

## When peace breaks out: The 42nd American Association for the Surgery of Trauma Fitts Oration

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**T**hank you so much Dr. Rozycki for this incredible honor of being the Fitts Orator and for your outstanding leadership as the president of the AAST. When Grace called to ask me to deliver this speech, clearly the greatest honor of my surgical career, I was in fact speechless. Once I recovered from the shock of the invitation, however, an intense anxiety settled in as I wondered what on earth I should talk about. The answer came the very next day in the form of the AAST *Trauma Source* with a message from the guest editor, Dr. Michael Rotondo:

The news in 2015 was rife with stories that strike right to the heart of those of us who have dedicated our professional lives to the care of the injured patient. Sadly enough-terrorist attacks, a major train derailment, violence in our streets, a church bombing and mass shootings hallmarked 2015 in a way that none of us will ever forget. With each event, our trauma centers and trauma systems are stretched to new levels of intensity that challenge our resiliency and jolt our sensibilities. With each event-the expertise and professionalism of the members of the AAST must carry the day and respond in an effort to preserve life, stave off disability and assist communities in picking up the pieces. The mission of the AAST, by virtue of its relevance in the current societal context takes on even greater meaning now for those around us.<sup>1</sup>

Thanks Mike for those eloquent words, and for providing me with the topic for the 2016 Fitts Oration: "Readiness." Now I was going to title this talk "Pass Along the Pizza," but somehow that didn't seem very professional. And yet, that phrase does have relevance as you will appreciate later.

For now, I would like to backtrack to the story of William "Billy" Fitts and for this I would like to thank Dr. Norman Rich for his personal comments and our colleagues at the University of Pennsylvania for their 2007 article in our *Journal* outlining the career of Dr. Fitts and highlighting his many contributions to this association.<sup>2</sup> World War II strongly influenced Fitts' training and career path, as he was deployed as an Army surgeon in 1942 after his rotating internship (Fig. 1). He served at the 20th General Hospital in Margherita India at the border of Myanmar (formerly Burma), a hospital later recognized for its outstanding surgical care of some 73,000 patients. While his original goal was to move to the Mayo Clinic and become an internist like his father, Fitts' experience during the War changed his orientation to a surgical career and a lasting special interest in trauma.<sup>3</sup> After deactivation of that Army hospital, Dr. Fitts returned to the University of Pennsylvania to pursue a surgical residency, eventually matriculating to become a member of the surgical faculty. Throughout his career, he advocated for improving trauma care in the United States, stating in his 1970 Scudder Oration: "...with the exception of those wounded by enemy action, we are failing to provide adequate care for our injured."<sup>4</sup> He was also quoted as stating that a person had a better chance of surviving injury in the rice paddies of Vietnam than on the streets of West Philadelphia.<sup>3</sup> Dr. Norman Rich, who knew Dr. Fitts personally, described him as "a true patriotic American who went out of his way to support those of us in uniform during the difficult time in our history in the late 1960s and early 1970s of the Vietnam era." (Dr. Norman Rich, personal communication). Perhaps most relevant to the topic for today Fitts advocated for all surgeons to be prepared in the event of a mass casualty:

In the event of a major catastrophe from an enemy attack on this country, the practicing civilian surgeon must play a key role in the care of casualties. Unless the practicing surgeon, no matter in what field his (her) special interests lie, keeps abreast of advances in the handling of mass casualties, he (she) will be unable to play the part he (she) should.<sup>5</sup>

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**Figure 1.** Captain William T. Fitts Jr. MD, Circa 1942. Courtesy of Michael A. Fitts. Reproduced from Kim PK et al,<sup>2</sup> with permission from Wolters Kluwer, Inc.

These words will certainly resonate with all of you here today.

In addition to knowing the history behind the oration, I think it is also important for you to know the history of your orator. As you might have surmised, I am NOT a member of the millennials, but instead must be classified as a baby boomer. I grew up in small towns in northern Minnesota where my father worked in the iron ore mines. As a young man studying engineering, my dad initially entered Army officer's training school, but was instead drafted into the infantry in 1942, serving in France and Italy under the leadership of General Patton. He never spoke of his wartime experience and when his Army buddies visited on occasion, they joked with my mother that my dad could fall asleep with water up to his neck. She thought they were talking about his ability to fall asleep in the bathtub. . . . .not in a foxhole filled with water on the battlefield. We were indeed privileged youth, for whom the Korean War was played out on the television by Hawkeye and Pierce (MASH). By the time the Vietnam War came along, we were hippies (and yes I said hippies, not hipsters) and were known to protest almost everything. We worried most about what draft number our boyfriends would be allotted and less about a war which seemed a world away from our daily lives. As you can imagine, being a member of the US military at that time was not very popular on our college campuses.

