



# **Trauma and Injury Subcommittee**

## **Decision Brief:**

**Combat Trauma Lessons Learned from  
Military Operations of 2001-2013**

**Col (Ret) Donald Jenkins, MD, FACS, DMCC**

Defense Health Board  
November 6, 2014



# Overview

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- Problem Statement
- Membership
- Timeline
- Briefings & Resources
- Structure of the Written Report
- Findings & Recommendations



# Problem Statement

(1 of 2)

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- The survival rate of Service members injured in combat has significantly improved during the recent decade of military conflict due to advances in trauma care and knowledge gained by medical personnel in the prehospital far forward environment



# Problem Statement

(2 of 2)

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- It is important that the advancements resulting in these increased survival rates not be lost but, rather, sustained and expanded with research so immediate re-implementation is possible in the event of future conflict.



# Membership

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## ■ Trauma and Injury Subcommittee

- James (Jim) Bagian, MD, PE
- CAPT (Ret) Brad Bennett, PhD, NREMT-P, FAWM
- CAPT (Ret) Frank Butler, Jr., MD
- Jeffrey Cain, MD
- David Callaway, MD, MPA
- John Gandy, III MD\*
- Col (Ret) Donald Jenkins, MD, FACS, DMCC
- Norman McSwain, Jr., MD, FACS
- CAPT Edward (Mel) Otten, MD, FACMT, FAWM
- CAPT (Ret) Peter Rhee, MD, MPH

\*Resigned as of May 1, 2014



# Timeline

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**January 2013:** DHB subcommittee members convened to begin investigation.

**October 2013– December 2013:** Members received briefings from subject matter experts to inform findings and recommendations.

**February 2014-July 2014:** Members developed draft report, and refined findings and recommendations for the DHB's consideration.

**August 2014-October 2014:** Members incorporated comments from the August DHB Meeting into the draft report, and refined findings and recommendations for the DHB's reconsideration.



# Briefings & Resources

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- U.S. Army Medical Research and Materiel Command
- Joint Trauma System
- Service Trauma Consultants
- Uniformed Services University of the Health Sciences
- U.S. Combat Casualty Care Research Program



# Structure of the Written Report

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- Executive Summary
- Background and Introduction
- Department of Defense Trauma System
- Communication
- Informatics
- Performance Improvement
- Training
- Research/Clinical Investigation





# Findings & Recommendations

## Overview

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- Department of Defense Trauma System
  - Recommendations 1.1-2.1
- Communication
  - Recommendations 3.1-3.4
- Informatics
  - Recommendation 4.1
- Performance Improvement
  - Recommendations 5.1-5.2
- Training
  - Recommendations 6.1-14.1
- Research and Clinical Investigation
  - Recommendation 15.1



# Lesson # 1

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*Despite vast improvements in the military trauma care system over the past decade, there is no unifying agency with oversight over all aspects of the combat casualty care system.*



# Recommendation # 1.1

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**Establish a senior level organization, such as the Defense Health Agency (DHA), as the lead agency for oversight of trauma care.**

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## Recommendation # 1.2

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**Establish the Joint Trauma System (JTS), in its role as the Department of Defense Trauma System (DoDTS), as the lead agency for trauma in the DoD with authority to establish and assure best-practice trauma care guidelines to the Director of the DHA, the Services, and the Combatant Commanders.**



## Lesson # 2

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*At the onset of the current conflicts, communication, coordination, and command and control of and among levels of care and personnel across the Services under Combatant Command control were not well coordinated, trained for, and implemented consistent with practices in civilian centers and systems.*



# Recommendation # 2.1

(1 of 2)

## Responsibilities of the Service Command:

- a. Unit surgeons\* or the medical advisor for the line commander shall be fully **competent\*\*** in the recommended **professional and** practice standards as promulgated by the proposed DoDTS [at the writing of this report, it would be the Tactical Combat Casualty Care (TCCC) Guidelines and DoDTS clinical practice guidelines (CPGs)].

