worry about the suspect they pull over as well as the fast-moving traffic speeding by.

⁷⁰ Brian A. Reaves, PhD, *Federal Law Enforcement Officers, 2008*, U.S. Department of Justice, June 2011; Brian A. Reaves, PhD, *Census of State and Local Law Enforcement Agencies, 2008*, U.S. Department of Justice, July 2011.

Wilderness officers have to deal with armed hunters and members of drug cartels. Additionally, wilderness police officers have to consider poor EMS response times on a daily basis. After being seriously injured, each officer, local or federal, urban or wilderness, should be trained to operate alone in a tactical environment for an extended period of time. Unlike the military, however, it is probably not necessary for law enforcement officers to work through a tactical medical scenario that lasts 15 or more hours. The next chapter discusses the TCCC procedures that are geared toward police officers based on the information covered in this chapter.

III. INJURY AND TREATMENT

A. INTRODUCTION

This chapter investigates how police officers are being killed and reviews potential mitigation efforts as well as preventative treatments. To determine areas of focus in police officer injury, chapter three begins by reexamining the common causes of line-of-duty deaths encountered by law enforcement officers nationwide. This follow-on fatality assessment suggests that little has changed regarding the causes of law enforcement deaths since the Sztajnkrzyca study. This is useful for confirming the medical treatments required by police officers. The chapter then assesses Tactical Combat Casualty Care procedures to establish which of the military procedures are useful for law enforcement. To determine which procedures are relevant to police officers, it compares the purpose of each procedure with the officers' common causes of line-of-duty death as well as their distinctive work environments (as studied in chapter two, the officers' work environment relevant to medical training includes number of officers working together, general work setting, and EMS response times). This injury and treatment chapter also considers aspects of the recently published IACP Training Keys, because many of the Training Key procedures are geared toward police officer tactical medicine and support TCCC's general guidelines.

The analysis shows that although law enforcement officers should not learn all TCCC procedures, many military interventions can be useful. The necessity to learn these potentially useful interventions depends on the police officers' specific mission requirements, work setting, and access to alternative medical support. One of the primary pieces of tactical medical advice for law enforcement officers that is established in this chapter is to focus on stopping the threat before treating the injury. The threat usually refers to an enemy belligerent that must be stopped before attempting treatments. Stopping the threat is an active procedure for police officers. The faster the threat is taken care of, the sooner innocent people will stop being hurt and medical care can be safely provided.

B. LINE-OF-DUTY DEATH UPDATE

To establish the common cause of law enforcement line-of-duty deaths, this chapter reviews and builds upon the Sztajnkrycer study, *Tactical Medical Skill Requirements for Law Enforcement Officers: A 10-Year Analysis of Line-of-Duty Deaths*, which was published in *Prehospital and Disaster Medicine* in 2010.⁷¹ Sztajnkrycer's 10-year evaluation improved the existing block of literature that discusses the relevance of TCCC training for police officers by using a retrospective analysis of open source data to compare the death statistics of law enforcement officers who died as a result of felonious assault with the death statistics of soldiers who die in combat.

To obtain updated fatality patterns, this thesis accessed the Law Enforcement Officer Killed and Assaulted (LEOKA) data, which is published yearly by the FBI's Uniform Crime Reports.⁷² The FBI's Uniform Crime Reporting Program is a coordinated effort to compile law enforcement data with the assistance of over 18,000 law enforcement agencies nationwide. Sztajnkrycer's 10-year evaluation examined the years 1998–2007, inclusive, using what was then the most up-to-date data on the LEOKA database. This chapter uses the same techniques as Sztajnkrycer's 2010 evaluation to study the three years of line-of-duty deaths that occurred from 2008–2010 (2010 was the most current open source data available at the time of this study).⁷³

Tactical Combat Casualty Care focuses on saving the soldiers who suffer from potentially preventable causes of death. According to TCCC manuals, battlefield casualties fall into three categories: "Casualties who will die, regardless of receiving any medical aid; casualties who will live, regardless of receiving any medical aid;" and,

⁷¹ *Prehospital and Disaster Medicine* is now the Official Journal of the World Association for Disaster and Emergency Medicine. Cambridge University Press assumed its publication in 2011.

⁷² The Federal Bureau of Investigation publishes Law Enforcement Officers Killed and Assaulted data annually as part of its Uniform Crime Reporting Program. The Uniform Crime Reporting Program was conceived of by the International Association of Chiefs of Police to provide reliable crime statistics in order to assist law enforcement professionals with carrying out their jobs. These statistics are collected by the FBI, analyzed, and published in its LEOKA report.

⁷³ FBI line-of-duty death statistics for 2011 are scheduled to be published in the fall of 2012 but as of 1 November 2012 are still not available.

“casualties who will die if they do not receive timely and appropriate medical aid.”⁷⁴ Of the three categories, TCCC addresses the third. This thesis focuses on the same: potentially preventable causes of death. Law enforcement officers, like soldiers, should be trained to prevent the deaths that they can. In a tactical environment, attempting to provide treatment to a patient who suffers from a non-preventable cause of death could risk the lives of healthy or less injured officers.

Like the Sztajnkrycer study, head trauma that leads to death is classified here as a non-preventable death. Classifying all deaths caused by head trauma as non-preventable is a justified over-simplification. Techniques practiced in advanced TCCC instruction can help a care provider prevent head trauma deaths; however, proceeding within the boundaries set by the original study is practical, because the advanced interventions required to secure an airway are outside of the scope of most police officers’ medical training time allowances. Police officers are required to receive as little as three days of medical training in their initial training block, which is not enough time to learn advanced airway management techniques or other life saving interventions used on casualties with extensive head trauma.⁷⁵ Thus, based on officers’ medical training time constraints, this analysis considers deaths from head trauma as non-preventable.

