Emergency Preparedness for Mass Casualty Events

THOR-AABB Working Party Recommendations for a Prehospital Blood Product Transfusion Program

Donald Jenkins MD FACS

Professor/Clinical, Division of Trauma and Emergency Surgery

Vice Chair for Quality, Betty and Bob Kelso Distinguished Chair in Burn and Trauma Surgery

Associate Deputy Director, Military Health Institute UT Health San Antonio

Uniformed Services University Adjunct Professor of Surgery

UT Health San Antonio

The University of Pittsburgh's Trauma and Transfusion Medicine Research Program, Center for Military Medicine Research, McGowan Institute for Regenerative Medicine, in partnership with Trauma Hemostasis and Oxygenation Research, are proud to announce:

HERETIC

The HEmostatic REsuscitation and Trauma Induced Coagulopathy

Disclosures

- None

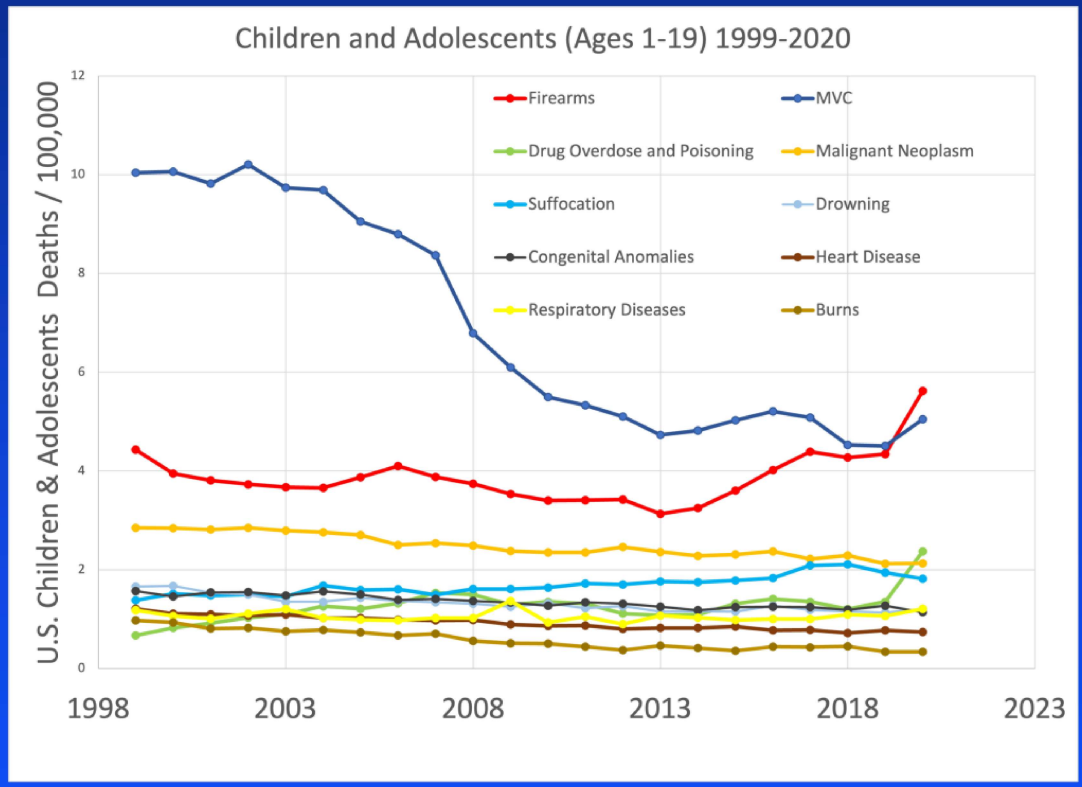
- Mass casualty incidents (MCI) are high profile contributors to the number of annual trauma-related deaths in the United States and in many other nations around the globe
- A critical aspect of MCI care is the ability to provide blood components in sufficient types and quantities to prevent deaths due to hemorrhage
- For transfusions to play an optimal role in the prevention of trauma-related hemorrhagic death, including MCI, there appears to be a very tight time window after injury to initiate transfusion therapy
- In order to meet this tight window, blood components of appropriate numbers and quantities must be immediately available