So what changed? On September 11, 2001, many of us were traveling to the airport for what was supposed to be the 61st annual meeting of the AAST in Seattle, Washington, with Dr. Ronald Maier as our president. (Dr. Maier was AAST president for 2001 and 2002). And then the unthinkable happened in New York City, Washington D.C. and in a field in Pennsylvania. . . . .events that changed us all.

In 2003, while our country was engaged in the early stages of war in Iraq, several of us served as founding members of the American College of Surgeons National Ultrasound Faculty. And yes, there was a time when the FAST exam was not ubiquitous in our trauma centers and assuring competency in ultrasound for surgeons became a priority for the American College of Surgeons. Under the leadership of our president,

Dr. Rozycki, and a past AAST president (2005), Dr. Shackford, we had developed several ultrasound training courses at the American College of Surgeons (ACS) and were beginning to export these courses nationally.<sup>6</sup> Our military representative on the faculty was Dr. David Wherry from the Uniformed Services University of the Health Sciences in Bethesda, Maryland. He coordinated a trip to Landstuhl, Germany, for the purpose of teaching deploying Army surgeons the use of ultrasound for trauma. From Germany, we conversed via radio with surgeons “down-range” who were dealing with horrific multi-cavity injuries and wondered how the civilian trauma surgeons might be of assistance. And as the conflicts raged on in Iraq and Afghanistan, we witnessed our military surgical colleagues deployed multiple times and again wished there was a way for us to participate. Fortunately, two other visionary leaders, Dr. William Schwab, a former captain in the Navy and president of this association in 2006 and past-president (2012) Dr. Wayne Meredith, then the chair of the American College of Surgeons Committee on Trauma, working with members of the Army and Air Force, initiated the Senior Visiting Surgeons program, allowing civilian surgeons to participate in the care of those injured in combat who were evacuated from Iraq and Afghanistan to Landstuhl Regional Trauma Center, Germany (LRMC).<sup>7</sup> Over a 7-year period, more than 200 civilian trauma and vascular surgeons provided voluntary care at LRMC, working alongside military surgeons in the operating room and intensive care unit, collaborating on research, providing lectures and mentorship to young surgeons, and assisting in the development of the LRMC trauma center, the first trauma center to be verified by the ACS Verification Review Committee outside of the United States.<sup>8-10</sup> A number of orthopedic surgeons and some neurosurgeons also volunteered at LRMC through their own professional societies. Some of us have had the rare opportunity as civilians to travel into theater to see first-hand the challenges of caring for multiple severely injured casualties directly from the battlefield.<sup>11,12</sup> This program set the stage for sustained military-civilian collaboration in trauma care. My personal experiences through the Senior Visiting Surgeons program changed my life as I know it did for many others here in this room today.

### **Military Readiness: Readiness for Deployment**

We are going to repeat the same mistakes we have made before. We are going to think our doctors are trained. They are not going to be trained. You have just got to pray your son or daughter or granddaughter is not the first casualty of the next war. Pray they come in about the year five mark.

—Former chief of staff for the U.S. Army, General Peter Chiarelli, addressing the Committee on Military Trauma Care's Learning Health System and Its Translation to the Civilian Sector. July 2015<sup>13</sup>

The principle mission of the Military Health System (MHS) is readiness. Yet how prepared will the next generation of military surgeons be? To address that question, several surveys have been conducted recently in order to develop a blueprint for the future. A comprehensive survey of Army surgeons revealed that the majority of those deploying for the first time were within one year of completing their surgical residencies and few had received any specific pre-deployment surgical training. (Col. Jennifer Gurney, US Army, personal communication). Despite