1. Number of Officers Included in the Study

From 2008–2010, the FBI reported on 145 police officers who were feloniously killed in the line-of-duty: 41 in the first year, 48 in the second year, and 56 in the third year, 2010. Each year the FBI includes summaries of most, but not all, of the officers who are feloniously killed. The agency is unable to publish summaries on certain officers for various reasons, such as if insufficient data related to the death exists or if the courts issue gag orders. From 2008–2010, six summaries of officers feloniously killed were excluded from the agencies Law Enforcement Officers Killed and Assaulted data. The

⁷⁴ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

⁷⁵ California Code of Regulations Title 22. Social Security Division 9. Prehospital Emergency Medical Services Chapter 1.5. First Aid Standards for Public Safety Personnel, June 2000.

results here are based on the officers with published summaries. Therefore, of the 145 deaths, 139 were considered for this thesis.⁷⁶

Of the 139 officers originally considered, time of death ruled out another 48. Using the same framework as Sztajnkrycer's 2010 evaluation, time of death is identified here as immediate if it occurred within one hour, early if it occurred between 1–48 hours, and late if it occurred more than 48 hours following the injury. It is assumed by this and the previous study that the deaths classified as immediate are those that could benefit most from TCCC interventions, because those officers are the most likely to die in the pre-hospital setting without prompt intervention.⁷⁷ Out of the officer summaries included in the LEOKA data, six officers had times of death that were not published or could not be determined; 12 officers were classified as late deaths—their times of death ranged from a week to several years after initial injury;⁷⁸ and 28 officers were classified as early deaths. The unknown, late, and early deaths are excluded from this study. Two additional officer deaths were excluded from this analysis, because the officers were off duty when killed. Thus, of the 139 officer summaries that are published, 91 were evaluated for their possible responsiveness to TCCC interventions.⁷⁹

2. Results: Line-of-Duty Deaths Potentially Amenable to TCCC

Of the 91 officers remaining for the study, 35 could have potentially been saved using TCCC interventions. Forty-seven police officers died as a result of head trauma and are not considered as being amenable to a life-saving TCCC intervention. The majority of

⁷⁶ U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2008, Uniform Crime Report, October 2009; U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2009, Uniform Crime Report, October 2010; U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2010, Uniform Crime Report, October 2011.

⁷⁷ Matthew D. Sztajnkrycer, MD, PhD, FACEP, *Tactical Medical Skill Requirements for Law Enforcement Officers: A 10-Year Analysis of Line-of-Duty Deaths*, Prehospital and Disaster Medicine, Vol. 25, no. 4, 2010.

⁷⁸ Some officers died after years of being in a coma from complications caused by a line-of-duty injury.

⁷⁹ U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2008, Uniform Crime Report, October 2009; U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2009, Uniform Crime Report, October 2010; U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2010, Uniform Crime Report, October 2011.

the officers who died from a head wound were shot once or a number of times at close range. Another 9 officers died as a result of multi-systems trauma. The majority of the officers who died from multi-systems trauma were struck by a vehicle, either as an assailant purposefully targeted the officer with a vehicle or accidentally collided with the officer while trying to escape from a crime. Death resulting from multi-systems trauma, like death caused by head trauma, is not classified as a fatality that police officers can prevent with TCCC due to the complexity involved in managing these wounds. Therefore, 56 of the 91 officers who passed exclusion criteria would likely have died even if treated by an officer trained in TCCC.⁸⁰

The 35 officers remaining who could have been potentially saved with TCCC fell into two categories: those who died from gunshot wounds to the neck and torso and those that died from gunshot wounds to an extremity. Gunshot wounds to the neck or torso caused the majority of these potentially preventable deaths. Some officers had a single shot to their chest or neck. Other officers had multiple gunshot wounds spread out across their bodies. Like the previous study, a minute percent of the line-of-duty deaths occurred from exsanguination from an extremity. In this follow on study, only a single officer died from a gunshot wound that would likely have been preventable with a tourniquet.⁸¹

Of the 145-officers who were feloniously killed from 2008–2010, just over 24 percent could have potentially been saved by TCCC. These numbers of preventable deaths show a decrease in the number of police officer line-of-duty deaths that are amenable to TCCC interventions since the previous line-of-duty death study. In the previous study, just over 36 percent of the deaths were potentially manageable with TCCC. These numbers, however, like those in the previous study, do not represent a definitive quantity, because there is not enough forensic evidence to explain the specific cause of death. (For instance, there is no way to know whether a police officer who was shot in the chest died from a collapsed lung versus internal blood loss.) The FBI to date does not have an open source reporting system that will allow researchers to determine absolute medical conclusions. This line-of-duty death study is useful, however, because it

⁸⁰ Ibid.

⁸¹ Ibid.

presents additional definitive data that supports the previous study's conclusion that law enforcement medical training requirements differ from those in the military.⁸²

C. TACTICAL COMBAT CASUALTY CARE

The military prides itself on being a learning organization that actively studies its performance as well as the performance of its enemies to develop the most relevant tactics based on the mission. TCCC represents the military's efforts to flex to the demands of contemporary combat situations and adopt tactics most suited to the present-day warfighter. Due to the unique demands of combat, the military chooses to be unconstrained by a fixed set of procedures that are based on the civilian laws that govern emergency medicine. Since police officers also need to develop tactical medical training to suit their work environment, this sections reviews TCCC and assesses its interventions for potential use in law enforcement.

Tactical Combat Casualty care, which is founded on real-world tactical situations, is an evolving set of tactical interventions that are informed by combat casualties and their outcomes. TCCC instruction manuals go as far as to warn operators that new technologies, data, and tactical challenges will make current TCCC medical procedures obsolete at some point in the future. TCCC's tactical, threat-oriented approach may be its only enduring legacy. The medicine makes all attempts to emphasize the importance of practicing threat-oriented tactics, while administering medicine. According to the 2010 TCCC Handbook, "TCCC focuses very directly on the immediate care of battle casualties . . . where the threat," the common causes of soldier injury, and the operator's skills "all come together."⁸³ Focusing on the threat before providing treatment is an imperative part of tactical medicine and is one of the most important things that police officer tactical medicine can benefit from.⁸⁴

⁸² Ibid.

⁸³ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10-44, May 2010.

⁸⁴ Ibid.