- Currently, it is questionable whether standing blood inventories at US healthcare facilities are sufficient to appropriately meet the transfusion needs of a surge of MCI victims
- Previous models of blood supply adequacy have focused on the availability of red blood cells, and the ability to move blood components quickly from blood suppliers to impacted healthcare facilities
- These models have not considered the adequacy of other critically necessary blood components, such as platelets
- A recent simulation of blood product demand after MCI showed that, in order to meet the defined RBC needs of 100 percent of casualties, a hospital would need 13-14 units in inventory per casualty

- This simulation did not evaluate requirements for platelets and plasma, which would likely be extensive
- Meeting balanced resuscitation demands in the timeframe necessary to minimize the number of preventable hemorrhagic deaths is probably not realistically
- achievable for most healthcare facilities in the United States or most other countries
- Alternative approaches to treat hemorrhage are likely necessary to solve this problem

Clinical Importance and Future Directions

- Firearm injury now leading cause of death for children and adolescents
- Rapid response of deployment of blood from urban to rural environment
- Model for adoption of similar programs throughout the country



San Antonio MCI Initiative

- ASPR TRACIE from 5 Nov 17 Sutherland Springs MCI (Assistant Secretary for Preparedness and Response, Technical Resources, Assistance Center, and Information Exchange)
  - Recommendation: take resources from urban to remote setting including people and blood
- South Texas Blood and Tissue Center
  - 30 units LTO+WB inventory
  - Dispatch EMS to STBTC to pick up 20 pack of whole blood and drive to scene/rural hospital or rendezvous with HEMS to fly it there

Real World Example

- Father's Day June 2018

- Big Wells Texas
  - 14 person MCI rollover Motor Vehicle Crash
    - 4 Dead on Scene
  - At least 9 Helicopter EMS agencies responded
  - 3 patients received O+ Whole Blood on scene/transport: 1 died (33%)
- First MCI event known where prehospital whole blood was used for resuscitation

Since El Paso Shooting

- Contingency plan established to supply blood in real time to hospitals in Texas for MCI events
- Approximately 30 units, taken from multiple locations, will be flown along with 6-8 personnel who can communicate needs back to STRAC
- Aircraft notification to take off ~30 minutes

- Prior to Southerland Springs mass shooting (2017)
  - No plan to respond to mass casualty incident with blood to site of MCI
- Big Wells, TX – 14-person MCI secondary to motor vehicle collision
  - First use of prehospital whole blood in response to MCI (3 patients)
- Southerland Springs mass shooting (Nov 2017)
  - Federal review of response/events: send people, supplies and blood in the future for such events; plan development initiated
- Mass Shootings (2019) – El Paso and Midland, TX
  - No blood deployed but considered and program developed in concept
  - Shortly after this El Paso MCI → WB deployment protocol adopted by Texas EMTF

