

Support Command



# Experiences with frozen blood products in the Afghan theater (Aug 2006 – Aug 2008)

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# NLD Blood Products ISAF / OEF 2006 - 2008

## Outline

- **Introduction**
- ISAF / OEF facts and figures
- Conclusions
- The way ahead
- Questions

# NLD Blood Products ISAF / OEF 2006 - 2008

## Netherlands Blood Supply

**Only One (civilian) Organization is responsible for the Netherlands (national) Blood Supply**

# NLD Blood Products ISAF / OEF 2006 - 2008

## Netherlands Military Blood Supply

Dependent upon the civilian organization:

- Recruitment and selection of donors
- Testing of donors
- Preparation of “raw materials”
- Production of standard, liquid red cells

# **NLD Blood Products ISAF / OEF 2006 - 2008**

Mandatory Tests on Volunteer, Allogeneic Donations performed by the civilian blood bank organization

- **ABO, RH D**
- **Syphilis**
- **Hepatitis B sAg**
- **Hepatitis C (NAT)**
- **Anti-Hepatitis C**
- **HIV 1 and 2 (NAT)**
- **Anti-HIV 1 and 2**
- **Anti-HTLV I and II**

# NLD Blood Products ISAF / OEF 2006 - 2008

## MILITARY BLOOD COMPONENTS (Role 2 and 3 MTF's)

O Platelets	(25-50 U)	<b>2 years</b>	at -80° C (*)
AB Plasma	(50-75 U)	<b>7 years</b>	at -80° C (*)
O Red Cells	(50-100 U)	<b>10 years</b>	at -80° C (**)

\* + 6 hrs at 22 °C after thawing / mixing

\*\* + 14 days at 4 °C after sterile thawing and washing

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# (Three) Two NLD Liquid-Frozen Blood Banks

## OEF / ISAF 2006 - 2008



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# NLD Blood Products ISAF / OEF 2006 – 2008

## Liquid-frozen blood bank module



Afghanistan  
Bosnia  
Iraq  
Liberia  
Pakistan

# NLD Blood Products ISAF / OEF 2006 - 2008



**Exposed to Danger.....**

# NLD Blood Products ISAF / OEF 2006 - 2008

## Type of Wounds / Problems

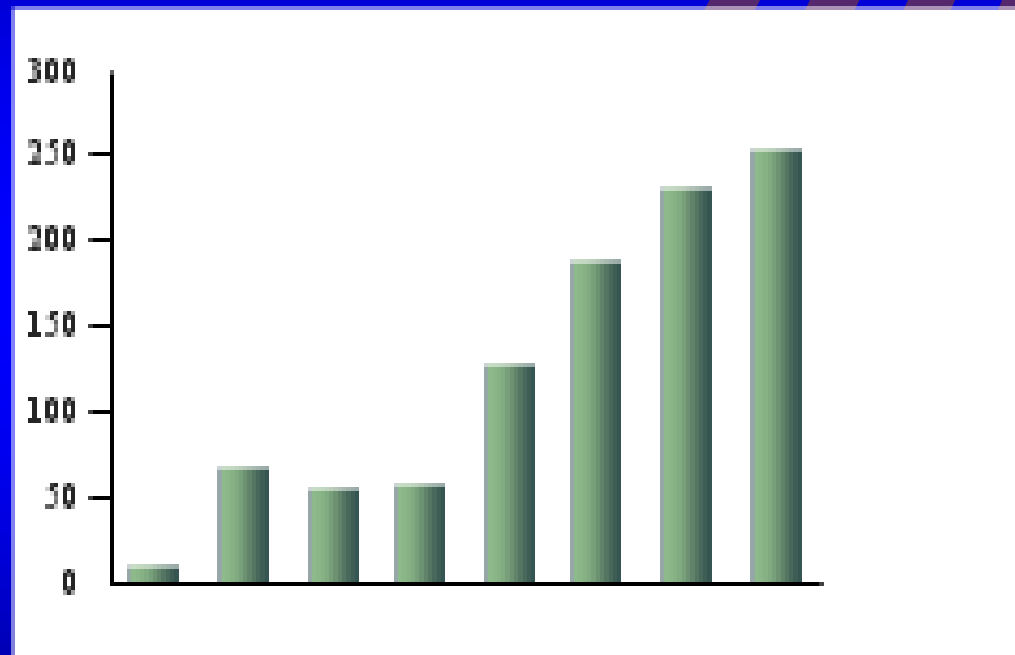
- Shrapnel Wounds
- (High Velocity) GSW
- Blast Injuries
- Time Delay (**hypothermia!**)
- Mass Casualties with **Massive Transfusion Needs**



