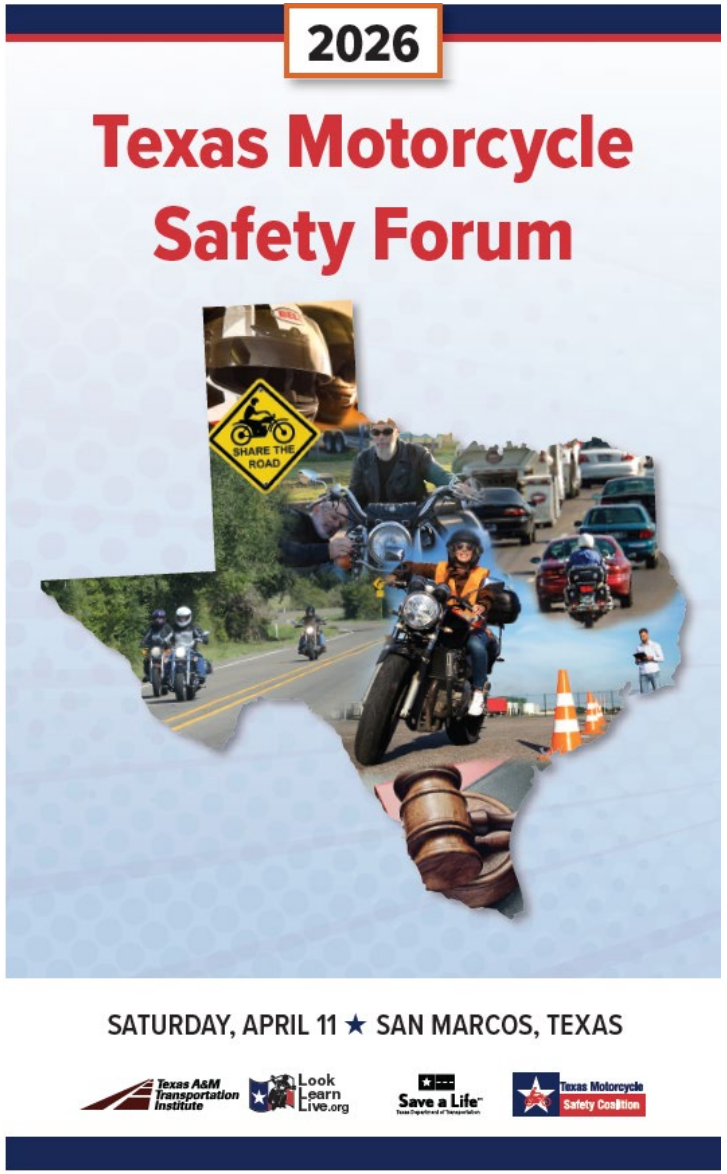
Texas Motorcycle Safety Forum
Whole Blood Programs and Trauma Outcomes – Advancing Care for Motorcyclists and All Crash Victims

- C. J. Winckler MD, LP

  - *Associate Professor University of Texas Health San Antonio*
  - *Associate Professor Texas A&M College Station*
  - *Deputy Medical Director San Antonio Fire Department*
  - *Medical Director Wilson County ESD 3 and ESD 1*
  - *Medical Director North Channel EMS*
  - *Medical Director Cloverleaf Fire Department*
  - *Medical Director Texas Emergency Medical Task Force Region 8*
  - *Chair -EMS Medical Directors Governor's EMS Trauma Advisory Council*
  - *Vice Chair -Prehospital Whole Blood Task Force Governor's EMS Trauma Advisory Council*



