

**Committee on Tactical Combat Casualty Care**  
**Meeting Minutes**  
**3-4 February 2009**

Venue: Hawthorne Suites Hotel  
830 North St. Mary's Street  
San Antonio, TX 78205  
Texas Rooms A and B

Attendance:

**CoTCCC Members**

Dr. Frank Anders	U.S. Army	"
Dr. Jim Bagian	VA	_____
Dr. Brad Bennett	Medical Training Norfolk	_____
COL Lorne Blackburne	USAISR	_____
Dr. Jeff Cain	MCM	_____
Dr. David Callaway	Operational Medicine Institute	_____
Dr. Howard Champion	USUHS	_____
COL Jim Czarnik	JSOC	_____
SFC Miguel Davila	USASOC	_____
COL Warner Farr	USSOCOM	_____
Dr. John Gandy	Emergency Medicine	_____
HMCM Shawn Johnson	NSWGRU2	_____
COL Jay Johannigman	USAF	_____
Dr. Jim Kirkpatrick	US Army DCDD	_____
MAJ Bob Mabry	Dept. Combat Medic Training	_____
Dr. Norman McSwain	Charity Hospital/PHTLS	_____
MSG Harold Montgomery	75 <sup>th</sup> Rangers	_____
LTC Kevin O'Connor	White House Medical Office	_____
CDR Luis Ortega	Deployable Ops Group, USCG	_____
Dr. Edward Otten	University of Cincinnati	_____
Mr. Donald Parsons	Dept. Combat Medic Training	_____
Mr. Gary Pesquera	MARFORCOM	_____
Dr. Peter Rhee	Trauma Surgery Tucson	_____
MSGT Thomas Rich	USAF/31RQ5	_____
HSCS Glenn Royes	Deployable Ops Group, USCG	_____
HMCS Eric Sine	JSOMTC/NSOMI	_____
CAPT Jeffery Timby	NMC Portsmouth	_____

**CoTCCC Guests**

Mr. Sisinio Baldis	Sapien Systems, LLC	_____
LTC Ron Brisebois	Canadian Forces	_____
COL Stuart Campbell	UK LNO OTSG	_____
Mr. Bill Cauley	DAGEAA	_____
Mr. Will Chapleau	ACS/NAEMT/PHTLS	_____
LTC Shon Compton	Center for Predeployment Medicine	_____
Mr. John Correa	FBI HRT	_____
COL Robert DeLorenzo	BAMC	_____
CAPT John DeNobile	Gen. Surg Specialty Leaders, USN	_____
Ms. Sandra Dickinson	USA RDECOM-STTC	_____
Mr. William Donovan	75 <sup>th</sup> Ranger Regiment	_____

COL Warren Dorlac	USAF Trauma Consultant	_____
Dr. Juan Duchesne	Tulane/Charity	_____
CAPT Jim Dunne	NNMC	_____
Dr. William Fabbri	FBI OPR MED	_____
COL Stephen Flaherty	USA Trauma Consultant	_____
LTC Larry France	OTSG/USAMEDCOM	_____
MAJ James Fulton	DMSB	_____
Dr. Gerard Gibbons	Visual Eye, Inc.	_____
LTC Douglas Hodge	DMSB	_____
LTC Christopher Hulst	DMRTI	_____
COL John Kragh	USAISR	_____
HMC Frank Lake	NECC	_____
SCPO Mike Langley	MARCORSYSCOM	_____
Mr. Lyle Lumsden	U.S. Dept of State	_____
SSG John Maita	75th Ranger Regiment	_____
LTC Paul Mayer	Dept. Combat Medic Training	_____
LTC John McManus	USA Predeployment Training Cell	_____
Dr. Claudia McDonald	Texas A&M-Corpus Christi	_____
Mr. John Miles	FMTB East	_____
Mr. Ron Palmer	USAMMA	_____
LTC Andy Pennardt	USASOC	_____
HMC Adrian Robinson	NEMTI	_____
Dr. Jeffery Salomone	PHTLS	_____
Dr. Martin Schreiber	USAISR	_____
MSG John Steinbaugh	USASOC	_____
LT Scott Staup	FMTB East	_____
HMCS Cyril Taylor	NEMTI	_____
MAJ Bart Thomas	DMRTI	_____
Dr. Lars Westerberg	Swedish Armed Forces	_____
SSC Jeremy Williamson	75 <sup>th</sup> Ranger Regiment	_____
LTC Nick Withers	CANSOFCOM	_____

