EMS Focus
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WELCOME

EMS Focus

Achieving Zero Preventable Deaths: Creating a National Trauma System

EMS Focus

Today

- The State of Trauma in the U.S.
- Zero Preventable Deaths
- Findings from the American College of Surgeons Committee on Trauma
- Lessons Learned From the Military
- How to Implement the NASEM Report

EMS Focus

Today's Speakers

- Cathy Gotschall, ScD, Senior Health Scientist
  - NHTSA Office of EMS
- Ronald Stewart, MD, Chair of the Committee on Trauma
  - American College of Surgeons
- Col. (ret.) John Holcomb, MD, FACS, Professor of Surgery
  - UT Health in Houston, TX

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Cathy Gotschall, ScD
Senior Health Scientist
NHTSA Office of EMS

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Trauma in the U.S.

- Trauma is the leading cause of death for Americans, ages 1-46
- 96 deaths per day

20% OF TRAUMA DEATHS are preventable with optimal emergency and trauma care[1]

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Sources:
- NHTSA Fatality Analysis Reporting System (FARS)
- National Academies of Science, Engineering and Medicine. *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury*

Trauma in the U.S.

MORE THAN ONE THIRD OF SERIOUSLY INJURED CRASH VICTIMS ARE NOT TAKEN DIRECTLY TO A LEVEL I OR II TRAUMA CENTER[3]

2 OUT OF 5

WERE ALIVE WHEN FIRST RESPONDERS ARRIVED, BUT LATER DIED[2]

THERE IS A **25%** INCREASE IN THE ODDS OF SURVIVAL for severely injured patients if treated in a hospital that is a level I or II trauma center[4]

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Sources:
- NHTSA National Automotive Sampling System-Crashworthiness Data System (NASS-CDS)
- NHTSA Fatality Analysis Reporting System (FARS)
- Mackenzie et al, 2006

FARS and NEMSIS Version 3.0

- **42%** of all MVC fatalities in 2015 occurred *after* the victim arrived
- NASEM estimates **1 in 5** deaths from traumatic injuries may be preventable with optimal trauma care
- NEMSIS V3 will collect data on the number of patients transported by EMS to all levels of trauma centers

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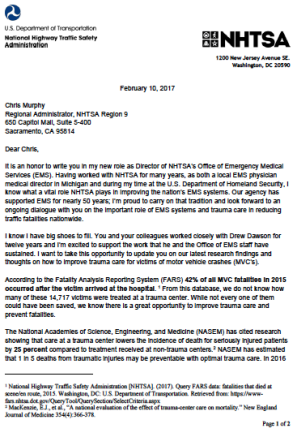

U.S. Department of Transportation
National Highway Traffic Safety Administration

NHTSA
1200 New Jersey Avenue SE.
Washington, DC 20590

February 10, 2017

Chris Murphy
Regional Administrator, NHTSA Region 9
650 Capitol Mall, Suite 5-400
Sacramento, CA 95814

Dear Chris,

It is an honor to write you in my new role as Director of NHTSA's Office of Emergency Medical Services (EMS). Having worked with NHTSA for many years, as both a local EMS physician medical director in Michigan and during my time at the U.S. Department of Homeland Security, I know what a vital role NHTSA plays in improving the nation's EMS systems. Our agency has supported EMS for nearly 50 years; I'm proud to carry on that tradition and look forward to an ongoing dialogue with you on the important role of EMS systems and trauma care in reducing traffic fatalities nationwide.

I know I have big shoes to fill. You and your colleagues worked closely with Drew Dawson for twelve years and I'm excited to support the work that he and the Office of EMS staff have sustained. I want to take this opportunity to update you on our latest research findings and thoughts on how to improve trauma care for victims of motor vehicle crashes (MVC's).

According to the Fatality Analysis Reporting System (FARS) **42% of all MVC fatalities in 2015 occurred after the victim arrived at the hospital.**[1] From this database, we do not know how many of these 14,717 victims were treated at a trauma center. While not every one of them could have been saved, we know there is a great opportunity to improve trauma care and prevent fatalities.