# NLD Blood Products ISAF / OEF 2006 - 2008

## Coalition Military Fatalities By Year

Year	US	Other	Total
2001	12	0	12
2002	49	20	69
2003	48	9	57
2004	52	6	58
<b>2005</b>	<b>99</b>	<b>31</b>	<b>130</b>
<b>2006</b>	<b>98</b>	<b>93</b>	<b>191</b>
<b>2007</b>	<b>117</b>	<b>115</b>	<b>232</b>
<b>2008</b>	<b>152</b>	<b>110</b>	<b>262</b>



**Total 627 384 1011 (Nov 21)**



# NLD Blood Products ISAF / OEF 2006 - 2008



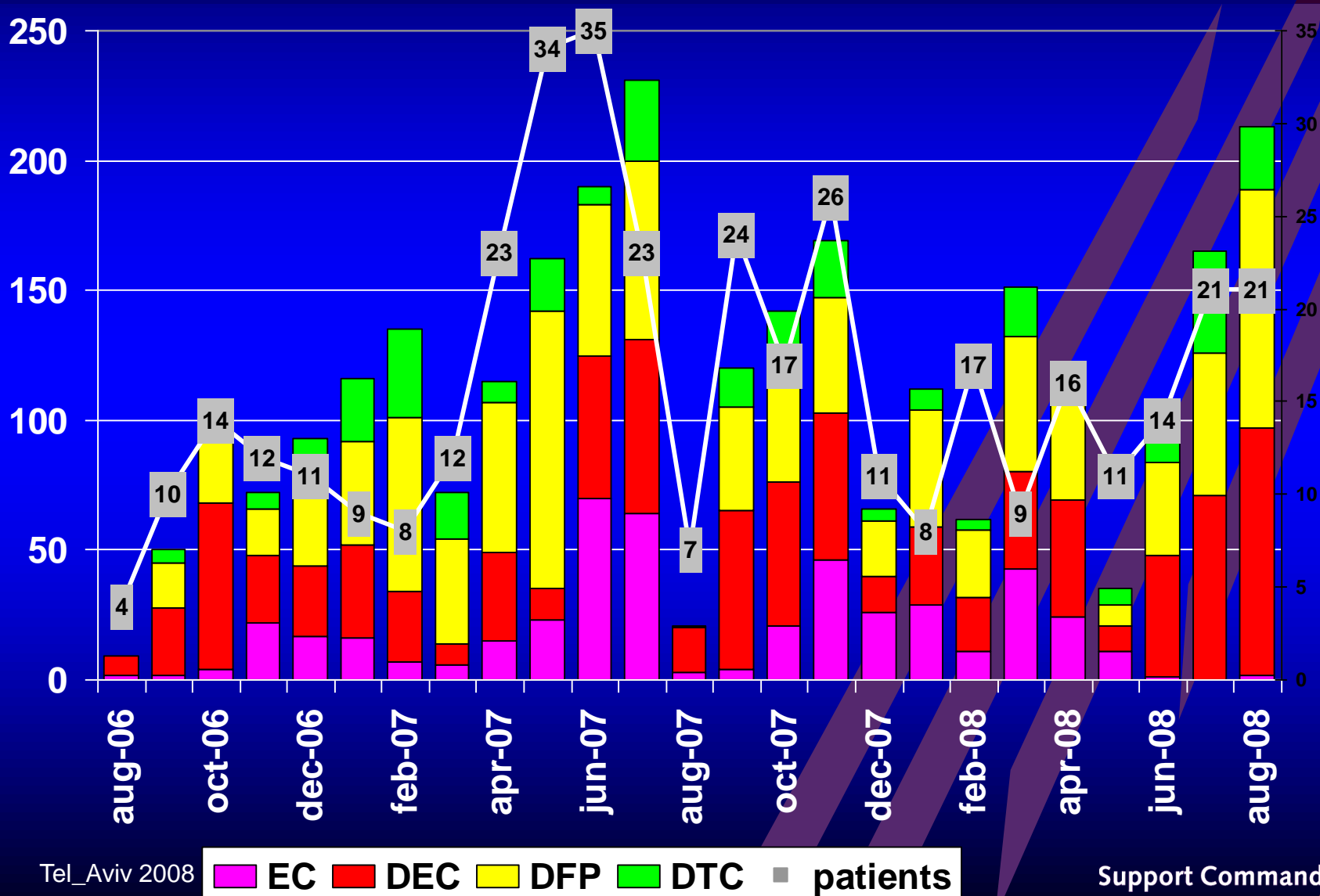
## Joint Combined (Medical) Effort

# NLD Blood Products ISAF / OEF 2006 - 2008



## Joint Combined (Medical) Effort

# Blood usage by month and patients transfused



# Patients transfused with NLD products (2006-2008)

Nr of Patients		Percentage	F-RBC	FFP	F-Plt's	L-RBC