Disclosures

Author/Presenter reports no conflict of interest

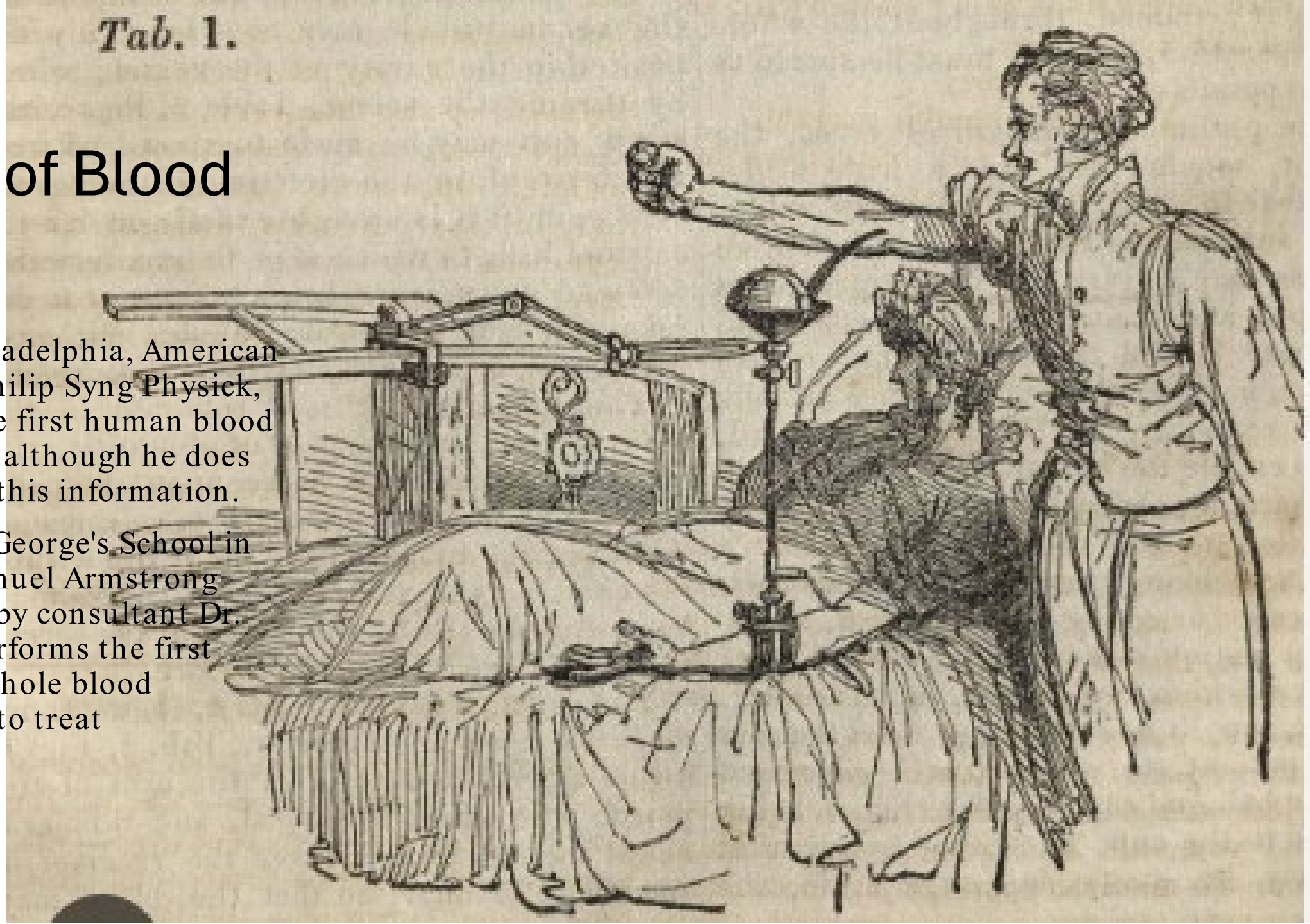

KSAT
abc 12
Expect more.
KSAT, SAN ANTONIO, TX
#KSATnews
KSAT
abc 12
Temp 42°

History of Blood

- **1628** English physician William Harvey discovers the circulation of blood. Shortly afterward, the earliest known blood transfusion is attempted.
- **1665** The first recorded successful blood transfusion occurs in England: Physician Richard Lower keeps dogs alive by transfusion from dogs to dogs
- **1667** Jean-Baptiste Denis transfusions from sheep to humans
- **1678** Animal to human transfusions outlawed

History of Blood

- 1795 In Philadelphia, American physician Philip Syng Physick, performs the first human blood transfusion, although he does not publish this information.
- 1840 At St. George's School in London, Samuel Armstrong Lane, aided by consultant Dr. Blundell, performs the first successful whole blood transfusion to treat hemophilia.