the severity of the injuries seen in combat, only 15% of current military surgeons are trauma/critical care trained.<sup>14</sup> In another survey sent to 246 active duty surgeons from the Army, Navy, and Air Force, 89% responded that they had no fellowship training before their first deployment and less than half had attended a pre-deployment surgical training course.<sup>15</sup> The courses that were available varied by service with the most commonly attended being the Emergency War Surgery Course (24.8% of total respondents). Regarding pre-deployment military training, over 60% of responding surgeons found their home station military training to be unhelpful. Many surgeons identified knowledge or practice gaps in vascular, neurosurgical, and orthopedic training. Dr. William Schwab, in preparation for his 2014 Scudder Oration on Trauma, worked with the Eastern Association for the Surgery of Trauma Military Ad Hoc Committee to develop and complete a survey of all its military-affiliated members.<sup>16</sup> Of the 86 surgeons responding to that survey, the average age at first deployment was 36 years and over 50% had only 2 years or less of independent surgical practice. Almost 25% of respondents deploying for the first time reported that they were stationed without another general surgeon. Once again, Schwab documented a wide variety of pre-deployment training programs attended by these surgeons with only 30% to 40% attending any course including Advanced Trauma Life Support (ATLS); Advanced Trauma Operative Management (ATOM), or the Emergency War Surgery Course. As in previous surveys, the need for a new skill set for the combat surgeon was recognized that would include supplemental training in vascular, urologic, neurosurgical, orthopedic, and ophthalmologic surgery. These surgeons also emphasized the need to prepare the entire operating team and the trauma team as well as individual surgeons in order to assure the best outcomes during deployment. Finally, as is shown in her AAST poster presentation this year, Colonel Gurney and others conclude that combat operations and frequent deployments have been a powerful engine for trauma skills sustainment and readiness.<sup>17</sup>

So what happens when peace breaks out and surgeons either deploy on missions with little surgical activity or are assigned to a practice caring for military beneficiaries? Sadly, many with extensive combat experience have already separated from the service, and others return to a garrison practice with little or no trauma exposure. Currently, of the 57 Military Treatment Facilities, only seven serve as trauma centers and only one is verified by the ACS Committee on Trauma (COT) as a Level I (Table 1). A recent article in the *Wall Street Journal* brought this topic of readiness to national attention with a headline that read: "Pentagon Faulted Over Combat Casualty Care."<sup>18</sup> In the article, the author states that "top military doctors say medical advances won on Afghan and Iraqi battlefields might be lost unless Secretary of Defense Ash Carter orders the Pentagon to make techniques, drugs, and devices mandatory for military physicians, nurses and medics." The article that he was referencing appeared in our *Journal* authored by Drs. Butler, Smith and Carmona, highlighting in particular the advances in Tactical Combat Casualty Care that have greatly improved the care on the battlefield and advocating that these advances must be preserved for the future.<sup>19</sup> As you might expect, the reporter's accusation was not well received by the generals in the Pentagon! They called on one of the coauthors of the article, David J. Smith,

**TABLE 1.** Current US Military Trauma Centers

Name of Facility	Location	Verification
San Antonio Military Medical Center (Brooke)	San Antonio, TX	ACS Level I
Walter Reed National Military Medical Center	Bethesda, MD	ACS Level II
Madigan Army Medical Center	Fort Lewis, WA	State designated Level II
Landstuhl Regional Medical Center	Landstuhl Germany	ACS Level III
William Beaumont Army Medical Center	Fort Bliss, TX	State designated Level III
Carl R Darnall Army Medical Center	Fort Hood, TX	State designated Level III
Tripler Army Medical Center	Honolulu, HI	State designated Level III

MD (RADM ret MC USN), who happens to also be the deputy assistant secretary of defense for health readiness policy and oversight at the Pentagon and wanted to know what was being done to assure the readiness of the military medical corps. Dr. Smith, aware of the recently formalized partnership between the MHS and the ACS, asked us to accelerate our program and provided additional funding to augment our efforts.

