

Reserve Donor Strategies

Kathryn Brinsfield, MD, MPH

Medical Director, Emergency Preparedness

Boston EMS/ Boston Public Health
Commission

What and Why?

- Disaster Preparedness
- One Day Blood Supply
- New Weapons
- Transfusion need 5-6 u pRBCs
- Alternative to component blood therapy
 - National Blood Reserve
 - Alternative blood products
 - Fresh Whole Blood

The Players...

- Kathryn Brinsfield, MD, MPH
- Michael Milner, PAC
- Anita Barry, MD
- Dianne Cavaleri, NREMT-P
- Victor Coronado, MD
- Lori Harrington, MD
- Jerry Holmberg, MD
- Joel Kase, DO, MPH
- Mary O'Neill, MD
- Patricia Pisciotto, MD
- Philip Spinella, MD
- Karen Quillen, MD

- American Red Cross
- CDC/ COTPER
- FDA/ CBER
- DHHS
- Boston EMS
- US Military
- Hospital Blood Bankers
- Trauma Surgeons, EM Physicians, ICU Physicians



The American Red Cross – New England Region (ARC NER)

- Last year, the ARC NER collected approximately 370,000 RBC units and 70,000 platelet units
- The ARC NER provides RBC and components to approximately 150 hospitals
- Within the Boston area at least 4/10 hospitals self collect and there are approximately 20 Massachusetts hospitals registered or licensed to collect blood
- NER ARC relies on imports from other parts of the country to meet the needs of area patients.

Blood Needs ARC NER

INVENTORY

(RED CELLS)

One Day Supply

O pos	947	O neg	223
A pos	774	A neg	168
B pos	221	B neg	49
AB pos	48	AB neg	16

ARC Total=2446 pRBCs

Hospital Blood Banks=2500 pRBCs

Total=**5000** pRBCs





IED 5000 lb in Open Area; 25 persons/sq foot

	Israel Experience	EMCAPS Model	Model Blood Product Use
Dead	967 (13%)	1,614 (8.8%)	
Trauma Injuries (Mod to severe)	1,512 (20%)	2,829 (15.4%)	X 3.85units pRBC ¹ = 10,891units pRBC
Urgent Care Injuries (mild injuries)	5,018 (67%)	13,850 (75.5%)	
Total	7,497	18,293	

¹ Rosenblatt MS, Hirsch EF, Valeri CR. Frozen Red Blood Cells in Combat Casualty Care: Clinical and Logistical Considerations. Military Medicine, Vol 159. May 1994

	Israel ¹ Experience	EMCAPS ² Model	Model Blood Product Use
Dead	967 (13%)	1,614 (8.8%)	
Trauma Injuries (Mod to severe)	1,512 (20%)	2,829 (15.4%)	X 6.7units pRBC ¹ = 18,955 units pRBC X 4.5units component= 12,731 units components
Urgent Care Injuries (mild injuries)	5,018 (67%)	13,850 (75.5%)	
Total	7,497	18,293	

1 Shinar E, Yahalom V, Silverman B. Meeting blood requirements following terrorist attacks: the Israeli experience. Current Opinion in Hematology 2006, 13: 452-456

2 Johns Hopkins Office of CEPAR, EMCAPS: Electronic Mass Casualty Assessment and Planning Scenarios. <http://www.hopkins-cepar.org/EMCAPS/EMCAPS>. Accessed 8/20/2007. Current Model 5000lb ANFO, 1 person per 25 ft².



National Planning Scenarios

Blood Supply: An Exhaustible Commodity

- 2-12 hours: critical period
(5000 units/5 u per person= 1000 patients)
- 12-36 hours: mobilizing resources
- 72 hours: collected blood earliest available