**Tuesday, February 3<sup>rd</sup>**

Introduction and Opening Remarks                      Dr. Frank Butler

Chairman had all present in the room introduce themselves. Sign-in sheets were circulated. Dr. Stephen Giebner, former CoTCCC chair, is returning as Developmental Editor. Dr. Butler presented a plaque to Mr. Dom Greydanus in recognition of his numerous contributions to TCCC. The next meeting of the CoTCCC will be held on 28-29 April, followed by another on 4-5 August. The location will probably be San Antonio. The agenda for the two days of the meeting was reviewed.

Defense Health Board Issues                      CDR Ed Feeks

CDR Feeks reviewed the DHB structure and composition and discussed governance by the Federal Advisory Committee Act. The CoTCCC will be a sub-panel under the Trauma and Injury Subcommittee, which will be chaired by Dr. John Holcomb.

MARSOC Combat Casualty Scenario            HM1 Jeremy Torrasi

HM1 Torrasi presented a multi-casualty scenario from Afghanistan in which he was the corpsman on scene. He was also wounded in this firefight. He was subsequently selected as the Marine Corps Special Operations Command Corpsman of the Year for his actions in this engagement, during which he treated 15 casualties, saving all but one. Among the points he made were: (1) self-aid and buddy-aid are crucial. Rapid SA/BA application of tourniquets saved at least three lives in this one scenario; (2) TCCC must remain flexible – the tactical situation will pose unexpected problems; (3) needle decompression for tension pneumothorax can be done repeatedly - one casualty received multiple decompressions with a 14-gauge needle decompressions in a 3-hour period and survived; (4) refresher training in TCCC SA/BA is crucial, especially with tourniquets; (5) medics do get wounded and the casualty plan must factor this in; (6) treatment during Care Under Fire may be very difficult when the available cover is minimal and very crowded; (7) TCCC should emphasize reinforcing chest seals; (8) do not withhold adequate analgesia based upon the casualty's desire to stay in the fight; and (9) take care of indigenous force allies. HM1 Torrasi received a standing ovation.

Revised TCCC Curriculum            Dr. Butler

The recently updated TCCC curriculum contains 5 PowerPoint teaching presentations, 9 skill sheets, 5 instructor guides, and 10 training videos. OPSEC concerns and other aspects of the internet posting review process have delayed posting of the new curriculum to several websites for the past several months. Once it has been posted to these websites, it will be updated in near real-time with future changes in the TCCC guidelines.

PreHospital Trauma Life Support Course            Mr. Will Chapleau

PHTLS is now in 40 countries and the list is growing. PHTLS is the only civilian prehospital trauma training course that has been documented to result in improved survival for trauma patients. The PHTLS program office is eager to support the military need for PHTLS and TCCC, including help with combined PHTLS-TCCC courses.

Defense Medical Readiness Training Institute Overview            MAJ Bart Thomas

At the Chairman's invitation, MAJ Thomas gave a brief overview on the mission of the DMRTI and its extensive role in military combat trauma training.

TCCC Training Discussion            Dr. Butler

The Chairman queried military medical schoolhouse representatives in the audience regarding their TCCC teaching activities. The Naval Expeditionary Medicine Training Institute is currently teaching the 2006 guidelines and is awaiting approval to teach the new TCCC curriculum that reflects the changes to the guidelines made in 2008. They have a large student volume and large class sizes. Many Individual Augmentees

(IAs) come through. Overseas sites and reserve units are requesting Mobile Training Teams. NEMTI considers the 2-year recertification cycle too long.

The USMC Field Medical Training Battalion trains Navy Corpsmen to get them ready to deploy with the Marines. TCCC training is embedded in the 8-week training program.

The Army 68 W course trains approximately 8000 combat medics per year in a 16-week Program of Instruction. TCCC is taught in the last 6 weeks in the tactical medicine section. Graduates get EMT-B, PHTLS, and TCCC cards.

