

# Wilking Blood Bank

October 2024

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# Disclosures

- None

# Acknowledgements

- STRAC (Epley, Schaefer, Rose and team) including all EMS, HEMS and trauma centers of South Texas
- COL John Holcomb
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- Bothers in Arms/Heroes in Arms donors

# Multi-disciplinary and Multi-National Review

**SHOCK**, Vol. 41, Supplement 1, pp. 70–75, 2014

## LOW TITER GROUP O WHOLE BLOOD IN EMERGENCY SITUATIONS

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Nicolas Prat,<sup>§\*\*</sup> Anne Sailliol,<sup>††</sup> Richard Gonzales,<sup>‡‡</sup> Clayton D. Simon,<sup>§§</sup>  
Paul Ness,<sup>|||</sup> Heidi A. Doughty,<sup>¶¶</sup> Philip C. Spinella,<sup>§\*\*\*</sup> and Einar K. Kristoffersen<sup>\*||</sup>**

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**Conclusion: Low titer Group O is preferred alternative for emergency transfusions where safe ABO identical transfusions cannot be ensured**

# Regional Whole Blood Consortium



# Air and Ground Regional Distribution June 2023

Map not to scale



**Level I Trauma Centers**  
**Level IV Trauma Centers**

**Rotation Centers:**  
 University Hospital (Lvl I)

**Regional Hospitals with LTOWB:**  
 Brooke Army Medical Center (Lvl I)  
 CSR-New Braunfels (Lvl IV)  
 Frio Regional (Lvl IV)  
 Peterson Regional (Lvl IV)

- Rotation Sites:**
- Acadian Ambulance (x2)
  - AirEvac/MAC (x9)
  - AirLife (x2)
  - Alliegiance EMS
  - Bandera EMS
  - Bexar Co ESD2 EMS (x2)
  - Bexar Co ESD 7 EMS
  - Bulverde-Spring Branch EMS
  - Canyon Lake EMS
  - Community EMS
  - Converse EMS
  - Gonzales ESD 1 EMS
  - Karnes Co EMS
  - Kenville Fire/EMS
  - La Salle Co EMS (x2)
  - Leon Valley EMS
  - New Braunfels EMS (x2)
  - San Antonio Fire Dept EMS (x8)
  - Schertz EMS
  - Seguin EMS
  - UT Health-SA Fellows
  - Wilson Co ESD 2 EMS (x2)
  - Wilson Co ESD 3 EMS

# Prehospital Cold Stored O+ Whole Blood in San Antonio

- Kicked off January 29, 2018
- 10,000 + male LTO+WB donors (1:256)
- 18 helicopters, 2 units each
- 16 ground ambulances, 1 unit each
- Pre-determined criteria for transfusion
- Pediatric patients  $\geq 2$  yo included
- Women of childbearing age included
- Rh isoimmunization risk versus bleeding to death