AFG	334	84.13	778	710	286	377
UK	22	5.54	3	88	3	13
CAN	14	3.53	43	32	16	10
US	12	3.02	18	74	41	0
NLD	8	2.02	86	113	33	67
AUS	2	0.50	7	3	1	0
Unk	5	1.26	6	3	1	2

**Total: 397      100      941      1023      381      469**



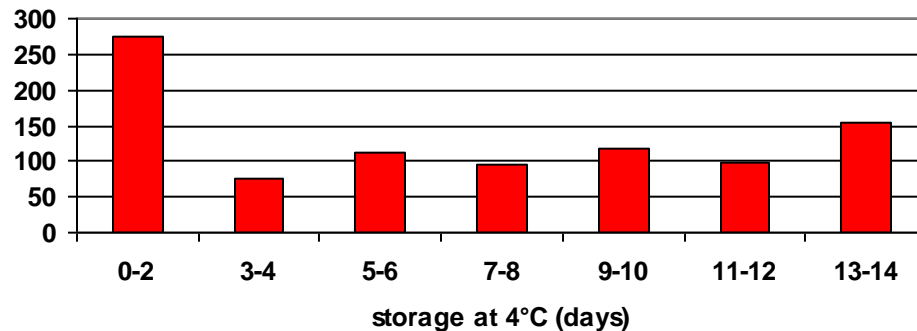
# Massive Transfusions within 48 hrs

	RBC	L-RBC	F-RBC	FFP	F-PLT	
1	13	-	13	14	7	AFG
2	13	-	13	7	3	NLD
3	20	-	20	13	6	AFG
4	27	-	27	17	4	AFG
5	29	-	29	28	8	NLD
6	14	4	10	6	3	AFG
7	16	6	10	6	1	AFG
8	20	9	11	12	6	AFG
9	25	12	13	23	3	NLD
10	31	17	14	14	6	AFG
11	55	29	26	39	10	NLD
12	19	11	8	6	2	AFG
13	32	24	8	26	9	NLD