There was then a discussion on growing TCCC training needs stemming from theater requirements, service training standards, and a growing need for self-aid/buddy-aid training. Many military units are currently being forced to obtain predeployment TCCC training from courses outside the military. This is especially true when a Live Tissue Training component is desired. One potential approach to meet this growing demand would be to offer a combined TCCC/PHTLS course through DMRTI. There are a number of funding, mission statement, and instructor qualification issues that will need to be resolved for this to be a viable option.

Quality control of the training content in the TCCC curriculum is also an issue. To help in this regard, the Powerpoint presentations in the new curriculum are password protected.

#### TCCC Recommended Skills by Provider Level Dr. Butler

The Committee reviewed the provider skills list presented in Table 22-2 of PHTLS6e (p.544), and considered several changes:

- |  |           |
|--|-----------|
| Add wound bandaging to all provider levels?          | Vote: YES |
| Add pressure dressings to all provider levels?       | Vote: YES |
| Add airway positioning to all provider levels?       | Vote: YES |
| Remove IV access from Combat Lifesaver?              | Vote: YES |
| Remove IV fluid resuscitation from Combat Lifesaver? |           |

\*Accepted as a consequence of the vote on IV access.

- |  |           |
|--|-----------|
| Add hypothermia prevention to all provider levels? | Vote: YES |
| Remove IM morphine from individual operator?       | Vote: YES |

Major Bob Mabry led the discussion on removing IV access from the Combat Lifesaver Skill Set. He noted that this is a very time-intensive skill to teach during CLS training, that it is difficult to sustain when it is not regularly practiced, and that it may be a distractor on the battlefield that delays more important elements of care such as controlling hemorrhage and expediting evacuation. Intramuscular morphine was removed from the all combatant skill set based on strong input from the First Responder Conference that this analgesic option was not an effective means of relieving pain on the battlefield. The skill set table will be changed to reflect these modifications in PHTLS7e. It is also found as attachment (1) to the minutes.

COL Farr stressed the need for the committee to recommend best battlefield care practices based on evidence and experience, not by current service training capabilities or logistic considerations.

The Committee also discussed removing the recommendation for chest tubes from the skill set for combat medical personnel or specifying that only advanced medics

should be allowed to insert them. This was tabled since it would constitute a change in the TCCC guidelines and not just to Table 22-2, and would require formal staffing as outlined in the CoTCCC charter. There was also a general agreement that the Committee should revisit its discussion in the PHTLS manual regarding the best IO device for field use to include the PYNG FASTx and the EZ-IO as possible alternatives to the PYNG FAST1.

#### New TCCC Technology      Dr. Butler

The Chairman proposed that vendors approaching the CoTCCC to have their products considered by the CoTCCC should be required to submit a briefing package which can then be forwarded to members. This package should consist of 5-10 PowerPoint slides along with any published papers that document the benefit of the proposed technology. A subcommittee was formed to evaluate new technologies for presentation to the whole Committee. The Technology Subcommittee will be chaired by Dr. Mel Otten. Members are Dr. Frank Anders, Dr. Norm McSwain, MSG Harold Montgomery, and HMCS Eric Sine.

#### Voice Documentation of TCCC      COL David Gilbertson

COL David Gilbertson, Deputy Commander of the U.S. Army Institute of Surgical Research (USAISR), briefed the Committee on a proof of concept study being conducted by the ISR looking at the use of a small, portable, rugged digital voice recorder for recording battlefield trauma care. The concept is that medics will dictate care rendered into the device and forward it with the casualty. Input from the committee was requested.

#### Tourniquets      COL John Kragh

COL Kragh presented the data and observations from his two tourniquet articles that have been published recently in the Journal of Trauma and Annals of Surgery. The more recent Annals of Surgery paper documents 232 patients with tourniquets applied out of 2838 trauma admissions at one Combat Support Hospital in Baghdad during a seven-month period in 2006. The paper reported that 31 lives were saved by the prehospital use of tourniquets during the study period. Additional points made by COL Kragh: (1) extrapolating the number of casualties saved by tourniquets from this study to the GWOT casualty population as a whole produces an estimated 2000 lives saved in this war by tourniquet use; 2) complications from tourniquet use have been minimal, with no extremity amputations attributable to tourniquet use; and (3) tourniquets need to be applied before signs of shock develop to provide the casualty with the best chance of survival.