As most of you are aware, Drs. David Hoyt (AAST president in 2003), the executive director of the American College of Surgeons and Jonathan Woodson, the then-assistant secretary of defense for health affairs, signed a treaty in October 2014 that formalized collaboration between the MHS and the ACS (termed the Military Health System Strategic Partnership American College of Surgeons) in the areas of education and training for military surgeons; quality initiatives; systems based practice related to the military trauma system; and DoD-relevant trauma research.<sup>20</sup> The education efforts are being spearheaded by Captain Eric Elster, MD, USN; Lt. Col E. Matthew Ritter, MD, US Army; and Col Ann Rizzo, MD, US Air Force Reserves; with the assistance of Sara Hennings, PhD. This group, together with 12 surgeon subject matters experts representing the Army, Navy, and Air Force, compiled a list of topics based on the Joint Trauma System Clinical Practice Guidelines (JTS CPGs available at [www.usair.amedd.army.mil/cpgs.html](http://www.usair.amedd.army.mil/cpgs.html)) divided into nine domains and organized along the six Accreditation Council for Graduate Medical Education core competencies used in residency training (Table 2). Under each domain, there is a comprehensive list of tasks (knowledge, skills and abilities) that were considered important by this group of experts (totaling over 400 tasks). Dr. Hennings then turned this list into a survey distributed to almost 700 surgeons with deployment experience. In turn, these surgeons ranked each task using two criteria: how often in a Role 2 or above facility was the task required and how important in terms of perceived impact did using that task have on the outcome of the patient? The resulting blueprint will serve to develop assessment tools, training courses and platforms as well as guide resource utilization. In essence, this blueprint will help determine the future of military surgery and assure that those who are deployed are in fact ready.<sup>21</sup>

### Civilian Readiness: Disaster Response

On the civilian side, as Dr. Rotondo stated above, we have certainly been challenged by what seems like an increasing

**TABLE 2.** Domains for Assessment in the Education Curriculum Blueprint, MHSSPACS

Domain	Examples of Tasks, Knowledge, Aptitudes
Wounds, amputations, fractures	Fasciotomy, burn care, war wounds
Transfusion and resuscitation	Frozen blood, REBOA, emergency thoracotomy
Head and spine	TBI management, cervical spine evaluation
Airway and breathing	Anesthesia, respiratory failure, inhalation injury
Torso trauma	Pelvic fracture care, damage-control surgery
Critical care	Infection, deep vein thrombosis, nutrition
Universal domains	Systems-based practice, professionalism
Emergency war surgery	Obstetrics and gynecology emergencies, extremity fractures
Other military	Pediatric trauma, ocular injuries, urologic trauma

MHSSPACS, Military Health System Strategic Partnership American College of Surgeons; REBOA, resuscitative endovascular balloon occlusion of the aorta.

number of mass casualty events occurring in such everyday places as:

- An elementary school (Sandy Hook)
- A marathon (Boston)
- A church (Charleston)
- A movie theater (Aurora)
- A Christmas party (San Bernardino)
- A nightclub (Orlando)
- A peaceful gathering (Dallas)

According to Northeastern University criminology professor, James Alan Fox, over the past four decades, the United States has seen an average of 19 mass shootings a year (defined as 4 or more deaths per shooting).<sup>22</sup> Since 1976, mass shootings in our country have claimed the lives of 3,712 victims with the highest number of victims being Orlando at 49. At this time, it is appropriate to acknowledge our colleagues in Dallas and Orlando for their very recent heroic efforts. And although both the AAST and the ACS COT have published timely and thoughtful statements on the prevention of firearm injuries, until we can adopt some of these policies, every community must be prepared to respond to a mass casualty event, be it a natural or a manmade disaster.<sup>23,24</sup>

Over the past 15 years of war, our military surgeons have had extensive experience in dealing with mass casualty events and many lessons learned can be translated into the civilian setting. Propper and others<sup>25</sup> summarized the surgical response to two explosive events occurring at the US Air Force Theater Hospital in Balad Iraq in 2008. These authors provide useful data on the transfusion, operative care, intensive care, and nursing requirements following such an event (Table 3). Elster et al.<sup>26</sup> reviewed the implications of Combat Casualty Care for civilian mass casualty events and emphasized the importance of care at the point of injury (i.e., bleeding control), care during transport using advanced evacuation platforms (i.e., MERT-E helicopter teams), and hospital-based care (i.e., damage control surgery). In that article, the authors point out that few military clinical practice guidelines are the result of standard, randomized clinical trials but rather are developed by identifying what works and what does not work, refining it over time and embracing a

culture of continuous process improvement, referred to collectively as “focused empiricism.”

On a personal note, I witnessed mass casualty events during my visit to Balad (Iraq) and made the following five observations: (1) a senior surgeon maintained control of the triage in the emergency department; (2) a small team (physician, nurse, and medic) was assigned to each patient and reported directly to the triage surgeon; (3) it was important to keep track of all patients, including their ID, injuries, and whereabouts; (4) Preservation of blood products was key and resuscitation guided by thrombelastography was used and (5) It was possible to perform surgery on two patients in one operating room. These observations proved useful when a major airliner carrying 307 people crashed at San Francisco International airport in 2014. Our trauma center received 63 injured patients including 10 critical, and 5 requiring immediate surgery.<sup>27</sup> We used a dual triage system, with an experience trauma surgeon evaluating incoming patients while a second surgeon directed flow in the operating room. We also learned that these types of disasters may last for weeks, that it is important to keep your team rested and fresh, and that time must be reserved for decompression of all hospital personnel after such an event.