The National Academies of Science, Engineering, and Medicine (NASEM) has cited research showing that care at a trauma center lowers the incidence of death for seriously injured patients **by 25 percent** compared to treatment received at non-trauma centers.[2] NASEM has estimated that 1 in 5 deaths from traumatic injuries may be preventable with optimal trauma care. In 2016

[1] National Highway Traffic Safety Administration [NHTSA]. (2017). Query FARS data: fatalities that died at scene/en route, 2015. Washington, DC: U.S. Department of Transportation. Retrieved from: https://www-fars.nhtsa.dot.gov/QueryTool/QuerySection/SelectCriteria.aspx
[2] MacKenzie, E.J., et al., "A national evaluation of the effect of trauma-center care on mortality." New England Journal of Medicine 354(4):366-378.

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EMS Countermeasures

- Use of Field Trauma Triage Guidelines to transport patients to trauma centers
- Use of Mass Casualty Incident Triage Guidelines
- Use of the evidence-based guidelines for prehospital pain management
- Use of the evidence-based guidelines for prehospital management of traumatic brain injury
- Use of the evidence-based guidelines for external hemorrhage control
- Use of the National Model EMS Clinical Guidelines

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NHTSA's Strategic Plan

- *The Road Ahead*
  - Includes a strategic objective to increase survivability from crashes with the following performance indicator:

By 2021, save an additional 500 lives by enhancing crash recognition, response, and emergency medical care

NHTSA
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

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Ronald Stewart, MD
Chair of the Committee on Trauma
American College of Surgeons

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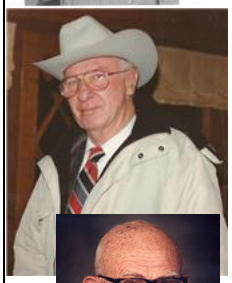
Achieving Trauma Zero Preventable Deaths and Disability #TraumaZPDD

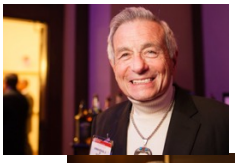
- Implementation Strategy for the National Academies Report:

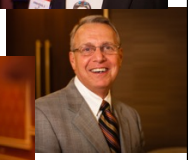
A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths after Injury

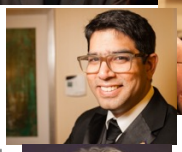
History of NASEM Recommendations

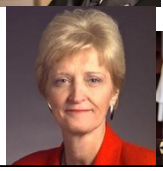


- 1966 National Academies of Science Whitepaper
- 2016 National Academies of Science, Engineering and Medicine
- Military & civilian physicians and scientists
- From extended combat experience









A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths after Injury

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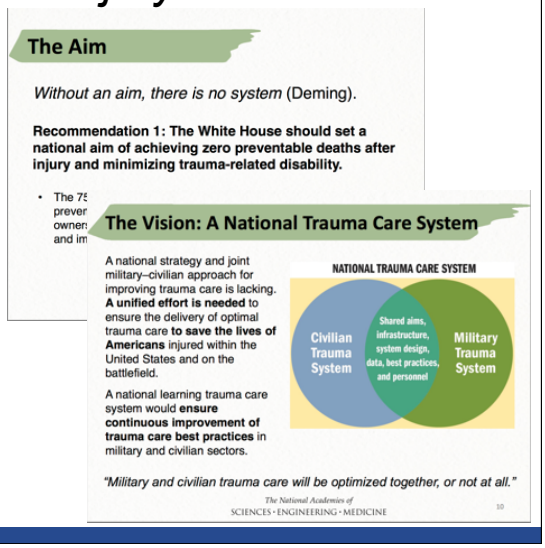
- Comprehensive in scope
- Eleven summary recommendations
- Military and Civilian Trauma Systems: *One nation, one system*



Position statement of the Coalition for National Trauma Research on the National Academies of Sciences, Engineering and Medicine report, *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury*

Coalition for National Trauma Research (CNTR), Donald H. Jenkins, MD, William G. Cioffi, MD, Christine S. Cocanour, MD, Kimberly A. Davis, MD, MBA, Timothy C. Fabian, MD, Gregory J. Jurkovich, MD, Grace S. Rozycki, MD, MBA, Thomas M. Scalea, MD, Nicole A. Stassen, MD, *and* Ronald M. Stewart, MD, *San Antonio, Texas*

