

Joint Trauma System



Presented to
Defense Health Board
21 February 2012
Presenter
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Vision

That every soldier, marine, sailor, or airman injured on ANY battlefield or in ANY theater of operations has the optimal chance for survival and maximal potential for functional recovery.



Double amputee soldier deploys to Afghanistan
By Todd Pitman - The Associated Press
Posted : Saturday Sep 25, 2010 12:50:17 EDT



JTTS History

- 2nd MED BDE directed LTC Eastridge to develop JTTS in Iraq (Mar 04)
- Service SGs coordinated with Health Affairs on Joint Theater Trauma Registry (JTTR) and JTTS (Nov 04)
- OSD/HA directed services to implement JTTR (Dec 04)
- 44th MEDCOM CG directed implementation of JTTS in Iraq (Dec 04)
- CENTCOM established JTTS in AOR (Mar 05)



JTS History

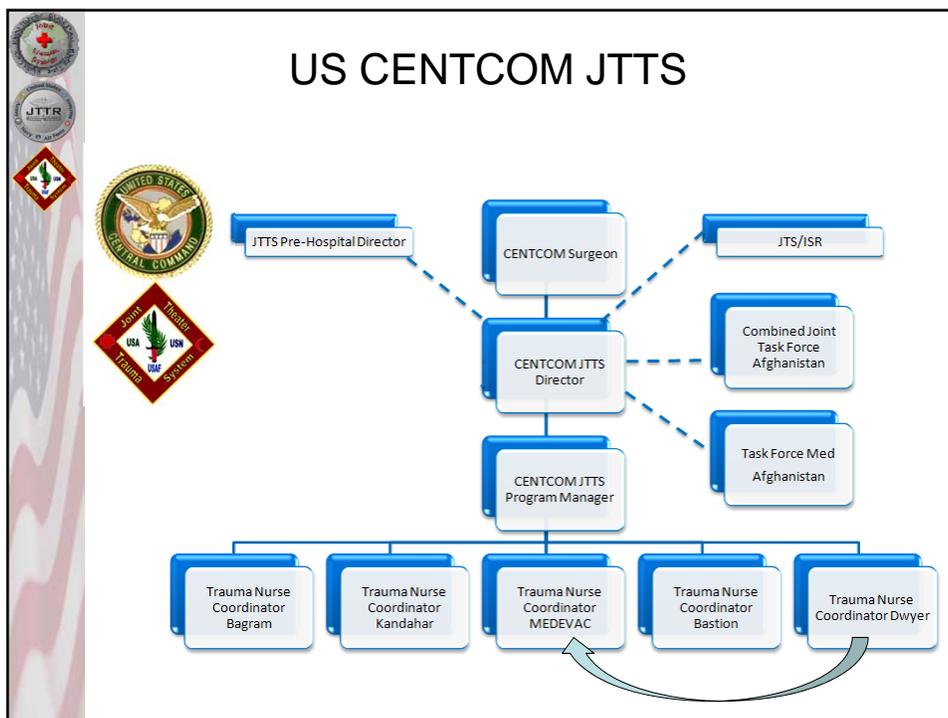
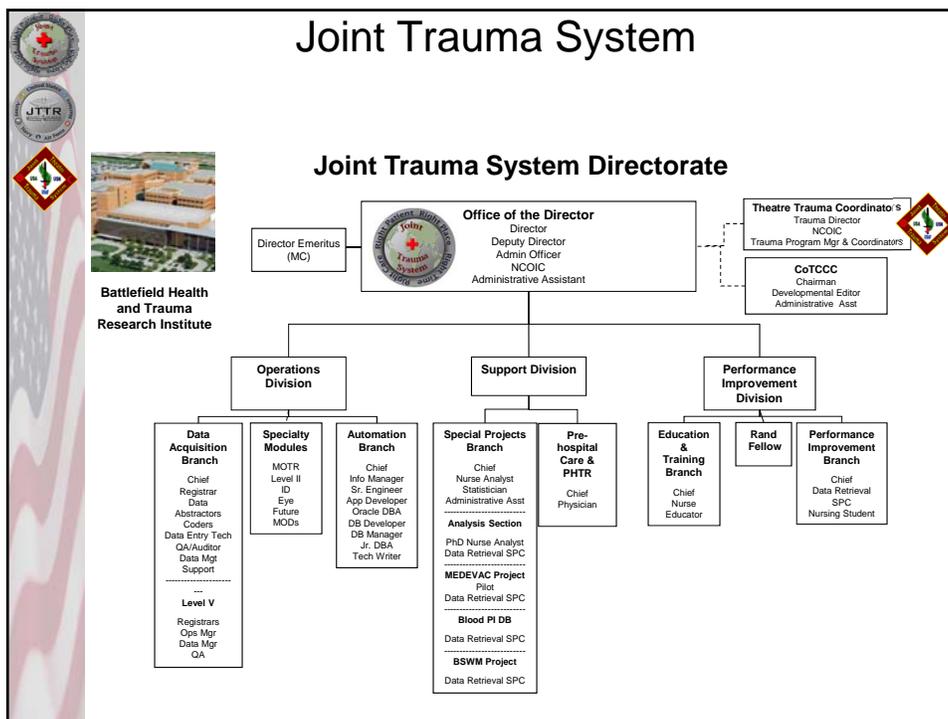
- Regional combatant command (COCOM) trauma systems are largely contingency based, they may expand, shrink or disappear depending on the political, strategic, operational or tactical situation
- JTS developed as an enduring resource for all trauma care within the DoD 2010
- JTS established as an official DoD organization in 2011

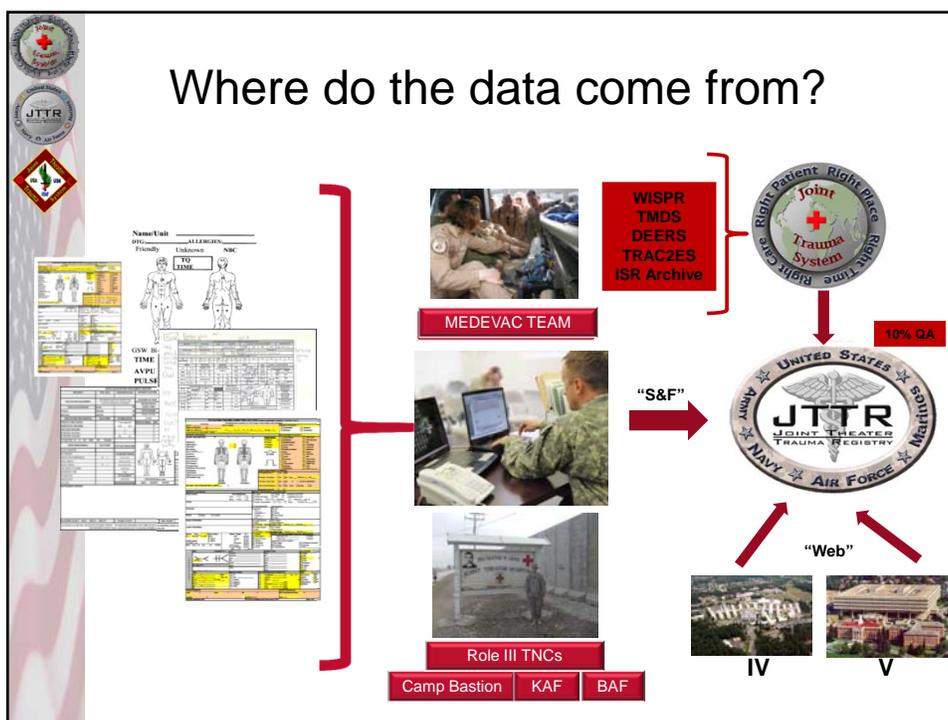
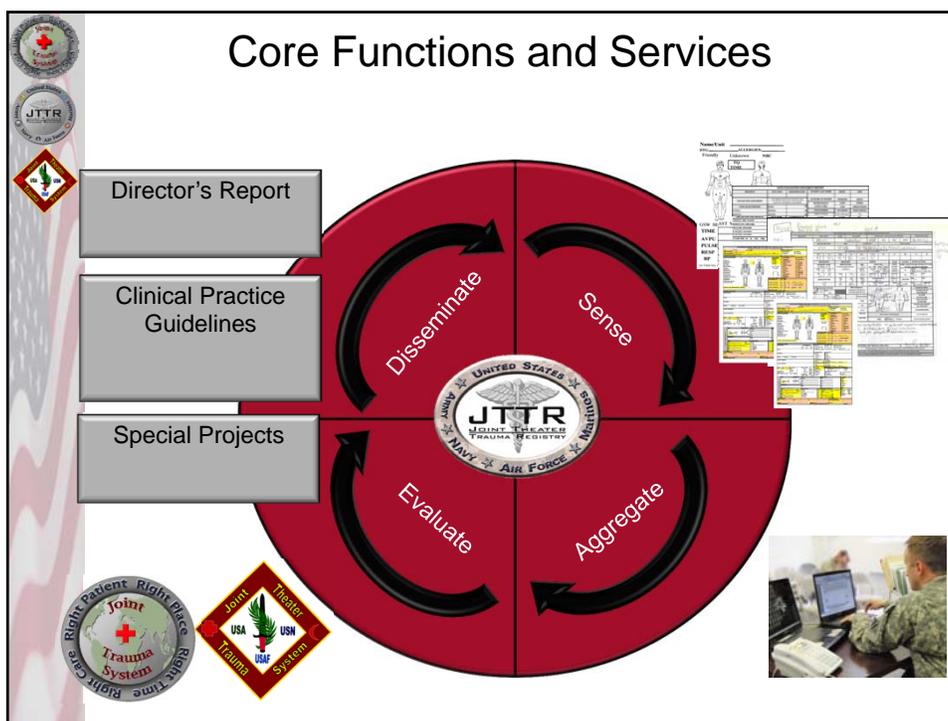
Mission