# Total Pre-Hospital Numbers

## All Agencies Whole Blood Status

Wednesday, February 7, 2024



**2,315** Units Handled Total  
Data reset November 1, 2022

**717** Units Administered to Patients

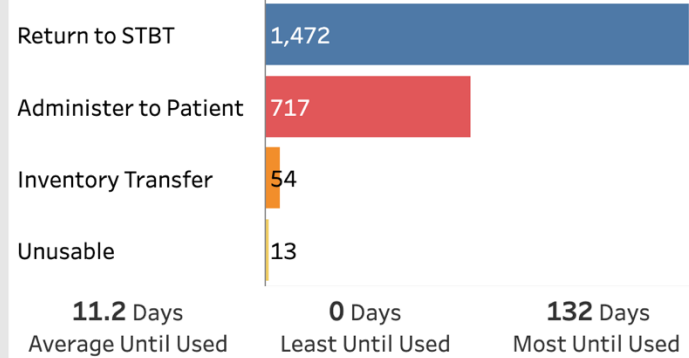
**1,472** Units Returned to STBTC

**54** Units Transferred to Another Unit

**13** Units Unusable

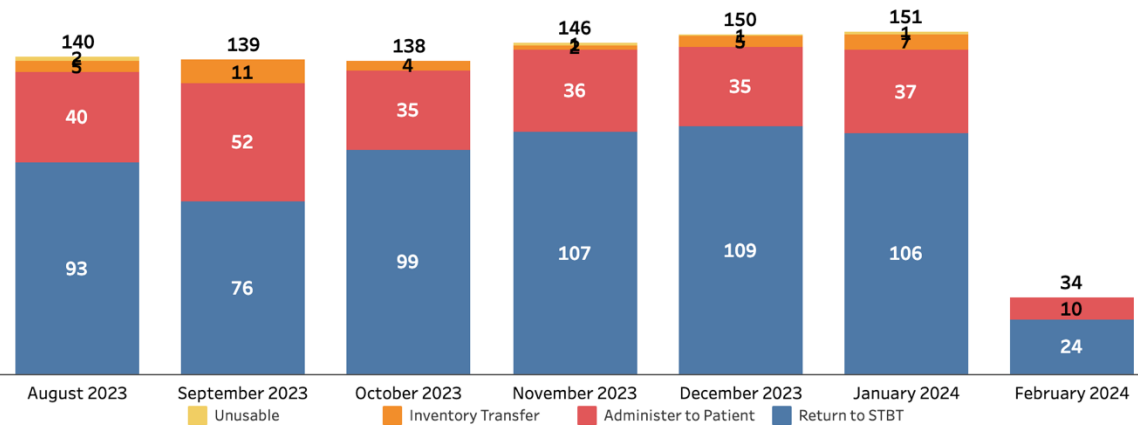
**59** Units On Hand

**2,256 Units of Blood Used** Data reset November 1, 2022  
Administered, Transferred, Returned, or Unusable



**11.2 Days** Average Until Used  
**0 Days** Least Until Used  
**132 Days** Most Until Used

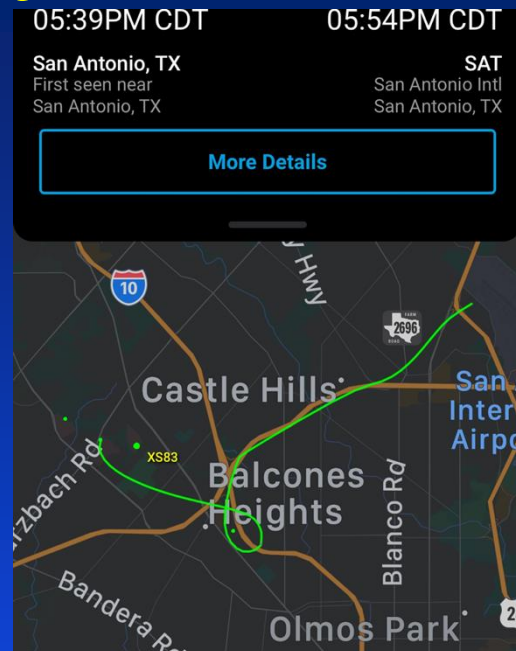
Blood Units Used Last 6 Months (Excludes On Hand Units)





# Real-time Resupply

- The immediate blood resupply of ground and helicopter EMS units, instead of waiting hours or, in some cases, days, have led to a second patient surviving that same evening on several occasions....also note that there have been several instances of ‘mutual aid’, wherein more blood would benefit a patient, an EMS agency on the route from scene to hospital is requested to rendezvous and provide their unit of whole blood



- **Brothers In Arms:**

- As of 2023, we have screened over 10,000 males for the LTOWB program.
- 82% of potential male donors qualify as low-titer and are able to enroll in the program.
- Of the >10,000 males screened, 4,411 have donated and in the last twelve months and 2,539 have donated more than once.
- PAR levels
  - STBTC > 60 u (usually 75)
  - UHS > 50 (usually 40)
  - EMS 65 (usually 67)

# Whole Blood Use UHS/STRAC

- STBT has collected over 31,000 u WB
- Trauma #1 use
- GI bleed
- Peripartum hemorrhage
- Other
- Pediatric use
- Mass casualty use
- Walking blood bank
- Women donors



