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Beyond the Ambulance: The Critical Role of Tactical Emergency Casualty Care in Civilian Prehospital Care.

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ABSTRACT

The increasing frequency of mass casualty incidents caused by antagonistic forces, along with the rise of unconventional traumatic injuries in the United States, underscores the urgent need for a standardized prehospital trauma course. This clinical review examines Tactical Emergency Casualty Care as the essential minimum standard for prehospital trauma training for paramedics. Tactical Emergency Casualty Care, the civilian adaptation of Tactical Combat Casualty Care, incorporates medical advancements from the military field into civilian prehospital care for critically injured patients. A literature search of PubMed identified relevant articles from the past decade, highlighting the need for changes in prehospital medicine due to the unique challenges of unconventional mass casualty incidents. The rise in mass casualty incidents over recent decades further emphasizes the necessity for standardized trauma training protocols. However, various logistical and systemic challenges may impede the widespread adoption of Tactical Combat Casualty Care as the minimum standard for training in trauma care, from initial wound management to patient handover to higher levels of care. Additional research is needed to evaluate the impact of trauma training for prehospital providers on patient outcomes.

Keywords: TECC, Tactical Emergency Casualty Care, TCCC, Tactical Combat Casualty Care, Mass Casualty Incidents.

Introduction

The rise in "antagonistically induced mass casualty incidents (MCIs)" and conventional traumatic injuries in the United States (US) over the past few decades, coupled with the growing threats from peer and near-peer adversaries and non-state actors, highlights the urgent need for a standardized prehospital trauma course.[1] Evidence-based guidelines currently exist for the prehospital management of traumatic injuries in high-threat civilian incidents and combat settings. In 1996, the Tactical Combat Casualty Care (TCCC) guidelines were developed for a Naval Special Warfare biomedical research project aimed at reducing combat-related deaths in a prehospital setting from battlefield injuries.[2,3] Tactical Emergency Casualty Care (TECC), the civilian adaptation of TCCC, was established in 2011 to apply these medical advances to the civilian prehospital care of critically injured patients. This course, which focuses on training medical providers to reduce their risk while maximizing patient outcomes, has the potential to significantly decrease preventable deaths in the evolving multi-hazard landscape threatening the US.[4]

The concept of an MCIs is multifaceted and varies depending on available resources. Generally, an MCI is defined as an event where the number of patients, the severity of their injuries, and the rate at which they present overwhelm the capabilities of the healthcare system, disrupting medical infrastructure and the standard of care while creating unfamiliar challenges to first responders and hospital providers.[1] As man-made and natural hazard MCIs continue to rise, the medical field of "disaster medicine" emerged, drawing from military medicine to prepare providers for catastrophic events and address the unique challenges of MCIs.

This article will explore the importance of establishing a minimum standard for trauma care, from point-of-care wound management to patient handover to a higher level of care. It will focus on TECC as the minimum standard for prehospital trauma training for paramedics in the US, aiming to increase patient survival rates, establish interoperability between states, and address current gaps in trauma management during MCIs. Additionally, the article will examine the logistical and systemic challenges within the US public safety sector that may hinder the implementation of TECC as a universal standard for trauma care protocols.[5]

METHODS

The primary research during phase I included database searches of the National Center for Biotechnology Information (NCBI), Cumulated Index to Nursing and Allied Health Literature (CINAHL), and the Cochrane Library. These databases were accessed through the Knight-Capron Library at the University of Lynchburg. The time interval was set to the past ten years. Keywords and focus terms utilized for this research included "prehospital care for mass casualty incident," "prehospital medicine," "prehospital care for mass casualty," "Tactical Combat Casualty Care," "TCCC," "Tactical Emergency Casualty Care," "TECC," "wilderness medicine," "austere medicine," "disaster medicine," "tactical emergency medical support," "EMS tactical," and "mass casualty incident."

Phase II of the research included selecting articles primarily addressing the need for a change in prehospital medicine for first responders due to the unfamiliar challenges medical first responders and providers face with the increase in unconventional MCIs, as well as selecting articles discussing the evolution of TECC. MCIs create a unique set of conditions for medical providers. The initial triage response and injury patterns are more complicated than previous scenarios. Therefore, an updated approach is required to prevent a lack of appropriate medical resources and inferior patient care. However, due to the nature of this topic, there are limited systematic reviews and meta-analyses evaluating civilian prehospital damage resuscitation interventions and patient management from the point of injury to a definitive level of care.

