Presented to
Defense Health Board

21 February 2012

Presenter
Col Jeffrey Bailey, MD

U.S. Army Institute of Surgical Research (USAISR)
3698 Chambers Pass, Bldg 3611
Ft Sam Houston, TX 78234

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 Trauma System

Joint Trauma System Directorate

Battlefield Health and Trauma Research Institute

Office of the Director
Director
Deputy Director
Admin Officer
NCOIC
Administrative Assistant

Director Emeritus (MC)

Theatre Trauma Coordinators
Trauma Director
NCOIC
Trauma Program Mgr & Coordinators

CoTCCC
Chairman
Developmental Editor
Administrative Asst

Operations Division

Data Acquisition Branch
Chief
Registrar
Data Abstractors
Coders
Data Entry Tech
QA/Auditor
Data Mgt Support

Level V
Registrars
Ops Mgr
Data Mgr
QA

Specialty Modules
MOTR
Level II
ID
Eye
Future MODs

Automation Branch
Chief
Info Manager
Sr. Engineer
App Developer
Oracle DBA
DB Developer
DB Manager
Jr. DBA
Tech Writer

Support Division

Special Projects Branch
Chief
Nurse Analyst
Statistician
Administrative Asst

Analysis Section
PhD Nurse Analyst
Data Retrieval SPC

MEDEVAC Project
Pilot
Data Retrieval SPC

Blood PI DB
Data Retrieval SPC

BSWM Project
Data Retrieval SPC

Pre-hospital Care & PHTR
Chief
Physician

Performance Improvement Division

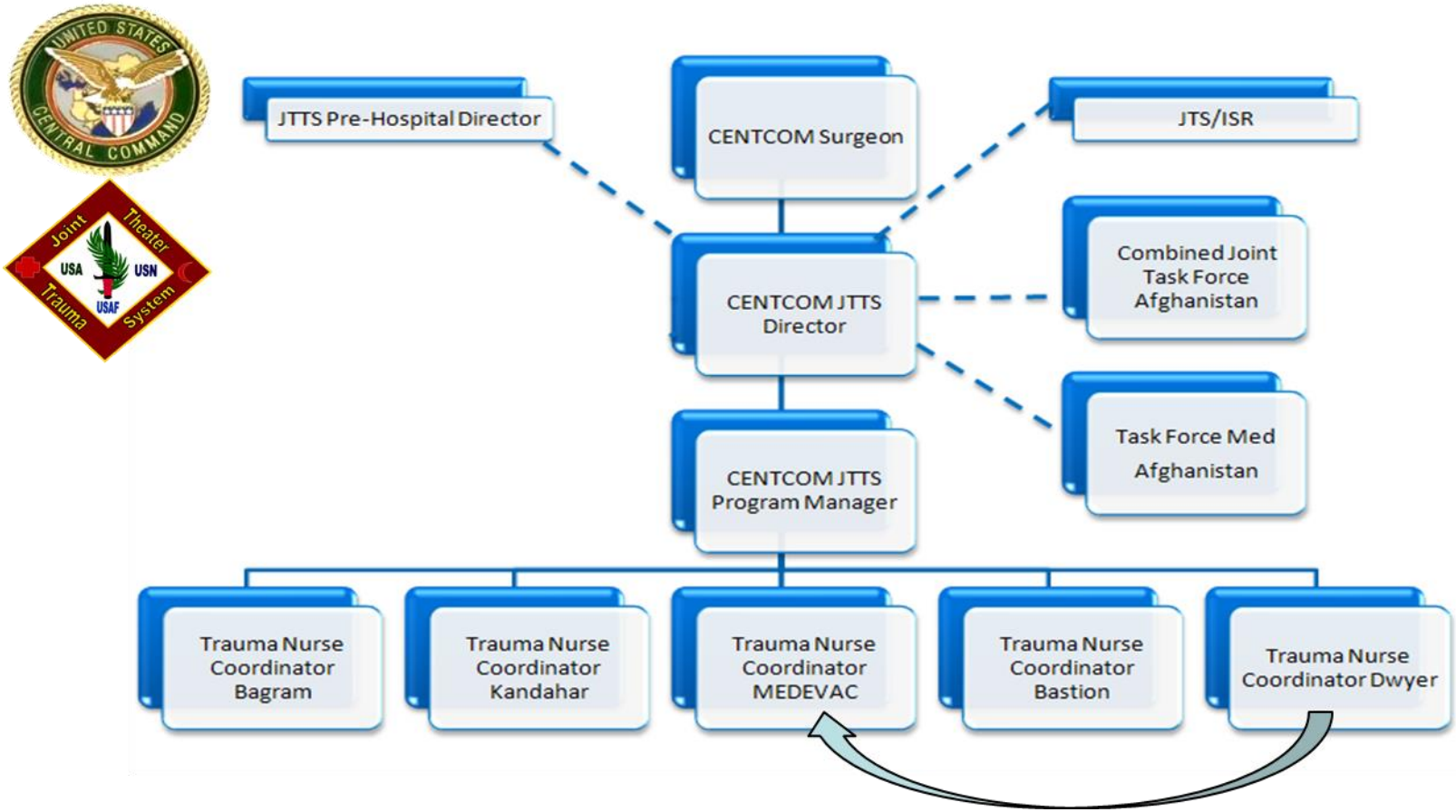
Education & Training Branch
Chief
Nurse Educator

Rand Fellow

Performance Improvement Branch
Chief
Data Retrieval SPC
Nursing Student

Joint Trauma System Organizational Chart

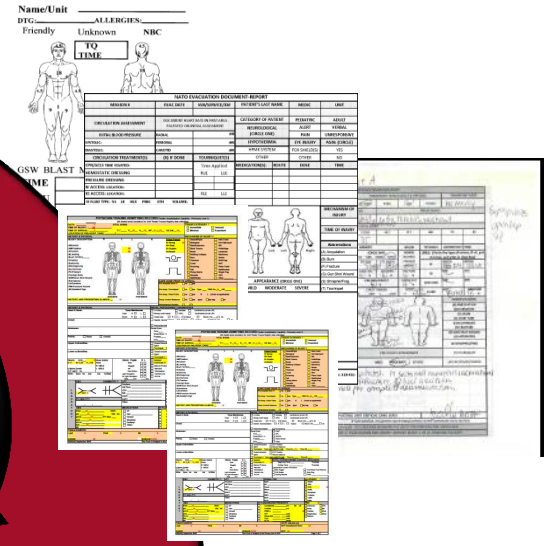
US CENTCOM JTTS



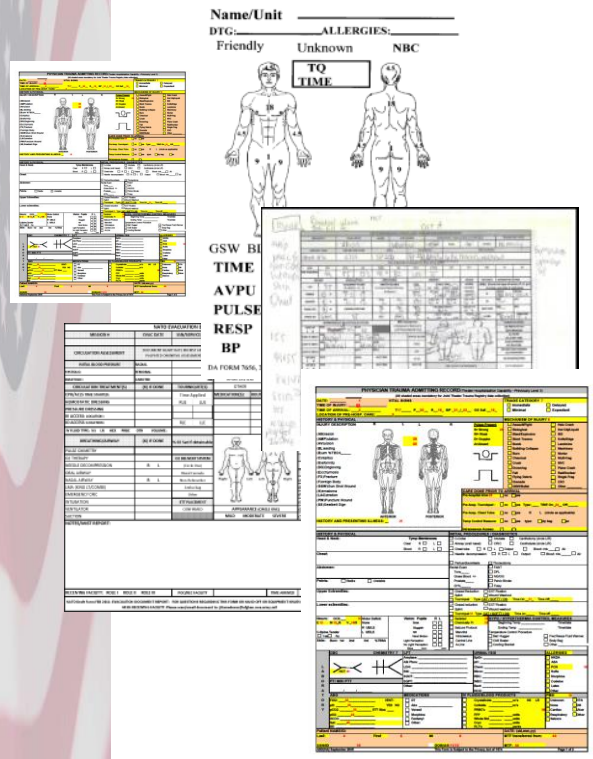
US CENTCOM JTTS Organizational Chart

Core Functions and Services

- Clinical Practice Guidelines
- Special Projects



Where do the data come from?



WISPR
TMDS
DEERS
TRAC2ES
ISR Archive

“S&F”

10% QA

Role III TNCs

Camp Bastion | KAF | BAF

“Web”

IV

V

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

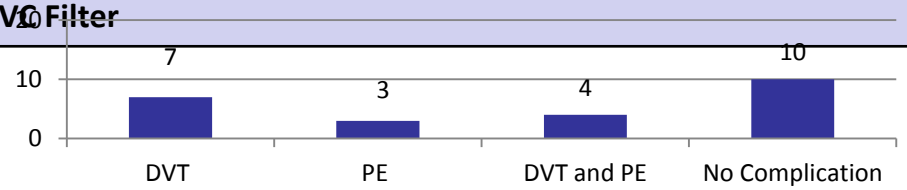
How do we use the data?
Performance Improvement

- 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

Joint Trauma System / Joint Theater Trauma System
Trauma Performance Improvement
IVC Filter Data

Performance Measure: IVC Filter



Data Source: *Joint Theater Trauma Registry (JTTR), Weekly VTC, Theater Medical Data Store (TMDS), National Navy Medical Center Registry*	**Time Period:** October 2010 – October 2011

Analysis:

•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: LRMC - 1, SAMMC - 2, WRAMC - 2, NNMC – 7, NMCSD /Balboa– 2

•17 (71%) do not have documentation of removal.

- **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 JTTR 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 JTTR of a DVT or PE complication.