\*For example a battalion surgeon

**Additional text in red**

**\*\*Replaced “current”** PREDECISIONAL



# Recommendation # 2.1

(2 of 2)

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## Responsibilities of the Service Command:

- b. Combatant Command Surgeons shall report their expectations, including evacuation times, CPGs, and integration to the DoD Trauma Registry (DoDTR).**



## Lesson # 3

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*At the beginning of the conflicts, communication and specifically clinical patient information was difficult to transmit among levels of care.*





# Recommendation # 3.1

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**DoD shall establish and promote a Joint Trauma Medical Communications and Information Director **to work with the JTS**, who has the authority and resources to develop, test, acquire, and implement a communication system focused on meeting medical needs.**

**Additional text in red**



# Recommendation # 3.2

(1 of 2)

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**DoD shall develop, test, and implement a dedicated medical communications and information system that:**

- a. provides GPS location of the medic in theater or garrison when the mission allows.**
- b. enables audiovisual communications among military treatment facilities to support situational awareness across Level I through IV facilities.**



# Recommendation # 3.2

(2 of 2)

- c. supports a user-friendly electronic medical documentation system from the field through the various treatment facilities. This system should be portable, have biometric and tracking capabilities, allow accessibility to pertinent medical records, contain audiovisual capabilities, and enable **viewing\*** of radiographs to the medical record. Further, the system should be standardized across the Services.
- d. supports collaborative performance improvement.

**\*Replaced “attachment”**



## Recommendation # 3.3

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**DoD should continue to expand its partnerships with civilian trauma organizations to share information, preserve lessons learned, and improve trauma care. A close partnership with a civilian medical center would help to ensure rapid stand up capability if necessary and in peacetime, could allow for additional trauma experience, maintaining the skills and competency of military medical personnel.\***

**Additional text in red**



## Recommendation # 3.4

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**DoD should ensure the sustainment of effective and targeted communication, distributing important combat casualty care information in a timely manner [such as the Committee on TCCC (CoTCCC system in use at the publication of this report)].**



## Lesson # 4

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*In the context of trauma care, informatics equates to the use of electronic medical records, which are vital to clinical care across the continuum and to performance improvement and research.*



# Recommendation # 4.1

(1 of 3)

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**To establish a uniform registry that encompasses all aspects of trauma care, from the field to rehabilitation, DoD should take the following actions.**

- a. Develop a high-fidelity online, tiered database as well as enhanced communications capability through all levels of care.**
- b. Increase research and development funding for new, automated live-patient tracking and identification, including biometrics.**



# Recommendation # 4.1

(2 of 3)

- c. Develop an expeditionary, deployable electronic medical record (EMR), which is easy to use, readily taught, increases productivity, secure, web-based, instantly visible from all levels including the Veterans Administration, compatible with existing databases and registries, and built by established experts in information systems with input from practicing military providers.**
- d. Increase system-wide support for concurrent data collection across the continuum to include tactical combat casualty care and Levels I-III, en route care/ Critical Care Air Transport (CCAT).**
- e. Expand the DoDTR platform to provide continuous real-time performance assessment.**





# Recommendation # 4.1

(3 of 3)

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- f. Expand the DoDTR platform to provide **data and information which can be used in conjunction with the Armed Forces Medical Examiner System in continuous real-time performance assessment and validation of best practices.**

**Additional text in red**



# Recommendation # 5.1

(1 of 2)

The DHB **\* concurs with\*\*** the findings and recommendations of the *United States Military Joint Trauma System Assessment* **as listed below†** and encourages DoD to act on **these recommendations. ††**

**\*Removed “Trauma and Injury Subcommittee”**

**\*\*Replaced “endorses”**

**† Additional text**

**†† Replaced “them”**



# Recommendation # 5.1

(2 of 2)