There is only one systematic review comparing the prehospital medical knowledge gaps in trauma patients to lessons learned from TCCC.[3]

DISCUSSION

Historical Review of Mass Casualty Incidents in the US

The severity of injuries from MCIs places prehospital healthcare providers in a challenging position. They must triage and manage patients effectively to avoid overwhelming local emergency rooms (ERs) and operating rooms (ORs). 'Antagonistically induced' MCIs - intentional acts of violence - require a shift in how prehospital care is approached in the US. In 2022, the National Institute of Justice (NIJ) conducted a retrospective study on mass shootings, defined as incidents in which four or more people were killed.[6] From 1966 to 2019, 167 such events occurred in the US,[6] with 20% happening from 2015 to 2019. From 2010 to 2019, an average of 52 mass shooting deaths occurred annually.[6] Following the 2012 Newtown, Connecticut shooting, Congress revised the definition of a mass shooting to include incidents with three or more casualties, excluding the perpetrator.[7] With the rise in intentional MCIs, trauma patterns have shifted from conventional mechanisms of injury (MOI) to those caused by improvised explosive devices, mass stabbings, mass shootings, and vehicular ramming.

These trends underscore the need to adapt trauma training for prehospital providers to meet these evolving threats.[1]

History and Evolution of Tactical Combat Casualty Care

Tactical Combat Casualty Care (TCCC) was developed in 1996 for the US Special Operations medical community to improve battlefield trauma care. It moved away from the civilian trauma algorithm taught in Advanced Trauma Life Support (ATLS).[3] Using historical medical data, TCCC identified the most common and preventable causes of death on the battlefield. As a result, the traditional ATLS ABC algorithm- airway, breathing, and circulation- was replaced with the MARCH protocol: massive hemorrhage control, airway management, respiratory management, circulation, and hypothermia prevention.[2,3] This research highlighted that the civilian approach to damage control resuscitation (DCR) did not adequately address the unique wounding patterns caused by penetrating and blast injuries, nor the challenges of treating casualties in an active threat environment.[8]

The establishment of TCCC guidelines introduced a standardized approach to prehospital care and enroute care, improving patient outcomes in an austere environment. Over the past three decades, TCCC has become the standard for managing combat-related trauma.[3] Recognizing TCCC's battlefield success, the civilian medical community began to evaluate whether its principles could benefit high-threat civilian medical operations. However, key differences between military and civilian medical objectives quickly emerged. This realization, along with the need for interoperable trauma training and a shared language across organizations, led to the creation of TECC by the Committee for Tactical Emergency Casualty Care (C-TECC) in 2011.[9]

Formation of Tactical Emergency Casualty Care

The TECC framework emerged from extensive discussions aimed at shifting traditional response paradigms for medical first responders. Historically, these paradigms prioritized scene safety over life-saving interventions, often leading to poor patient outcomes. TECC was designed to bridge the gap between military and civilian prehospital medicine by standardizing complex medical decision-making across all age groups in all-hazard and high-threat environments.[9–11] TECC addresses the unique challenges faced by civilian prehospital providers during high-threat response. These include legal requirements, coordination with civilian leadership, public bystander involvement, development of integrated response models, lack of body armor, and the specialized care needed for pediatric and geriatric patients.[9] These considerations, along with contributions from the Hartford Consensus (HC) and the Committee for Tactical Emergency Casualty Care (C-TECC), shaped TECC to what it is today.[9]

TECC guidelines emphasize three key areas: threat mitigation, hemorrhage control, and rapid evacuation of casualties to definitive medical care. While TECC shares foundational principles with TCCC, the two frameworks differ in terminology, operational focus, and approaches to trauma resuscitation. Despite these differences, both prioritize minimizing the time between injury and initial stabilizing care, which is critical for effective damage control resuscitation (DCR). A core feature of TECC is its focus on the continuity of care in DCR. It highlights the role of the "first care provider," often a bystander, in initiating hemorrhage control and transitioning care to trauma surgeons at a hospital.[8] This seamless progression of care is illustrated in the TECC Chain of Survival below (Figure 1).