- **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

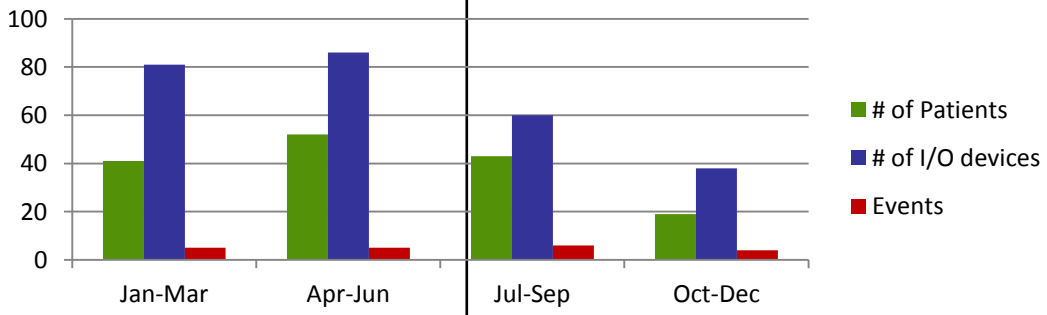
Corrective Action Plan / Follow-up:

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) – *Prevention of Deep Venous Thrombosis* to improve the IVC filter insertion process

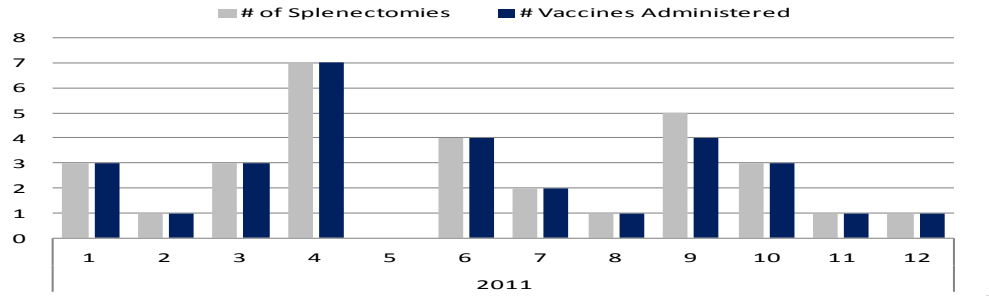
Joint Trauma System / Joint Theater Trauma System
Trauma Performance Improvement
Intraosseus Device Use

Data Source: *Joint Theater Trauma Registry (JTTR), Weekly VTC, Theater Medical Data Store (TMDS)*	**Time Period:** 1 January 2011 – 31 December 2011
Analysis:	**Corrective Action Plan / Follow-up:**
•155 Patients had I/O use during study period, as of 5 Jan 2012* • 261 I/O devices were inserted during this period • JTTR and TMDS chart reviews identified 20 "PI Events": •Device not working (unable to flush) 5 •Device dislodged/removed by patient 6 Operator Error: •Inserted into wrong space 1 •Tip broke off - required extraction 6 •Tip left in sternum to Level V 2	1. New FAST I/O introduced 2. New I/O removal tool sent to theater 3. Trauma Nurse Coordinators implemented training to clinical staff members at Level III MTF on new I/O 4. Reinforced utilization of appropriate I/O insertion (ICD-9 Code 41.92) in JTTR to more effectively identify the I/O population 5. Implemented PI Audit Filter "unplanned therapeutic intervention" to track and trend occurences

Intraosseus (I/O) Device Use 2011*



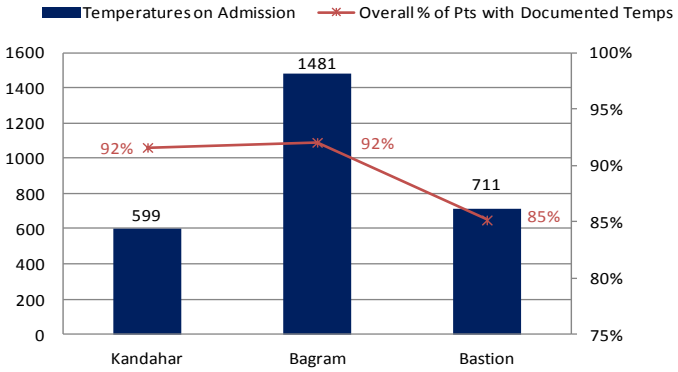
Joint Trauma System / Joint Theater Trauma System
Trauma Performance Improvement
Performance Measure: Post-Splenectomy Vaccinations

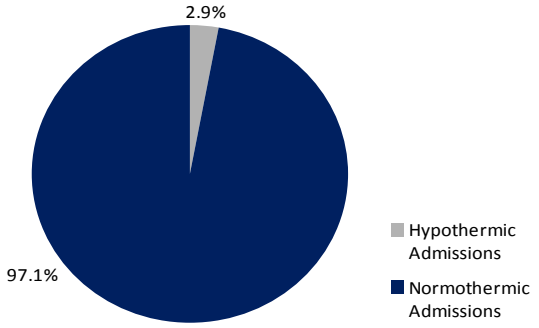


Data Source: *Joint Theater Trauma Registry (JTTR), Weekly VTC, Theater Medical Data Store (TMDS), Level II Access Database*	**Time Period:** 1 January 2011 – 31 December 2011
Analysis:	**Corrective Action Plan / Follow-up:**
•Administration of all three vaccines in the immediate postoperative period at the first Level III facility has increased from 2003 (0%) to 2011 (97%) •A total of 31 patients had their spleen removed in the AOR during this time period •Thirty (30) received all three of the post-splenectomy vaccines at either a Level II or Level III facility • In September, 1 of the 5 patients was not able to have vaccines validated as being administered on the Medication Administration Record (MAR) •83% of vaccinations given were documented in JTTR •97% of the vaccinations were identified as being given after cross referencing with the system/weekly VTC, Level II Access Database, and chart review	1. 2007 system wide initiative was put in place to identify best practice in the continuum of combat care across multiple echelons 2. 2008 Clinical Practice Guideline, *Post-Splenectomy Vaccination* developed and implemented across JTTS 3. 2009 JTTR guidance that all post-splenectomy vaccines will be 'V' coded in the Non-Trauma Diagnosis section for the facility as follows: a. V03.81, ND VAC H Influenza B b. V03.82, ND VAC Strep Pneumococcal c. V03.89, ND Other Specified Vaccination (for N. Meningococcal) 4. Immunization downrange was the standard of care for US, Coalition and local nationals 5. Variance analysis identified the need for a) continuous education of rotating providers, b) documentation of lot #, expiration date, and manufacturer on the MAR, c) documentation in the electronic immunization record a. *Post-Splenectomy Vaccination* CPG being revised to include clarification of documentation requirements

Joint Trauma System / Joint Theater Trauma System
Trauma Performance Improvement

Performance Measure: Temperatures Documented in the Emergency Department (ED) & Hypothermia on Admission





Data Source: *Joint Theater Trauma Registry (JTTR), Weekly VTC, Theater Medical Data Store (TMDS)*

Time Period: 1 October 2010 – 31 December 2011

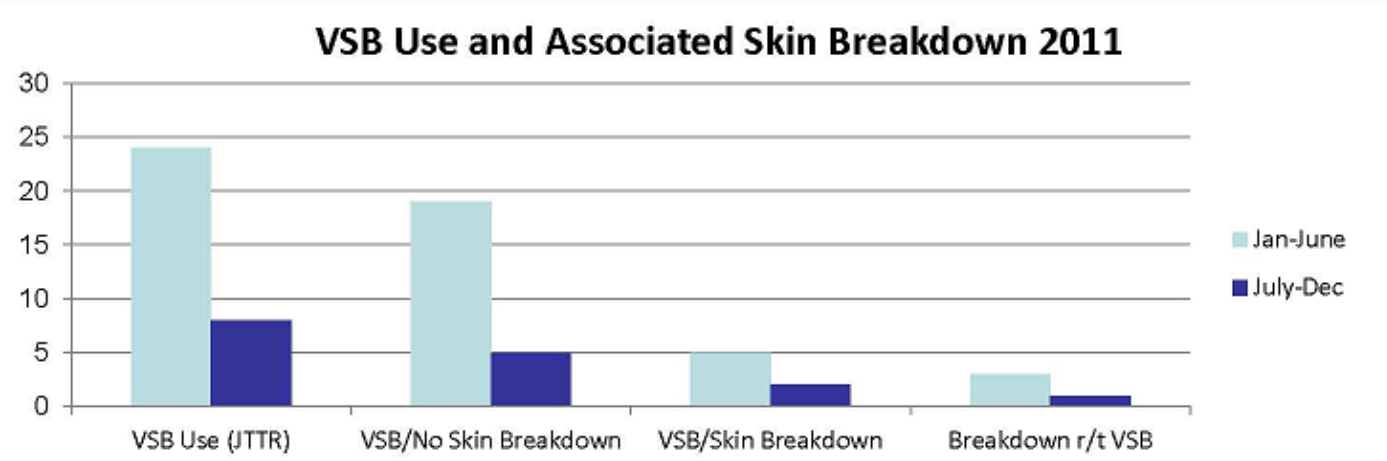
Analysis:

- 4,101 Wounded Warriors from OEF included during this study period
  - 3,391 (83%) had temperatures taken in the ED
  - 695 (17%) did not have temperatures taken and/or documented
- 28 was the average ISS for scores ≥ 16
- Of those patients who had temperatures taken (3,391), 99 (2.9%) were hypothermic
  - 25 (25%) had an estimated length of stay (LOS) in the ED ≥ 60 minutes
  - 26 was the average ISS for scores ≥ 16
  - 57 (57%) had no JTTR PI Audit Filter documentation of 1015 – Temperature < 35.5 C or <96 F at time of admission