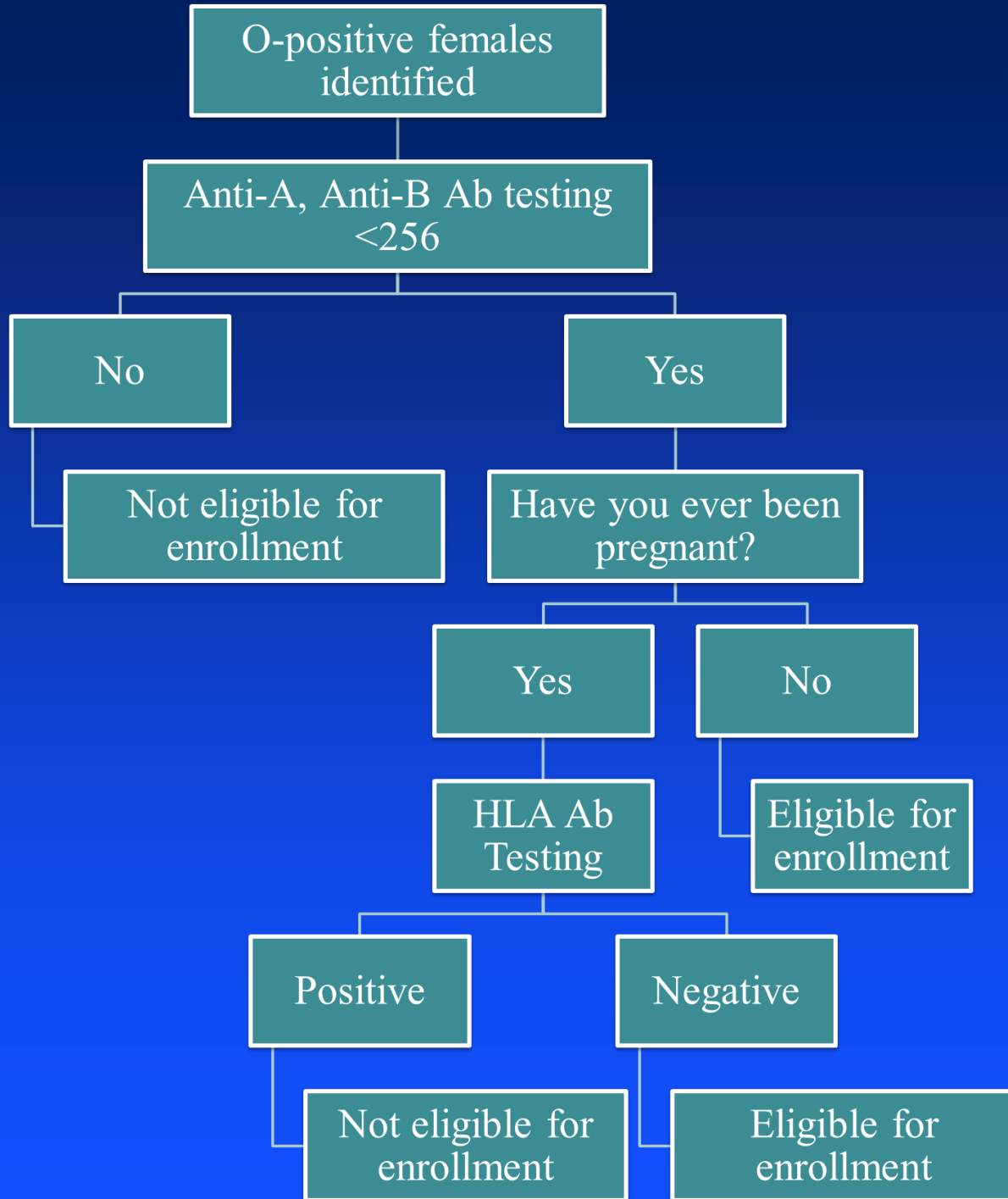
**South Texas  
Blood & Tissue**



**Dr. Samantha Gomez Ngamsuntikul – Medical Director  
South Texas Blood & Tissue**

**William Bullock - Specialized Program Coordinator,  
BA Paramedic**

*July 31<sup>st</sup>, 2023*



# How to Double Your Donors

- **Heroes in Arms (re-named after the addition of female donors)**
  - In the three months since adding women, the program has screened 352 women and has found that 69% of the women are considered low-titer and are thus eligible for the LTOWB program.
  - Several of the women who have been enrolled were originally screened as positive for prior pregnancy and underwent the additional HLA testing prior to enrolment.
  - South Texas Blood and Tissue Center screened 2,151 previously pregnant females in 2022 for HLA Ab testing and 1,789 (83%) tested negative while only 362 (17%) tested positive.
  - **As of today: 3278 O+ women screened eligible**  
**508 have donated over 700 units of whole blood**



Ground EMS Prehospital Blood Agencies from 2016-2018

Randall M Schaefer, DNP


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Mass Shootings and Rural Areas - m X +


https://files.asprtracie.hhs.gov/documents/mass-shootings-and-rural-areas-508.pdf

UHS Citrix UHS Citrix Imported From IE

1 of 7 75%



## MASS SHOOTINGS AND RURAL AREAS



*On November 5, 2017, a gunman opened fire in the First Baptist Church of Sutherland Springs (TX), killing 26 and injuring 20. While most of the wounded were taken by helicopter or ambulance to the closest Level 1 trauma center in San Antonio, some were brought to Connally Memorial Medical Center in Floresville first. Mandi Sralla was the director of this facility's emergency department (ED) at the time of the shooting and shared her experiences with ASPR TRACIE.*

*(Originally published in 2018)*

**John Hick (JH)**

**Please tell us about your facility and your role on the day of the shooting at the First Baptist Church.**

**Mandi Sralla (MS)**

Connally Memorial Medical Center is a 44 bed licensed facility. We have four beds in the intensive care unit, and our ED has 10 beds with one major trauma bay. The other 9 rooms are centrally monitored rooms or OB/GYN rooms. Our average daily census is 8-10 patients per day; this increases to between 18 and 20 patients in the wintertime. In the ER, we average 35 visits a day, with higher peak times (up to 60 visits) in the wintertime. Our ER is a "one-dot shop." While some used to work 24 hour shifts, most now work 12 hour shifts.