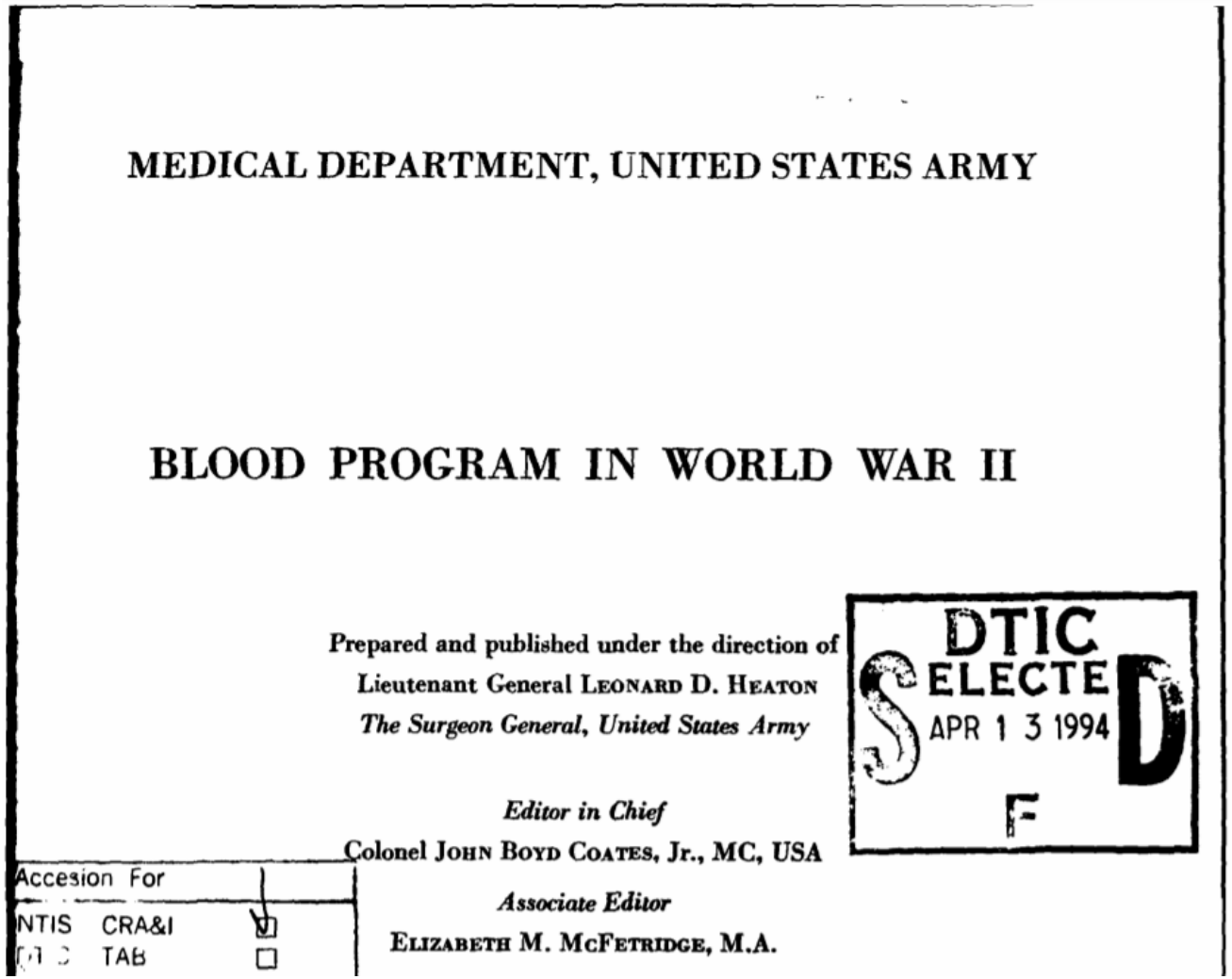
History of Blood

- 1884 Saline infusion replaces milk as a “blood substitute” due to the increased frequency of adverse reactions to milk.
- 1915 At Mt. Sinai Hospital in New York, Richard Lewisohn uses sodium citrate as an anticoagulant to transform the transfusion procedure from direct to indirect. In addition, Richard Weil demonstrates the feasibility of refrigerated storage of such anticoagulated blood.
- 1932 The first blood bank is established in a Leningrad hospital.