- 
- Maintain a Department of Defense Trauma Registry System
 - Provide each of the services with full and complete access to the DoD trauma registry
 - Provide timely and relevant information about trauma patient care and outcomes
 - Create a research strategy that supports reduction of morbidity and mortality

Goals

- 
- Capture and coordinate sharing of patient data across all levels of care
 - Develop and maintain evidence supported clinical practice guidelines
 - Assess success of interventions and outcomes
 - Identify training requirements
 - Maintain trauma care and systems currency







Joint Theater Trauma Registry (JTTR)

- Largest combat Injury database in existence
- All services injury data derived from records
 - Scoring of Injuries
 - Diagnosis and Procedures
 - Outcomes
- >26K Patients comprising 110K Records
- Specialty Modules (ID, MOTR, Eye, Outcomes, TBI, Acoustics)



What is it used for?

- Performance improvement
- Evidenced Based best practices
- Concurrent reports
- Special projects and reports



How do we use the data? Performance Improvement

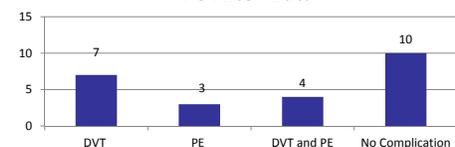
- IVC Filters
- Intraosseus Devices
- Post-splenectomy vaccines
- Temperature documentation
- Vacuum Spine Board and skin break down



Joint Trauma System / Joint Theater Trauma System Trauma Performance Improvement

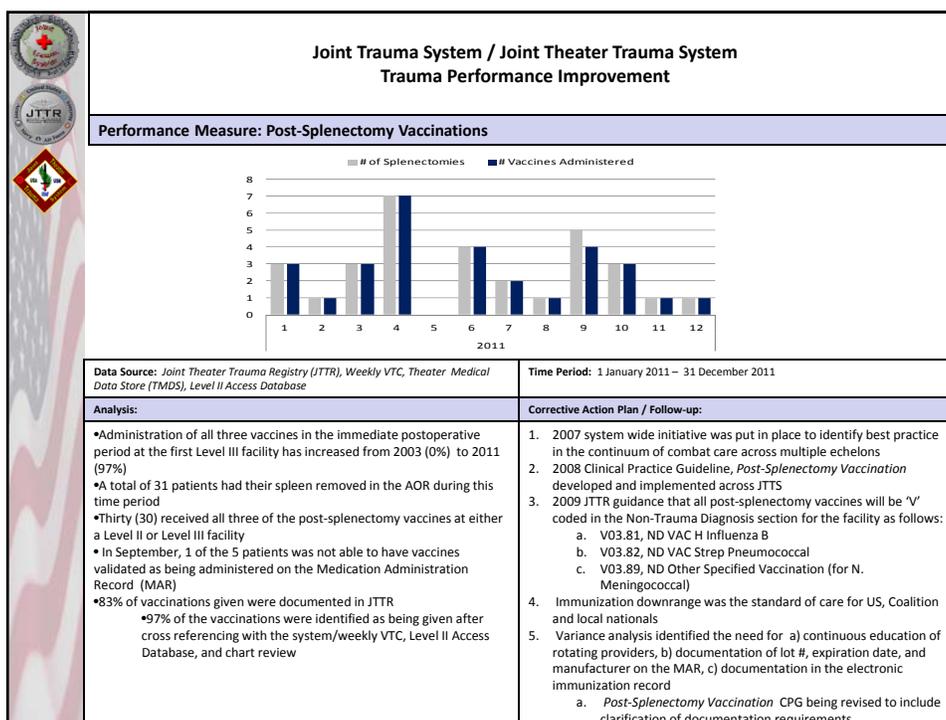
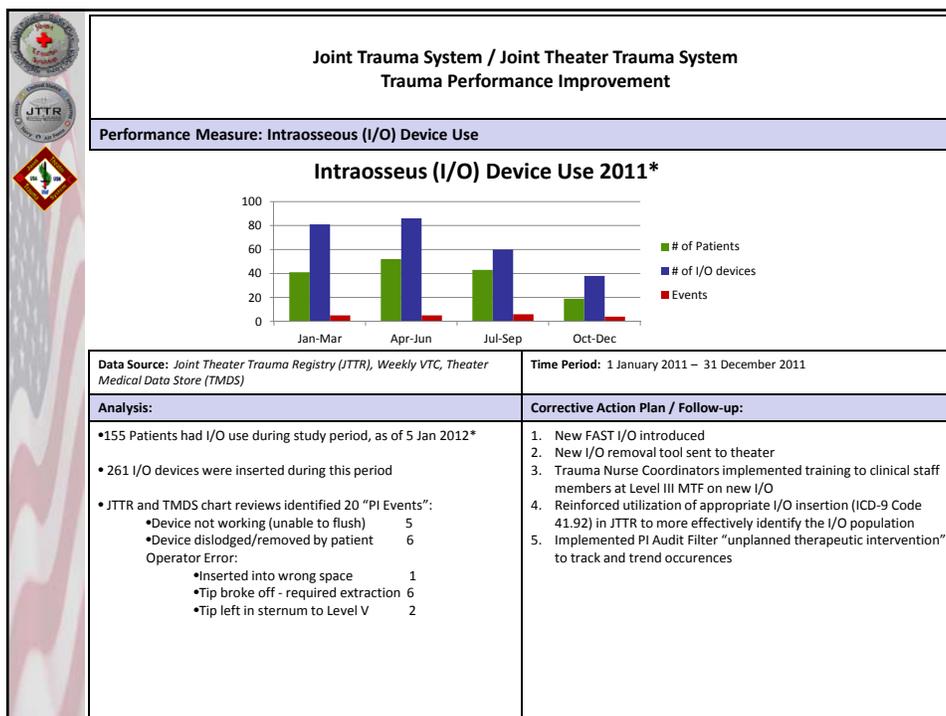
Performance Measure: IVC Filter