I moved here from Houston when I was 15. I've been at Connally for 15 years. I started as an ER technician, then served as a registered nurse (RN). I was asked to move to management, and I've been the ED director for eight years—this is the position I held on the day of the incident. Running a rural ER has been a rewarding experience for me.

**JH**

**How close are you to a major trauma center?**

**MS**

Sutherland Springs is a very small community made up of a few hundred residents. It is about 15-20 miles east of Floresville, the county seat, which



# 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**

- Local EMS resources may be overwhelmed and mutual aid minimal; surrounding communities may only be able to spare a single ambulance to assist and travel distances may be long. Hospitals should collaborate with surrounding EMS agencies to ensure that mutual aid planning for inter-facility transfers is a priority (including identifying landing areas for multiple helicopters).
- Incoming EMS assets (both ground and air) could also be used to deliver additional personnel or supplies (e.g., blood, chest tubes). This should be part of local and regional mass casualty plans.
- In some cases, EMS personnel responding to conduct secondary transport to another healthcare facility may be needed to assist with immediate patient care at the originating hospital prior to initiating that transport.

# Real World Example

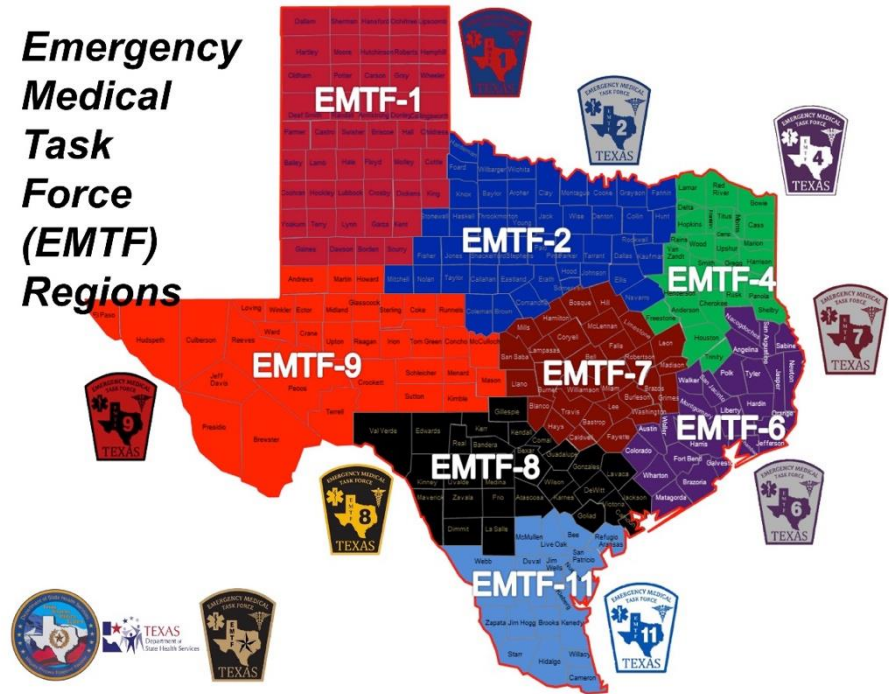
- Father's Day 2018
- Big Wells
  - 14 person MCI rollover MVC
    - 4 DOS
  - At least 9 HEMS agencies responded
  - 3 patients received LTO+WB on scene/transport
    - 1 died (33%)
- First MCI event known where prehospital whole blood was used for resuscitation

# 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

# 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





# Critical Incident Review: Active Shooter at Robb Elementary School

English Spanish

## Critical Incident Review: Active Shooter at Robb Elementary School

# Uvalde, TX – May 24<sup>th</sup>, 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

## UVALDE, TX MASS CASUALTY INCIDENT - BLOOD DEPLOYMENT TIMELINE



WB = whole blood

LPC = liquid packed cells

# 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



In addition, there were three life flights available to land at the school for assistance.<sup>623</sup> Medical air transport services were used to transport one of the seriously injured teachers, who received treatment at a San Antonio hospital.<sup>624</sup>