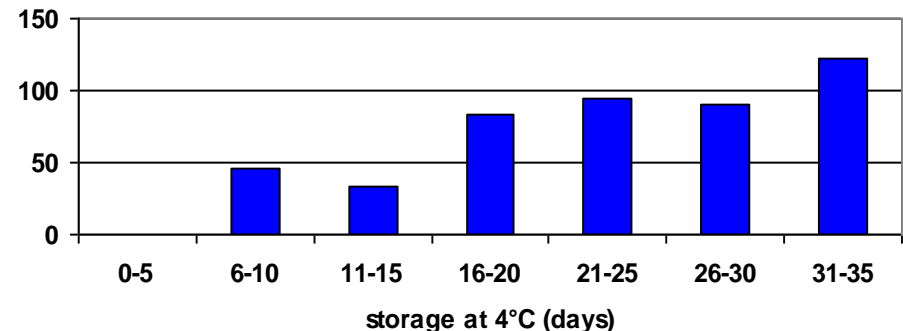
# Red Cell Units transfused in 2006-2008

## Shelf life at time of transfusion

DEC in AS3



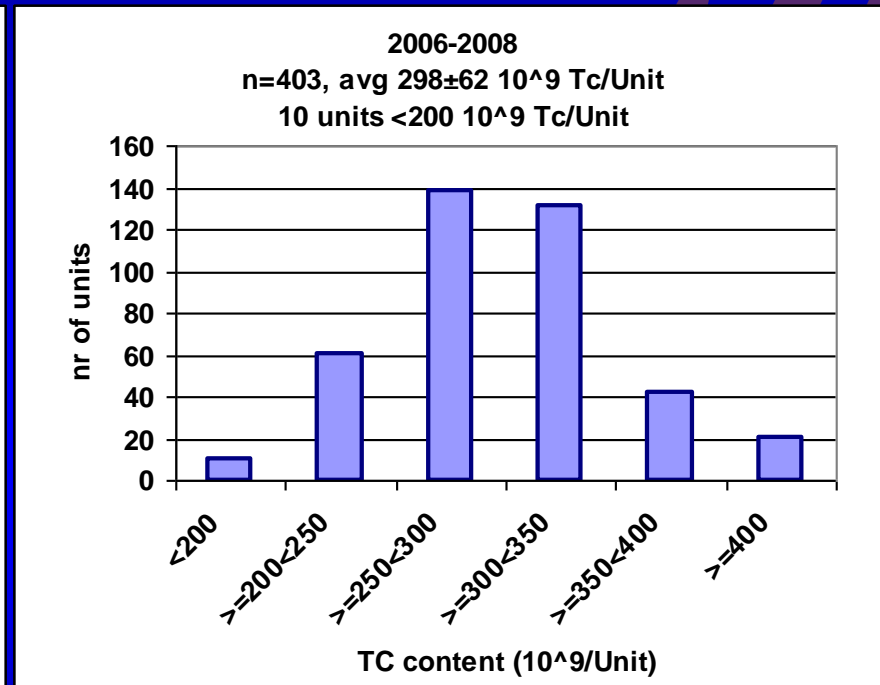
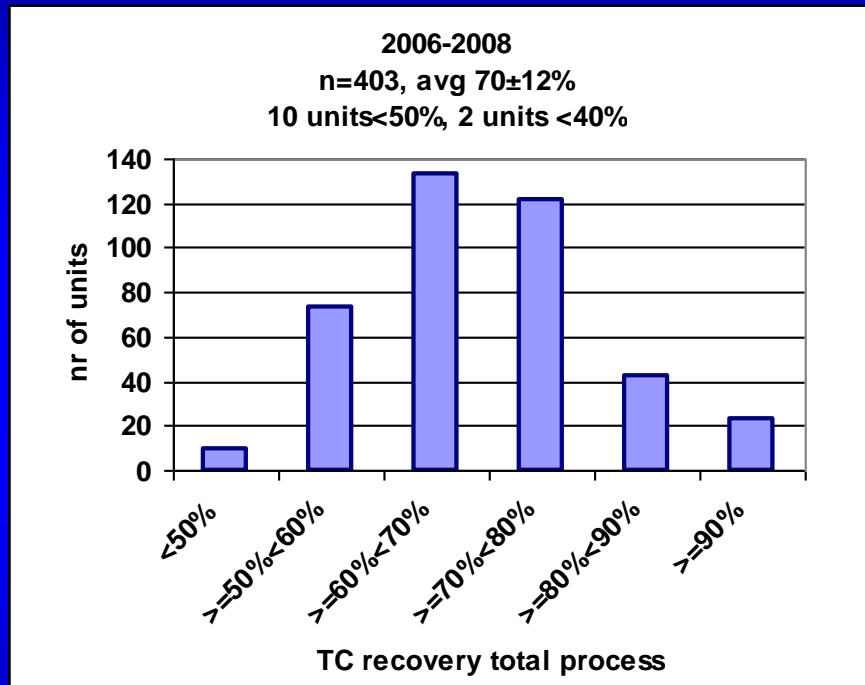
EC in SAGM



