



# Armed Services Blood Program

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## Defense Health Board Concerns Regarding the Collection and Transfusion of Non-FDA Compliant Blood Products in Theater

### Information Brief Defense Health Board 17 August 2009

COL Frank Rentas  
Director, Armed Services Blood Program Office



# Agenda



- 🔴 Purpose
- 🔴 Benefits of Transfusing Non-FDA Compliant Blood Products
- 🔴 Whole Blood Data
- 🔴 Platelet Data
- 🔴 Blood Product Availability
- 🔴 Current Policy/Guidance for HIV, Hepatitis B (HBV), and Hepatitis C (HCV) Screening Prior to Deployment
- 🔴 Transmission Countermeasures
- 🔴 Current Status
- 🔴 Issues Raised by Defense Health Board
- 🔴 Conclusions



# Purpose



- Provide data showing current status of blood operations in theater.
- Answer DHB recommendations regarding the transfusion of non-FDA compliant blood products in theater.



# Benefits of Transfusing Non-FDA Compliant Blood Products



- ◆ The physician practice of collecting and transfusing fresh whole blood (WB) and apheresis platelets supports hemostatic resuscitation techniques performed in parallel with aggressive surgical control of bleeding. This is a clinical decision made usually in the middle of a mass casualty.
  
- ◆ Retrospective studies examining efficacy of WB vs. components have shown:
  - ◆ **WB vs. Red Cells (RBCs) alone = increased survival in massively transfused patients.**
  - ◆ **WB vs. RBCs + Fresh Frozen Plasma (FFP) = slight increased survival.**
  - ◆ **WB vs. RBCs + FFP + platelets = no statistically significant difference.**
  
- ◆ Retrospective studies performed in theater suggest a significant survival benefit for the massively transfused casualty when both platelets and a 1:1 FFP:pRBC ratio are utilized. WB provides a 1:1 FFP:pRBC ratio as well as platelets (Massive transfusion and nonsurgical hemostatic agents, Crit Care Med 2008 Vol. 36, No. 7 (Supl.).