#### USAISR WoundStat Safety Research      Dr. Bijan Kheirabadi

The TCCC guidelines as updated in July of 2008 included two new hemostatic agents, Combat Gauze and WoundStat. These agents were proven superior to the

previously recommended hemostatic agents HemCon and QuikClot for controlling severe hemorrhage in animal models. This improved efficacy was confirmed in studies conducted at both the U.S. Army Institute of Surgical Research (USAISR) and the Naval Medical Research Center.

In December of 2008, Dr. Bijan Kheirabadi at USAISR presented his additional research on the safety aspects of WoundStat and Combat Gauze at the Special Operations Medical Association meeting in Tampa. WoundStat treatment of the injured vessels resulted in development of occlusive thrombi in carotid arteries (7 of 8) and jugular veins (6 of 8) two hrs after surgical repair and blood reflow. There was evidence of WoundStat residues and emboli in the lungs of two animals as well. The Combat Gauze animals were not observed to have either of these complications.

As a result of these findings, a review of the safety aspects of WoundStat was conducted. Dr. Kheirabadi again presented his new research findings and noted that the histology from the WoundStat-treated vessels in his recent study demonstrated evidence of endothelial toxicity.

#### WoundStat Safety Discussion

Dr. Butler

The Chairman presided over the discussion ensuing from Dr. Kheirabadi's presentation. It was energetic and touched upon diverse topics including the implications and limitations of this small study, WoundStat human use case reports, and a review of how previous hemostatic recommendations were decided upon and adopted by the services. Preliminary data from the WS safety study underway at Travis AFB were also discussed. This study uses a 2x6 mm punch injury to the femoral artery. WoundStat is then applied with pressure, left in place for 1 hour, followed by a repair of the injury with a vein patch graft harvested from other leg. The animals were resuscitated with hetastarch and anticoagulated with ASA postoperatively. After recovery, the animals are then allowed to survive for varying periods up to 5 weeks. All study pigs have done fine clinically, with no evidence of thromboses on physical exam, although 3/18 did have occlusion on post-op angiogram. There is also preliminary evidence of some renal infarcts on histology. Following the discussion, the issue was referred to the Hemostatics Subcommittee for their recommendations. The Chairman made this the lead item for the second day of the meeting.

#### TCCC Experience in a Special Operations Unit LTC Andy Pennardt

LTC Pennardt gave a synopsis of his Army Special Operations unit's medical staffing and training as well as their field experience with TCCC. LTC Pennardt reported that a review of the 201 casualties (including 12 fatalities) sustained by his unit since the start of the present conflict did not identify any potentially preventable deaths. His Top Ten lessons learned were: 1) cross-training all operators in TCCC saves lives; 2) train the basics frequently; 3) be creative in identifying potential TACEVAC platforms; 4) use modular packing and treatment "cheat sheets" to help simplify casualty care in combat; 5) medics may need to direct rather than provide care in mass casualties; 6) train and rehearse casualty procedures with the other units that you will be going into combat with; 7) medical contingencies must be fully integrated into the battle plan; 8) train on

hemostatic agents using live tissue; 9) pack appropriately for the environment; and 10) TCCC guidelines must be tailored to the specific casualty scenario.

DHB Trauma and Injury Subcommittee

CDR Ed Feeks

The Trauma and Injury Subcommittee of the Defense Health Board met in a follow-on meeting. Those minutes are being prepared separately.

### **Wednesday, February 4<sup>th</sup>**

Hemostatics Subcommittee WoundStat Recommendations

Dr. Peter Rhee

The Hemostatics Subcommittee's recommendations were:

- (1) The use of WoundStat by U.S. Armed Forces should cease.
- (2) The use of WoundStat should be removed from the TCCC guidelines.
- (3) The ISR should place high priority upon, and give increased resources to, performance of animal research on the safety and efficacy of topical hemostatics. Animal models should also be relevant to the requirements of the tactical providers.
- (4) TCCC should partner with civilian trauma centers to gain clinical experience with topical hemostatics.