**941 Frozen RBC**  
± 30% < 2 days old

**469 Liquid RBC**  
± 80% > 2 wks old

# Frozen Platelets: Recovery and Plt Count



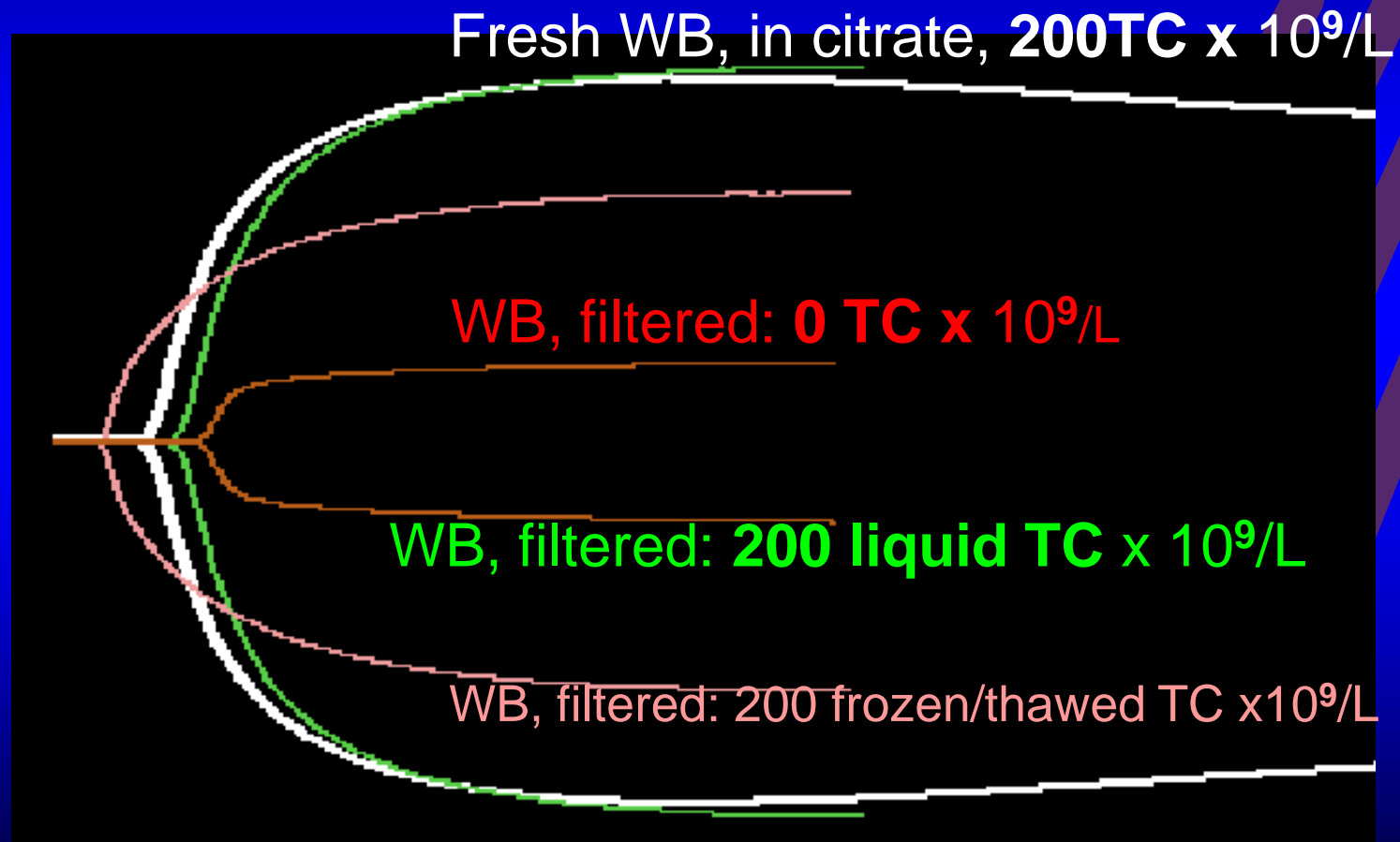
Plt Units Transfused: 403

Recovery:  $70 \pm 12\%$

Plt Count:  $298 \pm 62 \times 10^9/U$

# FROZEN PLATELETS IN THE TEG

Acceleration of clotting



# NLD Blood Products ISAF / OEF 2006 - 2008

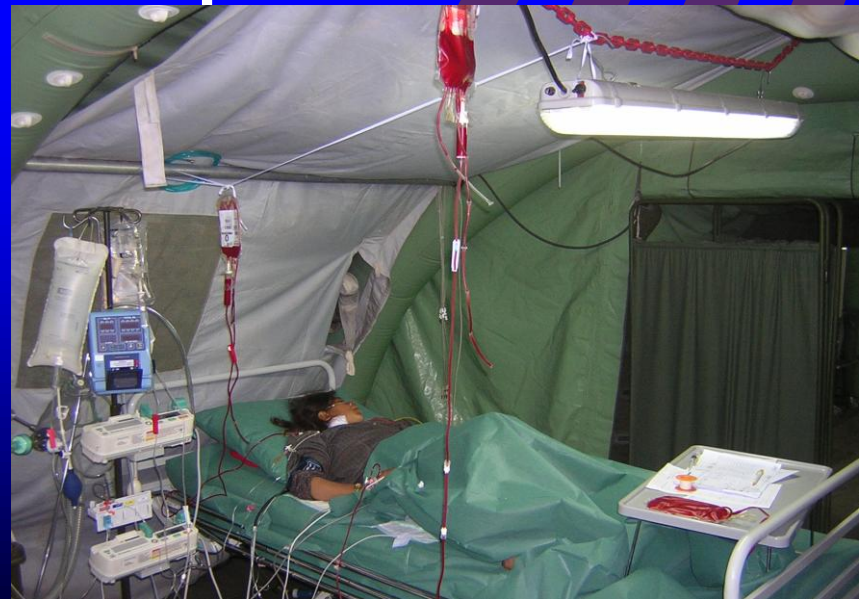
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# NLD Blood Products ISAF / OEF 2006 - 2008

## CONCLUSIONS

- Frozen blood products can provide safe, effective blood components on demand
- No “walking blood bank” required



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# NLD Blood Products ISAF / OEF 2006 - 2008



Are we there yet.....??



# NLD Blood Products ISAF / OEF 2006 - 2008



Challenges and difficulties upstream....

# NLD Blood Products ISAF / OEF 2006 - 2008

***“I don't like you, because you are dangerous.....!”***

*(Iceman vs. Maverick)*



**Whole Blood works, but:**

- Potentially Unsafe
- Unnecessary
- Fully tested components can do the job!

# NLD Blood Products ISAF / OEF 2006 - 2008

## Goals / Improvements:

- **Simpler, shorter (washing) procedures**
- **Prolonged post-wash shelf lives**
- **Blood bankers and clinicians:**
  - **“Fresh” Whole Blood** ↓
  - **Frozen components** ↑
  - **Massive Transfusion Protocol needed!**



# NLD Blood Products ISAF / OEF 2006 - 2008



QUESTIONS??