History of Blood and Military

- 1914-1918—Blood transfusions in World War I
- 1944—Blood transfusions in World War II
- 1950-53—Blood transfusions in Korean War
- 1965-73—Blood transfusions in Vietnam
    - Over 230,000 units transfused (mostly cold)

World War II
Prehospital
Whole Blood



MEDICAL DEPARTMENT, UNITED STATES ARMY

BLOOD PROGRAM IN WORLD WAR II

Prepared and published under the direction of
Lieutenant General LEONARD D. HEATON
The Surgeon General, United States Army

Editor in Chief
Colonel JOHN BOYD COATES, Jr., MC, USA

Associate Editor
ELIZABETH M. MCFETRIDGE, M.A.

Whole Blood Saves Lives

Preface

In World War I, between 8 and 11 of each 100 wounded men who reached forward hospitals alive died in them. In World War II, the number was reduced to 4.5 per hundred. In the Korean War, it was further reduced to 2.6 per hundred. The explanation is simple, that the mortality rate in combat wounds is inversely proportional to the availability of prompt and adequate resuscitation, in the routine of which whole blood and plasma play major roles.

Of Historical Interest…

“The vital role which whole blood played in the care of the wounded has been adequately dealt with elsewhere, but the essential planning that made possible the treatment of the greater portion of the wounded in the is a story that needs to be told ”

- COL James B. Mason,

Of Historical Interest…

"The vital role which whole blood played in the care of the wounded in World War II has been adequately dealt with elsewhere, but the essential planning that made possible the provision of over 385,000 pints of whole blood for the treatment of the greater portion of the 386,075 wounded in the European theater of operations is a story that needs to be told "

- COL James B. Mason, June 1948

UNIVERSAL DONOR TRANSFUSIONS (9)

The Vietnam blood program provided the opportunity for the first large-scale use of specific blood groups in association with sophisticated crossmatch procedures for serological compatibility. It should be noted that 100,419 universal donor transfusions were given without a single reported transfusion death from incompatibility (Table 6). *On the other hand, nine reported deaths were attributed to hemolytic transfusion reaction following extensive crossmatched blood compatibility testing.* The underlying cause of this enigma is simple. During mass casualty situations resulting from combat, a hospital receiving ten, 20, or 30 casualties had to make a decision to use group O universal donor blood or group specific, crossmatched blood. Those choosing the latter plan ran the whole gamut of possible errors:

1. Patient identification.
2. Blood sample identification.
3. Crossmatch procedure time.
4. Release of blood.
5. Transfusion of correct recipient.

History of EMS and Blood

- 1487—First ambulance
- 1970's?—Blood transfused by Helicopter EMS USA
- 2017—Harris County ESD 48 carries LTOWB on ambulances
  - A few weeks later Cypress Creek EMS starts carrying LTOWB on ambulances
- 2018—ASPR TRACIE asks metropolitan cities to provide rural areas with support and blood in mass shooting
- 2018—San Antonio Fire EMS carries LTOWB on ambulances
  - Making prehospital blood available to an entire metropolitan city
- 2022 AABB – THOR- Working Recommendations for a Prehospital Blood Product Transfusion Program
- 2023—Currently 116 EMS Systems in the United States transfusing prehospital whole blood or components

UT Health San Antonio
Emergency Health Sciences
Office of the Medical Director

Time is the Enemy

Contents lists available at ScienceDirect

The American Journal of Surgery

journal homepage: www.ajconline.org

Southwestern Surgical Congress

Time is the enemy: Mortality in trauma patients with hemorrhage from torso injury occurs long before the "golden hour"