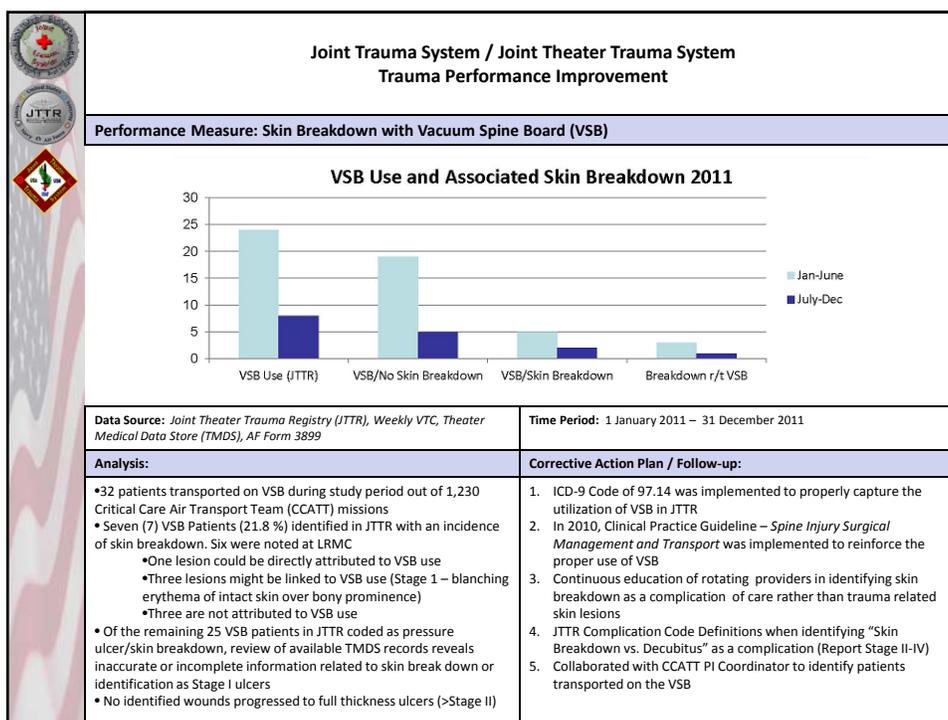
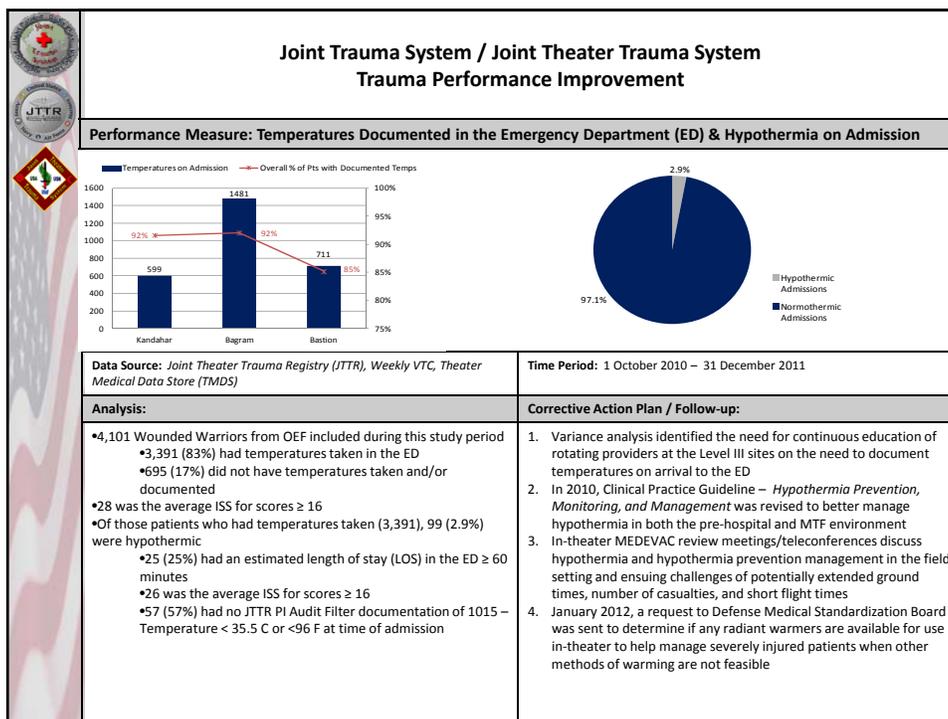
IVC Filter Data



Complication	Count
DVT	7
PE	3
DVT and PE	4
No Complication	10

Data Source: Joint Theater Trauma Registry (JTRR), Weekly VTC, Theater Medical Data Store (TMDS), National Navy Medical Center Registry	Time Period: October 2010 – October 2011
Analysis: <ul style="list-style-type: none"> •24 IVC Filters inserted during this twelve month period – all were inserted at Craig Joint Theater Hospital, Bagram •14 (58%) IVC Filters removed at the following locations: LRMCC - 1, SAMMC - 2, WRAMC - 2, NNMC – 7, NMCSDB/Balboa– 2 •17 (71%) do not have documentation of removal. <ul style="list-style-type: none"> •Caveat: Not all IVC filters placed during this time frame may have had indications for removal prior to the distribution of this report •24 have documentation of transfer to CONUS: SAMMC - 6, WRAMC - 8, WRNMMC - 10 •7 (29%) had documentation in JTRR of a Deep Vein Thrombosis (DVT), 3 (13%) had a Pulmonary Embolus (PE), 4 (17%) had a DVT and PE and 10 (42%) had an IVC filter inserted and no documentation in JTRR of a DVT or PE complication. <ul style="list-style-type: none"> •Caveat: Prophylactic placement of IVC filters may be placed in "very high risk" patients – those who cannot receive anticoagulation because of increased bleeding risk and: 1) Severe closed head injury (GCS<8), 2) Incomplete spinal cord injury with paraplegia or quadriplegia, 3) Complex pelvic fractures with associated long-bone fractures, or 4) Multiple long-bone fractures 	Corrective Action Plan / Follow-up: <ol style="list-style-type: none"> 1. Continue to collaborate with CONUS facilities to identify and develop a tracking system for IVC filter insertions and removals 2. In 2009, insertion codes were developed: Thoracic Vessels code – 38.75, Abdominal and Femoral Vessels code – 38.77 3. In 2010, ICD-9 Code 39.99 – IVC Filter Removal, was implemented 4. Continue educational awareness to the Theater of Operations Health Care Providers to document in the medical record, i.e. anesthesia flow sheet documentation of IVC Filter brand and manufacture's number 5. Discussed with TMDS representative to develop a template in the radiology section to capture the radiologist insertion of the IVC filter 6. Implement a monthly system PI Report on IVC Filter insertion and removal 7. Updated Clinical Practice Guideline (CPG) – <i>Prevention of Deep Venous Thrombosis</i> to improve the IVC filter insertion process







How do we use the data? Evidence based best practices

Clinical Practice Guidelines

Joint Theater Trauma System Clinical Practice Guideline

POST-SPLENECTOMY VACCINATION

Original Release/Approval	20 Mar 2008	None	This CPG requires an annual review.
Revised:	1 Dec 2009	Approved	1 Nov 08
Dependencies:	Post Splenectomy Vaccination, 1 Nov 08		
Minor Changes:	<input checked="" type="checkbox"/> Changes are substantial and require a thorough reading of this CPG. <input type="checkbox"/>		
Significant Changes:	<input type="checkbox"/> Added Appendix B. Includes 6 month review of use of the CPG in theater, includes additional clinical references.		

1. **Goal.** All post splenectomy and functionally asplenic trauma patients in the CENTCOM AOR will receive appropriate and timely vaccination. All vaccinations will be documented in longitudinal medical record and include date/time of physician order and time of administration by nursing personnel.