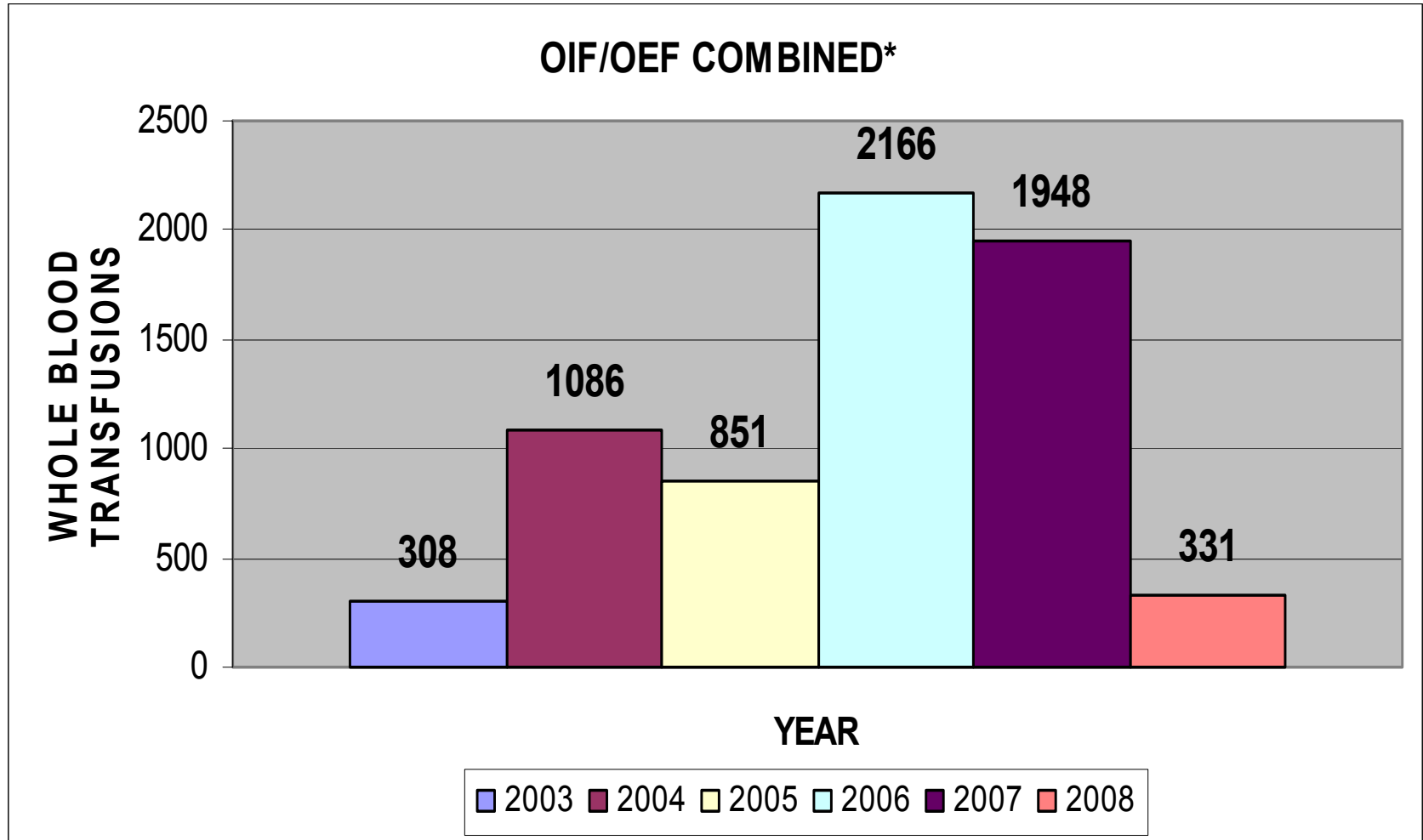
# Background - Whole Blood



- ◆ Whole blood (WB) has been used extensively to resuscitate casualties in military conflicts since World War I.
- ◆ As of 31 December 2008, 3,571 whole blood units have been transfused in theater to 497 US patients.
- ◆ One documented emergency transfusion associated HCV transmission in 2005(**unit not tested before transfusion**).
- ◆ 76% of WB transfusions have taken place in Level II facilities (2006-2008).
- ◆ WB transfusions are down 81.5%, and 83.4% from 2007 and 2006 respectively.