Our deceased friend and colleague, Dr. Eric Frykberg, who developed the first COT Disaster Management and Emergency Preparedness Course, stated in his 2002 Eastern Association for the Surgery of Trauma presidential address that “the civilian medical community in the United States has been relatively indifferent in past years to the potential threat of deliberated terrorist attacks and mass casualties. We have been shielded from such incidents and thus have been spared the need to confront the unique challenges of suddenly delivering medical care to great numbers of injured victims.”<sup>28</sup> Unfortunately, since Dr. Frykberg's poignant address 15 years ago, our world has changed dramatically and we now have several examples where civilian surgeons have responded to mass casualty events in the United States. Clearly, there are important lessons to be learned from each of these disasters.

On February 20, 2003, a rock music group was playing at a small nightclub in Rhode Island with 439 people in attendance.<sup>29</sup> The pyrotechnical displays as part of the act ignited the stage and ceiling and the building had no sprinkler system. As a result, 96 people died at the scene and 215 victims required treatment at local hospitals. One trauma center, Rhode Island Hospital, admitted 47 patients and rapidly converted a medical-surgical floor into a burn intensive care unit, whereas two operating rooms became dedicated burn rooms. The surgeons involved, under the leadership of AAST past-president Dr. Bill

**TABLE 3.** Resources Estimates After a Single Explosive Event

Resource	Guideline
Blood and plasma	3.5 u pRBC and plasma/casualty
Operations	0.75 operations/casualty 3.5 procedures/casualty
ICU beds (1:1 nursing)	0.5 ICU beds/casualty
Mechanical ventilation	0.5 ventilators/casualty

Adapted from Propper et al. *Annals of Surgery* 2009.<sup>25</sup>  
ICU, intensive care unit.

Cioffi, credited their favorable response to disaster planning, institutional commitment, and an overseeing experienced surgeon in key hospital locations. Areas in need of improvement included communication between the hospital and those present at the scene and a lack of planning for patient relocation/movement to make beds available for the large number of incoming victims.

On November 5, 2009, an army psychiatrist at Fort Hood in Killeen, Texas, opened fire at the largest US military base in the world, killing 13 and wounding 32.<sup>30</sup> Scott and White Hospital is the regional Level I trauma center in central Texas, located 26 miles from Fort Hood. However, due to communication issues and lack of security at the scene, some injured patients were sent to nontrauma facilities (undertriage). As mentioned above, dual command by experienced surgeons in the emergency and operating rooms was felt to be essential to the successful management of those who reached the trauma center.

On April 15, 2013, 4 hours into the 117th running of the Boston Marathon, 2 improvised explosive devices were detonated among the spectators near the finish line. In all, 281 people were injured with 3 dying at the scene.<sup>31</sup> Remarkably, within 30 minutes of the blast, all patients with an Injury Severity Score of 25 or greater were admitted to one of the six Level I trauma centers in Boston, and there were no deaths among those patients, despite the fact that two patients were pulseless on arrival to the emergency department.<sup>32</sup> Twenty-six patients arrived with field tourniquets in place, and 54 underwent urgent surgical intervention.<sup>31</sup> The presence of medical teams and ambulances at the finish line, rapid transport to the trauma centers, and immediate access to the operating rooms on a holiday schedule contributed to the successful response, but so too did the repeated preparations for such an event. As stated by one member of the US Navy involved in the response: “we train like we fight and we fight like we train.”<sup>33</sup> Still, the Boston Trauma Center Chiefs’ Collaborative warned that the superb outcomes following this event should not induce a state of complacency.<sup>32</sup> These leaders recommend improved communications using texting rather than relying on radio systems, secondary patient triage at the hospital level by experienced trauma surgeons, and providing all prehospital personnel with military tourniquets.