2. **Background.** Overwhelming post splenectomy infection (OPSI) is a potentially fatal complication with a case mortality rate as high as 100%. The incidence of OPSI is higher in splenectomized individuals and up to 540 times more susceptible to bacterial infection in the general population. The majority of trauma surgeons provide some sort of timing of initial vaccination to their patients, although to date, there is no consensus on timing of initial vaccination, vaccination regimen, or follow-up care. The Joint Theater Trauma System (JTTS) conducted a survey of trauma surgeons regarding their post-splenectomy patient care. Of 351 active surgeons, 99.2% (348) responded. The survey revealed that 17% (60) of surgeons provided the following for their post-splenectomy patients: 1) All but one provided the timing of initial vaccination, and 2) 56.7% gave all three vaccines. The timing of vaccination was from 0-24 hours (10.3%), 25-72 hours (37.2%), 73-144 hours (32.2%), and 145-360 hours (19.9%). The majority of surgeons (77%) provided a follow-up period of six weeks following surgery.

3. **High-CENTCOM AOR.** 99% of splenic injuries are managed in splenectomized patients and 99% of OPSI, therefore there must be a standard process to provide post-splenectomy vaccination, accurate documentation, and life-long tracking of splenic injuries (Appendix A for additional clinical background).

3. **Indications.** All splenectomized patients and those deemed to be functionally asplenic, i.e., normal architecture and/or vaccination in the remaining splenic remnant.

4. **Dosing.**

- Streptococcus pneumoniae (23-valent polysaccharide):** Single dose.
 - 0-6 months: Three doses + booster
 - 7-11 months: Two doses + booster
 - 12-14 months: One dose + booster
 - > 15 months: Single dose
- Neisseria meningitidis (Quadrivalent):** Single dose

Guideline Only/Not a Substitute for Clinical Judgment
Page 1 of 6 January 2009 Post-Splenectomy Vaccination

[02 CENTCOM JTTS CPG Process - 08 Apr 2009](#)

[Acoustic Trauma and Hearing Loss - 16 Feb 2010](#)

[Amputation - 16 Feb 2010](#)

[Blunt Abdominal Trauma - 30 Jun 2010](#)

[Burn Care - 20 Dec 2008](#)

[Catastrophic Injury - 16 Feb 2010](#)

[Lacerations and Wounds - 30 Jun 2010](#)

[Compartment Syndrome and Fasciotomy - 30 Apr 2009](#)

[Damage Control Resuscitation - 13 Feb 2009](#)

[Emergent Resuscitative Thoracotomy - 6 May 2009](#)

[Fresh Whole Blood Transfusion - 12 Jan 2009](#)

[Frozen Blood - 30 Jun 2010](#)

[Hypothermia Prevention - 30 Jun 2010](#)

[Infection Control - 16 Feb 2010](#)

[Intoxication and Toxic Chemical Exposure - 7 Nov 2008](#)

[Orbit Care - Ocular and Adnexal Injuries - 16 Feb 2010](#)

[Patient Transfer and Transport - 19 Nov 2008](#)

[Management of Pain Anxiety and Delirium - 23 Nov 2010](#)

[Management of Patients with Severe Head Trauma - 30 Jun 2010](#)

[Management of War Wounds - 16 Feb 2010](#)

[Nutrition - 16 Feb 2010](#)

[Pelvic Fracture Care - 30 Jun 2010](#)

[Post Splenectomy Vaccination - 30 Jun 2010](#)

[Prevention of Deep Venous Thrombosis - 21 Nov 2008](#)

[Spine Injury Surgical Management and Transport - 9 Jul 2010](#)

[Trauma Airway Management - 30 Jun 2010](#)

[Urologic Trauma Management - 30 Jun 2010](#)

[Use of Electronic Documentation - 30 Jun 2010](#)

[Use of Trauma Flow Sheets - 1 Dec 2008](#)

[VAP - 16 Feb 2010](#)

[Vascular Injury - 7 Nov 2008](#)



TXA use in OEF

- CRASH* 2 study Jun 2010
 - 20,000 patients
 - *No serious adverse events*
 - The risk of death due to bleeding was significantly reduced (489 [4.9%] vs 574 [5.7%]; *relative risk 0.85, 95% CI 0.76–0.96; p=0.0077*)
 - Post-hoc: best if given within 3H of injury
 - JTS initiated discussion
 - Safety concerns led to cautious approach

*Clinical Randomization of an Antifibrinolytic in Significant Hemorrhage



TXA use in OEF

- MATTERS* analysis of 896 Casualties cared for at R3 Bastion (Jan 2009 - Dec 2010) demonstrated mortality was lower in the TXA group (14.4% vs. 28.1%; $p=0.004$)
- TXA use in the massive transfusion cohort was independently associated with survival (odds ratio: 7.28; 95% CI: 3.02-17.32)

-- However --

*Military Application of Tranexamic Acid in Trauma and Emergency Resuscitative Surgery



TXA use in OEF

- There was an increased VTE burden for all patients requiring at least one unit of blood after combat injury, patients receiving TXA had higher rates of DVT (2.4% vs. 0.2%, $p = 0.001$) and PE (2.7% vs. 0.3%, $p = 0.001$)
- Risk of VTE in this population considered high
 - Risk offset by survival advantage

TXA use in OEF

- JTS adapted DCR CPG**
 - Incorporated TXA use: 10 Aug 2011 with monitoring
 - Includes JTTR data collection initiated Oct 2010

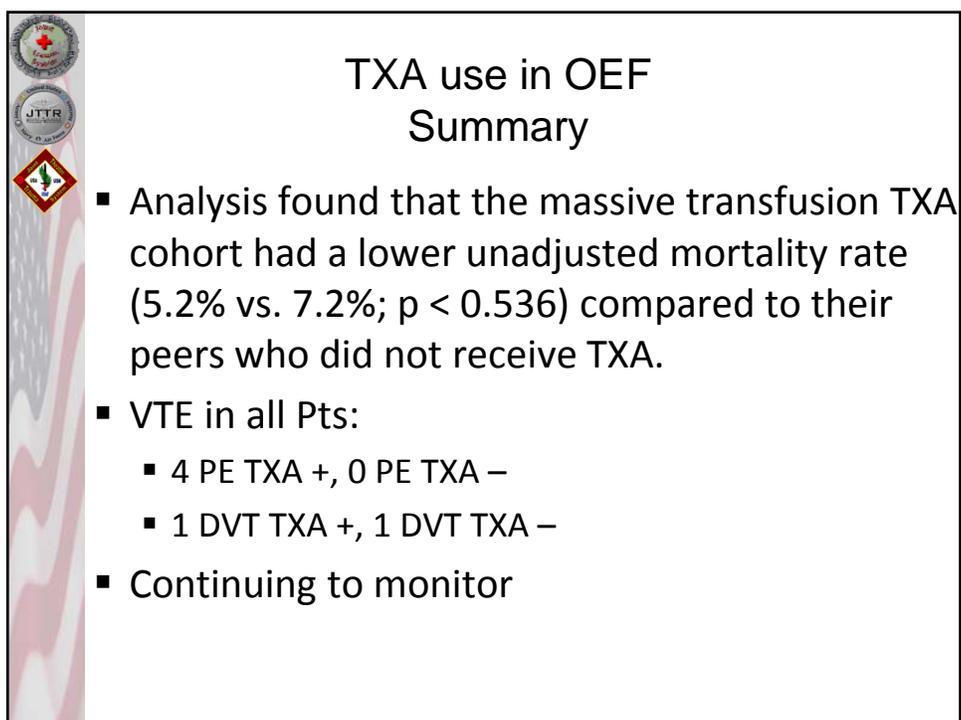
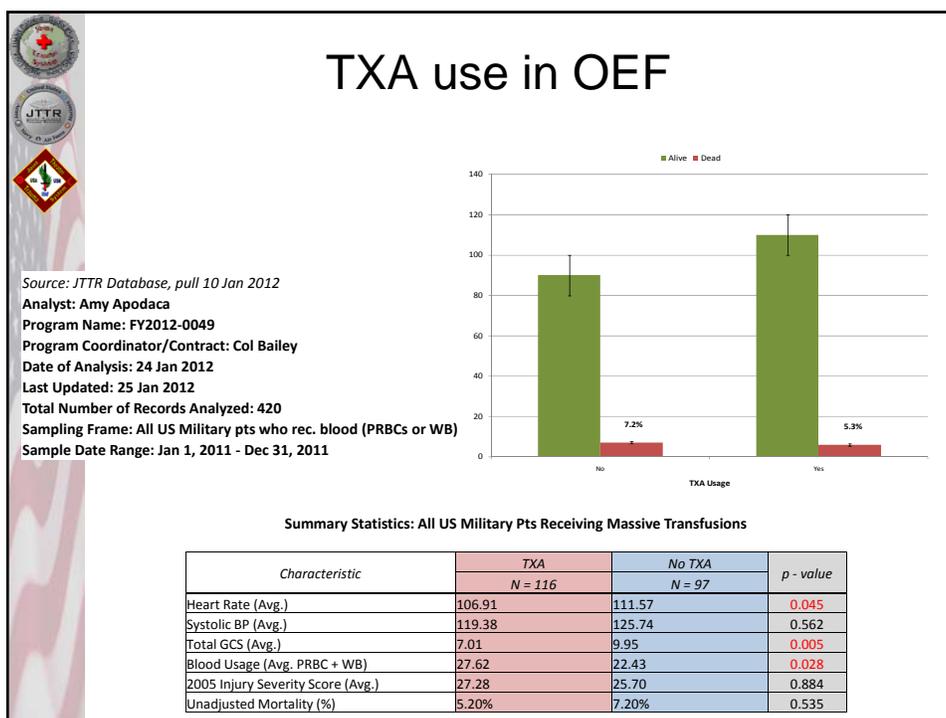
TXA use in OEF