- ◆ **Percentage of WB transfused vs. transfused RBCs is down to 3.8% in 2009 as compared to 7.3% from 2006-2008. Down from 3.6% to 2.3% vs. all blood components transfused.**
- ◆ Samples for retrospective testing collected on most donations.
- ◆ Current JTTS CPG on Whole Blood – Updated November 2008
  - ◆ WB is neither intended nor indicated for routine use.
  - ◆ WB is to be used only when other blood products are unable to be delivered at an acceptable rate to sustain the resuscitation of an actively bleeding patient or when specific components are not available.



# Background - Whole Blood



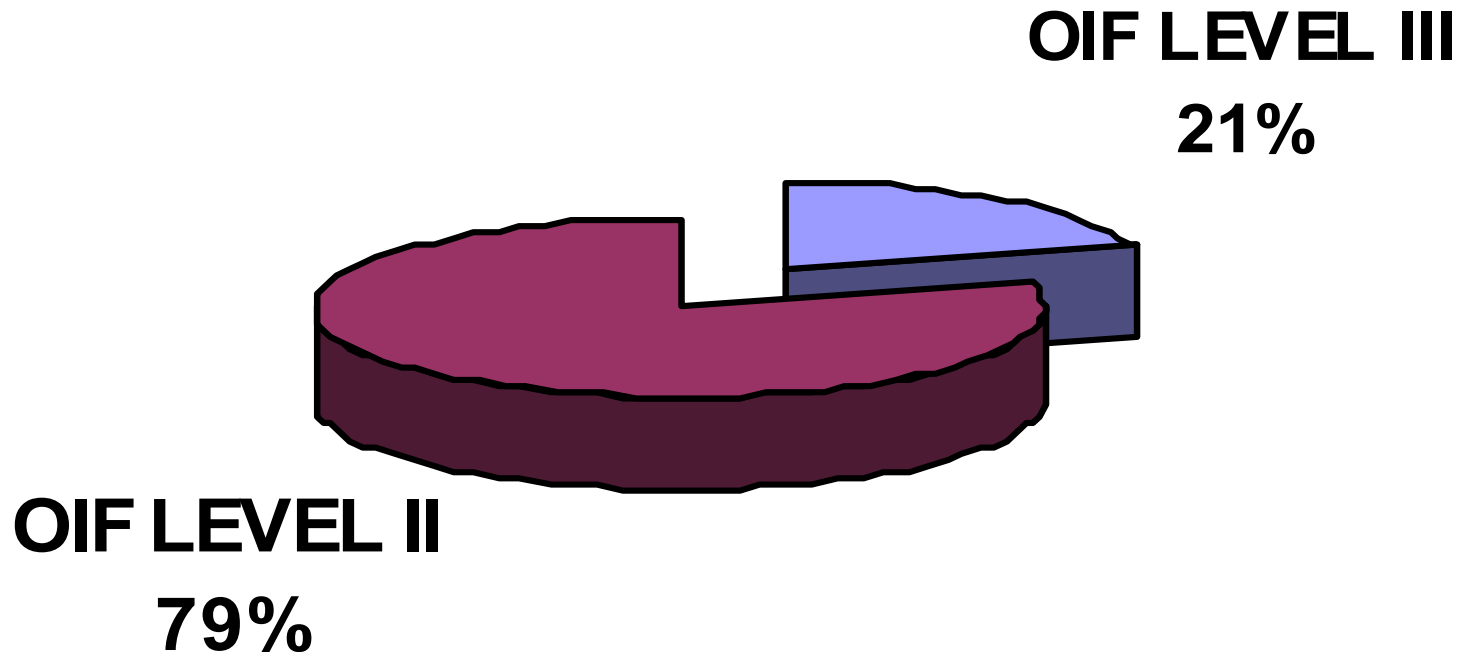
\*Includes all transfusions (US and Non-US)