Figure 1. Tactical Emergency Casualty Care (TECC) Chain of Survival

The TECC Chain of Survival shows the continuity of care in a tiered manner for all potential medical providers. Each medical provider has an appropriate, scope-limited set of TECC knowledge and procedures that can be built upon and carried forward as an injured patient moves up the chain.[8,9] Adapted from Shapiro et al and Callaway.[8,9]

The three dynamic phases of TECC (Table 1) focus on reducing the overall morbidity and mortality of patients in a prehospital setting by providing immediate access to the injured, delivering rapid life-saving interventions, and facilitating transportation to interventions, and facilitating transportation to the next level of definitive care when needed.

Table 1. Comparison of the phases of care for TECC and TCCC guidelines[11–13]

TECC - Phases of Care	TCCC – Phases of Care
Direct Threat Care – Hot Zone	Care Under Fire
Indirect Threat Care – Warm Zone	Tactical Field Care
Evacuation Care – Cold Zone	Tactical Evacuation Care

Differences in Current Civilian Prehospital Trauma Training

Currently there are four primary civilian prehospital training courses available for clinicians and providers: Advanced Trauma Life Support (ATLS), International Trauma Life Support (ITLS), Prehospital Trauma Life Support (PHTLS), and TECC. ATLS is a trauma training program developed by the American College of Surgeons and its Committee on Trauma (COT). It is designed to train physicians, advanced practice providers, and certified registered nurse anesthetists in using a systematic and concise algorithm to deliver life-saving interventions for trauma patients.[14] ITLS offers similar trauma training as ATLS but is accredited by the American Academy of Emergency Physicians. It emphasizes a flexible, team-centered, algorithmic approach to managing trauma patients.[9] The two main differences between ITLS and ATLS are: ITLS does not include the advanced surgical skills included in ATLS, and ITLS is available to a broader audience, including emergency medical support personnel and registered nurses.[15] PHTLS, accredited by the Commission on Accreditation for Prehospital Continuing Education (CAPCE), is widely regarded as the global gold standard for prehospital trauma education. It is available to emergency medical technicians, paramedics, nurses, advanced practice providers, and physicians. Framed around the principles of ATLS, PHTLS is specifically tailored for prehospital providers.[16] Care provided during the Cold Zone Phase of TECC closely resembles the trauma training taught in PHTLS and ITLS. However, TECC differs in that it emphasizes resource and personnel management in the face of ongoing operational threats. It addresses challenges such as managing multiple casualties, varying mechanisms of injuries, and balancing limited resources to prioritize care for the most critical patients.[8]

Training Guidelines for Paramedics

In the US, there is no standardization training requirement to maintain state licensure or certification, as compared to the national registry. To become a paramedic, candidates must graduate from an accredited paramedic program. Depending on the state where they plan to practice, they must pass either a state licensure examination, the National Registry exam, or both. Currently, 46 states use the National Registry certification, administered by the National Registry of Emergency Medical Technicians (NREMT), as the basis for licensure.[17] The US National Highway Traffic Safety Administration (NHTSA) mandates that each state establish an Emergency Medical Service (EMS) program and provide a national standard curriculum required for all Emergency Medical Technicians (EMTs). However, not all accredited paramedic programs require EMT certification before advancing to paramedic training.[18]

NHTSA also defines the scope of practice for EMS personnel.[18] Despite this, individual states can modify these standards by adding or removing required medical courses, skills, and procedures.[19] There are no universal mandates required for paramedics to maintain active certifications for Advanced Life Support (ALS), Basic Life Support (BLS), Pediatric Advanced Life Support (PALS), or trauma-focused certifications such as ITLS, PHTLS, or TECC. Instead, paramedics are only required to meet state, local, and system training standards. Most recertification requirements can be fulfilled through online training modules. This lack of national standardization for paramedic training, combined with limited funding for hands-on clinical competency development, contributes to complacency and the use of outdated trauma treatment protocols.