Source: JTTR Database, pull 10 Jan 2012
 Analyst: Amy Apodaca
 Program Name: FY2012-0049
 Program Coordinator/Contract: Col Bailey
 Date of Analysis: 24 Jan 2012
 Last Updated: 25 Jan 2012
 Total Number of Records Analyzed: 420
 Sampling Frame: All US Military pts who rec. blood (PRBCs or W
 Sample Date Range: Jan 1, 2011 - Dec 31, 2011

TXA Usage	Alive	Dead	Total
No	250	12 (5.2%)	262
Yes	140	7 (5.3%)	147

Summary Statistics: All US Military Pts Receiving Blood Products

Characteristic	TXA	No TXA	p - value
	N = 151	N = 269	
Heart Rate (Avg.)	106.04	106.30	0.921
Systolic BP (Avg.)	119.88	129.92	0.139
Total GCS (Avg.)	7.66	11.58	< 0.001
Blood Usage (Avg. PRBC + WB)	23.07	11.66	< 0.001
2005 Injury Severity Score (Avg.)	25.64	22.10	0.004
Unadjusted Mortality (%)	5.30%	5.20%	1.000





Questions

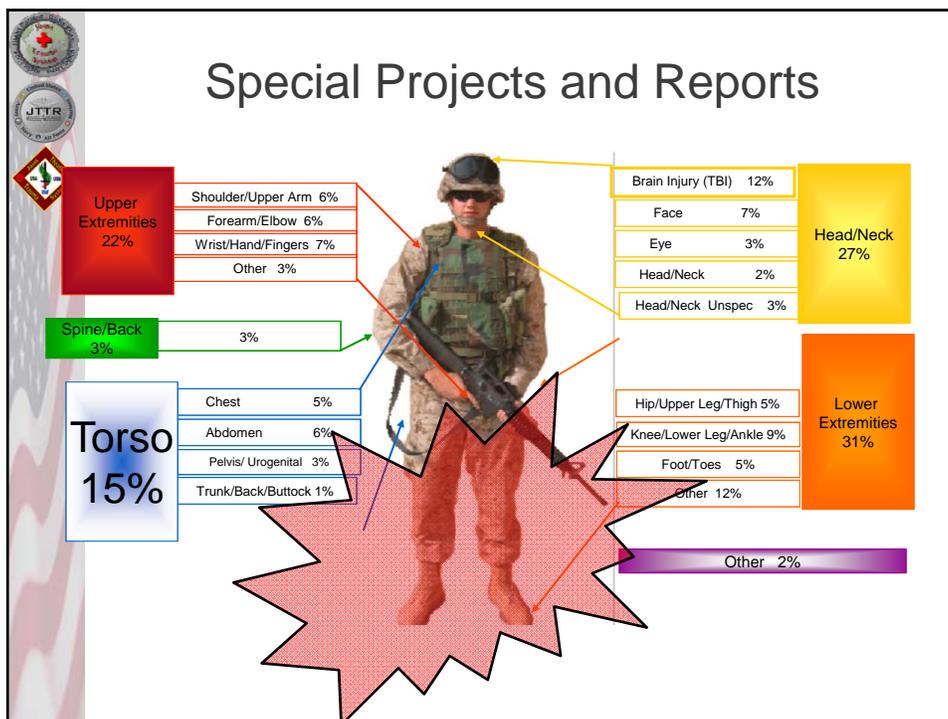
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The sidebar on the left contains three circular logos at the top: the first is the Army Medical Department Center and School (AMEDD) logo, the second is the Joint Theater Trauma Research (JTRR) logo, and the third is a diamond-shaped logo with a map of Africa. Below the logos is a vertical strip of the American flag.



Additional Slides

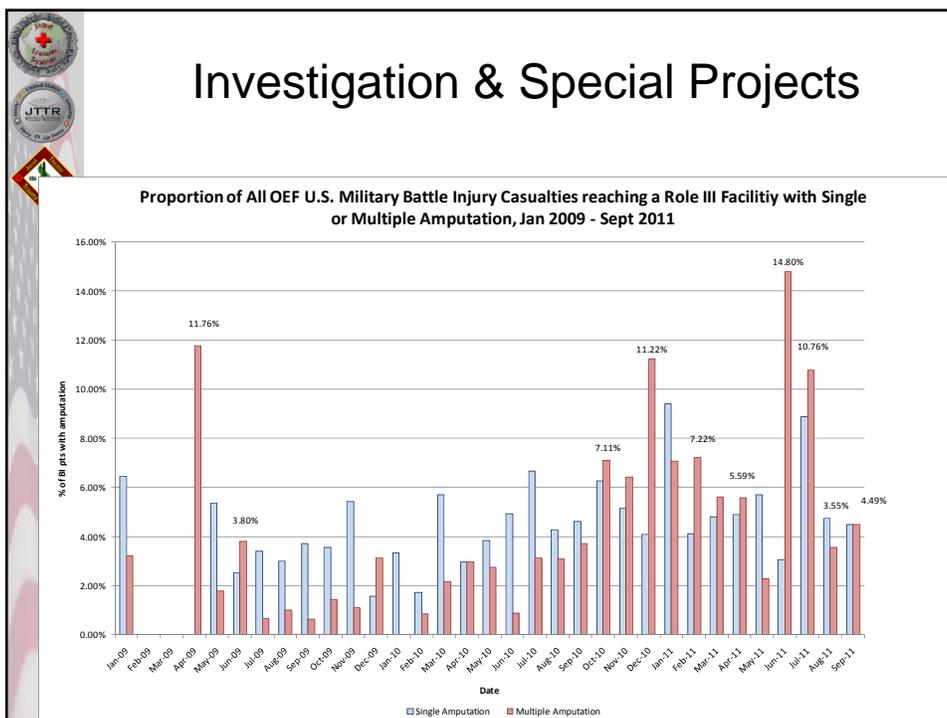
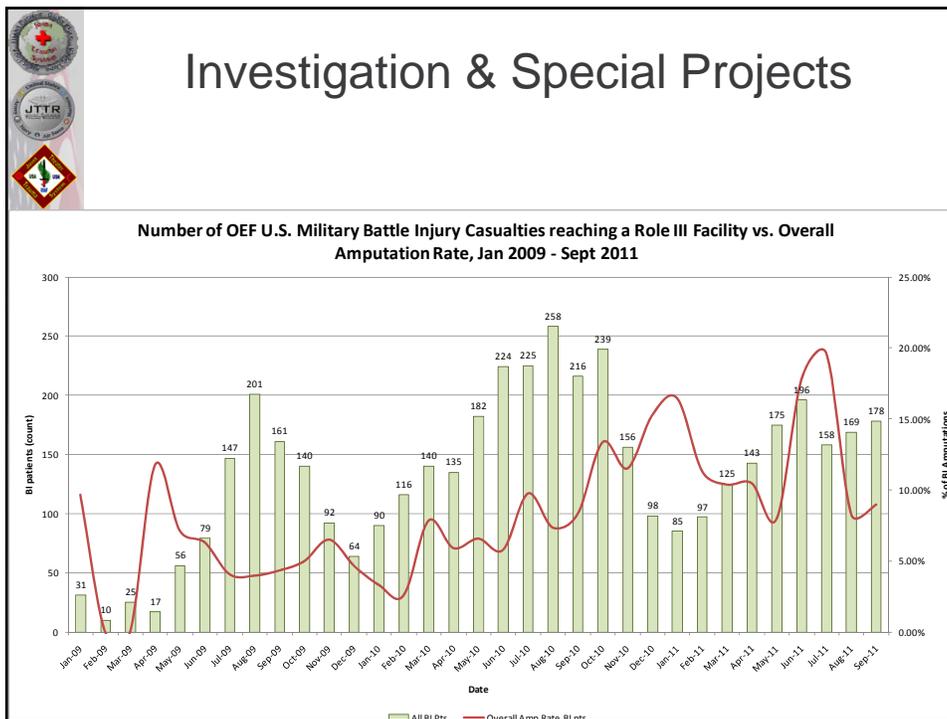
The sidebar on the left is identical to the one in the 'Questions' slide, featuring the AMEDD, JTRR, and Africa logos, and a portion of the American flag.