CURRENT OPINION

Position statement of the American College of Surgeons Committee on Trauma on the National Academies of Sciences, Engineering and Medicine Report, *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury*

Donald H. Jenkins, MD, Robert J. Winchell, MD, Raul Coimbra, MD, PhD, Michael F. Rotondo, MD, Leonard J. Weireter, MD, Eileen M. Bulger, MD, Rosemary A. Kozar, MD, PhD, Avery B. Nathens, MD, Patrick M. Reilly, MD, Sharon M. Henry, MD, Maria F. Jimenez, MD, Michael C. Chang, MD, Michael Coburn, MD, Jimm Dodd, MA, Melanie L. Neal, MS, Justin Rosen, Jean Clemency, David B. Hoyt, MD, *and* Ronald M. Stewart, MD, *Chicago, Illinois*

The Aim

- Recommendation 1: The White House should set a national aim of achieving zero preventable deaths after injury and minimizing trauma-related disability
  - The 75th Ranger Regiment demonstrated that achieving zero preventable deaths is **an achievable goal** when leadership takes ownership of trauma care and data is used for continuous reflection and improvement

#TraumaZPDD

From the National Academies of Science, Engineering and Medicine: http://nationalacademies.org/hmd/reports/2016/a-national-trauma-care-system-integrating-military-and-civilian-trauma-systems.aspx

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Implementation Strategy

- Break down the spaces into manageable and relatable areas
- Work towards a cohesive communication strategy
  - Is naturally organizing and aligning
  - Encompasses the whole
  - Patient centered
  - Provides a framework for describing the needed action from Academies report
- Provide a civil, collegial and inclusive forum for dialogue and strategy
- Advocacy – status quo favors inaction

ACS Committee on Trauma Pillars

TABLE 1. ACS COT Four-Pillar Approach to the National Leadership in Trauma

Advanced Trauma Education	Ensure Quality Patient Care	Champion Trauma Systems Strength	Drive Advocacy
Accredited continuing education programs that support medical professionals across the continuum of trauma care. • ATLS course • TEAM course • ATOM course • RTTDC course • DMEP course • ASSET course • "Stop the Bleed" campaign • Basic Endovascular Skills for Trauma	A verification program helps trauma centers verify resources, ensure readiness, and improve trauma care. The quality cycle continues with TQIP, a risk-adjusted local and national benchmarking program to measure and inform the improvement of outcomes and PIPS, a performance improvement and patient safety program that continuously measures and evaluates in order to improve care. • Resources for Optimal Care of the Injured Patient • VRC • TQIP • PIPS	Comprehensive expert assessment and consultative guidance for the improvement or development of state and regional trauma systems. Integrates and partners with multidisciplinary teams in each locality or region. • Trauma Systems Consultation for counties, regions, states, or systems • Benchmarks, Indicators and Scoring facilitations	Advocacy activities at the federal and state level focused on prevention, socioeconomic, legislative, and regulatory issues affecting trauma care. Develop and advocate health care policy that is in the best interest of trauma patients, such as the Stop the Bleed Campaign (also known as bleeding control or BCon). Promote injury prevention and control programs aimed at reducing needless injury, death, and suffering

American College of Surgeons
Inspiring Quality: Highest Standards, Better Outcomes
100+years

The Committee on Trauma

Path to #TraumaZPDD Five Broad Relatable Domains

- Trauma and EMS system infrastructure and organization
- Trauma related research and research funding
- Trauma data and data linkage
- Trauma work force, education, training and readiness
- Advocacy as an overarching umbrella

NIH Campus April 2017
169 attendees:
½ physicians
½ nurses, paramedics, public health, policy makers
¼ COT members

The Big Problem

- More deaths in children than all other causes combined
- More than 130,000 Americans die every year
- Health care costs + lost productivity = $671 billion/year

- *Most important problem of our children and uniformed service personnel*

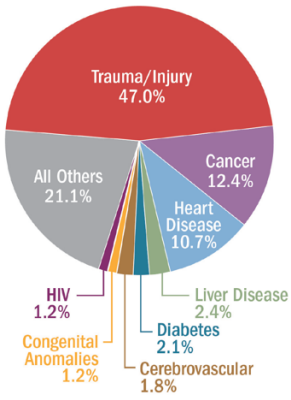


FIGURE 1-1 Leading causes of death, United States: 2014, ages 1-46 years.
SOURCE: Data retrieved from NCIPC, 2015b.