Tactical Emergency Medical Support and Rescue Task Force Programs

The need to expand beyond routine day-to-day medical knowledge and prepare for trauma-focused medical techniques is clear. A standardized training framework already exists within the civilian sector through Tactical Emergency Medical Support (TEMS) and Rescue Task Force (RTF) programs. Although TEMS-trained providers are embedded with tactical

teams, the principles of TECC apply universally to all members. The mission of the tactical provider is to focus on reducing risk, decreasing morbidity and mortality during prehospital care, and maximizing patient survival.[20,21] In 2009, the RTF model was developed by the Arlington County Fire Department in Virginia to adapt the core principles of TCCC for high-threat civilian environments. An RTF team typically consists of two EMS providers, either paramedics or advanced EMTs, and two to four law enforcement officers. These teams are designed to deliver immediate life-saving interventions in areas with active threats, where Special Weapons and Tactics (SWAT) teams are actively working to neutralize the danger.[22] Both TEMS and RFTs train providers using the TECC framework as a foundation.[22]

Expanding the TEMS and RTF frameworks into more state and federal jurisdictions will strengthen preparedness for future MCIs and improve the survival rates in prehospital settings. Implementing this standardized approach through TECC across more EMS systems will also promote the use of a common language for interoperability between systems and states. This ensures consistent response and treatment strategies during future MCIs.[20] A trauma response model grounded in TECC reduces errors with infrequently practiced protocols and enables streamlined training administration, validation, and recertification.[12] Establishing mandatory TECC training and recertification will hold EMS providers to higher standards of education and preparedness, enhancing the quality of prehospital trauma care.

Challenges and Considerations

More qualitative research is needed to assess the impact of trauma training for prehospital providers on patient outcomes. Conducting trauma research, especially randomized controlled trials in prehospital settings, poses significant challenges due to the complexity of patient care. While there is limited literature evaluating the application of TECC principles, existing evidence highlights the success of TCCC in deployed military settings over the last 20 years. Similarly, TECC's use in TEMs and RTFs demonstrates the potential to improve patient survivability before reaching definitive care.

However, implementing national standardization for TECC along with the curriculum, training, and operational models of TEMS and RTFs presents operational, political, and regulatory challenges. These programs must comply with jurisdictional laws and state regulations, navigate funding limitations, and address political conflicts between state and federal authorities.[12] A major obstacle to making TECC the national standard for prehospital trauma training is funding initial and recurrent training programs. Local, state, and federally funded EMS systems, particularly in rural areas, may find the costs prohibitive. In contrast, urban environments face a higher call volume and greater risk of violence, which may justify prioritization of such training.

Although advanced certifications such as the Certified Tactical Paramedic (TP-C) provide a recognized standard for providers in high-threat environments, these credentials are not universally required or accessible. Establishing TECC as a baseline for all providers would ensure consistency, while advanced certifications could serve as an additional layer of professional competency.

Because the location of the next conventional or unconventional MCIs cannot be predicted, these events create unique challenges for civilian prehospital providers and underscore the need for preparedness and adherence to a universal standard of trauma care.

CONCLUSION

The rising frequency and lethality of intentional mass casualty incidents (MCIs) in the United States, such as a 20% increase in mass shootings from 2015 to 2019, underscore the urgent need for standardized prehospital trauma training.[1] Tactical Emergency Casualty Care (TECC) offers a proven framework to address these challenges, equipping paramedics with skills that reduce preventable deaths by addressing critical factors such as hemorrhage control and rapid evacuation. Beyond domestic applications, TECC holds significant potential as a global benchmark for high-threat response protocols, aligning with international frameworks such as the World Health Organization (WHO) Emergency Trauma Care guidelines and the Sendai Framework for Disaster Risk Reduction.[23,24]

Countries like Israel, with its integrated trauma systems, and the United Kingdom (UK), through its Major Trauma Network, have demonstrated the value of standardized, scalable frameworks for addressing trauma and mass casualty incidents.[5,25] Recent studies on the UK's trauma care system highlight the success of its inclusive regionalized network, as well as innovations in triage protocols that enhance its readiness for mass casualty scenarios. [26,27,28] For instance, ongoing analyses of adherence to TCCC principles reveal critical areas for improvement and scalability to civilian settings.3,29 Adapting TECC into a broader context can address logistical challenges like resource scarcity while aligning with global recommendations, such as those for combat operations in extreme environments or unique triage situations.[30,31]

Future efforts should focus on addressing logistical, financial, and political barriers to widespread adoption, while fostering international partnerships with agencies such as the WHO and North Atlantic Treaty Organization (NATO). By leveraging lessons learned from global counterparts and integrating TECC into multinational training and disaster preparedness initiatives, the US can lead the way in creating a unified, lifesaving standard for prehospital trauma care. As emerging research underscores the importance of international collaboration in adapting TECC for diverse climates and operational settings, this model should be recognized not only as an operational necessity but as a vital global standard for safeguarding lives and strengthening international resilience.[9,32,33]

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The authors have no conflicts of interest to declare.