A.Q. Alarhayem [a], J.G. Myers [a], D. Dent [a], L. Liao [a], M. Muir [a], D. Mueller [a], S. Nicholson [a], R. Cestero [a], M.C. Johnson [a], R. Stewart [a], Grant O'Keefe [b], B.J. Eastridge [a, *]

[a] The University of Texas Health Science Center at San Antonio, Department of Surgery, Division of Trauma, Critical Care, and Acute Care Surgery, United States

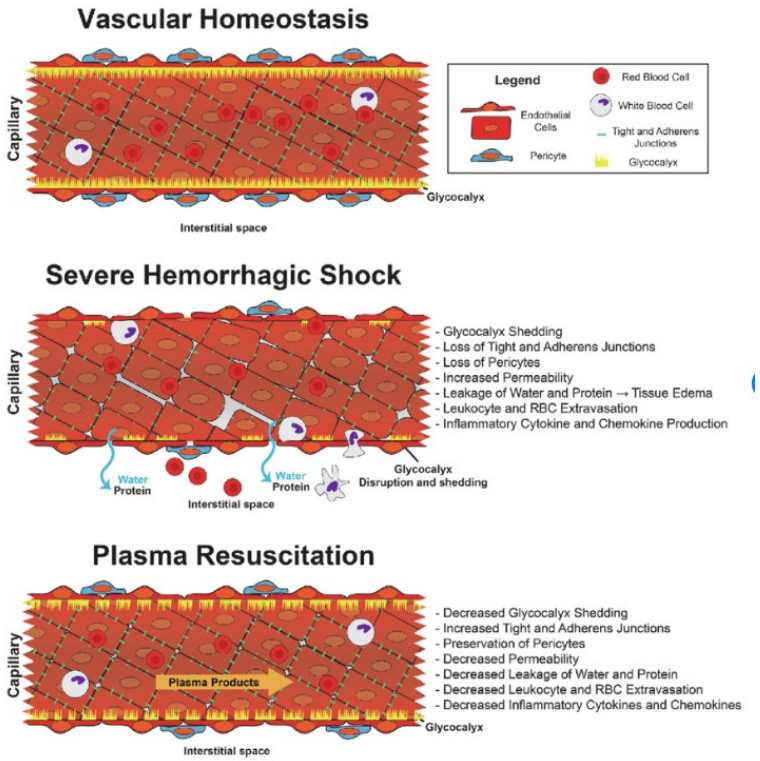
[b] University of Washington, Department of Surgery, Division of Trauma and Acute Care Surgery, United States