EMS was also not included in triaging or assessing any of the “walking” victims’ potential medical needs.<sup>625</sup> Several students with bullet wounds, grazes, and other injuries were directed onto buses that went to the civic center without ever having been brought to the medics’ attention.<sup>626</sup>

#### Deployment of STRAC

The Southwest Texas Regional Advisory Council (STRAC),\* one of 22 regional advisory councils across Texas, is a regional emergency management and health care system that coordinates across the trauma system and responder community.<sup>†</sup> STRAC serves 26,000 square miles, approximately 3 million people, 56 hospitals, 70 EMS agencies, and 18 medical aircraft and possesses mobile medical units and fully functional mobile medical facilities.<sup>‡</sup> STRAC also built and maintains MedCom, which is a technology platform to allow for the most efficient rapid trauma transfers possible based on the availability, capacity, and location of necessary assets for the type of trauma response that is needed.<sup>§</sup> All of these resources are available and accessible to Uvalde.

On the day of the incident, UEMS reached out to STRAC to notify them of the situation, and STRAC deployed 15 units of whole blood and more units of O positive blood within 67 minutes.\*\* This was in addition to the whole blood that was available on certain AirLife carriers in the Uvalde region.<sup>††</sup> Whole blood is the “natural, unseparated blood collected from a donor” and contains all components of healthy blood.<sup>‡‡</sup>

The coordination of STRAC and the accessibility of whole blood proved to be beneficial on the day of the incident.

\* Southwest Texas Regional Advisory Council, “About Us.”

† CIR Fact Finding.

‡ CIR Fact Finding.

§ CIR Fact Finding.

\*\* CIR Fact Finding.

†† CIR Fact Finding.

‡‡ Fisher et al., “Whole Blood in EMS May Save Lives.” To read more about the use of prehospital blood products, see Pokorny et al., “The Use of Prehospital Blood Products.”

<sup>623</sup> CIR Fact Finding.

<sup>624</sup> CIR Fact Finding.

<sup>625</sup> CIR Fact Finding.

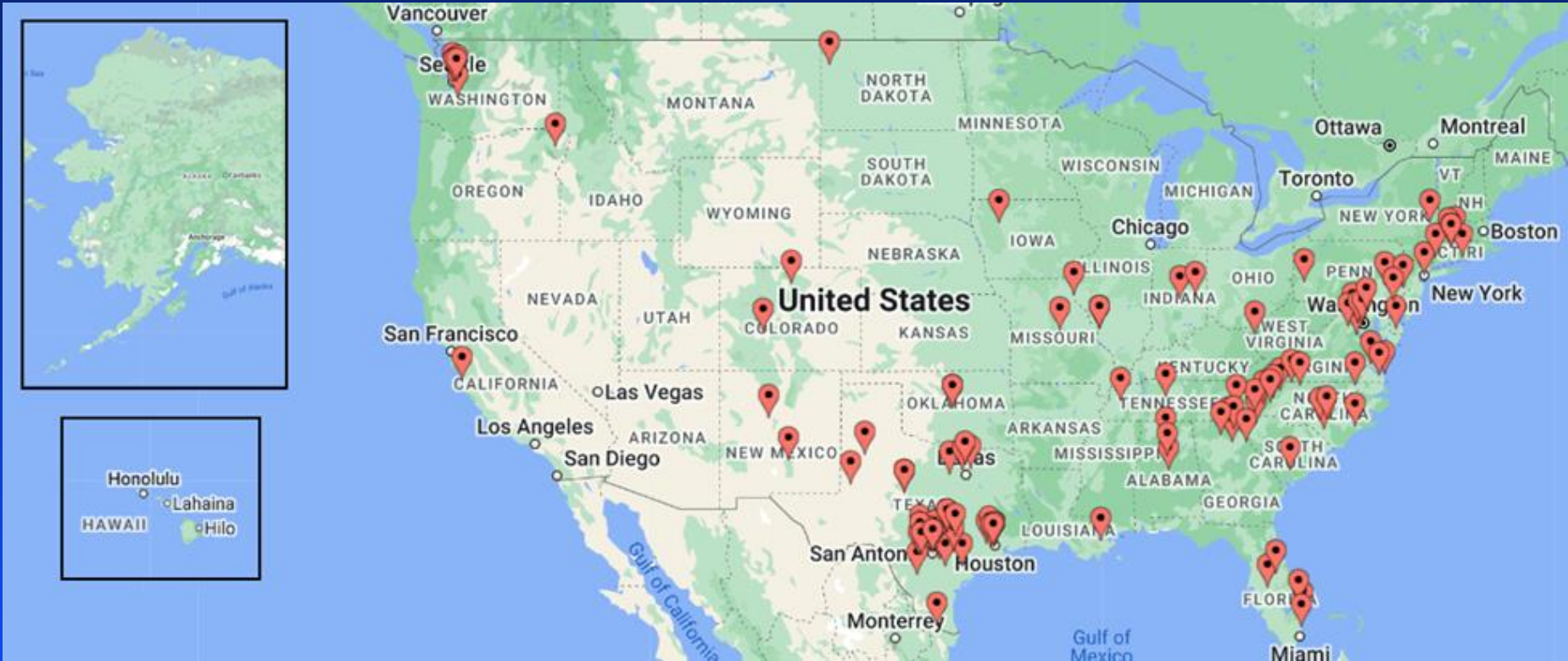
<sup>626</sup> CIR Fact Finding.