Concentrating on the threat is the very first intervention involved in TCCC and should be the leading intervention taught in all tactical medical training. Considering the threat before the victim is not a novel concept in emergency medicine; civilian paramedics are also instructed to make sure the scene is safe before providing medical aid. What differs is how the operators ensure scene safety. In the civilian context, safeguarding a scene before providing medical care is often a passive procedure, which involves circumstances such as making sure a hazardous material substance is identified or a gun battle has ceased before rendering medical care to wounded casualties. Even the recently published Training Keys offered by the IACP, discuss risks to the rescuers (responding police officers) in a more passive tone than the TCCC instruction does. The Keys explain an officer's role as a first responder but do so as if the officer is not already part of the tactical situation.⁸⁵

In the military context, ensuring the scene is safe frequently takes on an active role such as getting to cover while returning fire. The operator must neutralize the immediate threat before providing medical care, even if it involves shooting at an enemy. To underline the importance of focusing on tactics before medical procedures, military instructors tell operators repeatedly: "The best medicine on the battlefield is fire superiority."⁸⁶ Handling the threat before treating the injury allows the medical care provider to prevent further harm—this caveat goes for the medical care provider as well as the injured person, (in the cases that the two are different).⁸⁷

Note: The explanations of tactical scenarios included in this discussion of TCCC often refer to the medic (or care provider) and the casualty (or patient) separately as if they are always distinct individuals; however, in tactical settings, often the medic is the casualty or the casualty applies self or buddy-aid becoming the medic. The latter situation can be especially common among police officers who work alone or operate in groups without personnel classified as medics. Even in scenarios where multiple personnel are

⁸⁵ International Association of Chiefs of Police, Training Key #667, 2012; Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

⁸⁶ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

⁸⁷ *Ibid.*

available or where one officer is designated as a medic, tactical situations can dictate that the casualty should apply self-aid to prevent further injury to others. For instance, if a police officer would need to risk being shot to assist his partner, the partner should attempt self-aid instead of waiting for help and endangering the assisting officer. The importance of self-aid is expounded on in the description of TCCC's specific interventions. For now it is primarily important to understand that the term medic and patient are only used to clearly describe roles in a scenario. The medic or care provider is any person giving aid, the victim or secondary companion.⁸⁸

Tactical Combat Casualty Care is divided into three phases to account for the tactical environment: Care Under Fire, Tactical Field care, and Tactical Evacuation Care. Care Under Fire represents the tactical interventions rendered at the point of injury. This occurs while both the medic and the casualty are under effective hostile fire. (The military delineates between fire and effective fire. Sometimes gunfire will still be present when administering aid, but that gunfire will not be hitting nearby or directed effectively at the casualty or medic; this is not effective fire.) Effective fire occurs when bullets are landing nearby the medic or the casualty, putting them at immediate risk. The tactical risk guides the limited interventions that are provided in the initial, Care Under Fire, phase of TCCC. Additionally, it is assumed that only limited medical gear is available to the medic during the Care Under Fire stage. If proper tactics are ignored at any point in a tactical situation, medical interventions can result in additional casualties. This initial phase will in many ways mirror police officer tactical scenarios, when officers have limited medical gear and are under immediate danger.⁸⁹

Tactical Field Care is the second phase of medical care recommended in a tactical situation. Once the medic and casualty are no longer under effective fire, a more comprehensive set of interventions can be applied to the casualty. Again, the tactical situation dictates the depth of care that is given; however, generally this is the point when the patient can be thoroughly inspected. Based on the time constraints and threat level, the operator will determine the appropriateness of each procedure. This phase, and the

⁸⁸ Ibid.

⁸⁹ Ibid.

interventions performed during it, can also apply to tactical medical situations that occur in the absence of hostile fire or a direct threat. Examples of Tactical Field Care scenarios that occur in the absence of hostile fire situations include if an operator is injured while approaching a target during a night raid, while on an undercover stakeout, or while surveying a target in a remote location. The timeframe between injury and evacuation fluctuates in this setting. For soldiers it can vary from minutes to days. A more likely timeframe for law enforcement officers, however, is minutes to hours.⁹⁰

The third phase of care explained in TCCC training is Tactical Evacuation Care. This phase begins when auxiliary medical care equipment and providers arrive and the operators prepare to evacuate the casualty. In a military setting, the evacuation platform can be a boat, helicopter, or a High Mobility Multi-purpose Wheeled Vehicle (HMMWV, pronounced *humvee*), and it can arrive with or without trained medical personnel. Soldiers sometimes have additional duties at this point depending on the scenario and type of support that arrives. The medical evacuation platform is often pre-staged with additional medical equipment that the medic is trained to use but could not carry on the mission. Other times advanced medical personnel will arrive and relieve the on-scene medic of his duties.⁹¹

For civilian police officers, the evacuation platform that arrives at this stage will likely be an ambulance or a life flight helicopter. In most cases the evacuation platform will be equipped with skilled medical care providers and their equipment. The law enforcement officers' medical responsibilities are generally relieved during this TCCC phase of care; although, the IACP Training Keys point out that in some extreme situations such as when EMS assets are strained, police officers can be forced to transfer casualties to the hospital in squad cars or other non-conventional platforms.⁹² When police officers are active in transporting the patients, they need to be aware of the ongoing treatments required in the third phase. The specific procedures involved in each

⁹⁰ Ibid.

⁹¹ Ibid.

⁹² International Association of Chiefs of Police, Training Key #667, 2012.

of the three phases are discussed below in detail and compared to civilian EMS procedures like those learned in Advanced Trauma Life Support (ATLS) and the recently published Training Keys.⁹³

1. Care Under Fire

The military considers the risk of additional injuries extremely high during the Care Under Fire phase. Detailed medical procedures at this point are complicated by several factors such as limited medical gear, hostile surroundings, and reduced ambient light. The military suggests only three major actions during this phase: suppressing hostile fire, moving the casualty to a safe location, and treating life-threatening hemorrhage. Rapid successful completion of the combat mission is encouraged as a useful way to prevent further injury, as it improves the medic's ability to focus on the patient. For police officers completing the mission could mean making their arrest and should have similar positive influence in improving a medical provider's ability to care for the casualty. Police officers working in a team have an advantage at this point. Team settings contribute additional bodies and firearms that will help the officers gain fire superiority and dominate the hostile scene.⁹⁴

a. Airway Management

Airway management refers to performing interventions that will allow a casualty to breathe or breathe easier. It is addressed first here, because many Emergency Medical Technician and police officer training programs teach students to tackle airway management first when approaching a casualty. Compared to civilian emergency medical training, airway management is deemphasized in combat medicine. Unlike civilian EMS providers, combat medics are trained to forego airway management until the second