- a. JTS should develop an overarching performance improvement (PI) and Patient Safety Plan;**
- b. The PI and Patient Safety Plan should encompass a system wide process for identifying events, taking corrective actions, monitoring, evaluating and benchmarking;**
- c. JTS, as the lead agency for the system, and the JTTS leadership in theater, must possess the infrastructure and authority, and systems of accountability over the continuum of care for the PI process; and**
- d. A robust and system-wide informatics platform is needed to support the process.**

**Additional text in red**



## Lesson # 5

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*Ongoing improvement of outcomes for the combat wounded requires a robust ability to monitor the care rendered to combat casualties and to measure casualty outcomes as a function of the various elements of trauma care provided along the continuum in theaters of conflict. The Services are attempting to track and analyze outcomes, but compared to JTTS/JTS/DoDTS oversight of same, there is significant opportunity to codify the PI process.*



# Recommendation # 5.2

(1 of 3)

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**DoD shall establish a formal and system-wide process for event identification and prioritization, determination of root causes, and development of possible countermeasures for PI. Such analysis and evaluation would improve the entire spectrum of trauma care and allow DoD to document casualty outcomes to demonstrate that the right care was provided under the right circumstances.**



# Recommendation # 5.2

(2 of 3)

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**Specifically, this requires the following:**

- a. Improved documentation including prehospital care and evacuation care and times.**
- b. Ongoing analysis of combat injuries to identify potentially preventable adverse events in conjunction with the Armed Forces Medical Examiner System.**



# Recommendation # 5.2

(3 of 3)

- c. Submission of timely and focused case reports from the unit level, prepared by field level personnel who are trained, resourced and designated as responsible and who have deployed with all medical units. These reports should be linked, in a timely manner, to the larger JTS.**
- d. Adherence to the cycle of PI including data acquisition, information analysis, and application of advances back into the larger trauma system.**

**Additional text in red**



# Lesson # 6

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*A robust PI system is required to link trauma training to patient outcomes and validate training methodology.*





# Recommendation # 6.1

(1 of 3)

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**To ensure a systems approach to trauma training, DoD shall take the following actions.**

- a. Support the development of a formal link between the JTS and military medical training centers (e.g., Joint training centers, enlisted schoolhouses, Uniformed Services University of the Health Sciences [USUHS], medical proficiency training [MPT] sites).**
- b. Provide military medical leaders with formal training in PI operations.**



# Recommendation # 6.1

(2 of 3)

- c. Ensure line commanders are aware of current casualty response system and best practice recommendations (such as those found on the JTS website at the time of this report).\***
- d. Establish a joint electronic repository for medical lessons learned, supporting scientific evidence, relevant DoD and Service operational documents, and existing Service-training efforts.**

**\*Replaced “officers and personnel learn current lifesaving interventions (LSI) skills.”**



# Recommendation # 6.1

(3 of 3)

- e. Establish a high-level battlefield care directorate \* staffed with personnel possessing appropriate and relevant clinical expertise (**at the time of this report that directorate may be the DHA**).
- f. Enable oversight by the U.S. Army Institute of Surgical Research/DHA.

**\*Removed “or command”**  
**Additional text in red**



# Lesson # 7

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*Medical and trauma knowledge must flow freely between the civilian and military medical communities and be coupled with rapid training integration strategies.*



# Recommendation # 7.1

(1 of 2)

**To standardize and harmonize trauma training across the Services, DoD shall take the following actions:**

- a. Sustain and expand initiatives to train and support all tactical evacuation medics to a common and high standard (at the writing of this report that standard would be Critical Care Flight Paramedics) (e.g., 160th Special Operations Aviation Regiment [Airborne] model, Air Force Special Operations Command model, newly implemented Army Medical Department [AMEDD] model).**
- b. Develop an initiative to train and sustain combatant unit senior ground medics to a common and high standard.**
- c. Support the development of the Critical Care Air Transport (CCAT) and Center for the Sustainment of Trauma & Readiness Skills (CSTARs) by the Air Force for development of best practices and common standards for en route care.**