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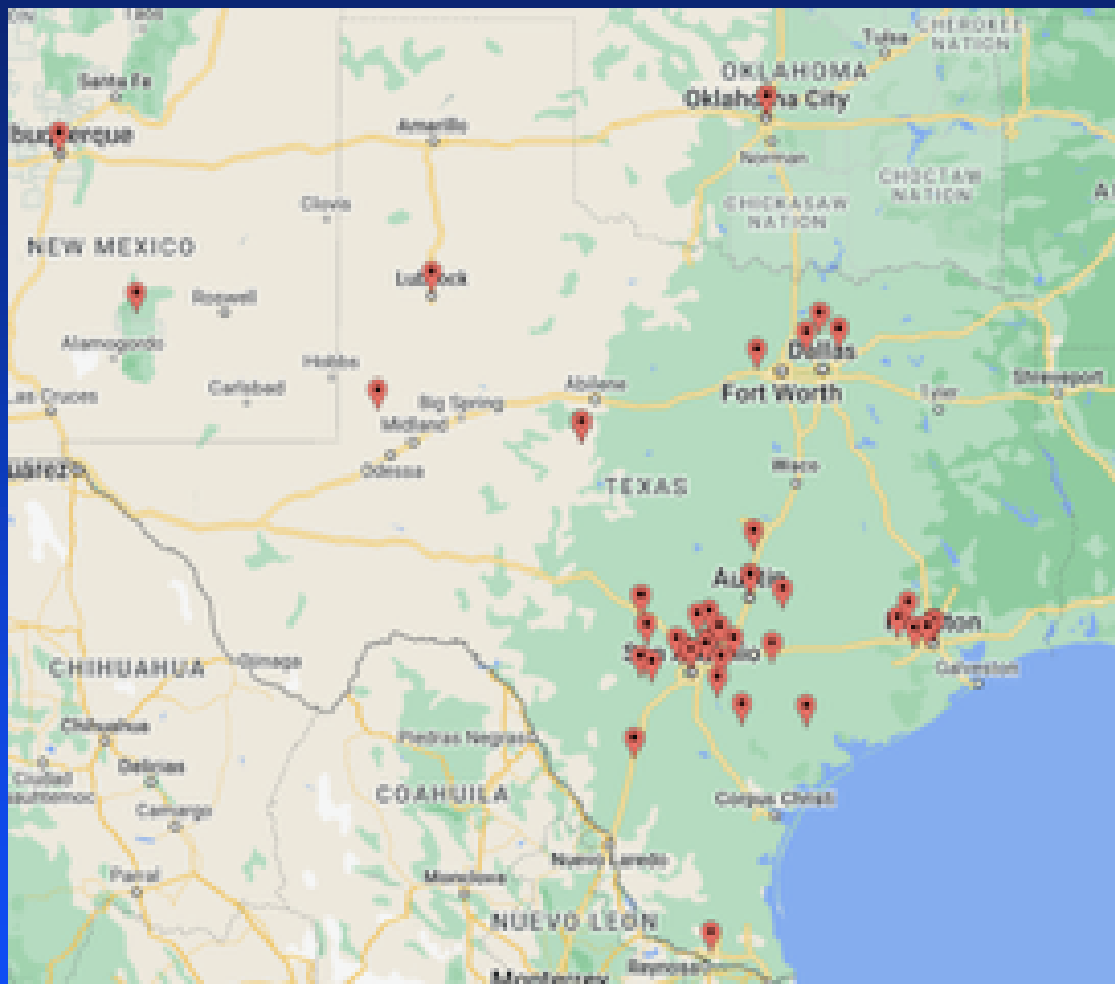
# Uvalde

Ciaraglia A, Brigmon E, Braverman M, Kidd E, Winckler CJ, Epley E, Flores J, Barry J, DeLeon D, Waltman E, Eastridge B, Stewart R, Liao L, Nicholson S, Jenkins D. **Use of Whole Blood Deployment Programs for Mass Casualty Incidents: South Texas Experience in Regional Response and Preparedness**. J Trauma Acute Care Surg. 2022 Aug 31. doi: 10.1097/TA.0000000000003762. Epub ahead of print. PMID: 36044513.