Still most pressing and neglected public health problem in U.S.

Much Progress Has Been Made

Past 50 Years

- Dramatic improvements in care and prevention
- Entire professional disciplines established
  - EMS
  - Emergency medicine
  - Trauma nursing
  - Trauma surgery
- Radical changes in quality
- Research and scholarship flourished
- Data systems unimaginable in 1966
- Educational transformation around trauma care
- Major reductions in mortality and complications

Problem?: Trauma System Infrastructure

- Trauma system: Still a patchwork quilt with major access gaps in some areas – true over proliferation in other areas

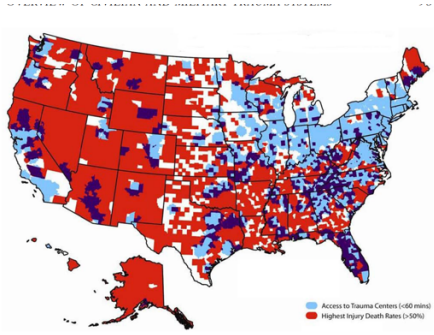


FIGURE 2-3 Lack of access to an appropriate level of trauma care is associated with higher trauma patient mortality.
SOURCE: Map provided by Charles Branas, Ph.D., Professor of Epidemiology, University of Pennsylvania, 2016.

Problem?: Research and Research Support

- Research: Lack of priority research funding for trauma and acute care research from any federal source – possible exception of the DOD

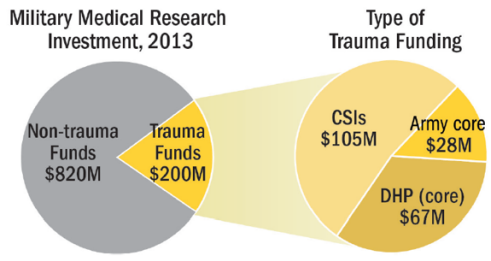


FIGURE 4-5 Funding sources for military medical research, 2013.
NOTE: CSI = Congressional Special Interest; DHP = Defense Health Program.
SOURCE: Data from Rasmussen, 2015.

PRESIDENTIAL ADDRESS

ANNALS OF SURGERY
Vol. 223, No. 5, 453–463

Seed Corn

Impact of Managed Care on Medical Education and Research

James C. Thompson, M.D.

From the Department of Surgery, The University of Texas Medical Branch, Galveston, Texas

Genesis 41:
v. 35 And let them . . . lay up corn . . .
v. 36 . . . that the land perish not through the famine.

"In the Bible, we are admonished to lay up corn so that the land would not perish through famine. If we fail to invest in future education and research, we may have a medical famine."

Tim Fabian, 2017 #TraumaZPDD

Next Steps with Research Action Plan

- National Trauma Research Action Plan
  - Articulate a unified Research Agenda across the continuum of care
  - Define the Ask for financial investment
  - Define a strategy for a federal home for trauma research funding
  - Develop strategies to address regulatory burden
  - Develop a unified approach to advocacy

Next Steps?

- ADVOCACY, ADVOCACY, ADVOCACY
- Define Research Agenda and priorities to support advocacy efforts
- Advocate for a National Trauma Research Institute?
- Bring all organizations interested in trauma research together to advocate with a unified/ coordinated approach
  - Eliminate “bone/blood/burn/brain”
- Engage the public and trauma survivors in advocacy efforts

Eileen Bulger

Problem?: Data Gaps

- Data and data linkage: greatly improved but promise not yet realized
- Data gaps at the temporal extremes
  - Death in the field
  - Long term outcomes