On December 2, 2015, a terrorist attacked the Inland Regional Center (IRC) in San Bernardino CA, killing 14 and injuring 22. Two trauma centers (Loma Linda University Medical Center and Arrowhead Regional Medical Center) were involved in the response. Physicians there commented that a recently conducted “active shooter” disaster drill proved to be very helpful during the actual response.<sup>34</sup> Crowd control was a concern however, as the receiving area was inundated with both essential and nonessential personnel. Additionally, one hospital had received a bomb threat during the disaster which further increased anxiety on the part of responders.

In March of 2016, Orlando Regional Medical Center, the only major trauma center in Central Florida, staged a large-scale “active shooter scenario” simulating a school massacre that left 500 wounded.<sup>35</sup> The drill used moulaged students, and 50 agencies were involved, including the FBI. On June 12, 2016, that nightmare became a reality. The six trauma surgeons at Orlando Medical performed 28 operations that night and all but those who arrived in extremis survived. When the dust

settles a bit I am sure that we have much more to learn from our colleagues in Orlando and Dallas, but what should be very clear is that it is our role as trauma surgeons to be ready.

## Military Civilian Collaboration: Towards Achieving Zero Preventable Deaths

Surgeons in a current war never begin where the surgeons in the previous war left off; they always go through another long learning period.

—Col. Edward D. Churchill, MD<sup>36</sup>

The US military did not go off to the wars in Afghanistan and Iraq with a trauma system in place. The Joint Theater Trauma System (JTTS) was developed by military trauma surgeons with experience in civilian trauma care who stood up the system during engagement in combat operations.<sup>37</sup> These visionary leaders included General Douglas Robb the then United States Central Command surgeon, Don Jenkins, John Holcomb, Jeff Bailey, Brian Eastridge, Jay Johannigman and Steve Flaherty to name but a few. These surgeons built the system from the ground up because in their words, they knew what “right” looked like. The JTTS, which spanned three continents and thousands of miles, included 5 levels of trauma center care, en route critical care, practice guidelines that spanned across service lines, a robust injury data base (Joint Trauma Theater Registry) and a worldwide performance improvement conference (the video teleconference), all supporting the vision that every soldier, marine, sailor, or airman injured on any battlefield or in any theater of operation would have the optimal chance for survival and maximal potential for functional recovery (Fig. 2). Indeed, the JTTS resulted in the lowest number of fatalities ever recorded despite a steadily increasing injury severity<sup>38</sup> (Fig. 3). But as combat operations wind down, there is concern that this remarkable system of care will be shelved away only to collect dust, and that the next generation of military surgeons will be forced to invent their own system with an initial higher fatality rate at the start of the next conflict. In other words, what happens when peace breaks out?

Those of you who are millennials (or maybe Generation Xers) may not know that the trauma system in the United States has not been in existence for that long and was really born out of the military experiences in Korea and Vietnam. As Brent Eastman pointed out in his 2009 Scudder Address, trauma systems in the United States really began in the 1970s with national funding provided through Emergency Medical Services.<sup>39</sup> Maryland, under the auspices of Dr. R Adams Cowley developed the first statewide trauma system. But today, nearly 50 years later, we still have gaps in trauma care in our country. Studies have shown that 20–30% of Americans (an estimated 45 million) lack access to a Level I or II trauma center within one hour of injury.<sup>40</sup> This disparity is particularly evident when comparing rural versus urban/suburban regions.

As some of you are aware, the National Academies of Science Engineering and Medicine (formally the IOM now the NASEM) recently released a publication titled: *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury*.<sup>13</sup> (Of note, immediate AAST past-president Dr. Tom Scalea (2015) had a major voice on the NASEM panel). In that report, the panel highlighted the study by Eastridge and others that