Corrective Action Plan / Follow-up:

1. Variance analysis identified the need for continuous education of rotating providers at the Level III sites on the need to document temperatures on arrival to the ED
2. In 2010, Clinical Practice Guideline – *Hypothermia Prevention, Monitoring, and Management* was revised to better manage hypothermia in both the pre-hospital and MTF environment
3. In-theater MEDEVAC review meetings/teleconferences discuss hypothermia and hypothermia prevention management in the field setting and ensuing challenges of potentially extended ground times, number of casualties, and short flight times
4. January 2012, a request to Defense Medical Standardization Board was sent to determine if any radiant warmers are available for use in-theater to help manage severely injured patients when other methods of warming are not feasible

Joint Trauma System / Joint Theater Trauma System
Trauma Performance Improvement
Performance Measure: Skin Breakdown with Vacuum Spine Board (VSB)



Data Source: *Joint Theater Trauma Registry (JTTR), Weekly VTC, Theater Medical Data Store (TMDS), AF Form 3899*

Time Period: 1 January 2011 – 31 December 2011

Analysis:

•32 patients transported on VSB during study period out of 1,230 Critical Care Air Transport Team (CCATT) missions

• Seven (7) VSB Patients (21.8 %) identified in JTTR with an incidence of skin breakdown. Six were noted at LRMC

- •One lesion could be directly attributed to VSB use
- •Three lesions might be linked to VSB use (Stage 1 – blanching erythema of intact skin over bony prominence)
- •Three are not attributed to VSB use

• Of the remaining 25 VSB patients in JTTR coded as pressure ulcer/skin breakdown, review of available TMDS records reveals inaccurate or incomplete information related to skin break down or identification as Stage I ulcers

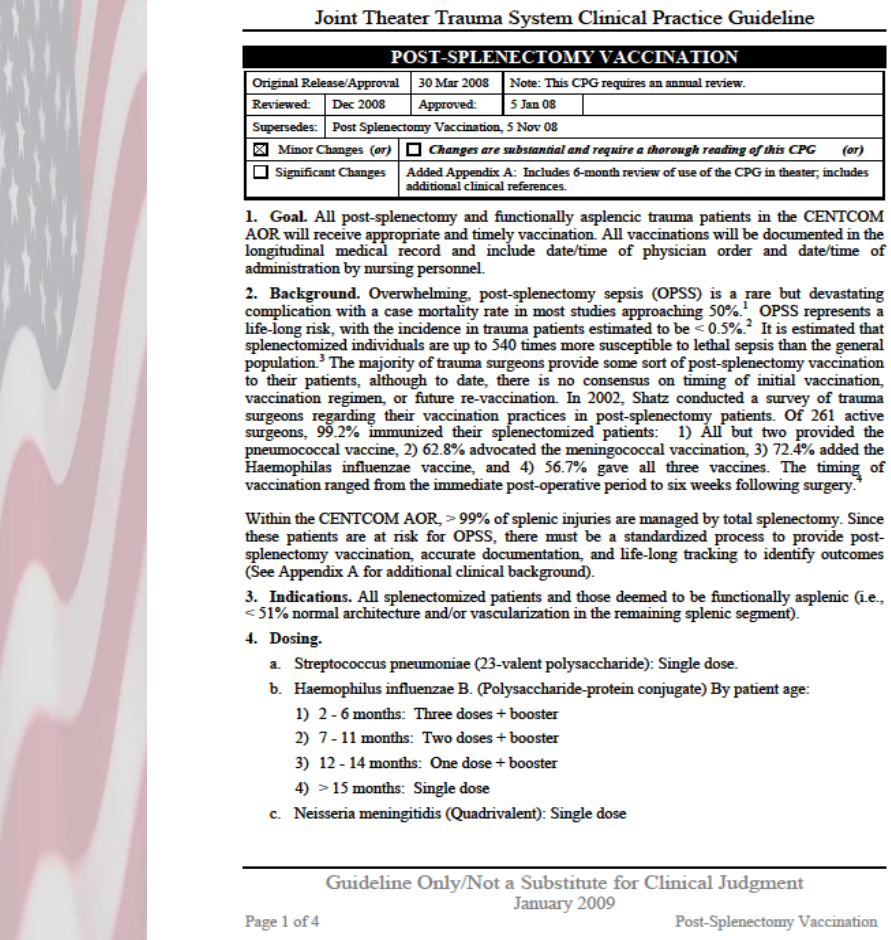
• No identified wounds progressed to full thickness ulcers (>Stage II)

Corrective Action Plan / Follow-up:

1. ICD-9 Code of 97.14 was implemented to properly capture the utilization of VSB in JTTR
2. In 2010, Clinical Practice Guideline – *Spine Injury Surgical Management and Transport* was implemented to reinforce the proper use of VSB
3. Continuous education of rotating providers in identifying skin breakdown as a complication of care rather than trauma related skin lesions
4. JTTR Complication Code Definitions when identifying "Skin Breakdown vs. Decubitus" as a complication (Report Stage II-IV)
5. Collaborated with CCATT PI Coordinator to identify patients transported on the VSB

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	30 Mar 2008	Note: This CPG requires an annual review.	
Reviewed:	Dec 2008	Approved:	5 Jan 08
Supersedes:	Post Splenectomy Vaccination, 5 Nov 08		
☒ Minor Changes *(or)*	☐ *Changes are substantial and require a thorough reading of this CPG* *(or)*		
☐ Significant Changes	Added Appendix A: Includes 6-month review of use of the CPG in theater; includes additional clinical references.		

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

2. Background. Overwhelming, post-splenectomy sepsis (OPSS) is a rare but devastating complication with a case mortality rate in most studies approaching 50%.[1] OPSS represents a life-long risk, with the incidence in trauma patients estimated to be < 0.5%.[2] It is estimated that splenectomized individuals are up to 540 times more susceptible to lethal sepsis than the general population.[3] The majority of trauma surgeons provide some sort of post-splenectomy vaccination to their patients, although to date, there is no consensus on timing of initial vaccination, vaccination regimen, or future re-vaccination. In 2002, Shatz conducted a survey of trauma surgeons regarding their vaccination practices in post-splenectomy patients. Of 261 active surgeons, 99.2% immunized their splenectomized patients: 1) All but two provided the pneumococcal vaccine, 2) 62.8% advocated the meningococcal vaccination, 3) 72.4% added the Haemophilas influenzae vaccine, and 4) 56.7% gave all three vaccines. The timing of vaccination ranged from the immediate post-operative period to six weeks following surgery.[4]

Within the CENTCOM AOR, > 99% of splenic injuries are managed by total splenectomy. Since these patients are at risk for OPSS, there must be a standardized process to provide post-splenectomy vaccination, accurate documentation, and life-long tracking to identify outcomes (See Appendix A for additional clinical background).

3. Indications. All splenectomized patients and those deemed to be functionally asplenic (i.e., < 51% normal architecture and/or vascularization in the remaining splenic segment).

4. Dosing.

a. Streptococcus pneumoniae (23-valent polysaccharide): Single dose.

b. Haemophilus influenzae B. (Polysaccharide-protein conjugate) By patient age:

1) 2 - 6 months: Three doses + booster
2) 7 - 11 months: Two doses + booster
3) 12 - 14 months: One dose + booster
4) > 15 months: Single dose

c. Neisseria meningitidis (Quadrivalent): Single dose

Guideline Only/Not a Substitute for Clinical Judgment
January 2009
Page 1 of 4 Post-Splenectomy Vaccination

- 02_CENTCOM JTTS CPG Process - 30 Apr 2009
- Acoustic Trauma and Hearing Loss - 16 Feb 2010
- Amputation - 16 Feb 2010
- Blunt Abdominal Trauma - 30 Jun 2010
- Burn Care - 20 Dec 2010
- Catastrophic Care -16 Feb 2010
- Cervical Spine Evaluation - 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
- Inhalation Injury and Toxic Chemical Exposure - 7 Nov 2008
- Initial Care of Ocular and Adnexal Injuries - 16 Feb 2010
- Intratheater 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

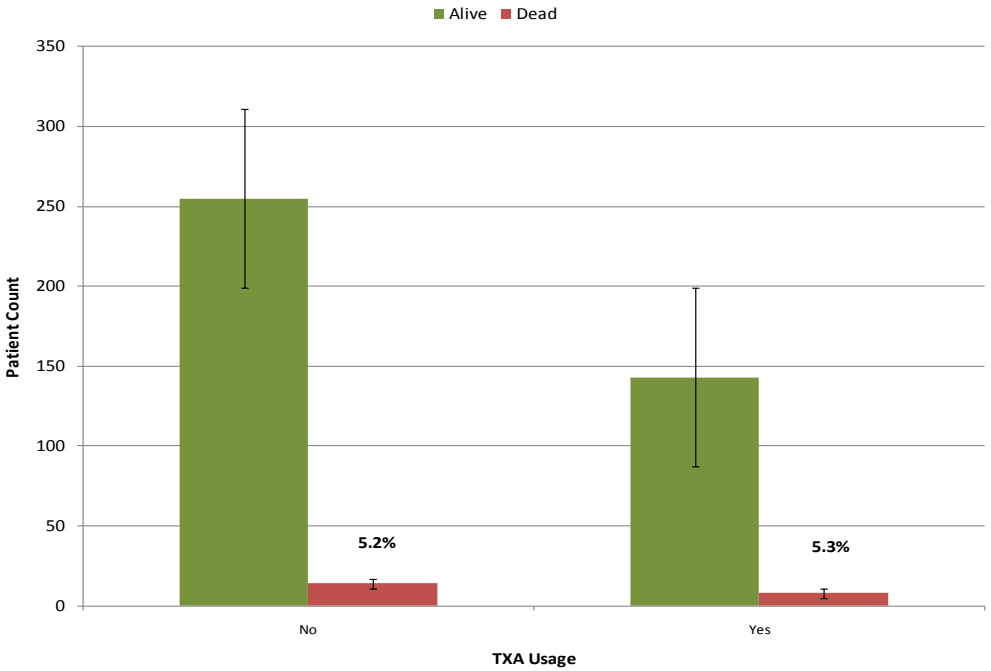
TXA use in OEF

- 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 2011with monitoring
  - Includes JTTR data collection initiated Oct 2010