San Antonio Whole Blood Consortium

Walking Blood Bank Plan

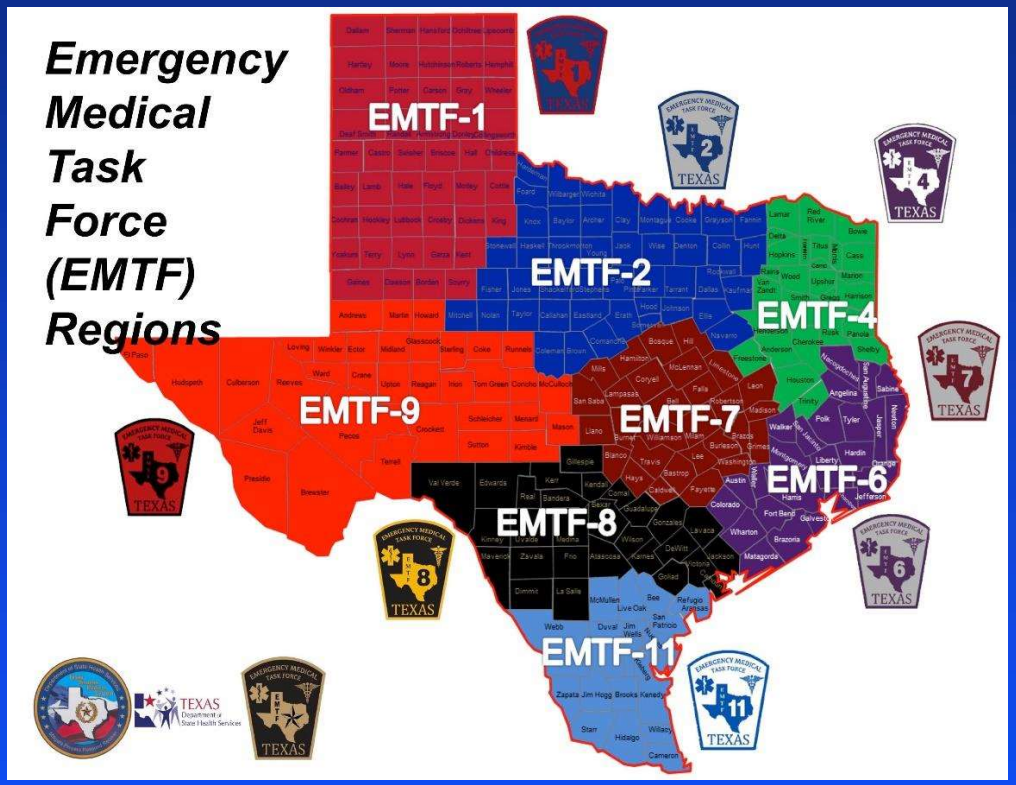
- MCI activated
- Immediately assess regional blood inventory
- If number of casualties is greater than predicted need initiate WBB
- Notify an appropriate number of Brothers in Arms donors
- Needs to be scalable response
- Donors report to their usual donor location
- Plan for four donors per patient; notify 8 donors in hopes 4 will show up

What next?

- Screen donors (these are regular donors tested 4 times/year)
- If screening questions indicate safe donor, initiate donation
- Blood will be delivered, by current need assessed by Medical Operations Center, to appropriate place (scene, hospital, etc)
- Blood will be warm from the donor and not yet tested
- Transfusion commences
- Retrospective testing of the donor unit and tracking of recipient for treatment of any transfusion transmissible disease