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References:

1.Hodgson L. How Violent Attacks Are Changing The Demands of Mass Casualty Incidents: A Review of The Challenges Associated with Intentional Mass Casualty Incidents. Homel Secur Aff. 2021; 17(1). Accessed September 1, 2024. https://www.hsaj.org/articles/16880

2.Puryear B, Roarty J, Knight C. EMS Tactical Combat Casualty Care. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022. Accessed September 1, 2024. http://www.ncbi.nlm.nih.gov/books/NBK532260/

3.Strauss R, Menchetti I, Perrier L, et al. Evaluating the Tactical Combat Casualty Care principles in civilian and military settings: systematic review, knowledge gap analysis and recommendations for future research. Trauma Surg Amp Acute Care Open. 2021 ; 6(1): e000773. doi:10.1136/tsaco-2021-000773

4.Committee for Tactical Emergency Casualty Care. What is C-TECC? 2024. Accessed September 1, 2024. https://www.c-tecc.org/about-us/what-is-ctecc

5.Kiertstead R. Recommendation for a National Standard for Tactical Emergency Casualty Care and Israeli Hospital Trauma Protocols in the United States. [Master's Thesis]. Monterey, CA: Naval Postgraduate School (US), Center for Homeland Defense and Security; 2015. Accessed September 1, 2024. https://www.hsdl.org/c/view?docid=768622

6.Peterson J. A Multi-Level, Multi-Method Investigation of the Psycho-Social Life Histories of Mass Shooters. Natl Inst Justice. Published January 1, 2021. Accessed September 1, 2024. https://www.ojp.gov/pdffiles1/nij/grants/302101.pdf

7.112th United States Congress. Investigative Assistance for Violent Crimes Act of 2012: Public Law 112-265. United States Congress. Published January 14, 2013. Accessed September 1, 2024. https://www.congress.gov/112/plaws/publ265/PLAW-112publ265.pdf

8.Shapiro G, Sarani B, Smith ER. Tactical Emergency Casualty Care (TECC): Principles and Practice. Front Line Surg. 2017; 711-725. doi:10.1007/978-3-319-56780-8_41

9.Callaway DW. Translating Tactical Combat Casualty Care Lessons Learned to the High-Threat Civilian Setting: Tactical Emergency Casualty Care and the Hartford Consensus. Wilderness Environ Med. 2017; 28: S140-S145. doi:10.1016/j.wem.2016.11.008

10.Shapiro GL, Marino MJ, Callaway DW, et al. Proceedings of the 2023 Spring/Summer Meeting of the Committee for Tactical Emergency Casualty Care (C-TECC) and Committee Updates. J Spec Oper Med. Published 2023. doi:10.55460/APZU-5IKO

11.Smith W. Integration of Tactical EMS in the National Park Service. Wilderness Environ Med. 2017; 28: S146-S153. doi:10.1016/j.wem.2017.03.002

12.Pennardt A, Callaway DW, Kamin R, et al. Integration of Tactical Emergency Casualty Care Into the National Tactical Emergency Medical Support Competency Domains. J Spec Oper Med. 2016; 16(2): 62-66. Accessed September 1, 2024. https://pubmed.ncbi.nlm.nih.gov/27450605/

13.Joint Trauma System - Committee on Tactical Combat Casualty Care. Tactical Combat Casualty Care Guidelines. Published January 25, 2024. Accessed September 10, 2024. https://books.allogy.com/web/tenant/8/books/b729b76a-1a34-4bf7-b76b-66bb2072b2a7/

14.American College of Surgeons. About Advanced Trauma Life Support. Trauma Education. Accessed September 13, 2024. https://www.facs.org/quality-programs/trauma/education/advanced-trauma-life-support/about/