# Background - Whole Blood



## Whole Blood Transfusions 2006-2008 OIF

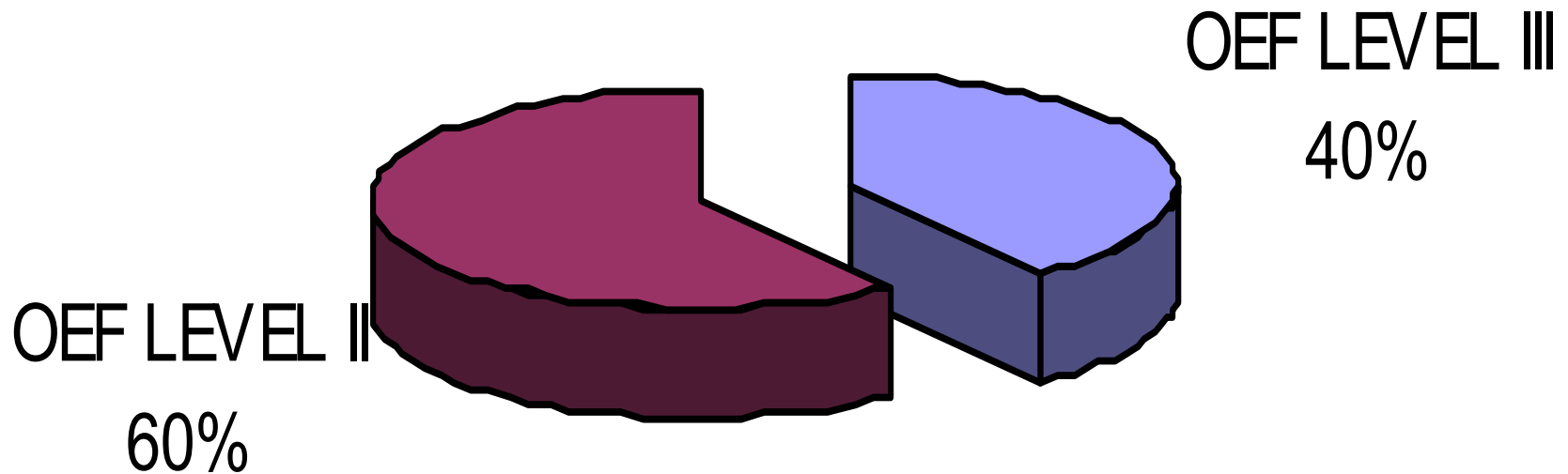




# Background - Whole Blood



## Whole Blood Transfusions 2006-2008 OEF







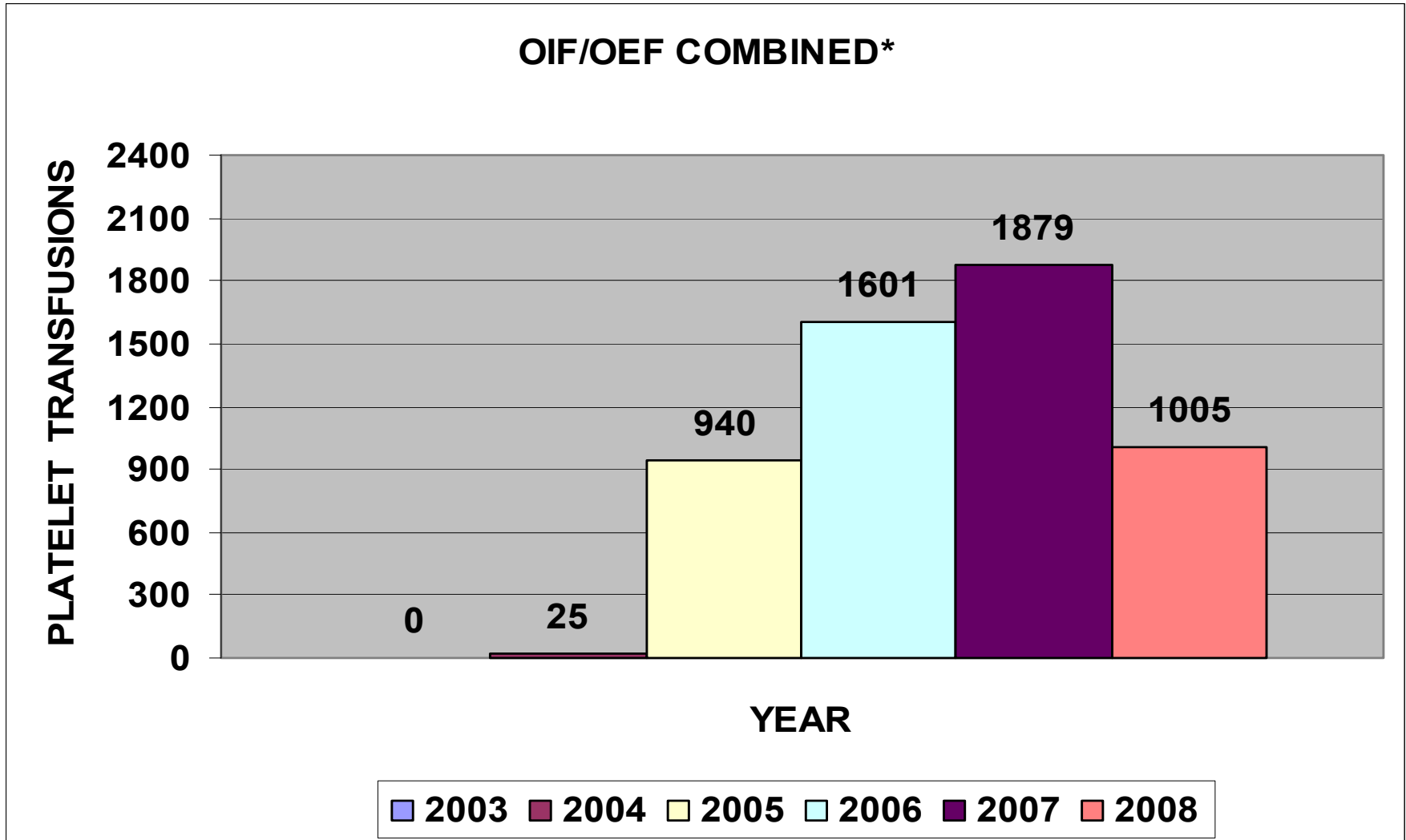
# Background - Platelets



- ◆ First used in OIF in 2004 and in OEF in 2007.
- ◆ As of 31 December 2008, 1,857 Platelet (PLT) units have been transfused in theater to 744 US patients.
- ◆ Collections in much more controlled environments than WB.
  - ◆ All collections at level III facilities.
  - ◆ Donors are pre-screened with all FDA-mandated tests before allowed to donate.
  - ◆ Donors allowed to donate every two weeks.
  - ◆ Samples for retrospective testing collected during every donation.
  - ◆ HIV, HBV, and HCV Rapid testing of all donations.
  - ◆ All products tested for bacterial contamination.
- ◆ 84% of PLT transfusions have taken place in Level III facilities (2006-2008).
- ◆ PLT transfusions are down 46.5%, and 37.2% from 2007 and 2006 respectively.
- ◆ Current JTTS CPG on Damage Control Resuscitation addresses use of PLTs - Updated November 2008.



# Background - Platelets



\*Includes all transfusions (US and Non-US)