⁹³ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

⁹⁴ Fire superiority refers to having a greater amount of effective fire—it does not mean having larger caliber weapons or even firing more rounds, although both can help. Firing more or larger projectiles down range is only effective if the projectiles land in close proximity or hit the desired target. Lessons from combat situations have proven that people will remain shooting even when being fired upon if the opponent is widely-missing the target; Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

phase of interventions. Statistics show that airway compromises have only affected 1–2 percent of combat casualties. Furthermore, airway management techniques are time consuming. Attempting to manage an airway can take several minutes. Since rapidly moving the casualty to safety is a major concern in the Care Under Fire phase, the military teaches operators to wait until they are away from hostile fire before attempting airway management. Police officers should do the same.⁹⁵

b. Hemorrhage Control

Stopping a life-threatening extremity (arm or leg) bleed is the number one medical intervention advised by military medical experts during the Care Under Fire phase. Reports from the battlefield show that the leading cause of preventable death among soldiers is exsanguination from extremity wounds. Studies covering the Vietnam War show that more than 2,500 soldiers died from extremity exsanguination alone. Uncontrolled hemorrhage can also lead to death faster than a compromised airway, which is why it is addressed in this first phase of treatment. If life-threatening bleeding is ignored in the Care Under Fire phase, the casualty could die before reaching the second phase of care.⁹⁶

Note: Not all bleeding is life threatening. Life threatening hemorrhage generally comes from a major artery and causes the patient to lose large amounts of blood in a short period of time. Venous bleeding, on the other hand, will usually seep out less rapidly. Small venous hemorrhages should be cared for later in the second phase of treatment.⁹⁷

When a casualty shows signs of life-threatening hemorrhage from an extremity, TCCC advise the use of a tourniquet. A tourniquet has several advantages in a tactical setting over other medical equipment that can be used to control bleeding. For instance, many conventional ATLS measures endorsed by civilian medical professionals

⁹⁵ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

⁹⁶ *Ibid.*

⁹⁷ *Ibid.*

are not as reliable at stopping the bleed in tactical situations when interventions need to be applied at night amidst hostile gunfire. Although the IACP Training Keys support the use of a tourniquet, they do not make a strong stance on determining when it should be applied. They instead say that direct pressure is the most efficient way to stop bleeding,⁹⁸ this could be misleading and confuse officers in a tactical setting. Additionally, any reluctance to advocate use a tourniquet could make tourniquets appear dangerous and discourage their timely use in a tactical setting.

Standard field dressings that rely on pressure applied directly to the wound are more difficult than a tourniquet to put in place, especially at night. Also, when placed incorrectly, pressure dressings will allow the wound to continue to bleed. Trying to position the dressings correctly takes longer than securing a tourniquet. The time wasted trying to secure the pressure dressing puts the casualty or the medic at an unnecessary risk. Tourniquets are simple, quick, and effective. Moreover, they can be secure with one hand. This allows the casualty to control the wound without outside support.⁹⁹

c. Casualty Transportation

Like other procedures examined here, TCCC teaches soldiers to remove casualties from a hazardous environment by utilizing a different set of techniques and focusing on an alternative set of precautions than those used in standard civilian emergency medicine. When preparing for casualty transport, civilian EMS responders are focused on protecting the patient by making sure the patient's wounds are not further complicated by the move. Special precautions are used to immobilize the patient's neck to avoid injury to the spine. Soldiers and police officers are not able to spend as much time worrying about injuring the patient's spine or complicating the patient's wounds while being shot at by adversaries. Instead, they must focus on saving the casualty's life as well as the lives of others. The risk of sustaining additional injuries from the active threat outweighs the risk of compounding an injury or hurting the patient's neck.¹⁰⁰

⁹⁸ International Association of Chiefs of Police, Training Key #667, 2012.

⁹⁹ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10-44, May 2010.

¹⁰⁰ *Ibid.*

Studies from Vietnam show that immobilizing the cervical spine may not be as important in a military setting as it is in non-tactical civilian settings. Only 1.4 percent of casualties with penetrating neck injuries in that war could have potentially benefitted from immobilizing their spine before transport. Unless the casualty is suffering from significant blunt trauma, such as parachute injuries or being hit by a car (the latter of which is common in police officer deaths that occur from multi-systems trauma), cervical spine immobilization is not useful in a tactical setting. It is possible that police officers who are suffering from a gunshot wound to the neck or torso are also less suited to civilian non-tactical cervical spine precautions.¹⁰¹

As opposed to cervical spine immobilization, in most situations, the precautions soldiers and other operators must be focused on in a tactical setting stem from the threat. The danger presented by the threat of hostile fire means that casualties should be moved to a safe location using the most expedient and safest way possible. Lifting and carrying the casualty can be difficult and slow or require assistance from multiple people at the scene. Alternate means of transport should be considered in the Care Under Fire phase. Dragging is one method that has been used successfully in the military. Military instructors also advocate that operators involved in casualty transport should utilize cover and concealment as much as possible. Cover is preferred over concealment, but both are useful. These techniques are endorsed by IACP Training Keys and would be useful for police officers in tactical scenarios.¹⁰²

2. Tactical Field Care

When distanced from the immediate threat of hostile fire, care providers can focus on a more comprehensive set of interventions. A detailed study of the casualty's wounds begins in the second phase, Tactical Field Care. In military settings, the scene is still not considered 100 percent safe. Soldiers who are injured in combat are

¹⁰¹ Ibid.

¹⁰² Cover refers to anything that provides a barrier to stop bullets. Concealment refers to objects that obstruct view; Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010; International Association of Chiefs of Police, Training Key #667, 2012.

often in unfriendly geographic locations surrounded by inhabitants that are hostile or belligerent. Tactical Field Care takes this into consideration and recognizes the imminent presence of new potential threats. This phase may be somewhat altered in a civilian setting if, for instance, the law enforcement officers are in friendly territory and have already neutralized the initial threat during the Care Under Fire phase; however, in other law enforcement settings, such as a terrorist attack that involves more than one suspect, the Tactical Field Care setting would be more similar to that faced by soldiers.¹⁰³

Care for a casualty in this phase of treatment is situational dependent. If the threat level is high or if security is unstable, medical interventions must be prioritized based on the needs of the individual patient. The most essential treatments will be given as quickly as possible, and other treatments will be deferred until later. If the situation is more under control, if the soldiers have managed to put great distance between themselves and the threat, or if massive numbers of reinforcements have arrived, more attention can be given to the patient.¹⁰⁴

a. *Altered Mental Status*

Early in the patient's evaluation process, mental status must be determined. Soldiers are directed to immediately disarm casualties that present with altered mental status. If a casualty has altered mental status, the casualty is a threat to friendly forces. This is true for police officers working in teams or with partners. A casualty with altered mental status is no longer an asset, and should be dealt with accordingly.¹⁰⁵

b. *Hemorrhage Control*

Like during Care Under Fire, hemorrhage control is TCCC's primary concern in the second phase of treatment. Once the casualty is distanced from the primary threat, bleeding should be reassessed. This requires a secondary evaluation of the