Why this isn't a Military Model

- Instantaneous
- No Warning
- Supply Chain not in place

US Military Experience with Fresh Whole Blood

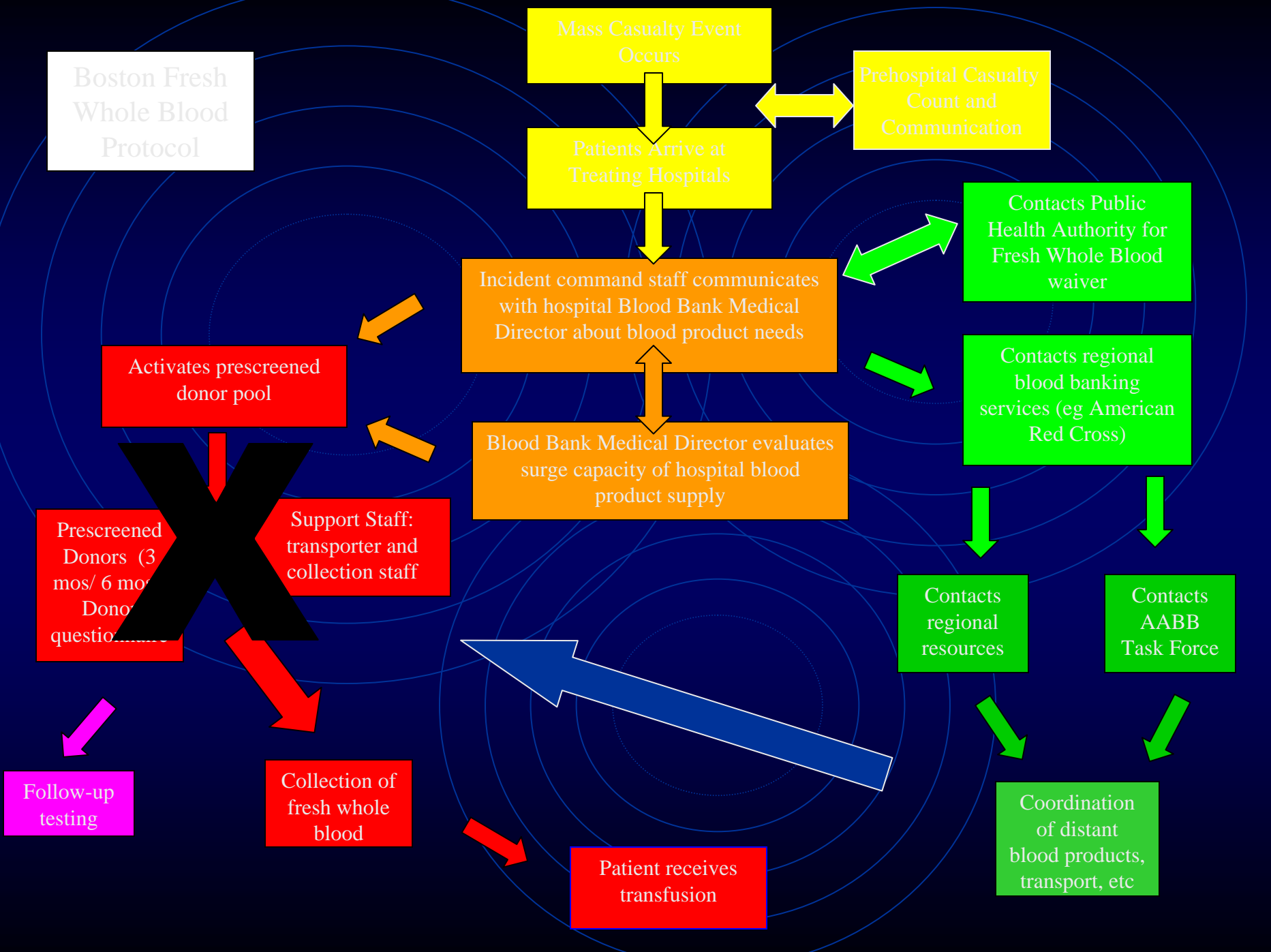
- Whole Blood that is collected from donor and transfused without standard infectious testing to recipient within 24 hours
- Indication ¹
 - Severe life threatening injuries
 - When blood components needed for resuscitation are not available
- Source of red cells, plasma and platelets
- Over 4000 units transfused since 2001 ²

¹ Emergency War Surgery Manual. 3rd Edition

² US Army Institute of Surgical Research

US Military Experience with Fresh Whole Blood

- Process is simple
 - Recruit volunteer donors
 - Donor Screening
 - Questionnaire
 - Infectious disease testing
 - Immediately prior to donation with rapid tests in 15 minutes
 - HIV, HBV, HCV, RPR
 - Months prior with formal testing
 - Type and Crossmatch
 - Collection
 - 400-500ml in CPDA bag
 - Transfusion of fresh whole blood immediately



Boston Fresh Whole Blood Protocol

Mass Casualty Event Occurs

Prehospital Casualty Count and Communication

Patients Arrive at Treating Hospitals

Incident command staff communicates with hospital Blood Bank Medical Director about blood product needs

Contacts Public Health Authority for Fresh Whole Blood waiver

Contacts regional blood banking services (eg American Red Cross)

Blood Bank Medical Director evaluates surge capacity of hospital blood product supply

Activates prescreened donor pool

Prescreened Donors (3 mos/ 6 mos Donor questionnaires)

Support Staff: transporter and collection staff

Contacts regional resources

Contacts AABB Task Force

Follow-up testing

Collection of fresh whole blood

Coordination of distant blood products, transport, etc

Patient receives transfusion

The image features three overlapping target diagrams on a dark blue background. Each target consists of four concentric circles: an outermost solid circle, an inner solid circle, and two dotted circles in between. The targets are arranged in a triangular pattern, with one at the top left, one at the top right, and one at the bottom center. Dashed lines radiate from the centers of each target towards the corners of the frame. The text 'Risk???' is centered in the middle of the image, overlapping the central target.

Risk???

Summary

- Red blood cells exhausted at ~1000 severely injured patients
- Fresh whole blood for emergency release effective in military setting is saving lives
- Goal is to develop an emergency plan that will improve survival in disaster with use of fresh whole blood
- Benefits of survival of patients with potentially fatal wounds outweigh the risk of fresh whole blood when tested components are depleted



70% Solution

But we need something right now