# Recommendation # 7.1

(2 of 2)

- d. Review Service trauma training center programs (Army Trauma Training Centers [ATTC], Navy Trauma Training Centers [NTTC], CSTARS) and consider creating Joint Trauma Training Centers (JTTCs).**
- e. Ensure best practices and procedures are cross-leveled and standardized across all military medical simulation training centers (MSTCs), which should receive central certification.**
- f. Ensure MSTC trainers are subject matter experts, regardless of military versus civilian status, and are trained to a standard, not to a time.**
- g. Train military TACEVAC personnel to, at a minimum, civilian critical care transport standards (see standard 6.2 c on previous slide).**



## Lesson # 8

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*The lack of comprehensive, standardized training for military **health care providers**\* creates an operational gap that affects unit-level training as well as effective utilization of the military system to reduce combat mortality.*

**\*Replaced “physicians”**



# Recommendation # 8.1

(1 of 2)

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**The Uniformed Services University of the Health Sciences, as DoD's joint military medical school, shall take the following actions.**

- a. Continue to expand and institutionalize its direct participation, research, and training in trauma and combat casualty care delivery across Services and throughout the continuum of care.**
- b. Develop and formalize a partnership with the Joint Trauma System.**





# Recommendation # 8.1

(2 of 2)

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- c. Systematically train and develop clinical experts in prehospital battlefield care.
- d. Involve the DHB Trauma and Injury Subcommittee in setting the curriculum.
- e. **Develop a trauma care curriculum that would be required by all health care providers before deployment.**

**Additional text in red**



# Lesson # 9

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*Effectively trained TCCC has a demonstrable effect on reducing potentially preventable causes of death on the battlefield.*



# Recommendation # 9.1

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**TCCC shall continue to form the basis for battlefield trauma care and be integrated as the minimal accepted standard of training for all military members, initial enlisted medical training, and specialized enlisted medical training. In addition, TCCC sustainment training programs must occur on a regular basis, as the TCCC Guidelines are a “living” document and are regularly updated.**

**Additional text in red**



# Lesson # 10

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*TCCC and combat trauma training must be provided in a tiered fashion to all personnel operating in the battle space.*



# Recommendation # 10.1

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**The DoD shall require that all military personnel deploying in support of combat operations be trained in TCCC. This training shall be carried out at a minimum on initial entry into the service and within six months of deploying. This training should be scaled to the skill set of the personnel. The unit commander should be accountable for accomplishment of this training task in a fashion similar to any other training standard of their unit. Personnel shall not deploy until they accomplish this training.**



# Lesson # 11

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*Effective knowledge acquisition and retention requires multi-modal educational strategies that include appropriate balance of didactics, practical application, scenario-based learning, distance learning, live tissue training (LTT), human role models, clinical experience, and high-fidelity simulation.*



# Recommendation # 11.1

(1 of 2)

**To ensure multi-modal educational strategies are used in trauma training, DoD shall take the following actions.**

- a. Prioritize medical and trauma training as components of the METL and fund efforts to develop distance learning, virtual reality, and high-fidelity simulation training.**
- b. Support enduring sustainment hands-on trauma training for all pre-hospital medical personnel including, but not limited to LTT and Trauma Center Rotations) (e.g., USSOCOM Directive 350-29 model; USASOC Regulation 350-1 model).**



# Recommendation # 11.1

(2 of 2)

- c. Investigate partnerships with the Defense Advanced Research Projects Agency and private industry developers of popular combat video games (e.g., “Halo ©,” “Call of Duty ©,” “Gears of War ©”) to create integrated, accurate first responder treatment protocols for casualties in the game, based on injuries and injury requirements.
- d. Upgrade the medical simulation training centers to serve as the medical range for every division-sized post.
- e. Develop a surgical skills course, including war surgery skills.
- f. Develop a national certified trauma course, **standardizing CPGs across the spectrum of trauma training.**

**Additional text in red**





# Lesson # 12

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*Medical and trauma training must be integrated into operational and tactical training.*



# Recommendation #12.1

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To integrate trauma training into operational and tactical training, DoD shall take the following actions.