Investigation & Special Projects

Recent Amputation Trends:
Jan 2009 – Sep 2011

U.S. Military Battle Injury Casualties in
Afghanistan by
Branch of Service & Mounted/Dismounted
Status





Ballistic Undergarment

Special Project: Are Ballistic Underpants effective?



*US Version
(Tier 1 only)*



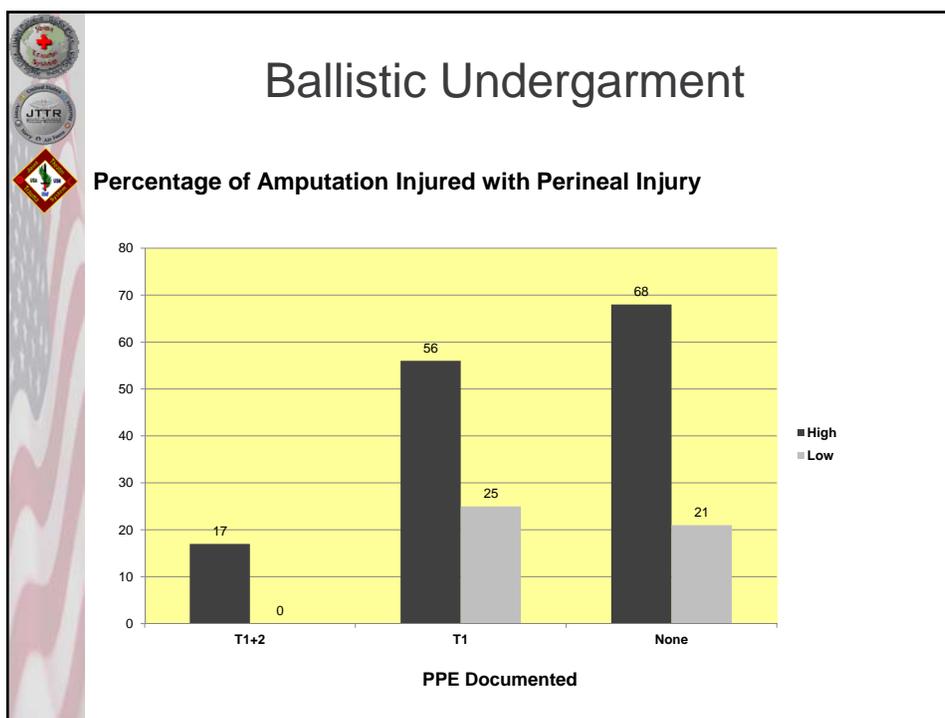
*UK Version
(Tier 1 & 2)*



Ballistic Undergarment

- Issued to UK & US Marines
 - UK had Tier 1 & 2 system
 - USMC had Tier 1 equivalent only
- Trauma Log from JTTS TNCs at Role III Bastion (HIPPA protected)
 - Underpants use not recorded in JTTR

- APR 1, 2011 – SEP 30, 2011 Bastion casualties
- “High Amputation Group” - 45 US or UK casualties w/ unilateral or bilateral at or above knee traumatic amputations +/- unilateral below knee or above ankle amputation
- “Low Amputation Group” - 31 US or UK casualties w/ unilateral or bilateral below knee or above ankle amputations but no TKA or AKA



Ballistic Undergarment - Conclusions

- 76 Amputee victims as Bastion since APR 1
 - Majority are US casualties 59 (5 US : 1 UK)
- BEST: UK Tier 1 and 2 system warn together
 - 17% Perineal Injury High Amp Grp / 0 Low Amp Grp
- INTERMEDIATE: Tier 1 only
 - 56% Perineal injury rate High Amp Grp / 25% Low Amp Grp



Ballistic Undergarment - Conclusions

- **INEFFECTIVE: No Ballistic Garment**
 - 68% Perineal injury rate High Amp Grp / 21% Low Amp Grp
- **UNKNOWN: 11 (15%) – Initial Assessment forward of Role III (PPE not documented)**