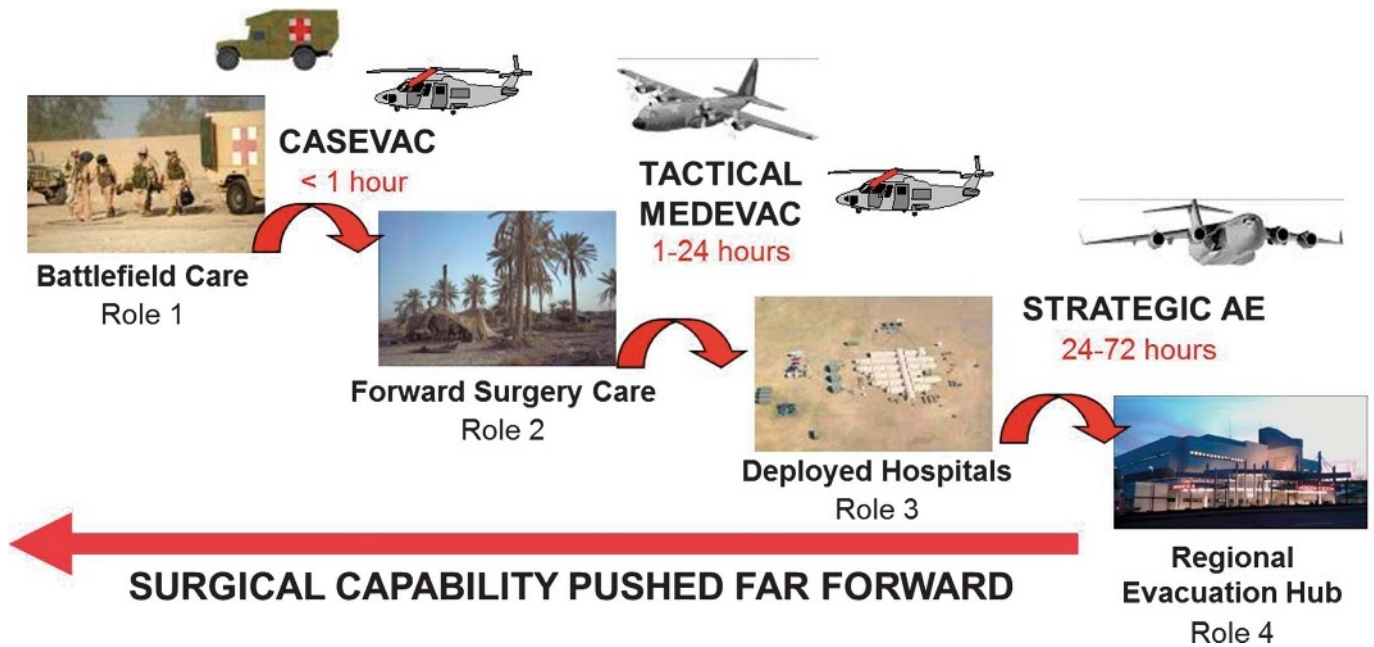


Figure 2. Patient flow in the JTTs. Courtesy of Col. Raymond Fang, US Air Force (with permission).

examined death on the battlefield between the years 2001 and 2011.<sup>41</sup> Of the 4,596 battlefield fatalities that occurred during that time period, 87% occurred in the prehospital setting and 24% were found to be potentially survivable if hemorrhage could be mitigated. By now, you are all familiar with the important work by Kragh and coinvestigators who documented the critical role of tourniquets in controlling hemorrhage from major limb trauma resulting from war wounds.<sup>42</sup> Additional evidence is provided by Kotwal and others who related the outcome of training in Tactical Combat Casualty Care for the 75th Ranger Regiment, US Army Special Operations Command.<sup>43</sup> Initiated in 1998 under the command of Col Stanley McCrystal, these rangers underwent focused training in four major areas:

(1) marksmanship; (2) physical training; (3) small unit tactics; and (4) medical training, including the use of tourniquets. In reviewing the 32 fatalities incurred by that regiment during an 8-year period, there were no deaths in the prehospital setting that were deemed preventable.

On the civilian side, a recent meta-analysis suggests that 20% of deaths after injury are preventable with optimal trauma care.<sup>44</sup> Roughly calculating, that means that of the 147,790 United States deaths from trauma in 2014, nearly 30,000 may be have been preventable. Translating the lessons learned from the battlefield into the civilian sector is one step in the process aimed at addressing this critical issue. An excellent example is the Hartford consensus inspired by Dr. Len Jacobs and the