¹⁰³ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

¹⁰⁴ *Ibid.*

¹⁰⁵ *Ibid.*

patient's wounds to ensure that all life-threatening bleeding has been controlled. The military directs medics to remove only the minimal amounts of clothing required to treat the wound, because hypothermia is a medical concern in trauma patients. Tourniquets are still the primary method for controlling extremity hemorrhage at this phase in the treatment. Other non-extremity bleeds can be controlled with gauze, hemostatic bandages, and various blood clotting agents. Medics are told to check for a distal pulse and to apply a second tourniquet side-by-side and proximal (closer to the torso) to the first if a distal pulse remains in an extremity with a tourniquet. IACP Training Keys advise using the same dual tourniquet method to manage out of control bleeds.¹⁰⁶

The military stresses the importance and safety of tourniquet use. Its TCCC Handbook explains that, "there is no evidence that tourniquets have caused the loss of any limbs in hundreds of tourniquet applications."¹⁰⁷ If medics chose to remove a tourniquet, it warns medics to use caution. Tourniquets can remain in place for hours and should not be removed until the casualty is at the evacuation point. Once at the point of evacuation, tourniquets can be replaced with a pressure dressing but do not need to be. The choice to remove a tourniquet is at the medic's discretion. The IACP Training Keys also recognize the safety of tourniquets and tell officers how to improvise a tourniquet if necessary.¹⁰⁸ Although far less police officer deaths occur from extremity bleeds, a tourniquet could still be carried by law enforcement, due to the tourniquet's history of safe use, simplicity, size, tactical efficiency, and potential for saving a life, even if it is just a single life every three years.

c. Airway Management

Only after the life-threatening bleeds have been addressed should the medic be concerned with airway management. In many cases of penetrating trauma, airway management is unnecessary. If the patient is awake, alert, and having no

¹⁰⁶ International Association of Chiefs of Police, Training Key #668, 2012; Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

¹⁰⁷ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

¹⁰⁸ International Association of Chiefs of Police, Training Key #668, 2012.

difficulties breathing, the medic can move past airway management without applying interventions. If the patient is having difficulty breathing, the medic should consider interventions progressively, beginning with the least invasive. Three procedures are preferred for managing a casualty's airway: performing a chin-lift jaw-thrust maneuver, inserting a nasopharyngeal airway, and performing a cricothyroidotomy. Of the three, performing a chin-lift jaw-thrust maneuver is the least invasive and should be attempted first.¹⁰⁹

Inserting a nasopharyngeal airway is advised for all unconscious trauma patients. Nasopharyngeal airway insertion is quick and easy. It is preferred over other means of airway management, because it is more likely to be tolerated if the casualty becomes conscious. This management technique, like the chin-lift jaw-thrust maneuver, is not invasive and would be a valuable option for police officers who need to maintain an airway. The nasopharyngeal airway is lightweight, portable, and durable. Police officers can learn to use it in a short period of time and would have no problem carrying it on their person.¹¹⁰

The third airway management technique preferred by the military is not used as widely by civilian EMS and would therefore be more difficult for police units to adopt.¹¹¹ A cricothyroidotomy is an invasive procedure that involves making a small incision on the casualty's airway and inserting a breathing tube. In a tactical setting, the military prefers this technique to intubation—the more mainstream, civilian endorsed technique—for multiple reasons: airways achieved by intubation are not tolerated well by a conscious patient; intubation requires a white light, which could negotiate a soldier's position in a tactical environment; and blood or disrupted anatomy can make it difficult to identify parts of the anatomy that guide intubation. Additionally, cricothyroidotomys can be performed on conscious patients and are the procedure of choice when a patient has penetrating wounds in the head or neck. Despite its use in the military, this thesis does

¹⁰⁹ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

¹¹⁰ *Ibid.*

¹¹¹ Police officer medical training is based on states' civilian EMS standards and guided by civilian emergency medical institutions.

not advocate surgical interventions for police officer training due to the officers' mission requirements and medical training time constraints. Furthermore, these invasive techniques generally require an additional care provider, which many patrol officers lack.¹¹²

d. Breathing

The number one breathing issue that the military is concerned with treating is a tension pneumothorax. Tension pneumothoraxes are common when patients suffer gunshot wounds to the neck and torso. This condition is treatable with simple interventions. Since the injury accounts for 3–4 percent of all combat deaths, the second leading cause of preventable death on the battlefield, TCCC instruction declares that all patients with open wounds to the neck and torso should be treated as potentially having a tension pneumothorax. Due to the large percentage of police officers who die from gunshot wounds to the chest and neck, some interventions used to treat a tension pneumothorax should also be considered for law enforcement officers.¹¹³

To treat this injury, military medics place an occlusive dressing over the wound or wounds in the torso and neck. The patient is then placed in the seated position when appropriate. If the casualty develops difficulty breathing and other signs of a tension pneumothorax, the medic is directed to relieve the symptoms by performing a needle thoracostomy (inserting a 14-gauge 3.25-inch long needle catheter into the casualty's second intercostal space on the mid-clavicular line, just below the collar bone). This is done on the side of the injury. The medic will listen for a sound as air is released. If no sound is heard and the patient continues to have difficulty breathing, the medic will try the other side. This procedure is not life threatening; "the additional trauma caused by a needle thoracostomy will not worsen his [the casualty's] condition should he not have a tension pneumothorax."¹¹⁴ At worst, the additional trauma caused by the needle

¹¹² Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

¹¹³ *Ibid.*

¹¹⁴ *Ibid.*

thoracostomy will need to be treated later at a definitive medical treatment facility. In the meantime, the casualty's life might have been saved by the intervention.¹¹⁵