Following these recommendations, there was a vote on a motion made by Dr. Howard Champion to remove WoundStat from the TCCC guidelines. This Chairman elected to handle this proposed change using the expedited decision procedure as outlined in the TCCC charter. The motion passed by a vote of 26 YES to 1 NO. This surpassed the 2/3 majority required to change the guidelines, and therefore the motion carried. The Chairman will move immediately to update the TCCC guidelines and the curriculum slides.

TCCC Outreach Program

CAPT Jeff Timby

There is increasing awareness and mastery of TCCC principles by combat medical personnel in the DoD. This is less true for other medical department personnel and the line leadership who are not routinely made aware of TCCC in their training. Dr. Timby reviewed the ongoing efforts to present an overview of TCCC to both line and medical audiences. Examples: AAST, NAEMT, ATACCC, USUHS research day, basic officer courses, enlisted leadership courses, etc.

TCCC First Responder Conference Recap

MAJ Bob Mabry

This conference, sponsored by the CoTCCC with support from the Army Surgeon General's office and the USAISR, was for medics, corpsmen, and PJs throughout the U.S. Armed Forces and the stakeholders in their training and equipage. The concepts of

TCCC were endorsed by the participants, but were found to be inconsistently implemented across the DoD. MAJ Mabry is working on an extraction protocol in response to an identified need for same. There is also a need for more line presence at these conferences and more line commander familiarity with TCCC. The conference was a valuable source of lessons learned from the combat medical personnel. A summary of the principle points made at this conference is available on the USAISR website and the presentations from the conference are available on the Naval Operational Medicine Lessons Learned Center website.

#### Sapien Systems Electronic TCCC Training

Mr. Sisinio Baldis

Mr. Baldis is the CEO of Sapien Systems. He and his company developed a CD-ROM/web-based electronic TCCC training/sustainment program with ONR funding. This program was completed in April, 2008. There was not a demonstration of this electronic TCCC training platform.

#### Visual Eyes Electronic TCCC Training

Dr. Gerard Gibbons

Dr. Gibbons is CEO of Visual Eyes, a company that specializes in strategic storytelling via electronic media. Their chief product, iSTORY, pushes knowledge to the web, to PCs, and to smartphones with the goal of making learning a more positive experience using all of the available electronic media options. Dr. Gibbons demonstrated the iSTORY learning platform.

#### PULSE!! Electronic TCCC Training

Dr. Claudia McDonald/CAPT Jim Dunne

Dr. McDonald, Vice-President of Texas A&M University at Corpus Christi, and CAPT Dunne from the National Naval Medical Center presented an overview of this electronic TCCC training initiative. Both an ICU-based trauma management scenario and a partially-completed TCCC scenario were presented. This platform features high-end computer graphics with a very capable user interface.

#### USA RDECOM Electronic TCCC Training

Ms. Sandy Dickinson

Ms. Dickinson presented an overview of the electronic TCCC training initiative at the Army Research, Development, and Engineering Command. There was not a demonstration of this electronic TCCC training platform.

#### Discussion

Dr. Butler

The Chairman held a closed session of the Committee to discuss the topic of electronic TCCC training platforms. Members agreed that these programs were good for getting students to think through their approaches to TCCC in specific combat scenarios, but were not effective in developing manual medical skills or in simulating the stress of real combat environments. The Visual Eyes iSTORY was the preferred platform by committee members on the basis of the presentations at the meeting. The Chairman noted

that all of the electronic TCCC training presenters represented organizations that had been sponsored by various government agencies to develop their electronic TCCC training products.

Other topics covered during the closed session included the need to increase the activity of the CoTCCC subcommittees. The charter is due for revision and this will be addressed by the Membership and Bylaws Subcommittee chaired by Dr. Jim Bagian. This group needs to work with CDR Feeks to revise the CoTCCC charter to better align it with DHB governing directives. Dr. Butler will send out the current charter for member review and input. Members will review the current charter over the next two weeks and forward their comments to Dr. Bagian. The Hemostatics Subcommittee chaired by Dr. Rhee and the new Technology Subcommittee chaired by Dr. Otten will both get new charges in the near future.

#### TCCC Guidelines and Civilian Trauma Care Dr. Butler

Dr. Butler presented Dr. John Holcomb's slides on a series of civilian trauma cases where tourniquets and hemostatic agents would have helped but were not used. Points made in the ensuing discussion were: 1) the CoTCCC needs to engage with the civilian sector to help transition the portions of the TCCC guidelines that are applicable to civilian EMS settings; 2) civilian emergency medical services are not the same as tactical law enforcement medical support; and 3) Dr. Rick Hunt at the Center for Disease Prevention and Control is forming a working group to look at this issue and he will be present at the next meeting to discuss.