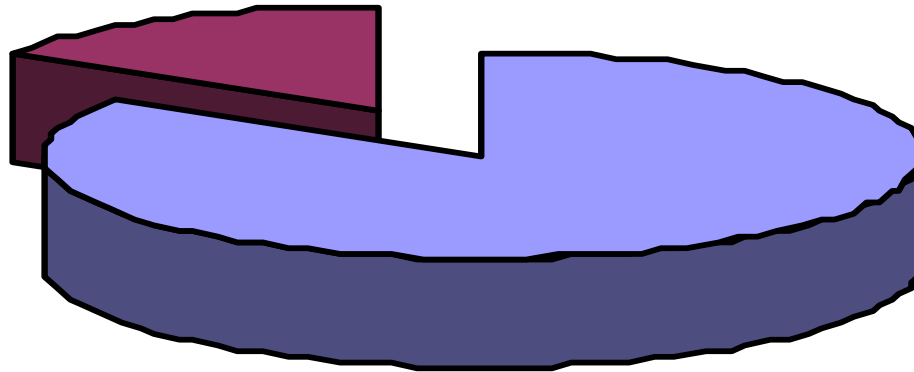


# Background - Platelets



## Platelets Transfusions 2006-2008 OIF

OIF LEVEL II  
15%



OIF LEVEL III  
85%



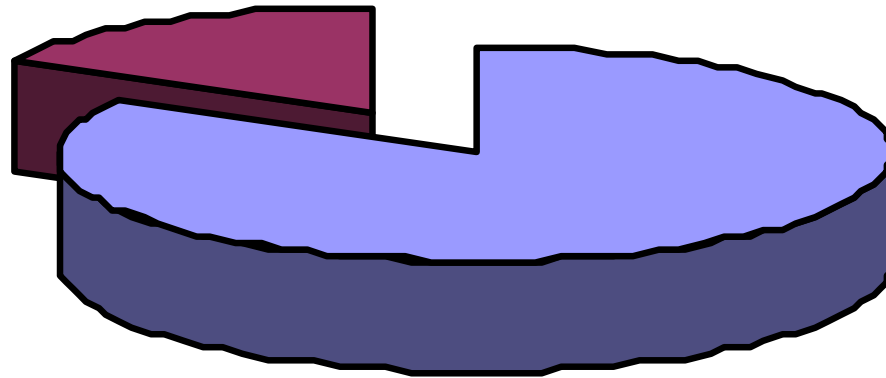
# Background - Platelets



## Platelets Transfusions 2006-2008 OEF

OEF LEVEL II

16%



OEF LEVEL III

84%



# Blood Product Availability



- ◆ Level III MTFs
  - ◆ Red Blood Cells - all blood types but AB.
  - ◆ Fresh Frozen Plasma - all blood types.
  - ◆ Cryoprecipitate
  - ◆ Platelets
  - ◆ Fresh Whole Blood – as needed for emergencies. Destroyed if not used within 24 hours.
- ◆ Level II+, Level II
  - ◆ Red Blood Cells – mostly Os.
  - ◆ Fresh Frozen Plasma – 13 MTFs in OEF, 15 in OIF, mostly A and AB.
  - ◆ Platelets – very limited, 4 level II+ in OIF, one level II+ in OEF.
  - ◆ Fresh Whole Blood – as needed for emergencies. Destroyed if not used within 24 hours.
- ◆ Level I – Battalion Aid Stations
  - ◆ No blood products



# Current Policy/Guidance for HIV, HBV, HCV Screening Prior to Deployment



## 🔴 HIV

- 🔴 Current USCENTCOM Individual Protection and Individual/Unit Deployment Policy (MOD Nine, September 2008) requires that HIV screening be performed within 90 days of deployment.

## 🔴 HBV

- 🔴 No current policy/guidance for screening prior to deployment. Current USCENTCOM Individual Protection and Individual/Unit Deployment Policy (MOD Nine, September 2008) requires all deploying military personnel to be vaccinated against both Hepatitis A and B.

## 🔴 HCV

- 🔴 No current policy/guidance for screening prior to deployment



# Transmission Countermeasures



	HIV	HCV	HBV
Force Screen	2 years	-	-
Theater Entrance	90 days	-	-
Vaccination	Not Available	Not Available	Required by all Services
Pre-Screens **	Yes	Yes	Yes
Retrospective Testing	Yes	Yes	Yes
Improved Rapid Testing	Yes	Yes	Yes

\*\* For all PLTs and some WB collections



# Current Status



- ◆ Draft HA policy to address rapid testing, pre-screening, retrospective testing, and follow up of recipients.
- ◆ WB transfusions are down 81.5%, and 83.4% from 2007 and 2006 respectively.
- ◆ PLT transfusions are down 46.5%, and 37.2% from 2007 and 2006 respectively.
- ◆ New improved rapid tests available to Level II facilities.
- ◆ Increasing availability of blood components at level II facilities.
- ◆ Pre-screens and retrospective testing performed.
- ◆ JTTS CPG on Whole Blood - Updated November 2008.
- ◆ Current JTTS CPG on Damage Control Resuscitation addresses use of PLTs - Updated November 2008.
- ◆ Frozen Blood (deglycerolized) transfusions taking place.
- ◆ Platelet collections at Kandahar.





# Issues Raised by DHB



*Issue 1: DoD limit the employment of emergency blood transfusion protocols to instances where the available supply of FDA-licensed blood and blood products is exhausted or unavailable.*

- ◆ Draft policy regarding management of donors and recipients of non-FDA compliant blood products sent to HA for approval after review by JSS, COCOMs, and Services.
- ◆ Increased number of level II facilities storing blood components.
- ◆ Much improved rapid testing for HIV, HCV, and HBV available at level II facilities.
- ◆ CPGs addressing WB and Platelet use updated Nov 08
  - ◆ FWB is neither intended nor indicated for routine use.
  - ◆ FWB is to be used only when other blood products are unable to be delivered at an acceptable rate to sustain the resuscitation of an actively bleeding patient or when specific components are not available (e.g., pRBCs, platelets, Cryo, FFP).
- ◆ FWB transfusions ↓ in 2008 compared to 2007 (81.5%) & 2006 (83.4%).