Ground EMS Prehospital Blood Agencies as of October 2023

Randall M Schaefer, DNP





# Preparing for today

In mass transfusion disasters, tomorrow is too late to respond. In a COVID-affected world, blood centers don't have enough blood on their shelves to weather these types of disasters. So, the Blood Emergency Readiness Corps was created.

## What is BERCC?

The Blood Emergency Readiness Corps (BERC) is a group of blood centers across the nation who commit to joining together to be prepared for mass transfusion disasters that may strike. These blood centers commit to collecting extra units on a rotating "on call" schedule to create an available supply of blood for emergency

## Why is it Needed?

In many disasters and critical-need scenarios – like a mass shooting, natural disaster or large-scale car crash – much blood is needed immediately. With current donation rates nationally, most blood centers don't have enough blood on their shelves to handle these types of disasters and are forced to request blood units

# Blood Emergency Readiness Corps

- BERC started with 7 Community Blood Centers across the nation, and has activated once thus far to send units for the Memphis shootings
- The concept is that every week, the “on-duty” centers hold dedicated units that will be sent in the event of need for a qualifying MCI or natural disaster
- We now have a total of 12 Centers that have committed to the collaboration and our group will be planning for the integration of the new centers this week
- Plan is to onboard more centers, add them to the existing rotations, in order to maximize the availability of blood on a given week without increasing the amount of blood that each individual center must hold back

# The following blood centers are participants in the program

[https://en.wikipedia.org/wiki/Blood\\_Emergency\\_Readiness\\_Corps#:~:text=The%20Blood%20Emergency%20Readiness%20Corps,shooting%20or%20mass%20casualty%20event.](https://en.wikipedia.org/wiki/Blood_Emergency_Readiness_Corps#:~:text=The%20Blood%20Emergency%20Readiness%20Corps,shooting%20or%20mass%20casualty%20event.)

- Blood Assurance (Chattanooga, Tennessee)[8]
- Bloodworks Northwest (Seattle, Washington)[9]
- Blood Bank of Hawaii (Honolulu, Hawaii)[10]
- Carter BloodCare (Dallas/Ft. Worth, Texas)[11]
- Central Pennsylvania Blood Bank (Hershey, Pennsylvania)[12]
- Coastal Bend Blood Center (Corpus Christi, Texas)[13]
- Community Blood Center of the Ozarks (Springfield, Missouri)[14]
- ConnectLife (Buffalo, New York)[15]
- Gulf Coast Regional Blood Center (Houston, Texas)[16]
- Houchin Community Blood Bank (Bakersfield, California)[17]
- ImpactLife (Davenport, Iowa)[18]
- Inova Blood Donor Services (Sterling, Virginia)[19]
- LIFELINE Blood Services (Jackson, Tennessee)[20]
- LifeServe Blood Center (Des Moines, Iowa)[21]
- LifeSouth Community Blood Centers (Gainesville, Florida)[22]
- LifeStream Blood Bank (San Bernardino, California)[23]
- Marsh Regional Blood Center (Bristol, Tennessee)
- MEDIC Regional Blood Center (Knoxville, Tennessee)[24]
- Miller-Keystone Blood Center (Bethlehem, Pennsylvania)[25]
- Mississippi Blood Services (Jackson, Mississippi)[26]
- Northern California Community Blood Bank (Eureka, California)[27]
- Our Blood Institute (Oklahoma City, Oklahoma)[28]
- OneBlood, Inc.(Orlando, Florida)
- Rock River Valley Regional Blood Center (Rockford, Illinois)[29]
- San Diego Blood Bank (San Diego, California)
- South Texas Blood & Tissue (San Antonio, Texas)[30]
- Solvita (Dayton, Ohio)[31]
- South Bend Medical Foundation (South Bend, Indiana)
- Stanford Blood Center (Palo Alto, California)[32]
- SunCoast Blood Centers (Sarasota, Florida)[33]
- The Blood Center (New Orleans, Louisiana)[34]
- The Blood Connection (Greenville, South Carolina)[35]
- The Community Blood Center (Appleton, Wisconsin)[36]
- Versiti (Milwaukee, Wisconsin)
- Vitalant (Scottsdale, Arizona)[37]
- We Are Blood (Austin, Texas)[38]
- Western Kentucky Regional Blood Center (Owensboro, Kentucky)[39]