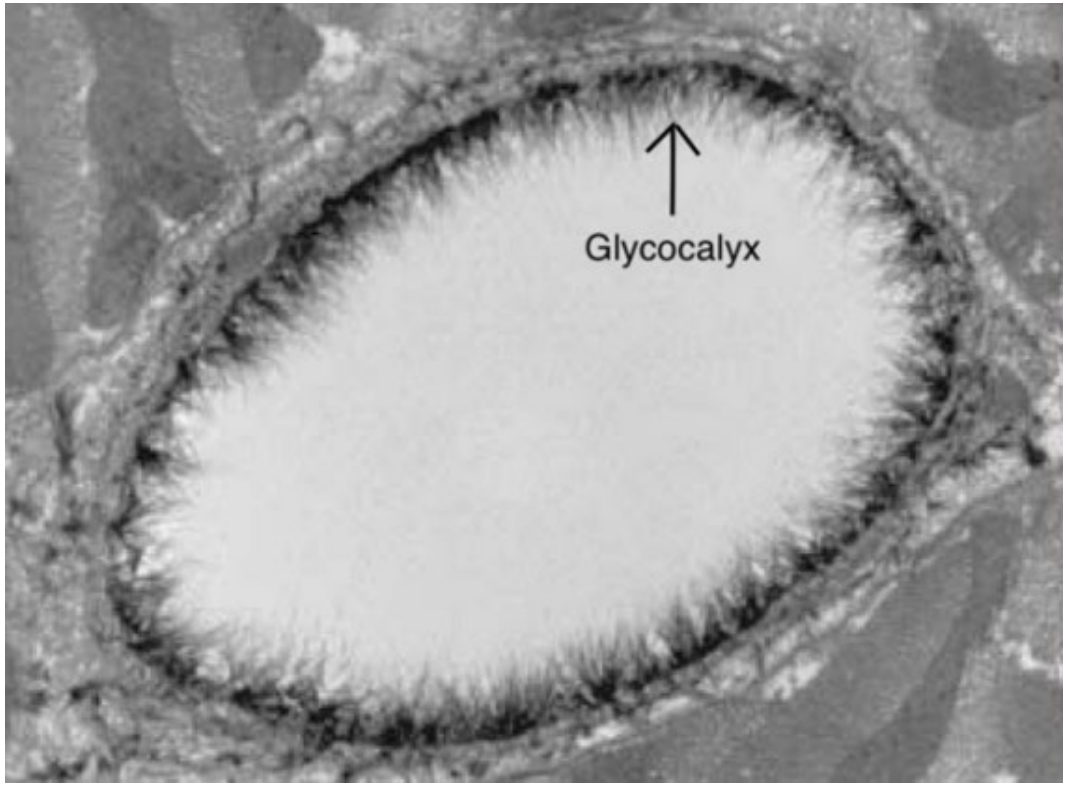
Hemorrhagic Shock Is Blood Failure

- Oxygen Debt
- Endotheliopathy
- Platelet Dysfunction
- Coagulopathy

The Greatest of These is Endotheliopathy?

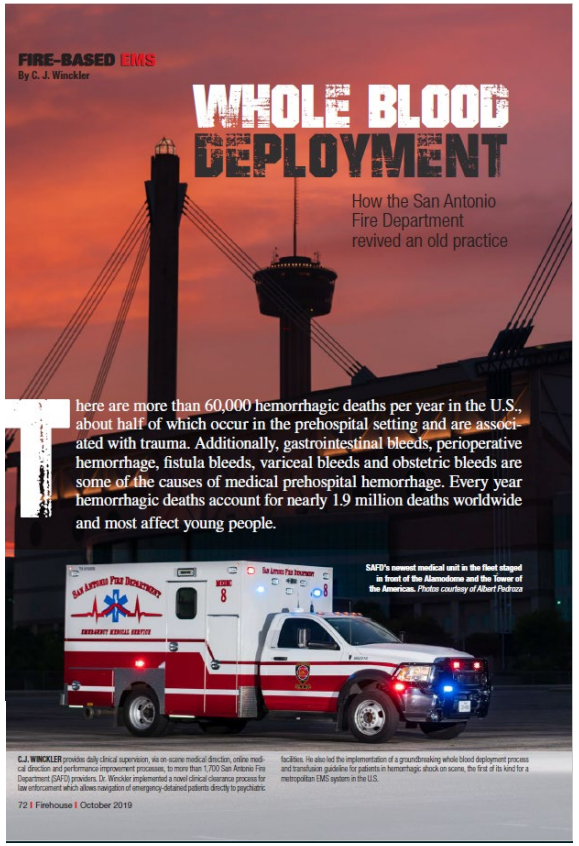
- Glycocalyx
  - Maintains vascular barrier
  - Regulates fluid exchange
  - Provides anticoagulant properties
  - Scavenges radicals
  - Regulates inflammaition






Silos of Care (Safety)

Reviving an Old Practice



FIRE-BASED EMS

By C. J. Winckler

WHOLE BLOOD DEPLOYMENT

How the San Antonio Fire Department revived an old practice

There are more than 60,000 hemorrhagic deaths per year in the U.S., about half of which occur in the prehospital setting and are associated with trauma. Additionally, gastrointestinal bleeds, perioperative hemorrhage, fistula bleeds, variceal bleeds and obstetric bleeds are some of the causes of medical prehospital hemorrhage. Every year hemorrhagic deaths account for nearly 1.9 million deaths worldwide and most affect young people.