# Issues Raised by DHB



*Issue 2: The Department should conduct a comprehensive risk-benefit assessment regarding transfusion of untested fresh whole blood in the combat environment. The risks associated with the use of untested blood and blood products in the current military cohort are largely calculable given existing data and analysis of specimens from the DoD Serum Repository. However, benefit estimates, particularly short and long term trauma mortality and improvements in post-trauma recovery, require careful data collection under peer-reviewed protocol utilizing epidemiological principles. If the comprehensive studies validate that the benefits of transfusing untested FWB significantly outweigh the risks, the Department should revisit the existing DoD blood management doctrine.*

- ◆ A brief Differential Risk Estimate has been performed and is included in this presentation (next page).
  - ◆ HIV, HCV, & HBV
- ◆ Additional studies to address this issue
  - ◆ Pending approval by MRMC leadership



# Transfusion-Transmitted Disease Residual Risk Estimates



US Military Donors Seroprevalence	US Military Rapid Screen Residual Risk (New test kits)	US FDA-Cleared Testing Residual Risk
<p><b>HIV:</b>            Medical Surveillance Report 2008 - Army            Active 1:5882            ANG 1:4167            AR 1:2381            Retrospective testing of 17,387 samples from actual donors in theater (caveat sample integrity):            No HIV cases identified</p>	<p>OraQuick Advance, WB, kit insert            Sensitivity =99.6%            1:1,470,500            1:1,041,750            1:595,250  <b>No cases</b></p>	<p>Bihl J Trans Med 2007            1:2,135,000</p>
<p><b>HCV:</b>            Hyams et al. Am J Epi 2001            Military 1:208            Retrospective testing of 17,387 samples from actual donors in theater (caveat sample integrity):            Military 1:1932</p>	<p>Axiom, WB, Sensitivity =95.2%            1:4333  <b>1:40,250</b></p>	<p>Bihl J Trans Med 2007            1:1,930,000</p>
<p><b>HBsAg:</b>            Retrospective testing of 17,387 samples from actual donors in theater (caveat sample integrity):            Military 1:2898</p>	<p>FirstVue, WB, Sensitivity =84.3%  <b>1:18,458</b></p>	<p>Bihl J Trans Med 2007            1:277,000</p>



# Issues Raised by DHB



*Issue 3: The Department should support and facilitate industry efforts to improve and gain FDA licensure of currently available blood borne pathogen rapid testing products for use in blood collection. Particularly, HIV technologies have high specificity and Sensitivity and are quite effective; the only issue is that available products are not FDA-approved for testing blood or blood products destined for transfusion. There is currently no FDA-approved rapid test for HCV. The need for blood transfusion related rapid testing capability transcends military uses. In the event of a natural or terrorist related mass casualty event in a major American city, available blood supplies could be rapidly depleted, forcing the employment of a civilian "Walking Blood Bank".*

- ◆ FDA approval of TTD donor screening rapid test unlikely – no market.
- ◆ FDA has approved diagnostic tests for HIV-1/2
  - ◆ Looking at diagnostic tests for HCV
- ◆ Rapid HBV & HCV TTD kits evaluated
  - ◆ New kits (HBV & HCV) now available in theater
  - ◆ HIV-1/2 kit has been in use and is still available
- ◆ Non-FDA compliant collections are screened using the 3 kits.
- ◆ Congressional Plus-up → more rapid tests gaining approval.