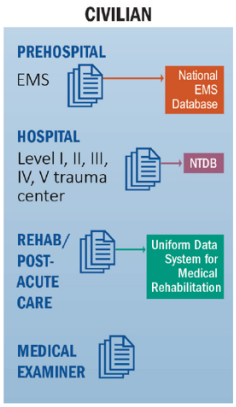
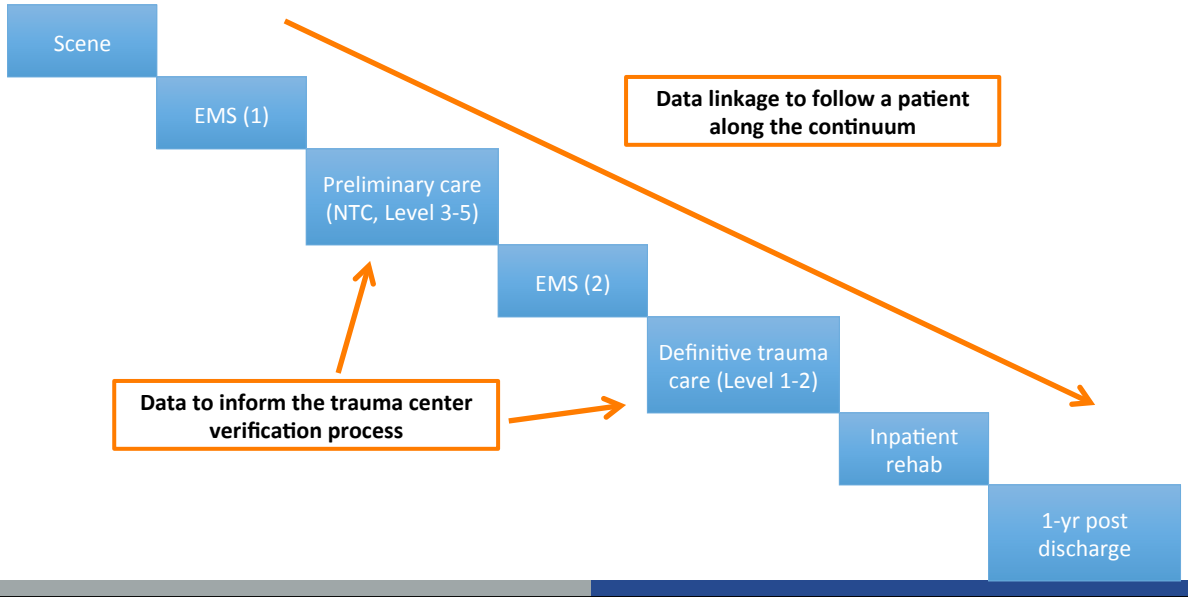


FIGURE 4-2 Digital capture of aggregate trauma patient data in multiple national-level civilian data systems spanning the continuum of care.
NOTE: EMS = emergency medical services; NTDB = National Trauma Data Bank.

Trauma Continuum



Problem?: Workforce

- Military & civilian workforce:
  - Lessons lost between conflicts
  - Military battlefield lessons not reliably translated to civilian care
  - Civilian advances not reliably translated to military care

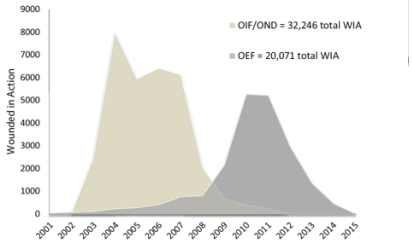


FIGURE 1-6 Wounded in action between 2001 and 2015, Operation Enduring Freedom and Operation Iraqi Freedom/Operation New Dawn.
NOTES: Data were retrieved from the Defense Casualty Analysis System (DCAS). OEF = Operation Enduring Freedom; OIF = Operation Iraqi Freedom; OND = Operation New Dawn; WIA = wounded in action.

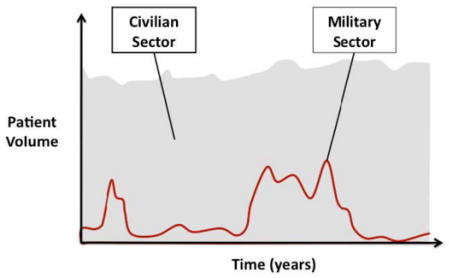


FIGURE 5-2 The episodic nature of trauma care in the military sector as compared with the civilian sector.
SOURCE: Cannon, 2016.