- a. Train all combatant unit personnel in basic TCCC and combat trauma management initially, annually, and within six months of combat deployment (e.g., USSOCOM Directive 350-29 model); this shall be a requirement for deploying to a combat theater.
- b. Include demanding, realistic, scenario-based exercises in training, identifying basic critical tasks and training those to mastery, not **merely** familiarization.
- c. Leverage the opportunity for field medical operations and training.
- d. Establish Service training under the newly established DHA in order to standardize training across the Services.



# Lesson # 13

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*LTT has an important, tailored role in trauma training for life saving interventions (LSI) on the battlefield.*



# Recommendation # 13.1

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**LTT should be combined with high-fidelity simulation and integrated operational medical training across the force. DoD should continue to fund research efforts to compare cost, efficacy and sustainability of LTT programs compared to high fidelity simulation for training LSI.**



# Lesson # 14

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*Commanders can only accept full responsibility for risk assumption or mitigation when they understand the inherent risk as well as their options as commanders to mitigate that risk. Medicine, medical, and medical training are terms conveying specialty training or education and have no tactical relevance. Accordingly, casualty response training for first responders and combatant leaders is often not incorporated into unit battle drills. This trauma training for leaders is an essential component of battlefield trauma care.*



# Recommendation # 14.1

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**To ensure command accountability for trauma training, the following shall occur.**

- a. Battlefield trauma training must be a reportable item and receive command attention.**
- b. Medical training and readiness shall be measured before deployments and considered a go or no go item with commander attention.**
- c. DoD shall provide a structure and foundation for casualty response systems and trauma care training. Combatant non-commissioned officers provide first responder continuity for casualty response systems.**
- d. DoD shall change all references to tactical life-saving tasks/equipment from medical to casualty.**



## Lesson # 15

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*Since the start of Operation IRAQI FREEDOM and Operation ENDURING FREEDOM in 2001, numerous advances have been made in battlefield trauma care but more research is needed to fill critical gaps.*



# Recommendation # 15.1

(1 of 3)

**To advance the trauma and injury research agenda, DoD shall take the following actions.**

- a. Continue to fill the research gaps remaining from the *2008 Guidance on Development of the Force*.**
- b. Continue to support trauma care research during the interwar years in order to address existing TCCC gaps identified by the CoTCCC in the following areas:**
  - i. non-compressible hemorrhage.**
  - ii. hemostatic dressings and resuscitation strategies.**
  - iii. lyophilized plasma product.**
  - iv. fluid resuscitation.**
  - v. combat casualty care monitoring devices.**
  - vi. junctional hemorrhage control.**
  - vii. training and evaluation methods for TCCC skills.**
  - viii. airway management.**





# Recommendation # 15.1

(2 of 3)

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- c. Embed deployable research teams within deployed commands or deployed hospitals.**
  - d. Work to ensure a clinicopathological review of every U.S. combat fatality, including preventable death analyses from combat units.**
  - e. Support the continued use and analysis of the DoD Trauma Registry in order to identify areas of potential improvement and measurement of implemented mitigation strategies.**



# Recommendation # 15.1

(3 of 3)

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- f. Implement a transition initiative to procure, field, train, and track new TCCC devices and medications.**
  - g. Establish an interagency mechanism with the Food and Drug Administration to approve proposed projects and indications for use by the Services in deployed combat environments.**
  - h. Recommend the sustainment of the annual Military Medical Health Research Symposium which is meant to link the clinical questions to the future funding.**



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# Questions?