#### TCCC in the Naval Expeditionary Combat Command HMC Lake

HMC Lake presented an overview of NECC's command structure and assets. NECC is big and busy, and getting bigger and busier. It has 830 medical personnel. All medical personnel get TCCC training every two years. Independent Duty Corpsmen get initial live tissue training. Approximately 10% of their non-medical personnel are Combat Lifesaver qualified.

#### USAISR Hypothermia Prevention Research CPT Paul Allen

Hypothermia impairs blood clotting mechanisms and increases the risk of bleeding to death for combat casualties with active bleeding. Dr. Allen briefed the ISR's research to evaluate the efficacy of the measures recommended by TCCC to prevent hypothermia in casualties. In their dialysate liquid model, the original Hypothermia Prevention and Management Kit (HPMK) outperformed all other alternatives tested in preventing heat loss. The best passive rewarming combination was the Hot Pocket + the Blizzard Blanket. MSG Montgomery noted that the real issue with the new HPMK was decreasing effectiveness with the normal wear and tear encountered in field settings. His experience was that the new HPMK did not hold up well in operational environments.

Prehospital Monitoring for Shock in Combat Casualties      COL Lee Cancio

COL Cancio from USAISR is investigating the possibility that physiologic monitors can enable an earlier diagnosis of shock and possibly improve the success of interventions in the prehospital tactical environment. He presented a synopsis of physiologic parameters that can be monitored (e.g., lactate, R-R variability, sublingual capnometry) and mentioned some monitors that are already being used in clinical settings. Most of these, however, have not been evaluated for their success in reducing mortality rate in trauma victims when used in the prehospital setting.

Intraosseous Packed Red Blood Cell Flow Rate      Dr. Don Jenkins

Dr. Jenkins has recently studied flow rates achieved when giving PRBCs through the EZ-IO in a porcine model. An ulnar infusion site yielded only a 2 cc/min flow rate. With pressure, a 16cc/min flow rate was achieved. A 330cc bag running on gravity alone took 173 minutes to completely infuse. With external pressure on the bag, it took only 21 minutes. These results indicate that giving PRBCs in prehospital settings by the IO route will require external pressure to be clinically meaningful.

TCCC Training in Emerging Nations      COL Frank Anders

Dr. Anders touched upon nation building in Africa in general, and then focused on Ethiopia, a country that he recently visited as the SOC-AFRICA Surgeon. Ethiopian armed forces were hesitant about military cross- training, but specifically requested TCCC training. In Dr. Anders' view, civil affairs and TCCC will be the foot-in-the-door approaches for cooperative military exercises throughout Africa. His lessons learned were: 1) you have to teach TCCC with an understanding of the host nation's equipment capabilities; and 2) you must take a good interpreter to assist in teaching the course.

Defense Medical Standardization Board      LTC Douglas Hodge

LTC Hodge outlined the DMSB's structure and its recent activity in procurement and testing/evaluation in the area of prehospital combat casualty care equipment. He noted that the Board is pushing further research in tourniquets and tactical prehospital oxygen as high-priority research issues. COL Blackbourne noted that the results with the currently fielded tourniquets have been excellent and that there are essentially no deaths occurring at present on the battlefield from tourniquet failures. The ensuing discussion noted that there was a recommended research priority listing that was a product of the TCCC First Responder Conference. Dr. Butler will forward that list to LTC Hodge. LTC Hodge stated that the DMSB is receptive to input from the CoTCCC, and suggested that a briefing for the Clinical Advisory Council be arranged. CAPT Timby will work with him to set this up.

Submitted:

S. D. Giebner, MD  
CoTCCC Developmental Editor

Approved: 6 March 2009

A handwritten signature in black ink that reads "FK Butler". The letters are cursive and somewhat stylized.

Frank K. Butler, MD  
CAPT MC USN (Ret)  
Chairman

Attachments:

1. TCCC Skills List by Provider Level – February 2009
2. TCCC Guidelines – February 2009