



**Trauma and Injury Subcommittee:  
Battlefield Research, Development, Test and  
Evaluation Priorities**

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Defense Health Board  
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## Overview

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- Trauma and Injury Subcommittee Membership
- Background
- Method
- List of Prioritized RDT&E Items
- Proposed Recommendation

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## Subcommittee Membership

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- 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
- Norman McSwain, Jr., MD, FACS
- CAPT Edward (Mel) Otten, MD, FACMT, FAWM
- CAPT (Ret) Peter Rhee, MD, MPH

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## Background

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Part 1 of 2

- The Committee on Tactical Combat Casualty Care (CoTCCC), a work group of the Trauma and Injury (T&I) Subcommittee, initiates this annually produced list of priorities

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## Background

Part 2 of 2

- May 2012: CoTCCC developed this year's priorities; T&I approved
- June 2012: DHB reviewed and concurred with the list and requested their top 10 priorities
- August 2012: CoTCCC Vote
- November 2012: T&I Vote

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## Method for Prioritization

- Will conducting this research help to identify the causes of preventable death on the battlefield?
- How likely is it that the outcomes of this research will reduce the incidence of preventable death on the battlefield?
- Will conducting this research help identify ways to reduce long-term disability for casualties?
- Is the research question applicable to prehospital care providers?
- What methods or tools are currently available to address the problem we are proposing to address in the research question?
- How long would it take?
- How much would it cost?

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## RDT&E Priorities

Part 1 of 10

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### 1. Unit-Based Prehospital Trauma Registries

- Lack of and/or inconsistent data on prehospital care in theater
- 75th Ranger Regiment demonstrated significant reduction in mortality rate with implementation of the first unit-based trauma registry

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## RDT&E Priorities

Part 2 of 10

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### 2. FDA-Approved Freeze-Dried Blood Products (i.e. plasma or platelets)

- Critically important to improving resuscitation
- FDP currently being developed in Germany and France, and fielded in Afghanistan by French. Initial small-scale prospective studies show promising results.

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## RDT&E Priorities

Part 3 of 10

### 3. Clinicopathological Review of Every U.S. Combat Fatality, including Preventable Death Analyses from Combat Units

- Previous analyses of combat fatalities<sup>†</sup> have helped to determine whether injuries that resulted in death might have been survivable, and the incidence of these fatalities.
- Additional studies of potentially survivable injuries<sup>‡</sup> that resulted in death inform key process improvements in TCCC.

<sup>†</sup>Kelly JF, Ritenour AE, McLaughlin DF, et. al. "Injury severity and causes of death from Operation Iraqi Freedom and Operation Enduring Freedom: 2003-2004 versus 2006." *J Trauma* 2008; **64**(2 Suppl): S21-6.

Holcomb JB, McMullin NR, Pearse L, et. al. "Casuses of death in U.S. Special Operations Forces in the global war on terrorism: 2001-2004." *Ann Surg* 2007; **245**(6): 986-91.

<sup>‡</sup> Kotwal RS, Montgomery HR, Kotwal BM, et. al. "Eliminating preventable death on the battlefield." *Arch Surg* 2011; **146**(12): 1350-8.

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## RDT&E Priorities

Part 4 of 10

### 4. Development and Testing of Non-Compressible Torso and Junctional Hemorrhage Control Devices

- There are now several new devices (i.e. Combat Ready Clamp<sup>™</sup>, Abdominal Aortic Tourniquet <sup>™</sup>) designed to treat non-compressible torso and junctional\* hemorrhage.
- Prospective studies are lacking on the efficacy of these devices.
- No devices presently being fielded to compress torso hemorrhage

\*Junctional includes groin proximal to inguinal ligament, buttocks, gluteal and pelvic areas, perineum, axilla and shoulder girdle, and base of the neck

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## RDT&E Priorities

Part 5 of 10

### 5. Optimized Airway Devices and Training

- Surgical airways performed in the tactical environment frequently fail to achieve a patent airway.\*
- There is little evidence on the best way to train medics to increase the likelihood of success.
- Evidence is conflicting and inconclusive regarding optimal non-surgical airway devices.

\*Mabry RL. "An analysis of battlefield cricothyroidotomy in Iraq and Afghanistan." *J Spec Oper Med* 2012; 12(1): 17-23.

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## RDT&E Priorities

Part 6 of 10

### 6. Optimal Fluid Resuscitation for Casualties with Traumatic Brain Injury (TBI) and Shock

- Evidence is limited and conflicting regarding best practices for resuscitating a patient who may have a TBI.
- There is a fine line between achieving adequate cerebral perfusion and raising intracranial pressure to a level that may worsen the effects of TBI later on.
- Raising blood pressure of a casualty with non-compressible torso hemorrhage can cause additional bleeding; however, there is a need to raise BP to achieve cerebral perfusion.

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## RDT&E Priorities

Part 7 of 10

### 7. Training and Evaluation Methods for TCCC Skills

- Without regular practice, skills degrade over time.
- Retrospective and small-scale studies show benefits of TCCC training and skills; more prospective studies are needed to grow evidence base.
- Better metrics are needed to measure the effectiveness of training methods and tools.
- Evidence for simulation-based training versus live-tissue is lacking.

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## RDT&E Priorities

Part 8 of 10

### 8. Impact of TCCC Interventions in Preventing Post-Traumatic Stress Disorder (PTSD) and TBI including the role of Analgesia in Preventing PTSD

- The prevalence of PTSD and TBI among combat casualties has increased dramatically in recent years.
- A retrospective study published in the New England Journal of Medicine found that PTSD prevalence was lower among a group of casualties that received morphine directly after injury or during resuscitation and early trauma care, as compared to a group that did not receive morphine.\* Additional prospective studies of the impact of analgesia on PTSD are needed.

\*Holbrook TL, Galameau MR, Dye JL, et. al. "Morphine use after combat injury in Iraq and post-traumatic stress disorder." *N Engl J Med* 20120; 362(2): 110-7.

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## RDT&E Priorities

Part 9 of 10

### 9. Combat Casualty Care Monitoring Devices

- There is currently no single, compact remote monitoring device on the market that measures all vital signs.
- Such a device would enhance ability to provide care during TACEVAC.
- Given lack of prehospital data and challenges faced by hospital trauma providers when receiving casualties in theater without this information, such a device would greatly enhance care provided after turnover.

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## RDT&E Priorities

Part 10 of 10

### 10. Impact of Tactical Evacuation Provider level and Skill Sets on Survival

- LTC Robert Mabry conducted a retrospective study demonstrating higher survival rate among casualties treated by experienced, highly trained Reservist Paramedics than those treated by Army Combat Medics (68 Whiskeys).\*
- Prospective studies are needed to expand evidence base and confirm these assumptions.

\*Mabry RL, Apodaca A, Penrod J, et. al. "Impact of critical care-trained flight paramedics on casualty survival in helicopter evacuation in the current war in Afghanistan," *J Trauma Acute Care Surg* 2012; 73(2 Suppl 1): S32-7.

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## Recommendation

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- That the DHB approve forwarding the following battlefield medical RDT&E priorities to the Assistant Secretary of Defense (Health Affairs) (ASD(HA)), recommending:
  - That the ASD(HA) forward the list to the Deputy Assistant Secretary of Defense (Force Health Protection and Readiness) and the Service Surgeons General for consideration as high priority RDT&E issues

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## Summary

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- The Trauma and Injury Subcommittee believes that the aforementioned issues should be considered by the Department as the highest battlefield medical RDT&E priorities.

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**Questions?**