TXA use in OEF

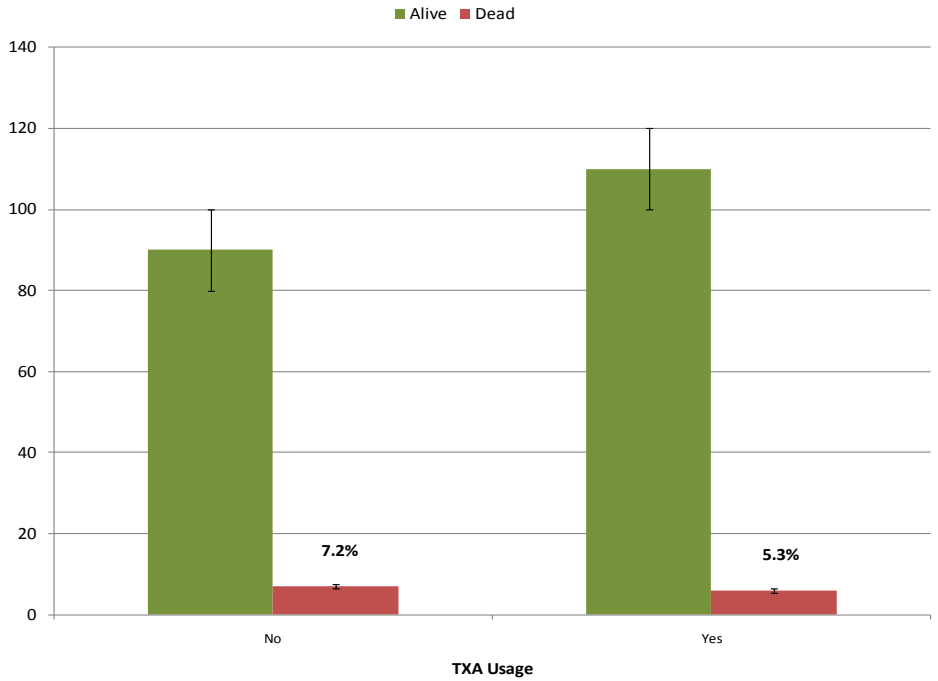


Source: JTTR Database, pull 10 Jan 2012
Analyst: Amy Apodaca
Program Name: FY2012-0049
Program Coordinator/Contract: Col Bailey
Date of Analysis: 24 Jan 2012
Last Updated: 25 Jan 2012
Total Number of Records Analyzed: 420
Sampling Frame: All US Military pts who rec. blood (PRBCs or W
Sample Date Range: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

Summary Statistics: All US Military Pts Receiving Blood Products

Characteristic	*TXA* *N = 151*	*No TXA* *N = 269*	*p - value*
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

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 WB)

Sample Date Range: Jan 1, 2011 - Dec 31, 2011

Summary Statistics: All US Military Pts Receiving Massive Transfusions

Characteristic	*TXA* *N = 116*	*No TXA* *N = 97*	*p - value*
Heart Rate (Avg.)	106.91	111.57	0.045
Systolic BP (Avg.)	119.38	125.74	0.562
Total GCS (Avg.)	7.01	9.95	0.005
Blood Usage (Avg. PRBC + WB)	27.62	22.43	0.028
2005 Injury Severity Score (Avg.)	27.28	25.70	0.884
Unadjusted Mortality (%)	5.20%	7.20%	0.535

TXA use in OEF
Summary

- Analysis found that the massive transfusion TXA cohort had a lower unadjusted mortality rate (5.2% vs. 7.2%; $p < 0.536$) compared to their peers who did not receive TXA.
- VTE in all Pts:
  - 4 PE TXA +, 0 PE TXA –
  - 1 DVT TXA +, 1 DVT TXA –
- Continuing to monitor

Questions

Col Jeffrey A. Bailey, MD
210-539-9174
Jeffrey.a.bailey3@amedd.army.mil
Jeffrey.a.bailey@conus.army.smil.mil

Additional Slides

Investigation & Special Projects

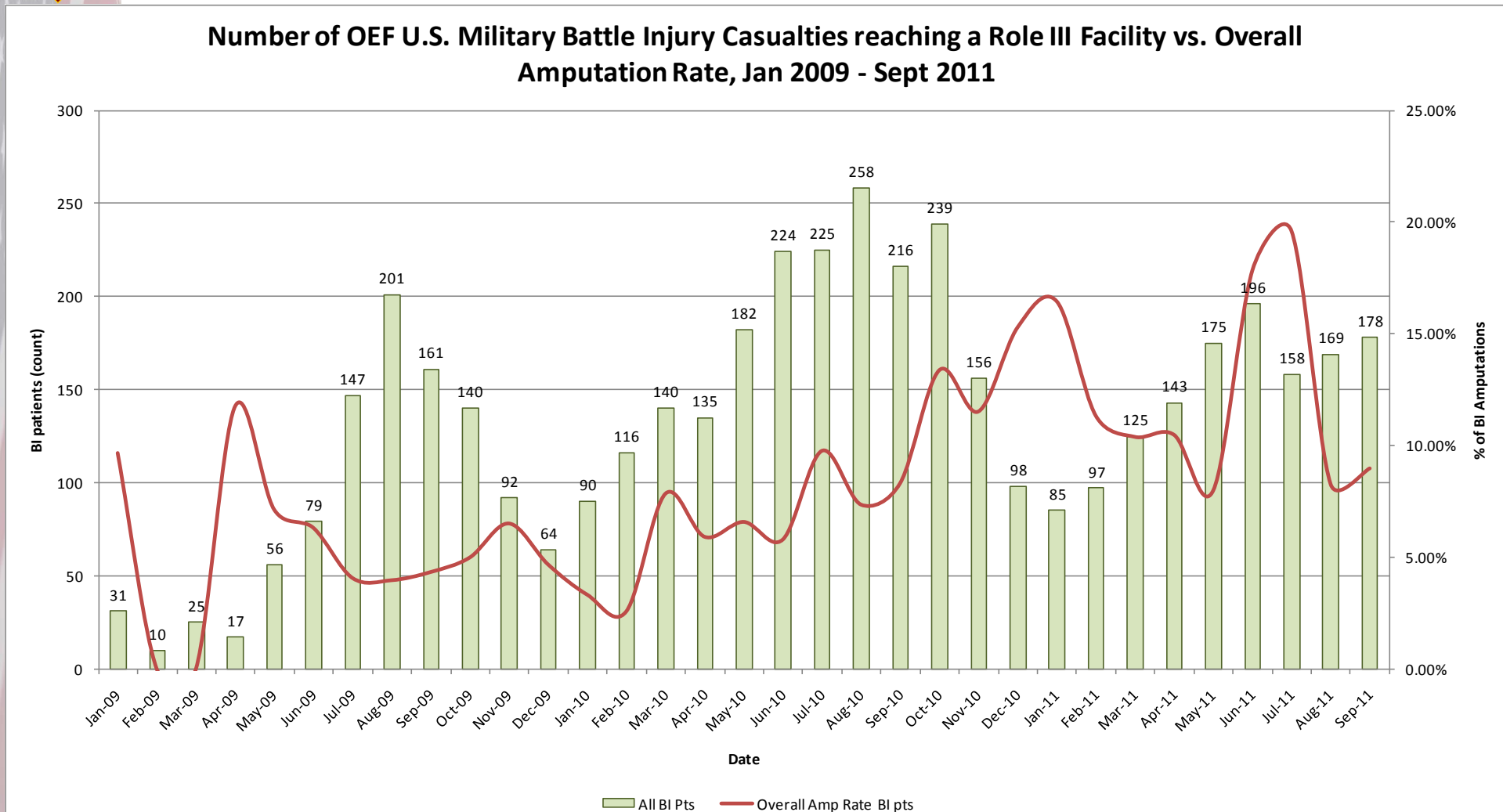
Recent Amputation Trends:

Jan 2009 – Sep 2011

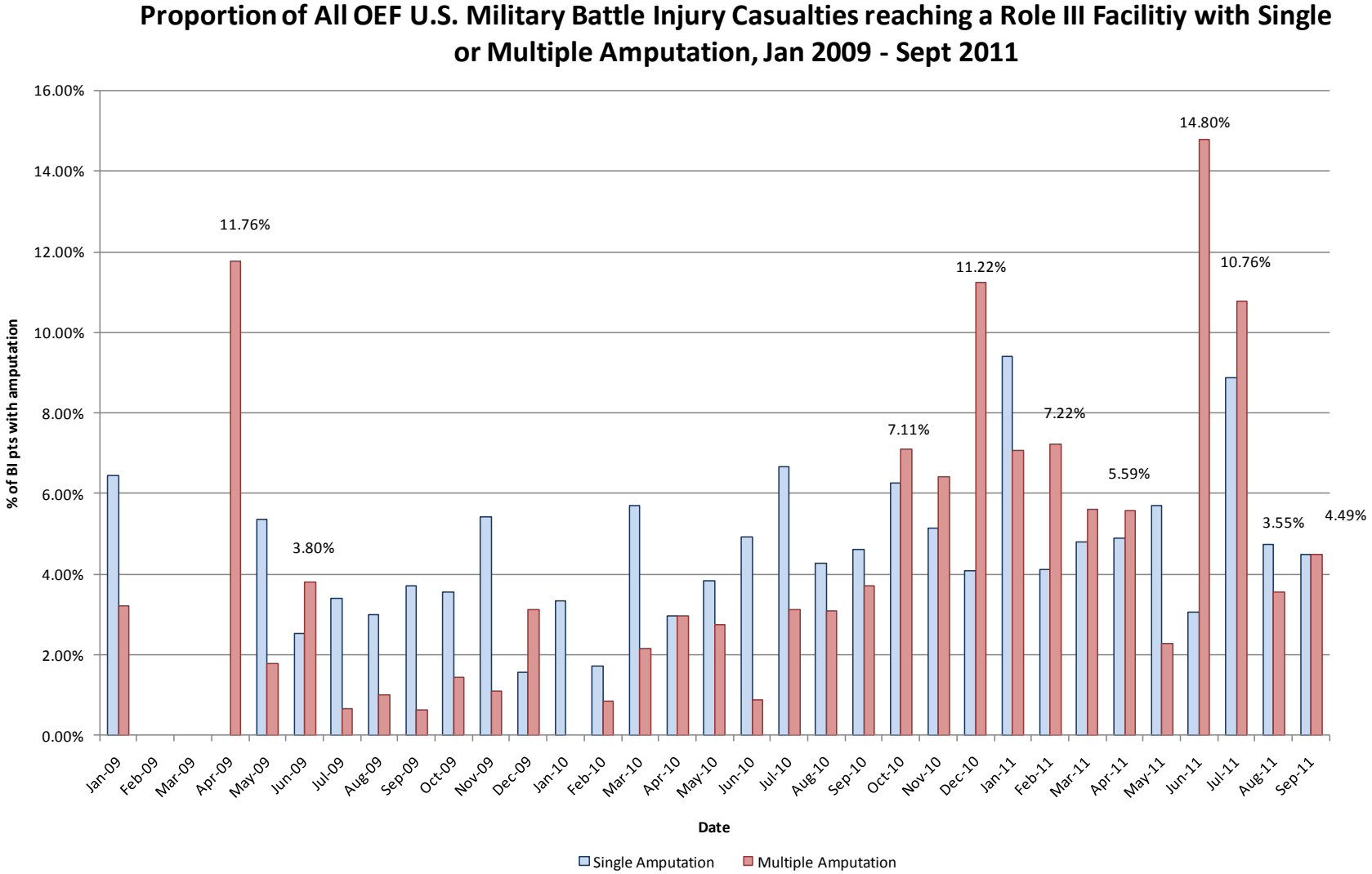
U.S. Military Battle Injury Casualties in Afghanistan by

Branch of Service & Mounted/Dismounted Status

Investigation & Special Projects



Investigation & Special Projects



Ballistic Undergarment

Special Project: Are Ballistic Underpants effective?

US Version
(Tier 1 only)

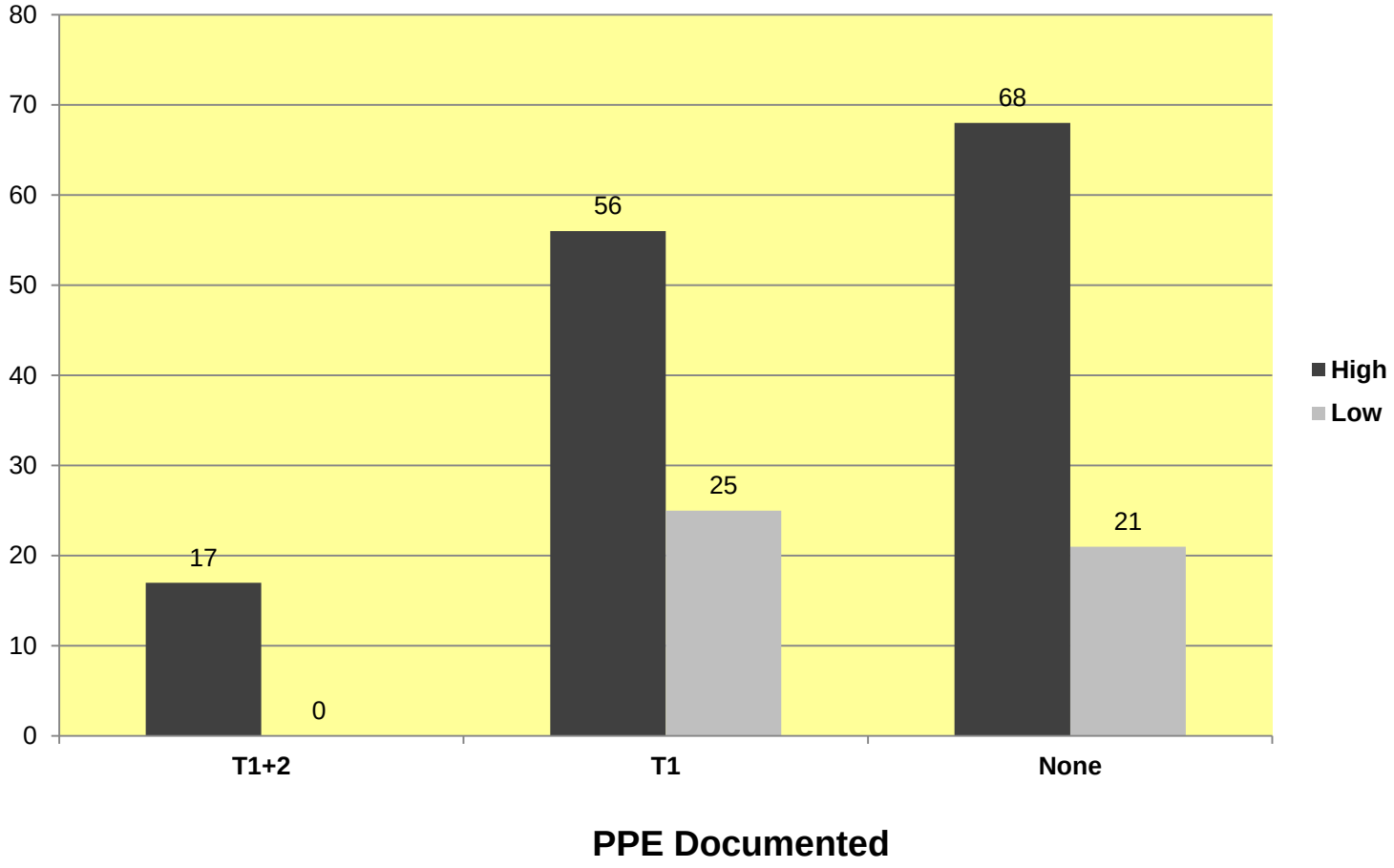
UK Version
(Tier 1 & 2)

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

Percentage of Amputation Injured with Perineal Injury



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)

m
c

JTTS Director's Report

December 2011

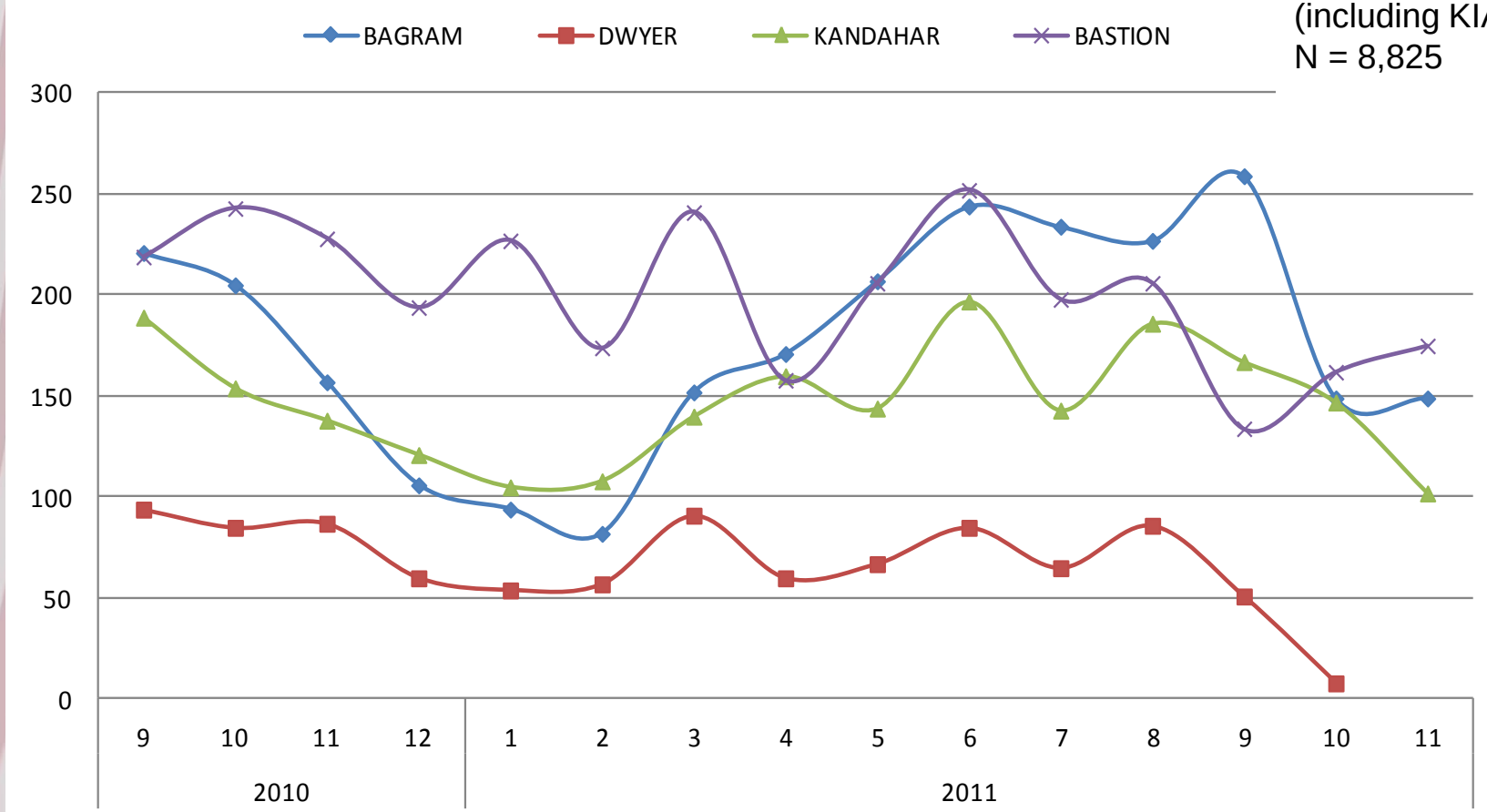
COL Kirby R. Gross, MC USA
CENTCOM JTTS Director
Presented on behalf of the in-theater JTTS team