# Mass Casualty Incident Plan (MCI)

- MCI = Vegas/El Paso shooting
- True MCI which will rapidly diminish blood supply
  - First to be consumed: platelets
  - Platelets longest to donate/recover

# 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 Heroes 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

# MCI Plan Walking Blood Bank (WBB)

- Number of 'red' casualties  $\times 4 = \#$  LTOWB needed
- When current stock inadequate (more red casualties than available LTOWB and platelets), activate WBB
- Utilize Heroes In Arms (HIA) donors
  - Most reliable
  - Tested several times per year
  - Known low antibody titers

# MCI WBB Plan continued

- Coordinate with STBTC donor HIA donors go to their usual donor center
  - Sites chosen augment manpower
  - Robo-call initiated by MEDCOM to appropriate number of donors, geographically distributed
  - Activate blood transport

# WBB Plan

- Preference given to HIA donors
- Other STRAC hospitals in San Antonio donate man power to assist STBTC
- Utilize Uber/Lyft/VIA or SAPD/SAFD to get donors and volunteers to locations
- Utilize HEB Favor delivery system, coordinated by MEDCOM, to distribute LTOWB to trauma centers (not necessarily geographic; needs-based distribution)

# WBB Plan

- Likely to need to call 2 x number of needed donors due to donor unavailability
- STBTC needs to coordinate and update HIA donor contact info with MEDCOM

# WBB Plan

- Usual donor screening questionnaire
  - Specimen for standard testing (retroactive)
  - LTOWB from HIA donor into container
  - Timed at donation, will not be cooled
  - Tamper-proof tape on container
  - Rendezvous with Favor on site, MEDCOM coordinates
- Post-transfusion testing of donor blood



# WBB Plan

- Likely attract many more donors beyond HIA donors
  - Draw blood as needed
  - Likely need standard testing: blood unavailable for several days but would resupply the STBTC (today's donors, tomorrow's transfusion)
  - If a HIA donor doesn't clearly pass the questionnaire, quarantine the unit and put it through usual testing
- Need to coordinate with DoD MCI plan
  - DoD goes on lock down
  - Favor takes blood to SAMMC
  - Who shuttles it from the gate to the hospital?

# Clinical References/Resources

[www.strac.org/blood](http://www.strac.org/blood)

**STRAC**  
Southwest Texas Regional Advisory Council

### Pre-Hospital Blood Product Transfusion Record

Product Unit Number	Product Type (Circle One)	Transfusion Date & Start Time	Transfusion Complete* (Circle One)	Transfusion Reaction** (Circle One)	Medic/RN Initials
1.	PRBC / Plasma / LTOWB		Yes / Ongoing	Yes / No	
2.	PRBC / Plasma / LTOWB		Yes / Ongoing	Yes / No	
3.	PRBC / Plasma / LTOWB		Yes / Ongoing	Yes / No	
4.	PRBC / Plasma / LTOWB		Yes / Ongoing	Yes / No	

Air Medical/ Ground Agency: \_\_\_\_\_ Receiving Facility (Circle One):  
 University Hospital Brooke Army Med Center Other: \_\_\_\_\_

Aircraft ID / Medic Unit #: \_\_\_\_\_ Comments: \_\_\_\_\_

\*If blood product transfusion is on-going at time of patient transfer to hospital, document "Ongoing"  
 \*\*Document actions taken in "Comments" section

Actions to Take for Suspected Transfusion Reaction

- STOP TRANSFUSION
- Disconnect tubing from infusion site; flush IV site with normal saline
- Keep IV line open with normal saline
- Re-inflate new transfusion if it is deemed clinically essential
- Document actions taken in comments section

Patient Identification: \_\_\_\_\_

Run/MRN #: \_\_\_\_\_

Copy 1: Transporting crew  
 Copy 2: Receiving Facility  
 Copy 3: Receiving Facility Blood Bank

Transporting crew, please send a copy via secured FAX to STRAC MEDCOM @ (210) 233-8822 or secured email to research@strac.org  
 As of 17 August 2016

**STRAC**  
Southwest Texas Regional Advisory Council

**Patient received O+ whole blood**  
 (single donor RBC, platelets and plasma)  
 as a part of the STRAC pre-hospital transfusion program.

LOW TITER  
**O+**  
 WHOLE BLOOD  
 RECIPIENT

VISIT  
[strac.org/blood](http://strac.org/blood)  
 FOR FAQs & MORE INFORMATION

**WHOLE BLOOD**

This card can be given to receiving facilities



**Thank You!**  
**Questions?**



# Contact

**Donald H. Jenkins, MD, FACS**

Professor/Clinical, Division of Trauma and  
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