Joint Theater Trauma System Reporting Excerpts



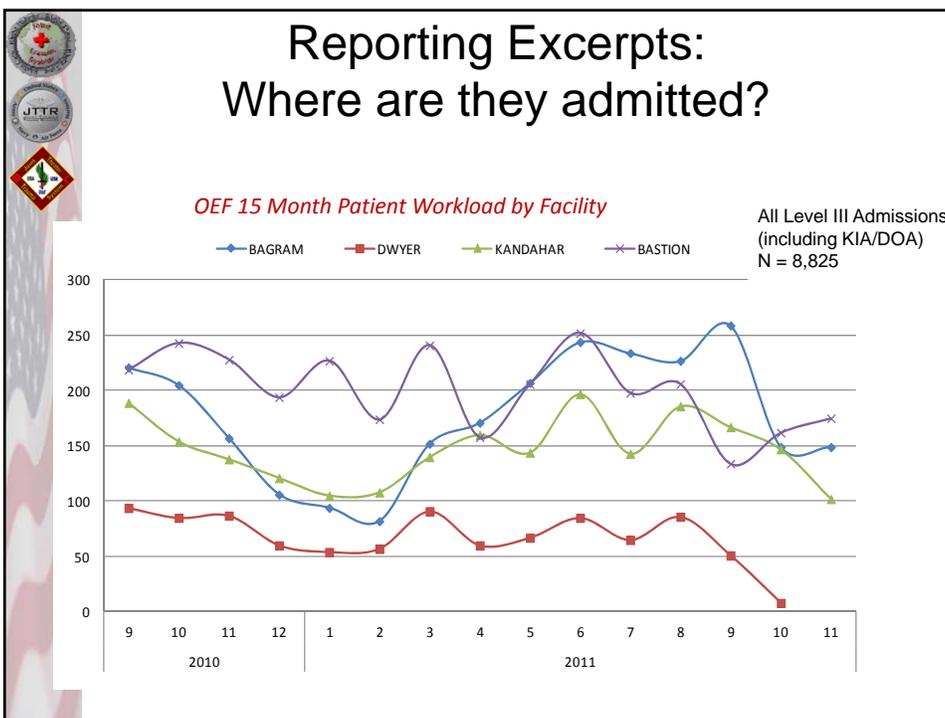

JTTS Director's Report
December 2011

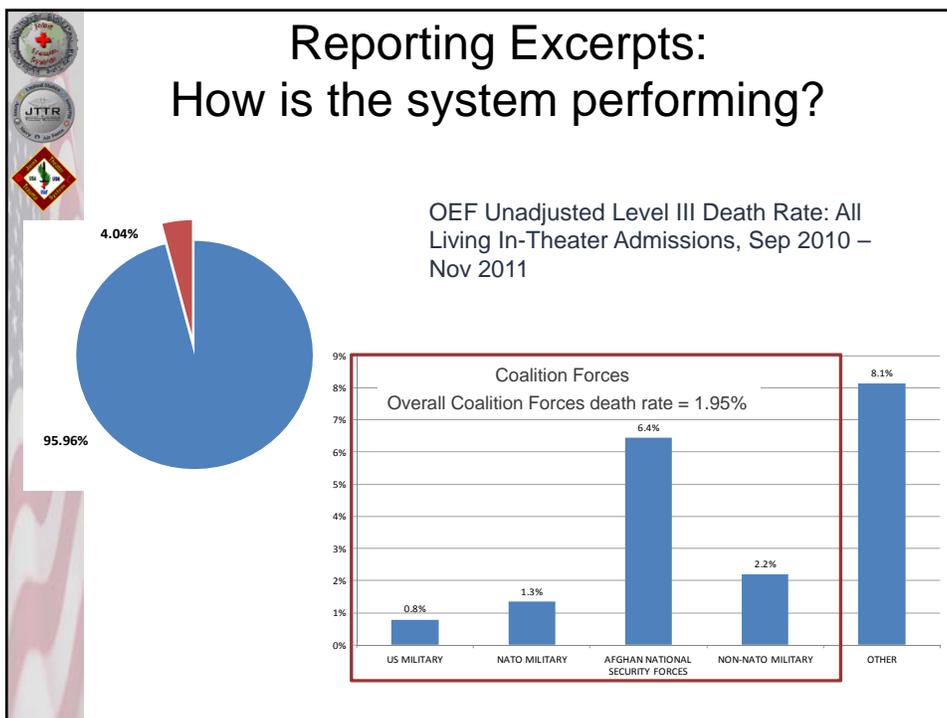
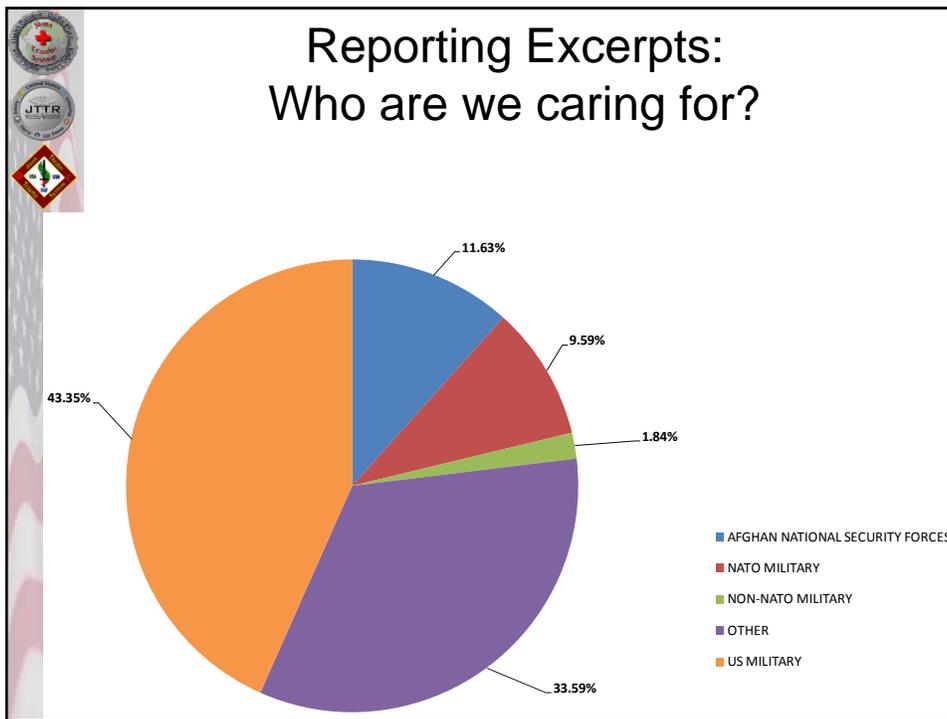
COL Kirby R. Gross, MC USA
CENTCOM JTTS Director
Presented on behalf of the in-theater JTTS team

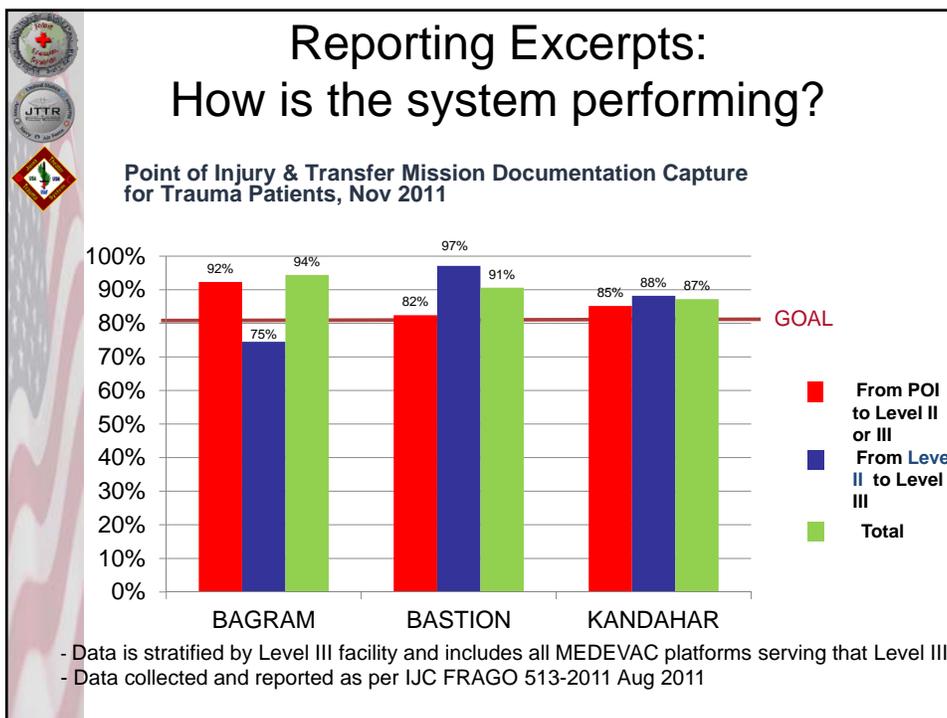
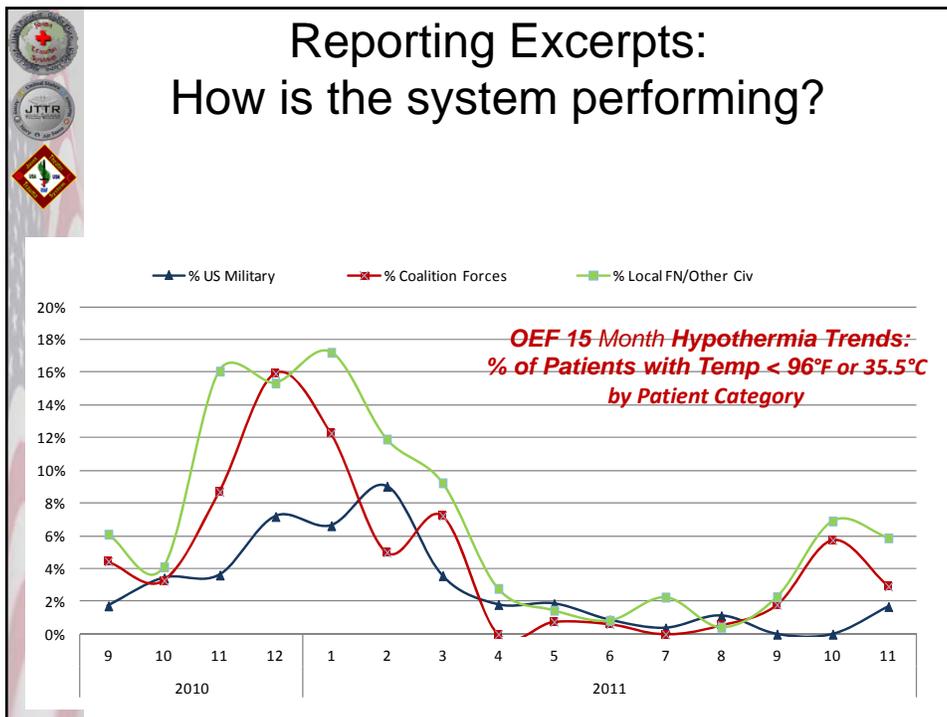