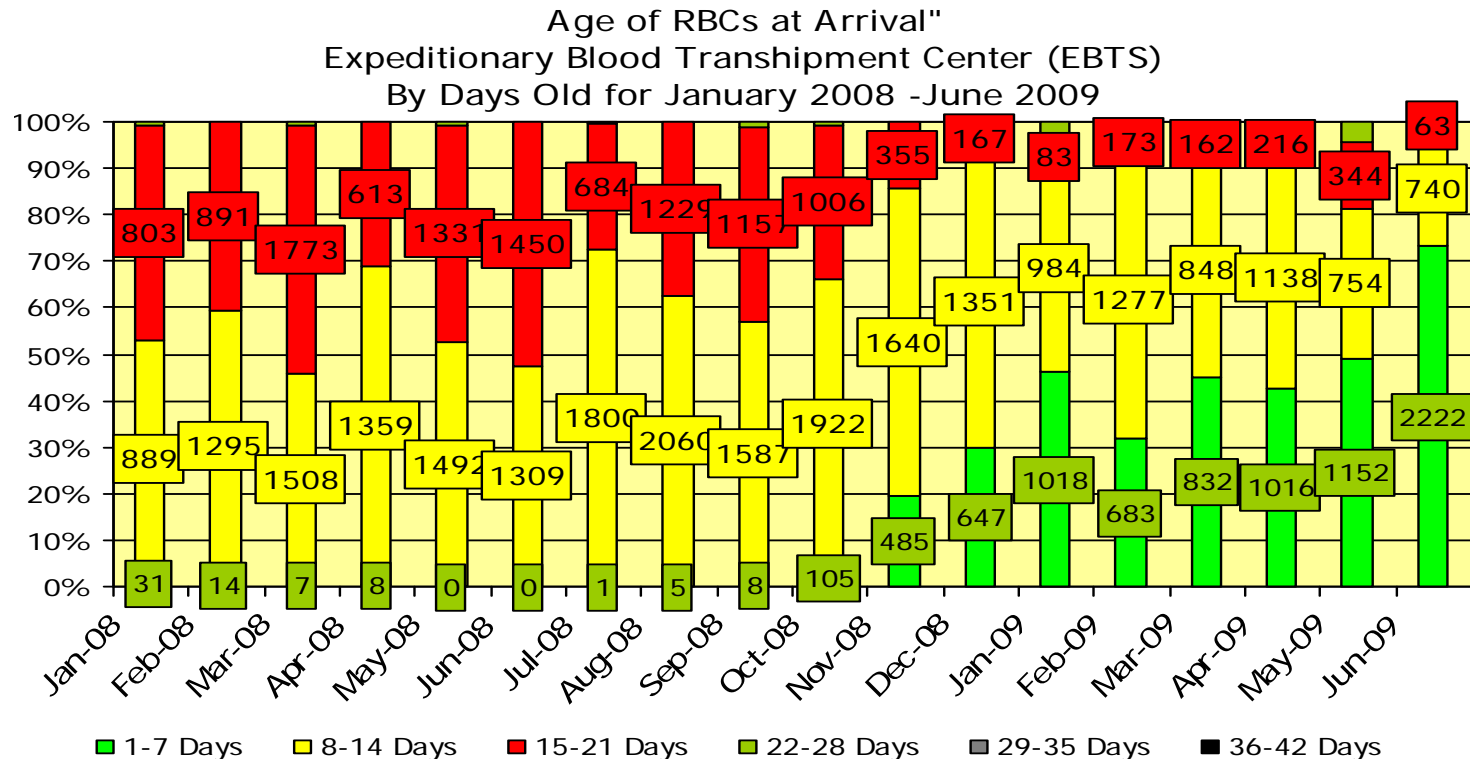


# Issues Raised by DHB



*Issue 4: The Board recommends that DoD critically review the current blood supply logistic system in OIF/OEF to determine if a more agile system that would better ensure the availability of licensed blood and blood products during mass casualty events is achievable.*

- ◆ **2<sup>nd</sup> weekly flight to theater added on 28 Oct 08.**
- ◆ **Substantial improvement in the age of blood.**
- ◆ **Pushing plasma and platelets to level II facilities.**
- ◆ **Less need to collect whole blood.**





# Issues Raised by DHB



*Issue 5: The Board recommends the Department further investigate the establishment of blood collection, processing, and testing centers forward in theater.*

- ◆ \$10 million estimated start-up to establish testing center in CENTCOM.
- ◆ Not recommended by ASBPO
  - ◆ FDA-required testing is complex.
    - ◆ Results could take longer than 24 hrs and over 12 people.
      - ◆ Need negative pressure rooms
      - ◆ Maintain sterile conditions
  - ◆ Units collected in theater are typically transfused w/in hours of collection.
    - ◆ Results would not be available until after transfusion.
    - ◆ Samples will have to be flown from all over theater to a central location.
  - ◆ Units would still be non-FDA licensed.
    - ◆ Donors collected would not be eligible if donating in U.S.
    - ◆ Testing results will still not be available before units are transfused.



# Issues Raised by DHB



*Issue 6: The HIV interval testing policy of every two years was based on an assumption of rare use of a walking blood bank. However, that assumption is no longer valid, and the Board recommends that this interval be reassessed, or that deployment testing be carried out in addition to interval testing. Other nations have approached the issue of blood supplies through frequent testing of local donors.*

- ◆ USCENTCOM Individual Protection and Individual/Unit Deployment Policy (MOD Nine, Sep 2008).
  - ◆ Requires HIV screening be performed w/in 90 days of deployment for all military deploying.



# Issues Raised by DHB



*Issue 7: The Board advises the Department re-perform the HCV Sero-incidence study (ref m) (Am J of Epidemiol 2001) showing sero-prevalence, since the samples upon which the data is based are from 2000 and the prevalence of HCV has decreased in the U.S. population since that time.*

- ◆ WRAIR Infectious Disease Department designed strategies to conduct seroprevalence/seroincidence studies of recently deployed personnel.
  - ◆ Define epidemiology of HBV/HCV in deployed forces.
  - ◆ Pending approval.
  - ◆ Retrospective testing of 17,387 samples from actual donors in theater showed a seroprevalence of 1:1932





# Conclusions



- Current infectious disease transmission countermeasures in theater provide a good level of assurance against transfusion-transmitted infections.
- The collection and transfusion of non-FDA compliant blood products in theater according to established Clinical Practice Guidelines is saving lives and should continue.
- The increased availability of blood components at level II facilities may have played a role in the reduction of whole blood transfusions.