Solution: Integrate Civilian and Military Trauma Education and Readiness

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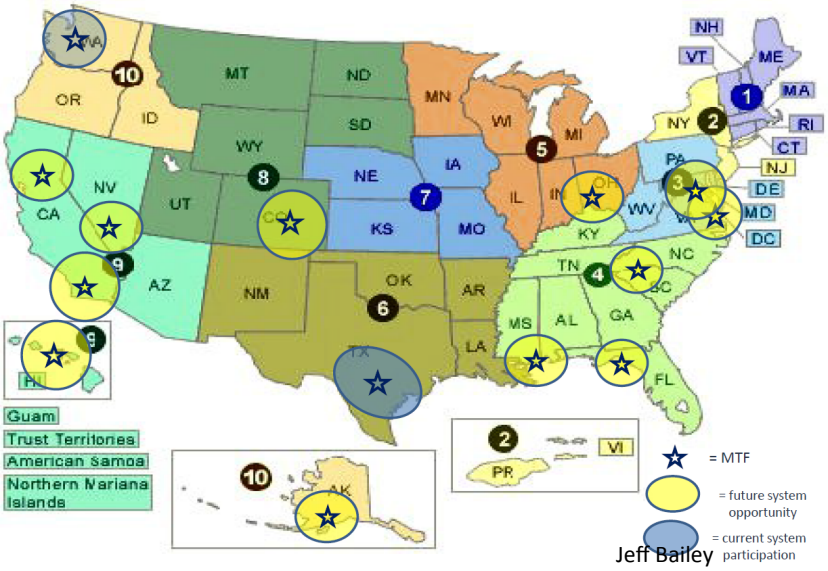


Jeff Bailey

A National Trauma Action Plan

- We need a great trauma system to get to #TraumaZPDD
- We can't have a great trauma system without great research
- We can't have great research without great data
- We can't implement a great trauma system without great education and training

- **We need a national trauma action plan**

Peter W. Thomas: #TraumaZPDD Patient Speaker

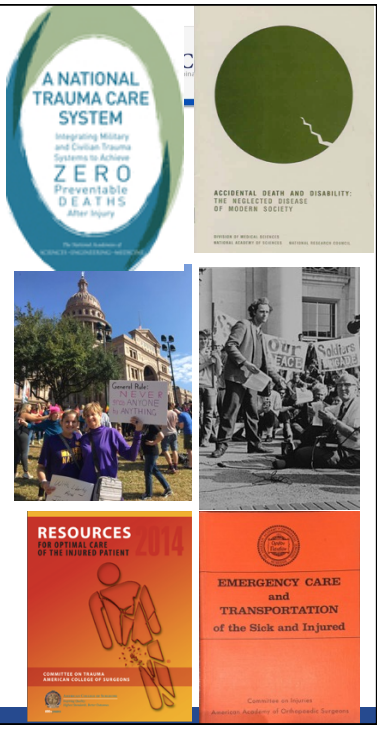
- Advocate
- Attorney
- Leader
- Trauma survivor
- Improve both advocacy and patient care by increased involvement of trauma survivor community

1966

September 9, 1966: President Johnson signs the National Traffic and Motor Vehicle Safety Act and the Highway Safety Act.

The Time is Now

- 50 years since the first great strides were made
- National Academies of Medicine Report
  - 1966 and 2016
- Turbulent times
- Aligned civilian and military leaders
  - Committed group of young and senior leaders
  - Organized commitment
- Still critical need with large burden of disease
- Critical for national and homeland security
- Critical for our children
- Prehospital care critical to getting to #TraumaZPDD



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John B. Holcomb, MD, FACS
COL (USA ret.)
Professor of Surgery
UT Health, Houston, TX

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Lessons Learned from Iraq and Afghanistan

1. No system →
2. No registry →
3. No tourniquets →
4. No charts →
5. No communication →
6. No performance improvement →
7. No research →