STRAC and the EMTF

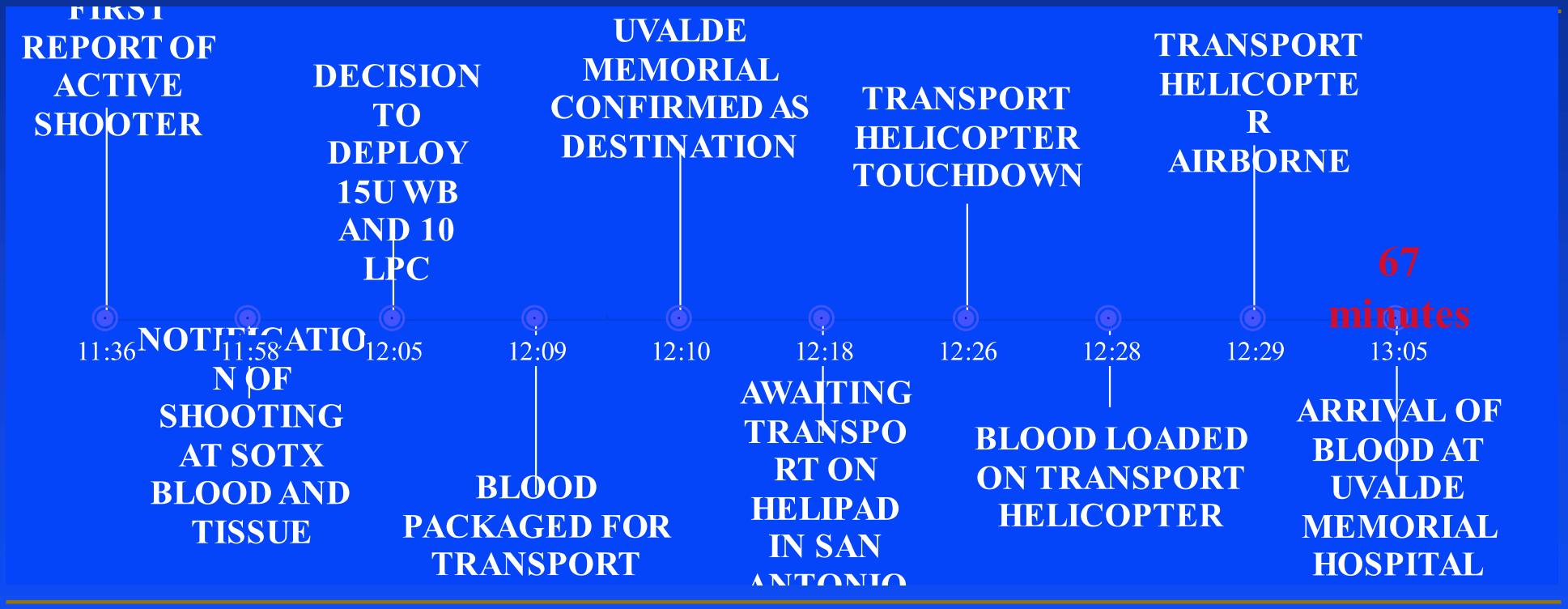
- Texas Emergency Medical Task Force (EMTF)
  - 8 multi-RAC geographic regions
- STRAC is lead RAC for EMTF-8
  - Designated as the State Coordination Office (SCO) for entire Texas EMTF program
- Statewide collaboration for rapid response to MCIs and regional emergencies
- WB deployment adopted by EMTF



Uvalde, TX – May 24th, 2022

- Located approximately 80 miles from San Antonio, TX
- Mass casualty incident occurred resulting in 22 deaths (19 children, 3 adults)
- WB package: 15 units LTO+WB and 10 units LPC
  - 1 child received 2 units LPC
  - 1 adult received 1 unit LTO+WB

Timeline of Events



Additional Whole Blood Available

- We did not account for this in our plan
- 3 ambulances from San Antonio responded = 3 units WB
- 2 HEMS organizations with 9 aircraft = 17 units WB
- Total of 20 additional WB units on the scene within 75 minutes of the notification of the active shooter MCI
- 15 units South Texas Blood and Tissue and 20 from responding EMS agencies = 35 units WB + 10 units O- RBC's = 45 units of blood products
- 2 patients got blood and sent to San Antonio
  - One adult got 1 u WB
  - One child got 2 u O- RBC's (got 9 units WB after arrival and during surgery)
  - All 6 patients transported to San Antonio alive and recovering

Norway

- Has established a walking donor blood bank
- It has been used in a remote community at least once
- National Blood Services supports the program
- Numerous remote hospitals have been trained, including oil platforms in North Sea

Contact

Donald H. Jenkins, MD, FACS
Professor/Clinical, Division of Trauma and Emergency Surgery, Vice Chair for Quality, Department of Surgery, Betty and Bob Kelso Distinguished Chair in Burn and Trauma Surgery, Associate Deputy Director, Military Health Institute

UT Health San Antonio
7703 Floyd Curl Drive
San Antonio, TX 78229-3900
Phone: (210) 743-4130

Jenkinsd4@uthscsa.edu