"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

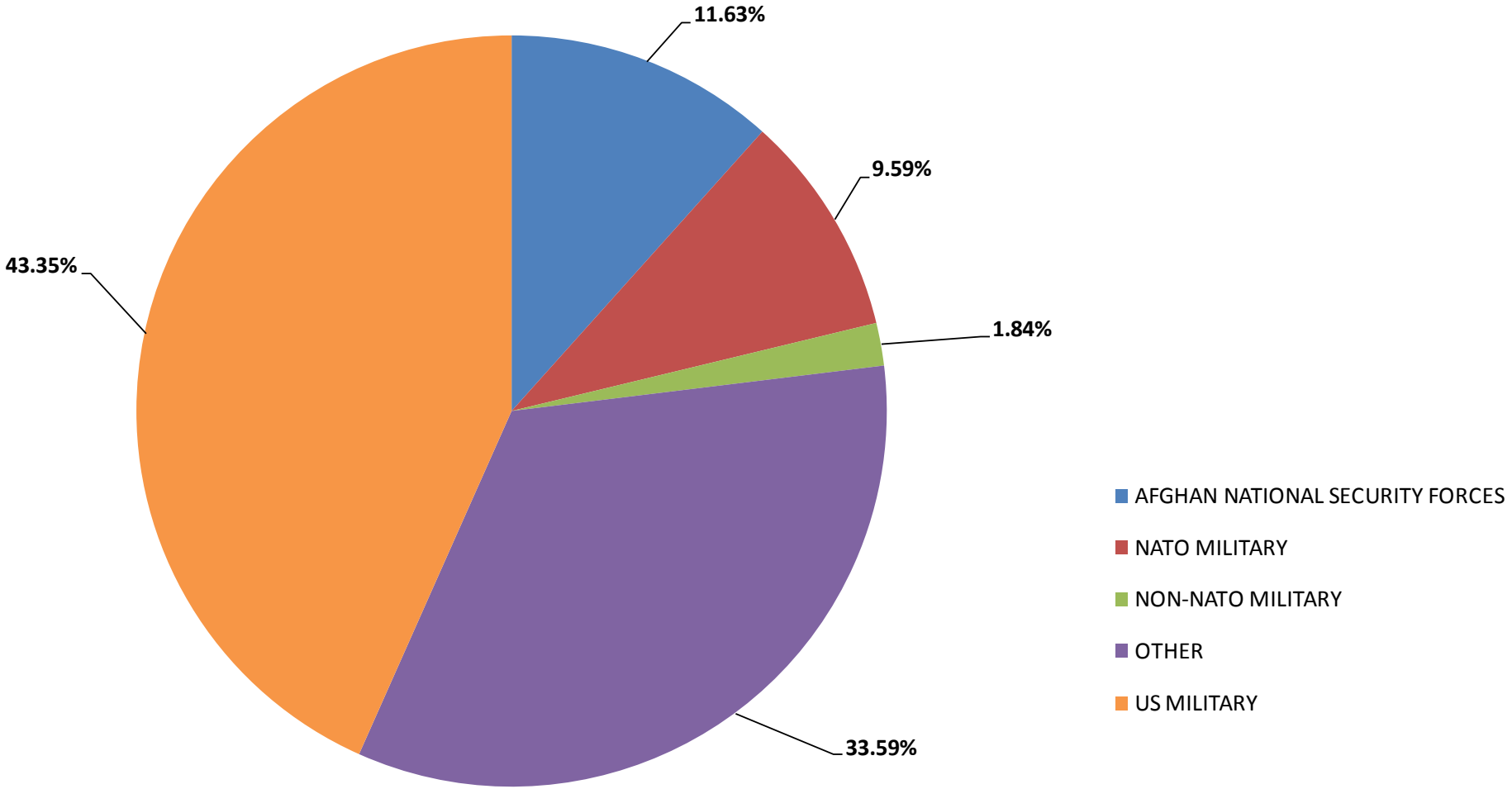
Reporting Excerpts: Where are they admitted?

OEF 15 Month Patient Workload by Facility

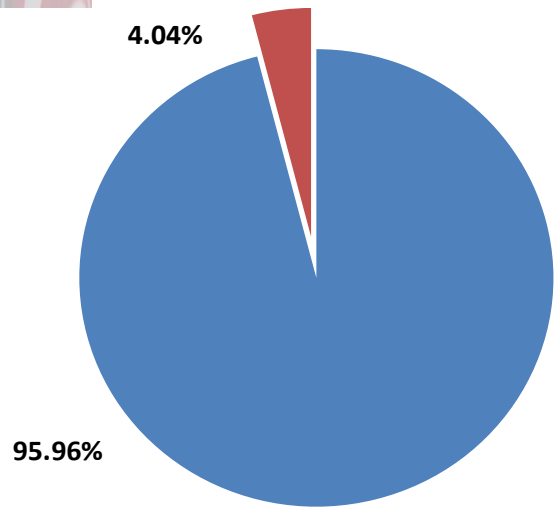


All Level III Admissions
(including KIA/DOA)
N = 8,825

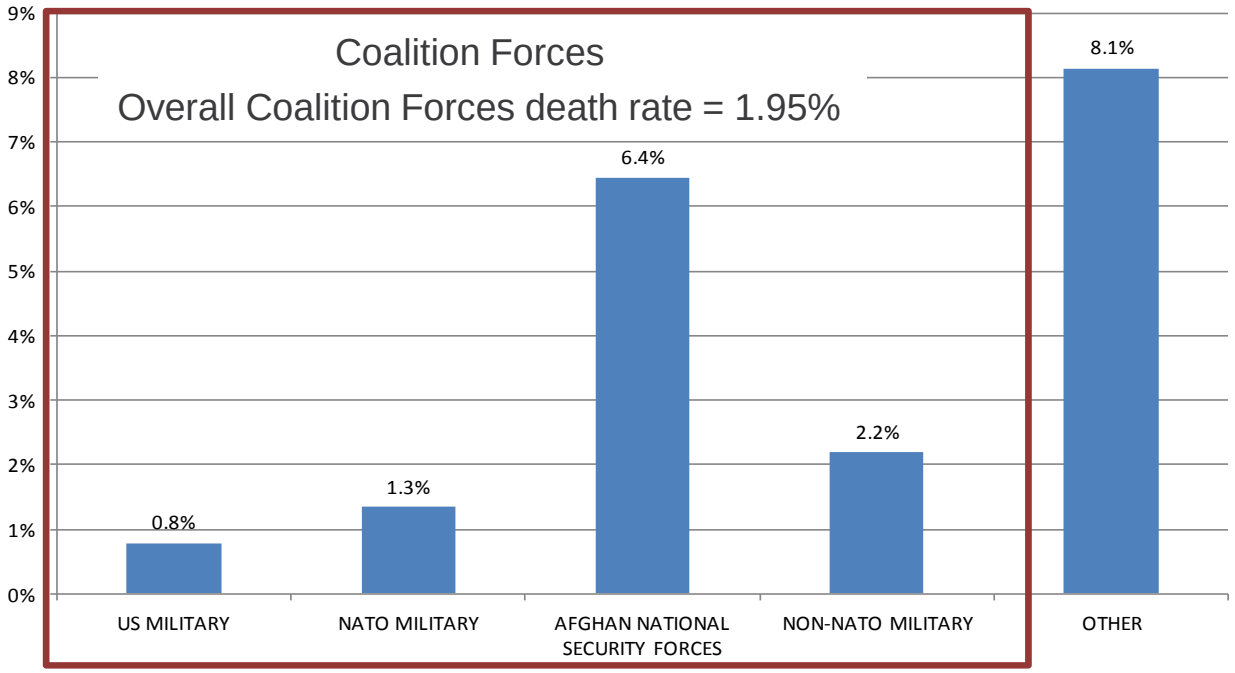
Reporting Excerpts: Who are we caring for?