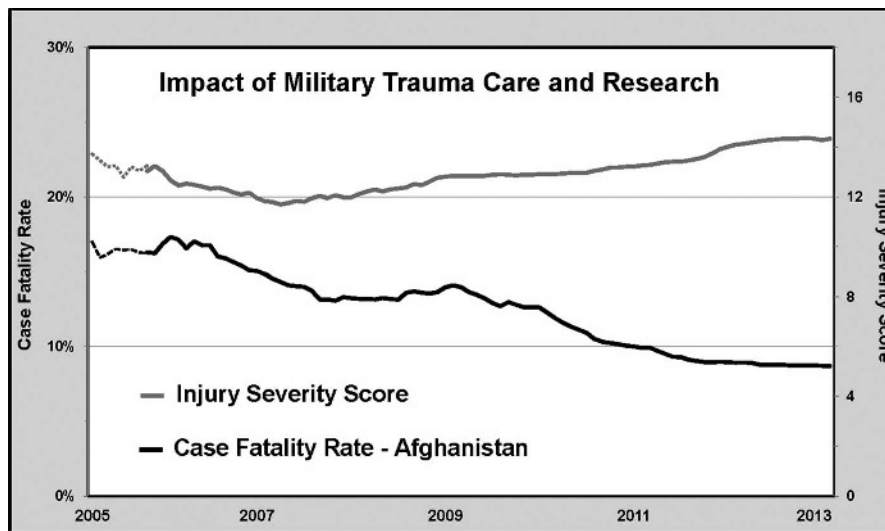


Figure 3. The case fatality rate for US service personnel injured or killed in Afghanistan from 2005 to 2013 compared with the Injury Severity Score over the same time period. Reproduced from Rasmussen et al,<sup>38</sup> with permission from Wolters Kluwer, Inc.

national “Stop the Bleed” campaign that endorses the use of bleeding control measures by the public as the first providers.<sup>45–49</sup> Other efforts to prevent death and disability from trauma both on and off the battlefield will require an investment in research that focuses on the knowledge gaps identified in both sectors.<sup>50</sup> This association’s initiation of Coalition for National Trauma Research by AAST past-president Bill Cioffi (2014) together with the National Trauma Institute under the leadership of AAST past-president Jerry Jurkovich (2009), can serve as a starting point for collaborative Department of Defense-civilian clinical research in trauma. As stated in the NASEM report, “the end of the wars in Afghanistan and Iraq represents a unique moment in history in that there now exists a military trauma system built on a learning system framework and an organized civilian trauma system that is well positioned to assimilate and distribute the recent wartime trauma lessons learned and to serve as a repository and incubator for innovation in trauma care during the interwar period.”<sup>13</sup> Our military personnel deserve our deepest respect and gratitude, but they are unlikely to continue their service without the knowledge that a competent medical team is ready to provide care should they be injured during conflict. Keeping our military medical teams trauma-ready strengthens our national security and enhances our collaborative ability to respond to mass casualties and disasters wherever they occur.

So what can you do to contribute to readiness? Here are a few suggestions for your consideration:

1. Really participate in your local hospital and regional disaster plans, recognizing that the response to any disaster is local.
2. Avail yourself of the ACS COT disaster course or the on-line modules being developed by the AAST under the auspices of Dr. Susan Briggs and the disaster committee.
3. If you are able to volunteer for a disaster, sign up now on the AAST website. This information is also being shared with the ACS Operation Giving Back program.
4. Have a “go-pack” ready at all times as well as a personal disaster plan for you and your family.
5. Promote the “Stop the Bleed” campaign at the local level including the training of all first responders and the lay public on methods to control hemorrhage. Support the placement of bleeding control kits in public places like shopping malls, theaters and schools.
6. Become an instructor for ATOM and ASSET and encourage the exportation of these courses to local Military Treatment Facilities in your area.
7. Support Coalition for National Trauma Research in its efforts to address research gaps in military/civilian trauma care. Educate your local congressional representatives on the need for dedicated funding for trauma research.
8. If the opportunity presents itself, welcome military surgical teams into your trauma center for training and exchange of information. Support the national effort to expand the inclusion of additional civilian centers into the military trauma system.
9. Recognize that strengthening our partnership with the military strengthens our security at home and worldwide.
10. And don’t forget to pass along the pizza.....the value of your message of support for your fellow trauma surgeons during times of disaster (demonstrated by sending food or messages of encouragement) cannot be underestimated.

Can we really achieve zero preventable trauma deaths with a collaborative military-civilian trauma system? Well, the 75th

rangers were able to in the fields of Iraq and Afghanistan. And there were zero preventable deaths among those that reached the hospital after the recent mass casualty events in Boston, San Francisco, and Orlando. So it is an achievable goal; one that our war fighters deserve and the American public should expect. Through education, organization and research, this should be the AAST’s mission going forward. We owe it to a generation of service members who have given so much during these past 15 years, the longest period of conflict in our nation’s history and especially to those who have paid the ultimate price for our freedom. We must honor their sacrifices by ensuring that lessons learned are not forgotten *when peace breaks out*.

## DISCLOSURE

The authors declare no conflicts of interest.

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