15.ITLS - International Trauma Life Support. ITLS Provider. ITLS - International Trauma Life Support. Updated January 2017. Accessed September 13, 2024. https://www.itrauma.org/education/itls-provider/

16.National Association of Emergency Medical Technicians. Prehospital Trauma Life Support. NAEMT. Accessed September 13, 2024. https://www.naemt.org/education/trauma-education/phtls

17.National Registry of Emergency Medical Technicians. About The National Registry - National Registry of Emergency Medical Technicians. NREMT. Updated February 2024. Accessed September 18, 2024. https://nremt.org

18.National Association of State EMS Officials. Practice Model 2019: Including Change Notices 1.0 and 2.0. DOT HS 813151. Accessed September 21, 2024. https://www.ems.gov/assets/National_EMS_Scope_of_Practice_Model_2019_Change_Notices_August_2021.pdf

19.National Highway Traffic Safety Admin. National EMS Education Standards. Published 2021. Accessed September 18, 2024. https://www.ems.gov/assets/EMS_Education-Standards_2021_FNL.pdf

20.Turner CD, Lockey DJ, Rehn M. Pre-hospital management of mass casualty civilian shootings: a systematic literature review. Crit Care. 2016; 20 (1): 362. doi:10.1186/s13054-016-1543-7

21.Snyder EN, Less K. EMS Federal and State Laws Affecting Tactical Medicine. StatPearls. Published June 5, 2024. Accessed September 1, 2024.

http://www.ncbi.nlm.nih.gov/books/NBK603754/

22.Nguyen L, Kropp A, Ross J. Cooling Down the Warm Zone: Rescue Task Force. EMRA - EM Resident. Published June 12, 2018. Accessed September 21, 2024. https://www.emra.org/emresident/article/rescue-task-force

23.World Health Organization. Prehospital Trauma Care Systems. WHO; 2005. Accessed December 31, 2024. https://iris.who.int/bitstream/handle/10665/43167/9241592294X.pdf?sequence=1

24.United Nations Office for Disaster Risk Reduction. Sendai Framework for Disaster Risk Reduction 2015-2030. UNDRR; 2015. Accessed December 31, 2024. https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

25.Cole E. The national major trauma system within the United Kingdom: inclusive regionalized networks of care. Emerg Crit Care Med. 2022;2(2):76-79. doi:10.1097/EC9.0000000000000040

26.Malik NS, Chernbumroong S, Vassallo J. The BCD triage sieve outperforms existing major incident triage tools: comparative analysis using the UK national trauma registry population. Lancet EClinicalMedicine. 2021;34:100806. doi:10.1016/j.eclinm.2021.100806

27.Gabbe BJ, Veitch W, Curtis K. Review of the requirements for effective mass casualty preparedness for trauma systems. Br J Anaesth. 2022;128(5):732-738. doi:10.1016/j.bja.2022.01.024

28.Horne S, Hunt P, Hall B. War and disaster are forcing a major rethink around mass casualty management. BMJ Mil Health. 2024;170(6):457-463. doi:10.1136/bmjmilitary-2023-002208

29.Fisher AD, April MD, Naylor JF, et al. An analysis of adherence to tactical combat casualty care guidelines for the administration of tranexamic acid. Am J Emerg Med. 2019;37(12):2184-2190. doi:10.1016/j.ajem.2019.06.025

30.Clarke EE, Hamm J, Fisher AD, April MD. Trends in prehospital blood, crystalloid, and colloid administration in accordance with changes in tactical combat casualty care guidelines. Mil Med. 2022;187(11-12):e1265-e1271. doi:10.1093/milmed/usab461

31.Rund TJ. Casualty evacuation in Arctic and extreme cold environments: a paradigm shift for traumatic hypothermia management in tactical combat casualty care. Int J Circumpolar Health. 2023;82(1):2196047. doi:10.1080/22423982.2023.2196047

32.Joyce S, Grow R, Brenneman JL, SPRINGER BL. EMS Tactical Remote Assessment and Surrogate Care. In: StatPearls. Treasure Island (FL): StatPearls Publishing; September 26, 2022.

33.Remondelli MH, Remick KN, et al. Casualty care implications of large-scale combat operations. J Trauma Acute Care Surg. 2023;95(8 Suppl):S76-S85. doi:10.1097/TA.0000000000003912

