Lessons from Other Systems: 
The DoD Answer, 
The Joint Theater Trauma System

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Trauma, Data and Quality

• IOM report 1966
• Major Trauma Outcome Study
• ACS-COT Resources for Optimal Care Of The Injured Patient
• ACS-COT Trauma Performance Resource Manual
• NTDB
• Trauma Quality Improvement Program TQIP
JTTS Introduction

- DoD did not have a systems approach to trauma care in 2003
- To improve the outcomes of soldiers injured on the battlefield, the U.S. military developed and implemented the Joint Theater Trauma System (JTTS) and Joint Theater Trauma Registry (JTTR)
- Modeled on the U.S civilian trauma system
History of the DoD Trauma Registry and System

- USA Surgeon General directed trauma consultant evaluation visits, COL Holcomb, (May 03)
- LTC Eastridge directed to develop JTTS in Iraq, (Mar 04)
- SGs coordinated with Health Affairs on Joint Theater Trauma Registry (JTTR) and JTTS, (Nov 04)
- OSD/HA directed all services to implement JTTR, (Dec 04)
- Col Jenkins directed to implement JTTS in Iraq, (Dec 04)
- JTTS / JTTR established for entire theater, (Mar 05)
JTTS System Components

“The right care to the right casualty at the right location and right time”

Components Across the Continuum of Care

Prevention
- Linkage with Material developers
- Center for Health Promotion and Preventive Medicine (CHPPM) and Readiness Center

Integrated Pre-Hospital, Levels 3-5
- Integrated approach for MTFs and divisional medical units
- Coordinated divisional Evacuation Standard Operating Procedures
- Adopt Clinical Practice Guidelines
- Communicate, train

Leadership & Communication
- Intra theater
- Inter theater
- Recognized lead facility and consulting assets
- Director / Coordinators

Integrated Pre-Hospital, Levels 3-5
- Joint Theater Trauma Registry (JTTR)
  - Linkages to Analysis System
  - Linkages to Defense Health Information Management System (DHIMS)
- Longitudinal trauma registry
- Provide data and information needs for Services / DoD/ VA

QA/PI
- Feedback mechanism for all providers throughout the continuum of care

Research
- AOR research team and mechanism
- Deployed clinicians to conduct research

Education
- Linkage with Army Medical Department Center & School/Training & Doctrine Command (AMEDD C&S / TRADOC)
- Trauma Outcomes & Performance Improvement Course – Military Version (TOPIC-M)
- Joint Combat Trauma Management Course (JCTMC)
- JTTS Theater Team Rotation Training

Information Systems
- Joint Theater Trauma Registry (JTTR)
- Linkages to Analysis System
- Linkages to Defense Health Information Management System (DHIMS)

Components Across the Continuum of Care
Basis of Combat Casualty Care Benchmark Metrics

• JTTR
  – Comprehensive initial database
    • Demographic
    • Mechanism
    • Anatomic
    • Physiologic
    • Acute outcomes
  – Implemented across all levels of care
Basis of Combat Casualty Care Benchmark Metrics

- JTTR
  - Largest combat Injury database in existence
    - Scoring of Injuries
    - Diagnosis and Procedures
    - Outcomes
    - ~25,000 US injury patients
Dissemination of Evidence-Based Best Practices

• JTTS Clinical Practice Guidelines
• Reviews at each medical treatment facility (Level III, Level IV (LRMC), and Level V’s (WRAMC, BAMC, Bethesda)
  – Weekly Patient Management Conferences
  – Monthly System-Wide Trauma conferences
Examples:

Movement of casualties and data across three continents

Massive transfusion outcome benchmark
Continuous En Route Care
Current Route from Injury to Definitive Care

CASEVAC
1 Hour
BAS
Level 1
Forward Surgical teams
Level 2

TACTICAL EVAC
1-24 Hours
Combat Support Hospital, EMEDS, Fleet Hospital
Level 3

Definitive Care
Level 4
Definitive Care
Level 5

Surgical Capability Pushed Forward
Risk Factors Massive Transfusion

- Pattern recognition ~ coagulopathy during major trauma resuscitation?
- Physical injury pattern: bilateral amputation, amputation + torso injury
- Hypotensive from blood loss
- Base Deficit >6
- Hypothermic
- Coagulopathic (INR>1.5)
- Require damage control measures
- May require fresh whole blood
- Actual and Anticipated transfusion >4u PRBC in ED
Damage Control Resuscitation
Overarching Goals

• Avoid dilution of coagulation factors by standard serial escalation resuscitation practices
  
  LR (3:1) → PRBC (10 units) → FFP → platelets → cryoprecipitate

• New paradigm
  – Parallel resuscitation rather than serial

• Early administration of the beneficial elements in fresh whole blood
  – Plasma and platelets, rFVIIa, cryoprecipitate

• Provide necessary volume

• Correct metabolism

• Early identification massive transfusion candidates
Pertinent Clinical Practice Guidelines (CPG)

- Fresh Whole Blood (FWB) Transfusion
- Massive Transfusion
- Hypothermia Prevention, Monitoring and Management

- JTTS Home Page, USA Institute of Surgical Research
## Damage Control Resuscitation

### CPG Impact?

<table>
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<th>Massive Transfusion Mortality (≥10 u RBC / 24 hours)</th>
<th>Pre-CPG</th>
<th>Post-CPG</th>
<th>p</th>
<th>CPG Compliance</th>
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Eastridge, Am J Surg, Accepted Dec 2009
Summary

• The DoD has evolved an effective system of communication and regionalization of trauma care after injury which has become the “standard of care” on the battlefield.

• The registry and the system facilitates an effective and efficient technique for capturing and analyzing trauma data as well as for disseminating real-time data driven quality improvement measures.