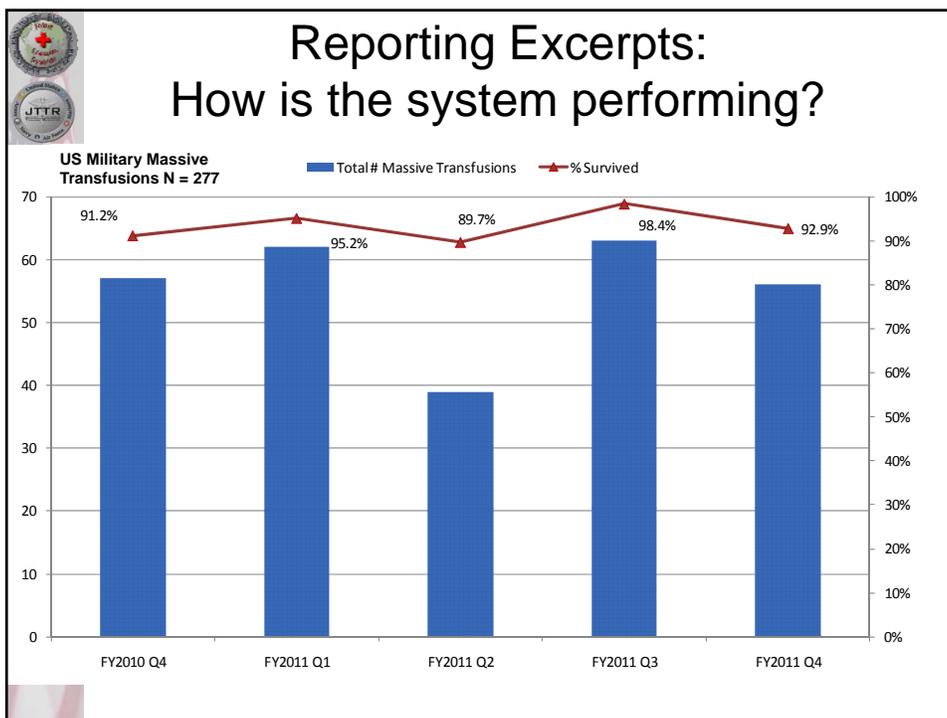
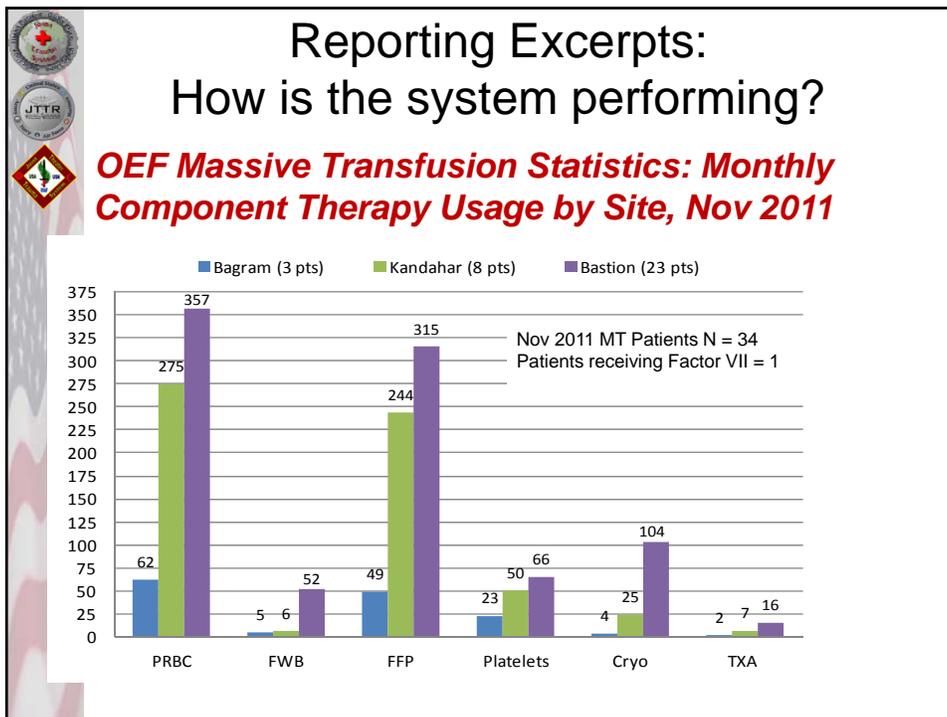
“Theater Director’s Report” Data Caveats

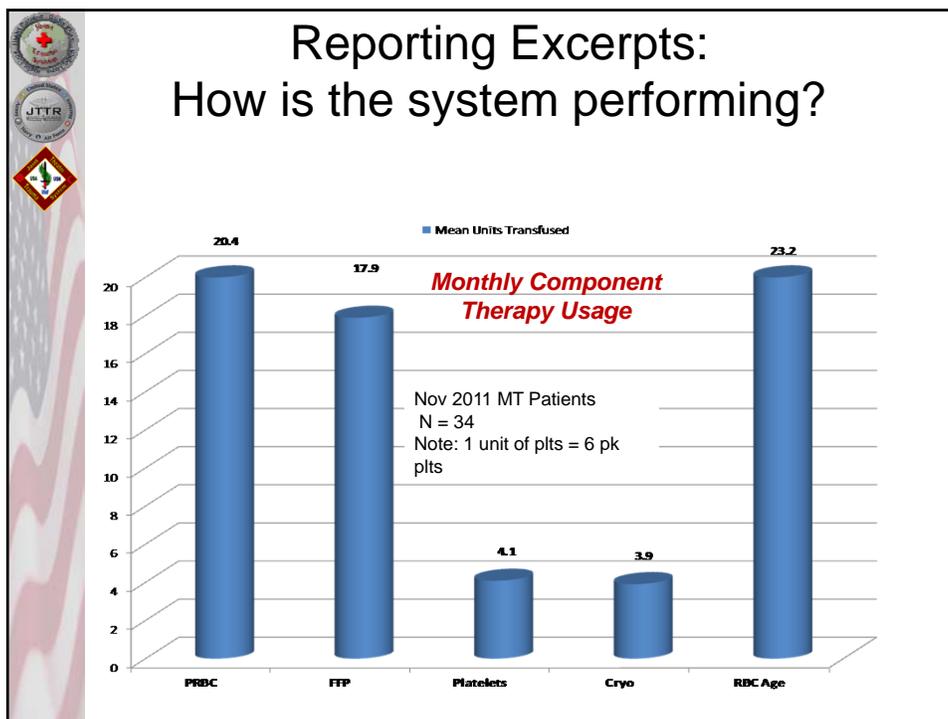
- In-theater data only
- Collected at Level III facilities & by MEDEVAC team
- Serious trauma only (admitted overnight)
- Data is continuously updated (previous months are revised)
- OIF/OND data retrospective capture











CPG Impact

	Pre-CPG	Post-CPG	p	CPG Compliance
Burn Resuscitation Associated Abdominal Compartment Syndrome Mortality (Burn CPG)	36 %	18 %	<0.05	94 %
Hypothermia on Presentation (Hypothermia CPG)	7 %	1 %	<0.05	84 %
Massive Transfusion Mortality (≥10 u RBC / 24 hours) (Damage Control Resuscitation CPG)	32 %	20 %	<0.05	85 %

Eastridge, Am J Surg, Dec 2009