Although performing a needle thoracostomy is not considered dangerous, even if the wrong lung is punctured with the medic's catheter, police officers can consider a less-invasive technique for managing the injuries that cause tension pneumothoraxes. The IACP Training Keys, like TCCC, suggest placing a four-sided occlusive dressing over the wound. The Training Keys, however, add a series of steps not used by soldiers who perform a needle thoracostomy. They explain that a care provider should wait until the casualty has exhaled all air before placing the four-sided occlusive dressing on the wound. If pressure later builds up in the patient's chest, which can be determined by increased difficulty in breathing, the four-sided dressing is briefly removed and then reapplied. This non-invasive option can possibly suit police officer needs better than the invasive technique advocated by the military.¹¹⁶

e. Intravenous (IV) Access and Fluid Resuscitation

Military medics are taught to start an intravenous (IV) catheter at this point in the treatment. IVs are important for stabilizing the patient's blood pressure and administering medication. Whereas ATLS courses teach civilian EMS personnel to start two large bore (14-or 16-gauge) IV catheters, the military advocates using a single 18-gauge IV catheter in tactical environments. In casualties that have lost a considerable amount of blood, it is difficult to gain vascular access because the veins are less prominent. An 18-gauge IV catheter is easier to start than the larger bore catheters and is deemed sufficient by the military for administering resuscitation fluids and medications to trauma patients. If IV access cannot be obtained, intraosseous (IO) (in the bone marrow cavity) access should be gained. These invasive techniques often require a second person and always require advanced training that could be unnecessary for police officers.¹¹⁷

¹¹⁵ Ibid.

¹¹⁶ International Association of Chiefs of Police, Training Key #668, 2012.

¹¹⁷ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10-44, May 2010.

Based on the advance training requirements and the standard EMS response times that many police officers can rely on, IV and IO insertions are not recommended for law enforcement in most settings. These techniques could be useful for rural police, but more forensic information on rural police officer deaths is needed to make the determination. If a number of rural officers are dying from complications that could have been prevented with more expedient IV access, then perhaps rural police should be trained in administering some form of fluid resuscitation; however, unless they are working in pairs or teams, IV and IO training could be impractical. While it is possible to self-administer an IV, patients who need fluid resuscitation to prevent death before EMS backup arrives will probably not be in a condition that allows them to self-administer the procedure.¹¹⁸

f. Pain and Infection Control

Administering medications to control pain and infection is essential in military settings. For police officers with close EMS backup, this is less critical. Like IV access, administering pain and infection control medication is probably most important for officers who work in areas with extended EMS response time. TCCC training teaches medics to administer different drugs depending on the casualty. If the casualty is conscious, oral medications can be given. If not, IV or IO lines will have to be utilized. Additionally, medications are varied depending on if the casualty is still able to fight. As far as infection, all open wounds are considered infected, and medics are instructed to administer antibiotics that cover a broad spectrum of organisms. If police officers administer any medications, it must be documented to provide EMS providers and hospitals with relevant information to avoid overdose.¹¹⁹

g. Hypothermia Prevention

Blood loss contributes to hypothermia. (Hypothermia occurs when the body's temperature drops below 95 degrees Fahrenheit.) Since blood loss is a concern in

¹¹⁸ Ibid.

¹¹⁹ Ibid.

all cases of penetrating trauma, both soldiers and police officers will benefit from understanding the basics of temperature control in trauma patients. Although wet conditions increase chances for hypothermia, the condition can affect trauma casualties regardless of the season or air temperature.

Hypothermic coagulopathy is a bleeding disorder that impairs the blood's ability to clot. This is dangerous for trauma patients who have lost large amounts of blood. Since up to 10 percent of trauma patients who arrive at Level III treatment facilities exhibit some degree of hypothermia, police officers should learn how to combat the condition with simple-to-learn interventions. The techniques used to keep a trauma casualty warm are no different than techniques used to keep any person warm. Police should keep the casualty covered at all times with dry blankets or protective clothing if hypothermia is a potential.¹²⁰

h. Cardiopulmonary Resuscitation (CPR)

Tactical Combat Casualty Care does not advocate CPR in all of the same situations that civilian EMS training does. Casualties injured by blast or penetrating injuries that are found without “pulse, respiration, or other signs of life,” are not recommended for CPR by TCCC guidelines.¹²¹ The military does not want soldiers attempting CPR in hopeless situations, because it puts operators at unnecessary risk and prevents casualties with less severe injuries from receiving timely care. Studies have shown that even when casualties are close to definitive care centers, CPR has not been proven successful on patients with the aforementioned symptoms if caused by penetrating trauma or blast injuries. CPR is only suggested before evacuation on patients suffering from non-trauma wounds. The IACP Training Keys support TCCC guidelines on CPR. The Keys tell police officers that CPR is most useful for non-trauma casualties suffering a cardiac arrest. While police officers should learn CPR for other duties involved in protecting society, it is not a useful skill in combative tactical settings.¹²²

¹²⁰ Ibid.

¹²¹ Ibid.

¹²² International Association of Chiefs of Police, Training Key #668, 2012; Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

i. Burns

TCCC provides detailed information on how to deal with burns; however, since no police officers suffered fatal burn injuries in the studies reviewed here, training that enables police officers to treat burns is not considered necessary in a combative tactical setting.¹²³

j. Monitoring Treatments

Patients should be continuously monitored during this phase. Once initial treatments are provided, they should be reassessed as frequently as the tactical situation allows. Reviewing previous interventions can reveal new wounds not found in earlier assessments. Speaking with the patient can also expose new wounds or potential areas of consideration. Monitoring the patient continuously until evacuation is essential for both military and law enforcement officers.¹²⁴

k. Communication

Military advice on communication will likely resonate with law enforcement officers who have operational experience in tactical environments involving casualties. TCCC training endorses active communication between the casualty and medic. The medic's vocal reassurance has curative properties. Combat and gun battles, whether military or civilian, can be frightening, especially for a casualty. Speaking with the casualty is not only useful for obtaining diagnostic information but also for encouragement.¹²⁵

¹²³ U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2008, Uniform Crime Report, October 2009; U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2009, Uniform Crime Report, October 2010; U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2010, Uniform Crime Report, October 2011.

¹²⁴ Department of Defense, *Handbook: Tactical Casualty Combat Care, Tactics, Techniques, and Procedures*, no. 10–44, May 2010.