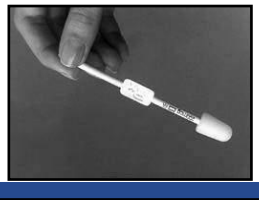
Starting in 2004
a lot better

Prehospital Battlefield Trauma Care: 1992

- Based on trauma courses NOT developed for combat
- No tactical context for care rendered
- Heavy emphasis on endotracheal intubation vs bleeding control
- Medics taught NOT to use tourniquets
- No hemostatic agents
- No junctional tourniquets
- SOF medics – IV cutdowns for difficult venous access
- 2 large bore IVs on all casualties with significant trauma
- 2 large volume crystalloid fluid resuscitation for shock
- Civil War-vintage technology for battlefield analgesia (IM morphine)
- No focus on prevention of trauma-related hypothermia and coagulopathy

Prehospital Battlefield Trauma Care: Now

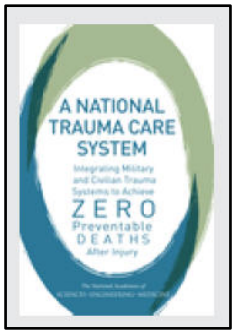
- Phased care in TCCC
- Aggressive use of tourniquets
- Combat Gauze as hemostatic agent
- Aggressive needle thoracostomy
- Sit up and lean forward airway positioning
- Surgical airways as needed for facial trauma
- Hypotensive resuscitation (with blood products)
- IVs only when needed; IO access if required
- PO meds, OTFC, ketamine as "Triple Option" for battlefield analgesia
- Hypothermia prevention; avoid NSAIDs
- Battlefield antibiotics
- Junctional Tourniquets/XStat



What We Are Doing in Houston

- 2008 – Tourniquets on helicopters and in the ED
- 2010 – Tourniquets on ambulances
- 2011 – Tourniquets and hemostatic dressings for 5,000 police
- 2012 – Plasma and RBCs on helicopters
- 2016 – Preventable death rate study (all 1,864 trauma deaths)
- 2016 – Stop the Bleed (hospitals, schools, etc)
- 2017 – Should have whole blood prehospital next week

NASEM Trauma Care Report 2016



A National Trauma Care System

Recommendation 2: The White House should lead the integration of military and civilian trauma care to establish a national trauma care system. This initiative would include assigning a locus of accountability and responsibility that would ensure the development of common best practices, data standards, research, and workflow across the continuum of trauma care.

NASEM Trauma Care Report 2016

- Who would benefit the most from a National Trauma System?
- U.S. Military: Approximately 1,000 potentially preventable deaths from combat trauma 2001-2011
- U.S. Civilian Sector: Approximately 20,000 to 30,000 potentially preventable deaths from trauma every year

Berwick, Downey, Cornett
JAMA 2016

Tactical Combat Casualty Care: Lessons from 14 Years of War

Dr. Frank Butler
Chairman, TCCC

What Can TCCC Offer to My Civilian EMS System?

- Experience and advances from 14 years of war
  - Function with a system and drive interventions with data
- Tourniquets
- Hemostatic dressings
- Trauma airway approach
- TCCC Needle Decompression Plan
- Hypotensive resuscitation – with blood products where possible
- Intraosseous vascular access
- Triple-Option Analgesia

Elements of a National Prehospital Trauma Care System

- Immediate Responders
  - Teachers and school officials
  - Mass transportation workers
  - Malls and sports events workers
  - Nightclub workers
  - Church workers
- Professional First Responders
  - Law enforcement officers
  - Fire and rescue/tactical medics
  - EMS personnel

Proposed Standards of Care

- Lay Persons
  - Bleeding Control (B-CON) for the injured (*Hartford Consensus*)
- Law Enforcement Officers
  - B-CON or Law Enforcement First Responders (*Hartford Consensus*)
- Fire and Rescue and Tactical Medics
  - TCCC for Medical Personnel OR TECC
- EMS Personnel
  - Prehospital Trauma Life Support (PHTKS) – (updated to reflect TCC advances as appropriate for the civilian sector)

What You Can Do

- Use the NASEM Report as a guide
- Get involved
- Work with your trauma system
- Drive innovations with data
- Share results

Thank You

Q&A

To download the NASEM report:
https://www.nap.edu/catalog/23511/a-national-trauma-care-system-integrating-military-and-civilian-trauma