# Armed Services Blood Program



Questions?



# Armed Services Blood Program



Back-up slides



# Comparison of Fresh Whole Blood vs “Component Therapy” in Massively Transfused Patients

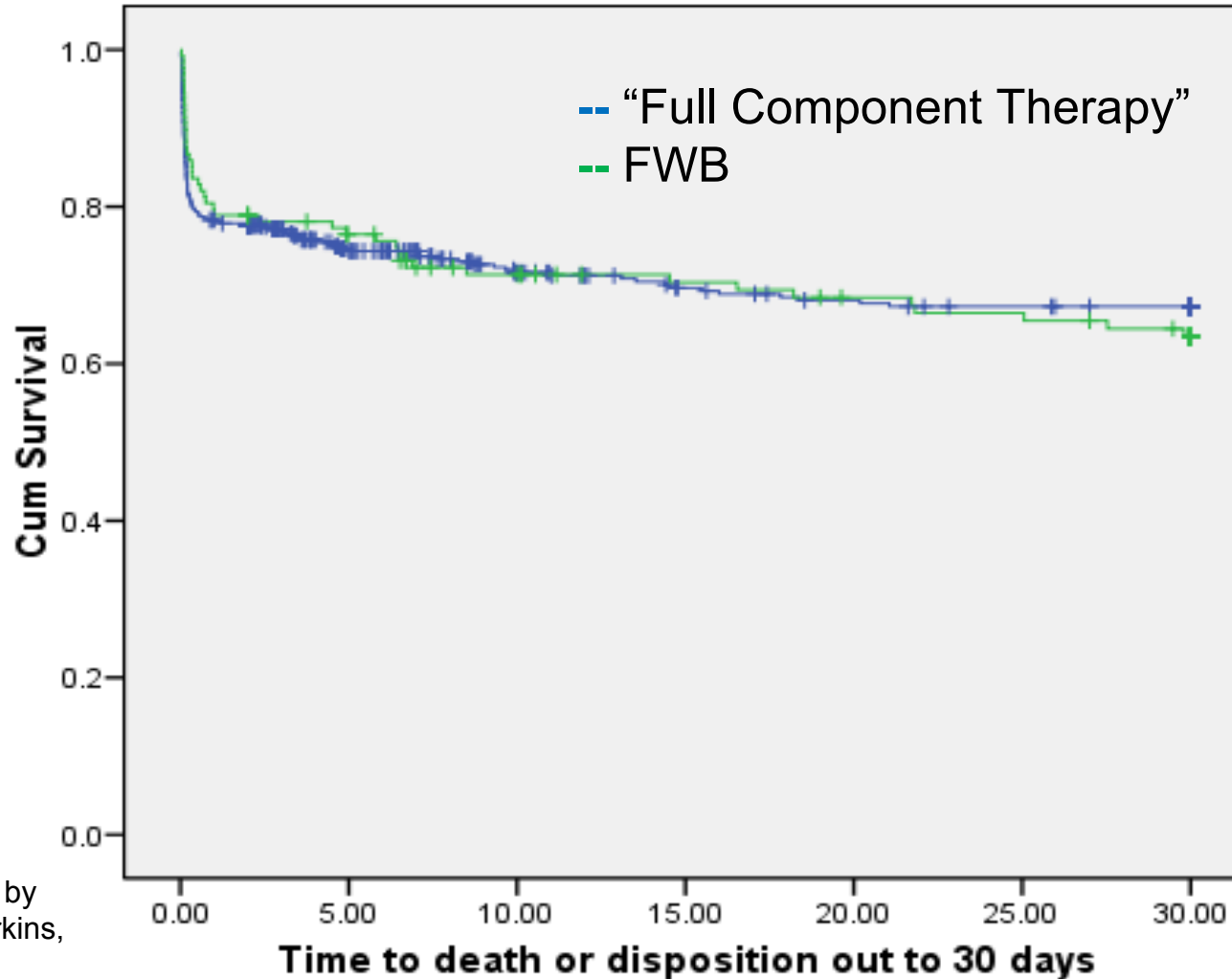


Chart provided by  
Dr. Jeremy Perkins,  
Chief, Blood  
Research , WRAIR



# Armed Services Blood Program



**“...if any single medical program can be credited with the saving of countless lives in World War II and the Korean War, it was the prompt and liberal use of whole blood.”**

**LTG Leonard D. Heaton  
Surgeon General of the Army**