¹²⁵ *Ibid.*

3. Tactical Evacuation Care

During the Tactical Evacuation Care phase, military personnel often need to continue reassessing the interventions provided in earlier phases of TCCC; the arrival of new equipment can even expand the medics' role. Conversely, law enforcement officers are almost done performing their role as a medical provider in the Tactical Evacuation Care phase. In situations where police officers must transport victims to the hospital, their main focus will be reassessing previous treatments, unless new medical equipment, like a tourniquet, arrives to expand the police officers medical role. Although the police officer's medical duties will likely cease when civilian medical support arrives, the officer who applied interventions can be instrumental in helping the EMS providers identify areas that require immediate attention. Officers can help by quickly briefing EMS personnel on the interventions provided by law enforcement personnel before the EMS arrival.

D. INJURY AND TREATMENT SUMMARY

The updated line-of-duty death analysis performed here revealed little change since Sztajnkrycer's former study. The leading cause of death for officers who expire in the first hour following their injury is head trauma. These deaths are considered non-preventable by the tactical medical training procedures that can be taught to police officers; the officers' medical training time constraints, professional duties, and mission requirements limit the extent of medical training that is practical. For casualties with serious head trauma, this thesis, like the recently published IACP Training Keys, suggests foregoing police officer medical interventions beyond hemorrhage control and making all possible attempts to get a casualty to a secondary medical facility as quickly as possible.¹²⁶

Interventions regarding burn care, IV placement, and the administration of medication are also unnecessary in most cases for police officer tactical medical training. No officers in this thesis were shown to have died of complications amenable to these

¹²⁶ International Association of Chiefs of Police, Training Key #668, 2012.

advanced medical techniques in the first hour. Only officers who face long EMS response times should consider learning these detailed interventions.

Another large percent of police officers died from gunshot wounds to their neck or torso. It is unknown how many of these injuries were complicated by a tension pneumothorax that ultimately caused the death. If forensic evidence later proves that a significant number of these officers are dying, like soldiers, from tension pneumothoraxes, law enforcement agencies can investigate the value of teaching police officers invasive medical procedures. Until then, a non-invasive technique that police officers can use to manage tension pneumothoraxes is explained in greater detail in the recently published in the IACP Training Keys. For police officers, this technique appears more practical than the military's invasive procedure.¹²⁷

Certain TCCC interventions would benefit police officers. One of the most important TCCC techniques for police officers to learn regarding tactical medicine is focusing on the tactical threat before treating the injury. Doing this will save police officers' and civilians' lives. Another potentially useful intervention is the tourniquet. While only a small percentage of police officers die from extremity exsanguination, tourniquets might prevent these deaths. Furthermore, there are no contradictory medical indications that prevent police officers from carrying a tourniquet. Tourniquets are simple to use, inexpensive, and safe. Other interventions that police officers should be trained to administer are those involving continuous communication, hypothermia prevention, and repeated monitoring of the medical interventions applied. These interventions, like the tourniquet, require little training and are proven effective in managing a casualty's health in a tactical environment.

¹²⁷ U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2008, Uniform Crime Report, October 2009; U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2009, Uniform Crime Report, October 2010; U.S. Department of Justice—Federal Bureau of Investigation, Law Enforcement Officers Killed and Assaulted, 2010, Uniform Crime Report, October 2011.

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IV. LESSONS FOR POLICE OFFICER MEDICINE

A. INTRODUCTION

The special operations personnel who created Tactical Combat Casualty Care and have subsequently developed advanced TCCC training procedures based on combat lessons did so because civilian medical training was found to be insufficient for military tactical situations. Today, some experts argue that law enforcement medicine can learn from these developments in TCCC. But to develop tactical medicine that is relevant for the warfighter, military medical experts have continuously sought updated medical data combined with tactical recommendations from the battlefield. The military tactical medical training that developed from that data is more useful for military combatants than for law enforcement personnel, and it should not be adopted by law enforcement agencies before they review its purpose and make necessary adjustments.

While some TCCC techniques, particularly the basics, are applicable to all police officers, including lone patrol officers, the officers' unique medical assets, mission requirements, and work environments necessitate slightly altered medical procedures in many situations. Police officers need to develop more standardized medicine that is specific to law enforcement situations based on officer experiences in the field. To improve police officer specific medical training, law enforcement medical experts should embrace the technique of gathering job specific medical, tactical, and forensic data surrounding police officer casualty situations. As described in this chapter, data collection can be improved by implementing a more detailed reporting process nationwide.

Some prominent law enforcement data collection and tactical medical training instruction has already been accomplished. Sztajnkrycer's 2010 line-of-duty death study revealed that police officers are dying from different mechanisms of injury than military combatants. More recently, the Training Keys released by the International Association of Chiefs of Police focus on law enforcement specific tactical medicine that can be embraced by all officers at any department, whether working alone or in teams.

Procedures advocated in the Training Keys embrace tactical techniques that account for law enforcement medical assets and mission requirements. Still, future IACP instruction must emphasize the importance of actively eliminating the threat.

B. TACTICAL RECOMMENDATIONS

The four casualty scenarios presented in chapter two of this thesis show the need for police officer tactical medical training that focuses on teaching life-saving medical interventions in environments that may not be suitable to standard civilian medicine. Some basic guidelines of TCCC training, which focus on stopping the threat before treating an injury as well as attempting self-aid when possible, would be useful for police officers in all four scenarios presented here as well as all of the FBI's LEOKA summaries reviewed for this thesis.

One advantage of adopting basic TCCC guidelines stems from their wide-ranging applicability for law enforcement casualty scenarios regardless of the number of officers involved. Some of the injured officers studied in this thesis were accompanied by a partner or a team, while other casualties had nobody to assist in their medical treatments. From 2001–2010, the most recent data available, on-duty police officers were alone when feloniously killed 36 percent of the time. Another 33 percent were working in a lone patrol vehicle but were assisted by one or more officers who were on the scene when the assault took place. It is essential that police officers be taught to apply self-treatments as their primary recourse.

Another advantage of adopting basic TCCC guidelines is that they put an emphasis on teaching officers to continue fighting after being wounded. Continuing to fight after sustaining an injury is essential for eliminating the threat. If officers focus first on their injury, the threat could overwhelm them, cause injuries to others on the scene, or both. In several of the LEOKA summaries, officers proved their ability to continue fighting after being wounded; however, continuing to engage the threat after being wounded is not necessarily a common reaction. It must be stressed verbally as well as rehearsed during training.