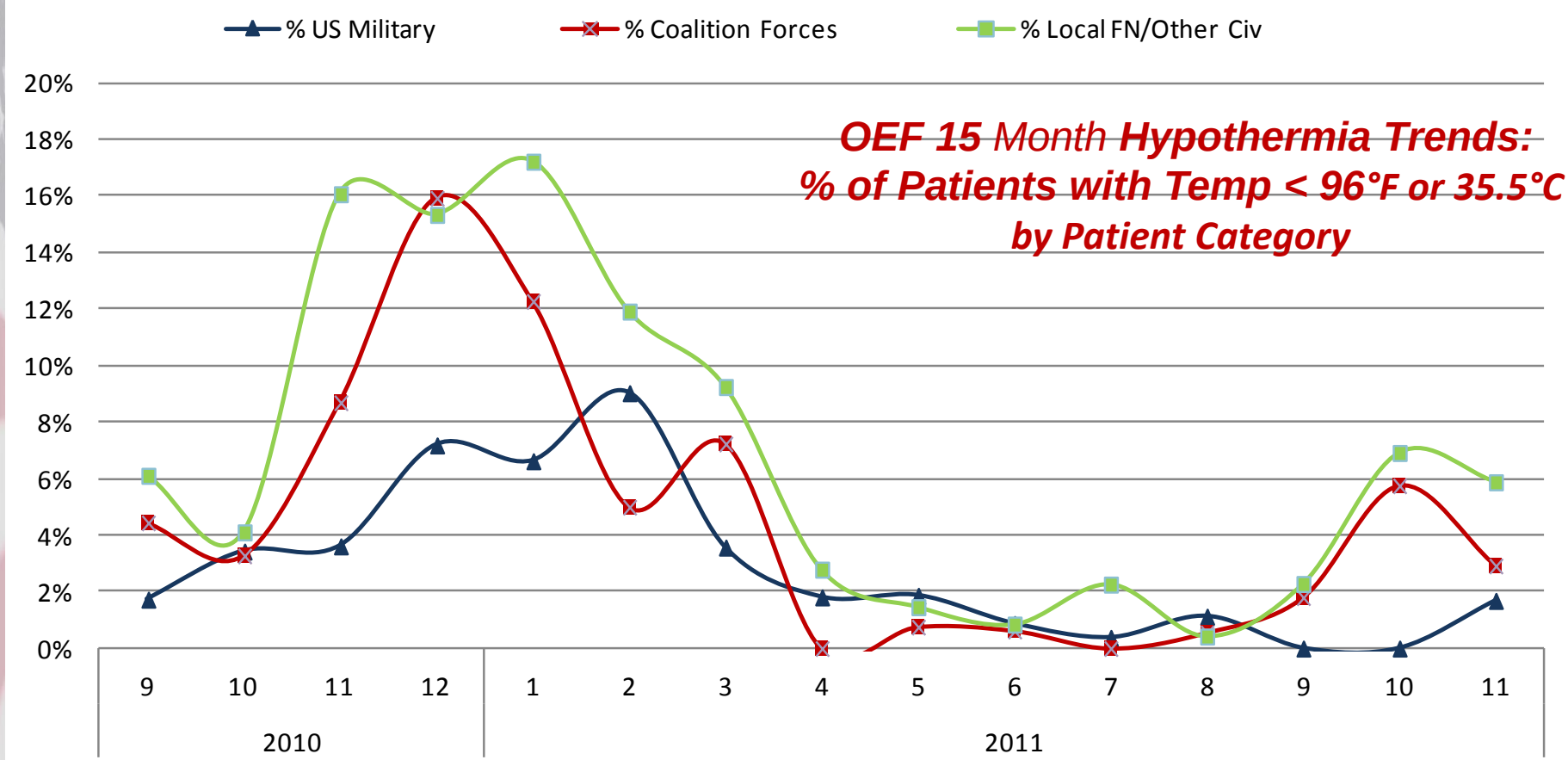
Reporting Excerpts: How is the system performing?



OEF Unadjusted Level III Death Rate: All Living In-Theater Admissions, Sep 2010 – Nov 2011

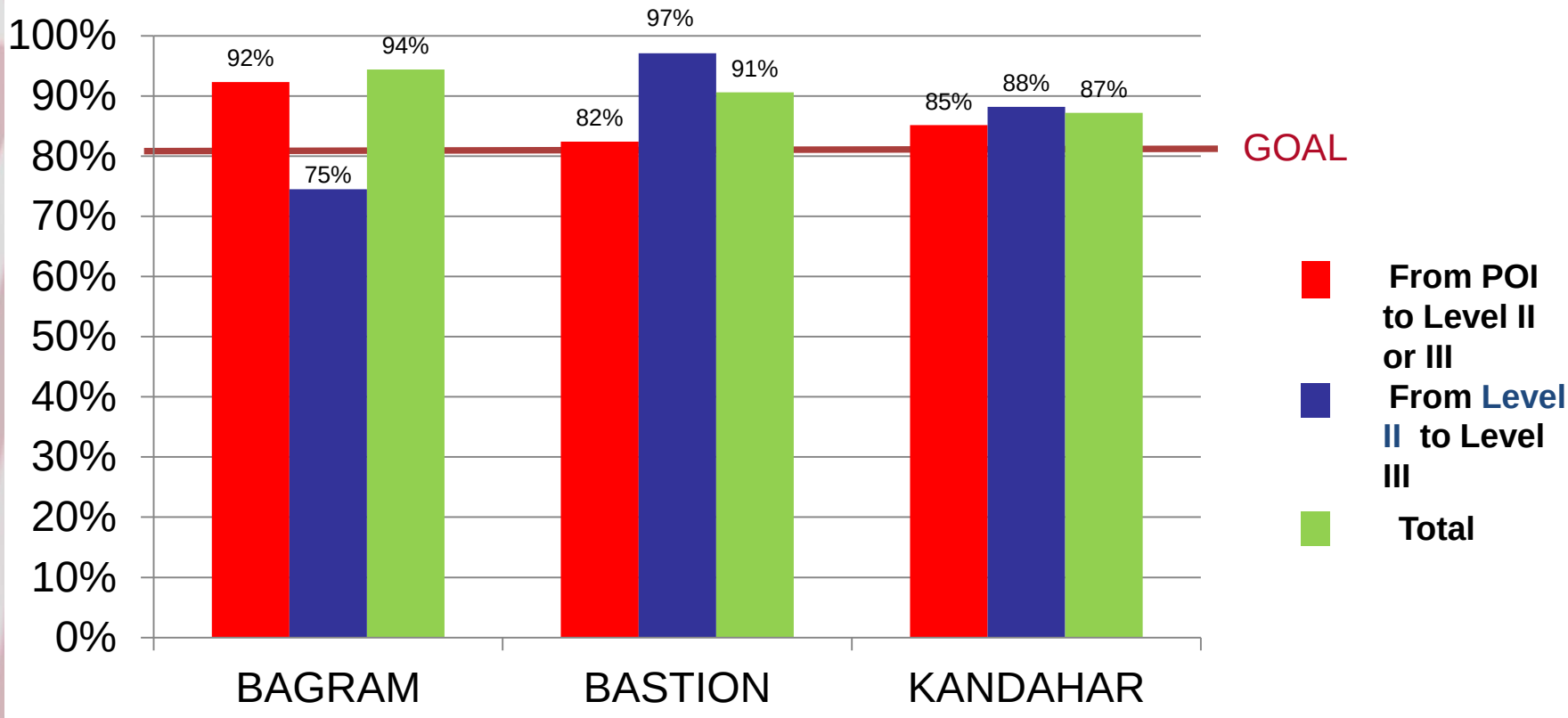


Reporting Excerpts: How is the system performing?



Reporting Excerpts: How is the system performing?

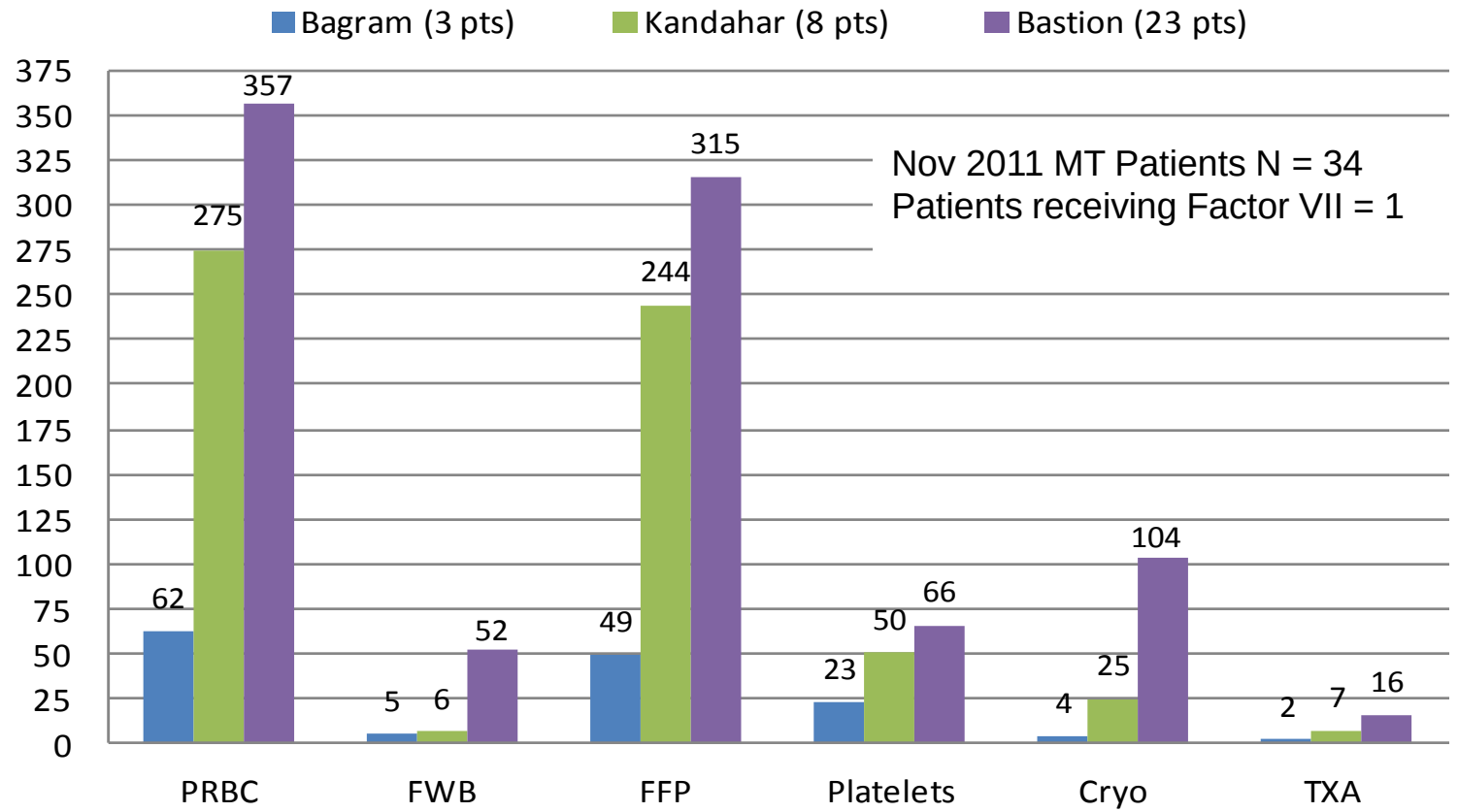
Point of Injury & Transfer Mission Documentation Capture for Trauma Patients, Nov 2011