As stated in chapter one and advocated by the military, realistic training is essential for grasping TCCC's basic guidelines. Practicing becoming incapacitated after being shot in training can create training scars and impair the way officers react in real scenarios. Officers should practice continuing to fight (not lie still) after being wounded in training scenarios. Additionally, interventions that are taught in training scenarios, such as applying a dressing, should be practiced with the actual dressings that the officers will use in the field and should be done in environments that are similar to the tactical environments police officers might encounter; for instance, officers should practice applying medical interventions outside, both during the day and at night, and in inclement weather. This will allow them to recognize potential problems with their tactics and find solutions before put into an actual casualty scenario when an officer's life is on the line.

The environments where police officers are assaulted are seldom optimal for providing medical care. Most of the line-of-duty assaults studied in this thesis that led to death were the result of gunfire. If a suspect is still shooting or if another threat is present, the tactical situation will dictate the depth of care that is optimal. Almost 50 percent of the officers studied between 2001–2010 were assaulted between 8 p.m. and 6 a.m., when darkness would likely frustrate efforts to visualize wounds or apply treatments. Since tactical situations sometimes dictate that interventions be applied in low light or rapidly, due to an active threat, the simplest effective interventions should be rehearsed as primary interventions. An example of a simple intervention for controlling extremity hemorrhages is the tourniquet.

While EMS response times are generally quick for police officers, several elements can slow the response. In the fourth casualty scenario offered in this thesis, which is based on a scenario that occurred in 2009, the sheriff died because EMS personnel were delayed due to the rural location and consequent breakdowns in lines of communication. If the casualty or his partner could have controlled the bleeding before EMS arrived, he would have had a better chance of surviving the incident. Similar to the military's delayed evacuation experience in Mogadishu, this law enforcement experience shows a potential need for more detailed medical instruction in rural environments. Of the casualty summaries and work environments reviewed for this thesis, rural location

was the primary cause of delayed EMS response. While no EMS should be relied upon to the point that officers neglect basic guidelines of tactical medicine, police officers should consider learning advanced medical procedures in rural settings, where EMS response time is known to be inadequate on a regular basis.

C. STANDARD POLICE OFFICER TRAINING RECOMMENDATION

Many members of the U.S. armed forces are taught different levels of TCCC based on their specific duties in whichever unit they are attached to. Snipers in the SEAL Teams, for instance, usually do not need to know the detailed medical interventions learned by SEAL medics, but they still learn the fundamentals of TCCC training to improve their situational awareness and to make them more useful in a casualty scenario.

Like members of the military, police officers should learn different levels of the same block of standard medical training, whether it is called Tactical Emergency Medical Support (TEMS) or any other name. The level of medical training they learn should be based on their individual job at an agency as well as their working environment. A more standard block of police officer medical instruction could help police officers in many ways. First of all, a more standard set of procedures would cause departments to develop procedures based on a broader sample of casualty experiences, and allow the agencies to learn from law enforcement casualty situations nationwide. Additionally, it would make their training recognized across state lines.

Furthermore, standard medical training will help police officers across multiple jurisdictions work together more safely. Skillsets involved in working together are increasingly important in today's environment, as agencies are challenged to coordinate their efforts to battle crime and terrorism. When local police departments join forces with federal agencies on a raid, as discussed in chapter three, both must be prepared to administer life saving care to their counterparts.

Working together may even become more common in the future as new technologies are developed that facilitate integration. As an example of how such integration is accomplished, on 18 April 2012, federal and local law enforcement agencies conducted a multi-agency operation in Clarksburg, West Virginia, to arrest a

major drug supplier. Leading to the arrest, seventy agents used a virtual command center on the Law Enforcement Online network to share information about the case. To conduct the arrest, the Drug Enforcement Agency, Internal Revenue Service, West Virginia State Police, U.S. Marshals Service, Clarksburg Police department, Bridgeport Police Department, and the Harrison County Sheriff's office joined forces. Having the same tactical training that teaches officers to stay in the fight when wounded, and the ability to use standard medical terminology and equipment carried by officers across jurisdictions and levels of the government will prepare the officers to react more seamlessly when an officer from another agency is wounded during a multi-agency raid.¹²⁸

D. OTHER CONSIDERATIONS TO IMPROVE TRAINING

Being taught to continue fighting after sustaining a gunshot wound is not the only non-medical tactical training that will help save police officers' lives; the Federal Bureau of Investigation has developed training based on its LEOKA database that is designed to help officers avoid many types of injury. The FBI's Criminal Justice Information Services (CJIS) Division developed a training program called the LEOKA Officer Safety/Awareness Program, which is used to inform officers of ways to avoid risk. CJIS' LEOKA trainers, all of whom are former law enforcement officers with extensive law enforcement backgrounds, travel throughout the United States each year to give instruction to other agencies; however, not enough agencies participate in the training.

Although the LEOKA training provides information on a wide spectrum of subjects, from conducting a traffic stop to felony pursuit, only approximately 11,000 officers from 3,000 agencies received the training last year. That means just over one percent of the sworn police officers working in the United States received this instruction. Because the LEOKA Officer Safety/Awareness Program training is an evolving program designed to prevent death based on reviewed causes of police officer injury, it might be useful for more law enforcement agencies than those that currently benefit from it. Furthermore, if found useful, it could be adapted to the initial police officer medical

¹²⁸ Federal Bureau of Investigation Criminal Justice Information Services Division, CJIS Link, vol. 14, no. 2, July 2012.

training received at police academies nationwide, especially if police officers move towards a more standardized medical training program.¹²⁹

Evidence-based tactical medical training is desired whenever possible. Military medical experts who work to develop and advance TCCC training attempt to compile databanks on forensic data from published journals and after-action reports of lessons learned. Their efforts are often obstructed by the challenges of collecting data in a combat environment. Law enforcement medical researchers might be in a better position to collect forensic information than military researchers, due to police officers' different operating environment and generally close proximity to some form of EMS support. If multiple levels of the government work together in an effort to collect detailed forensic information related to each officer's injury and have it included on standard fatality reports, police officer tactical medicine could be improved exponentially.¹³⁰

¹²⁹ Ibid.

¹³⁰ Federal Bureau of Investigation Criminal Justice Information Services Division, CJIS Link, Vol 14, no. 2, July 2012; CAPT Frank K. Butler, Jr., MC USN (Ret.), et al., *Tactical Combat Casualty Care 2007: Evolving Concepts and Battlefield Experience*, Military Medicine, vol. 172, no. 11, (2007): 1-19.

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