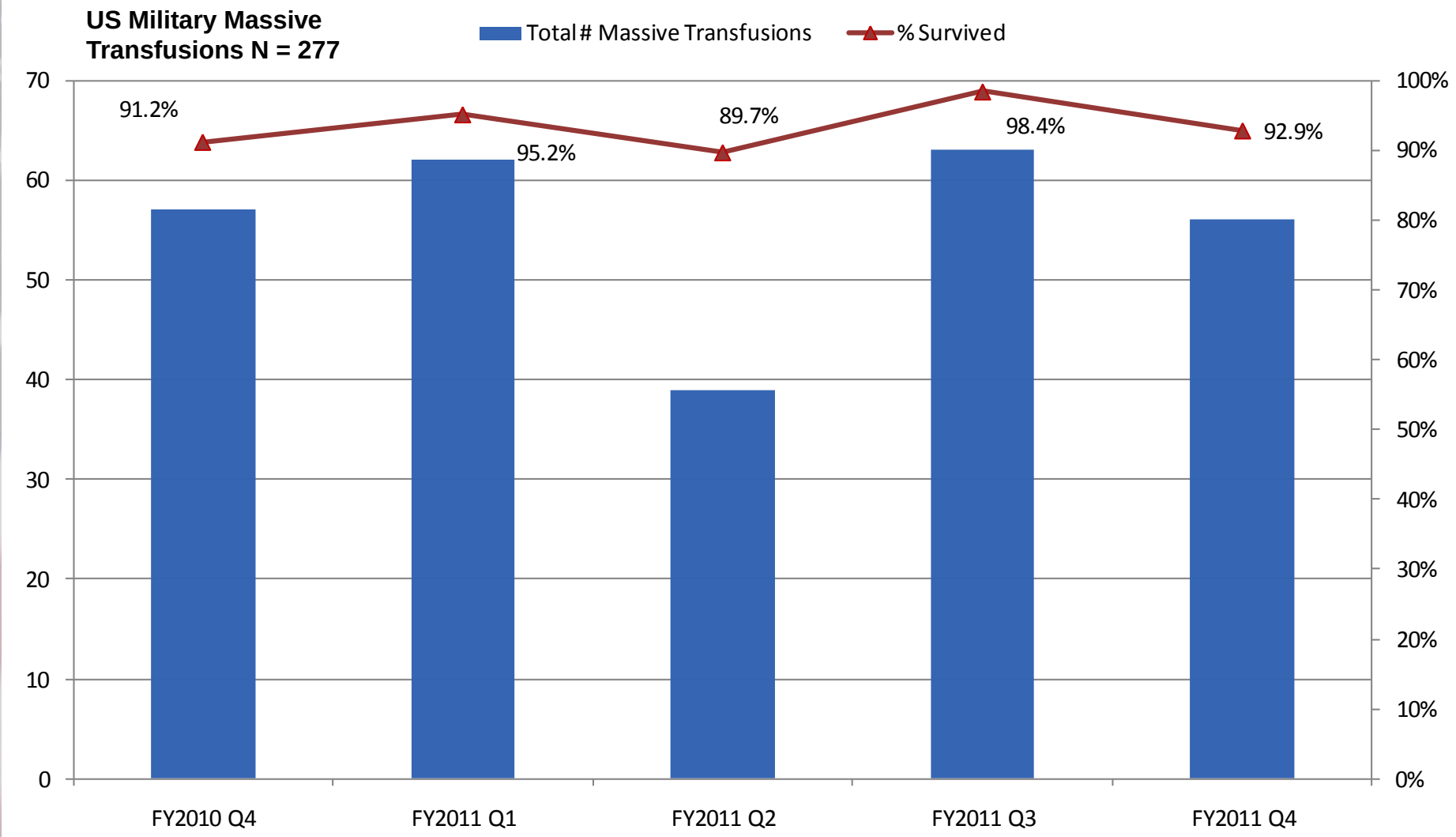
- Data is stratified by Level III facility and includes all MEDEVAC platforms serving that Level III
- Data collected and reported as per IJC FRAGO 513-2011 Aug 2011

Reporting Excerpts: How is the system performing?

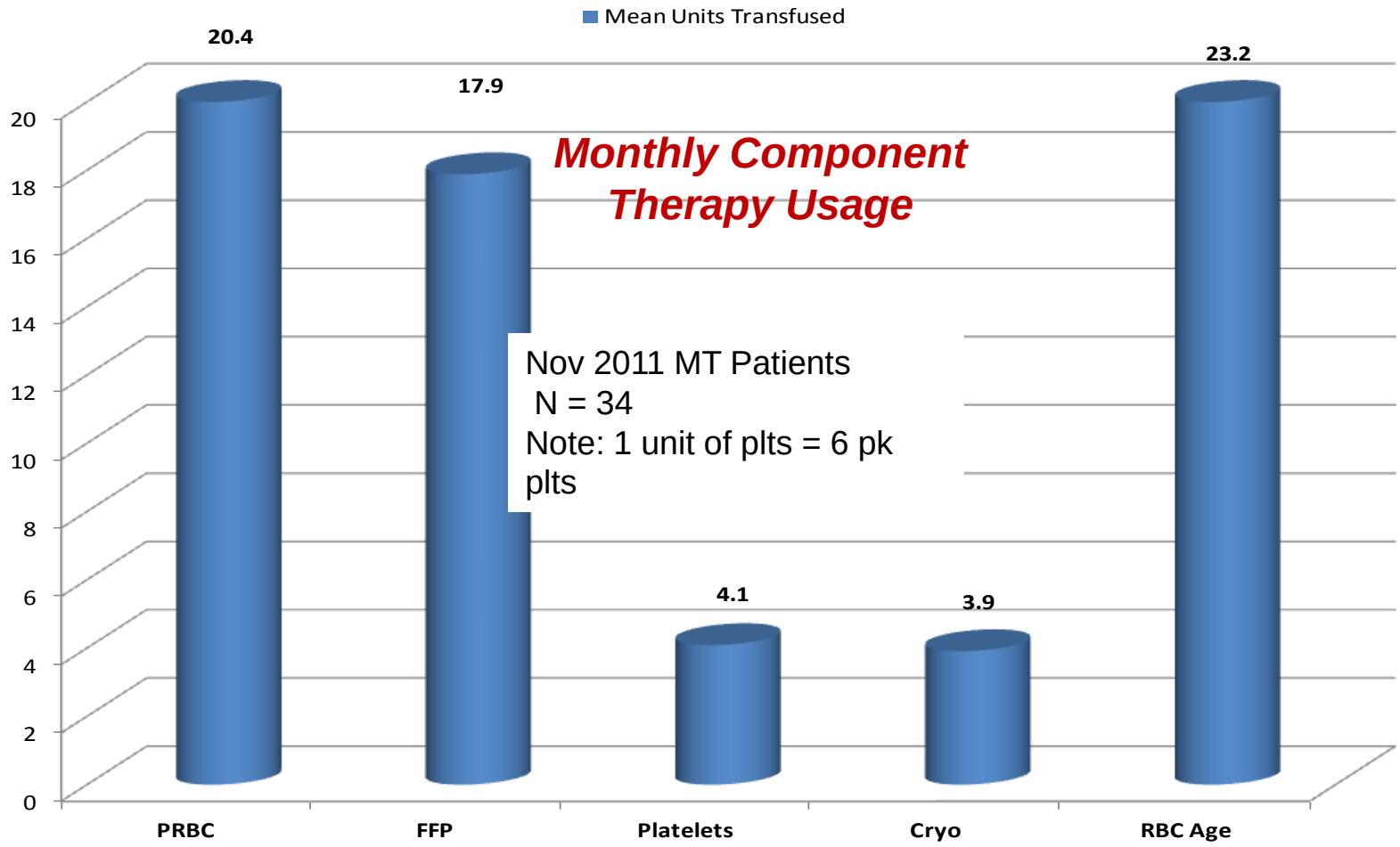
OEF Massive Transfusion Statistics: Monthly Component Therapy Usage by Site, Nov 2011



Reporting Excerpts: How is the system performing?



Reporting Excerpts: How is the system performing?



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