SAFD's newest medical unit in the fleet staged in front of the Alamodome and the Tower of the Americas. *Photos courtesy of Albert Pedroza*

C.J. WINCKLER provides daily clinical supervision, via on-scene medical direction, online medical direction and performance improvement processes, to more than 1,700 San Antonio Fire Department (SAFD) providers. Dr. Winckler implemented a novel clinical clearance process for law enforcement which allows navigation of emergency-detained patients directly to psychiatric facilities. He also led the implementation of a groundbreaking whole blood deployment process and transfusion guideline for patients in hemorrhagic shock on scene, the first of its kind for a metropolitan EMS system in the U.S.

72 | Firehouse | October 2019

EMSWorld.com

OCTOBER 2019 | VOL. 48, NO. 10

EMSWORLD

Charting the Future of Out-of-Hospital Care

SERVICE ABOVE SELF

Presenting the Winners of the National EMS Awards of Excellence

Page 16

SPECIAL ISSUE

EMS WORLD EXPO

Innovation Awards Finalists Page 60

Research Abstracts from the International Scientific EMS Symposium Page 64

EMSWORLD EXPO OCTOBER 14–18, 2019 | NEW ORLEANS, LA

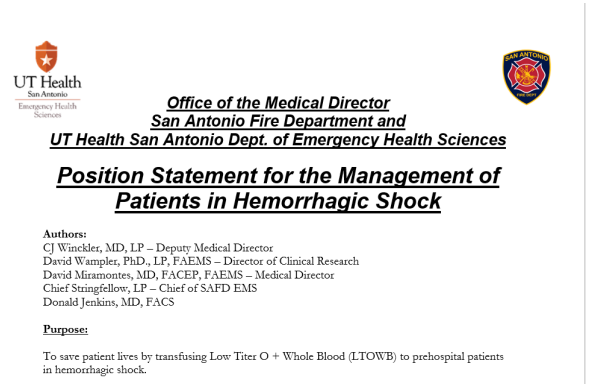
AN HMP PUBLICATION

UT Health San Antonio Emergency Health Sciences

Office of the Medical Director

Prehospital Blood Transfusion Position Statement—2019

EMSWORLD



UT Health San Antonio Emergency Health Sciences

Office of the Medical Director
San Antonio Fire Department and
UT Health San Antonio Dept. of Emergency Health Sciences

Position Statement for the Management of Patients in Hemorrhagic Shock

Authors:
CJ Winckler, MD, LP – Deputy Medical Director
David Wampler, PhD., LP, FAEMS – Director of Clinical Research
David Miramontes, MD, FACEP, FAEMS – Medical Director
Chief Stringfellow, LP – Chief of SAFD EMS
Donald Jenkins, MD, FACS

Purpose:

To save patient lives by transfusing Low Titer O + Whole Blood (LTOWB) to prehospital patients in hemorrhagic shock.

PATIENT CARE

Position Statement for the Management of Patients in Hemorrhagic Shock

05/08/2019

David A. Wampler, PhD, LP C. J. Winckler, MD, LP

Purpose:

We aim to explain our rationale for a ground ambulance cold stored low-titer ORhD+ whole blood (LTO+WB) program.

Scope:

In the greater San Antonio metro area, the South Texas Blood and Tissue Center (STBTC), UT Health San Antonio, University Health System, San Antonio Military Medical Center, US Army Institute for Surgical Research, San Antonio Medical Foundation and Southwest

THE TEXAS TRAUMA SYSTEM

22 TRAUMA SERVICE AREAS

✣

REGIONAL ADVISORY COUNCILS

✣

TRAUMA CENTER DESIGNATIONS

✣

STANDARDS OF CARE

✣

HOSPITAL PREPAREDNESS GRANTS

✣

CONSISTENCY THROUGHOUT URBAN, SUBURBAN, RURAL AND FRONTIER

STRAC

Mission: To reduce death / disability related to trauma, disaster, and *acute illness* through implementation of *well-planned and coordinated regional emergency response systems*.

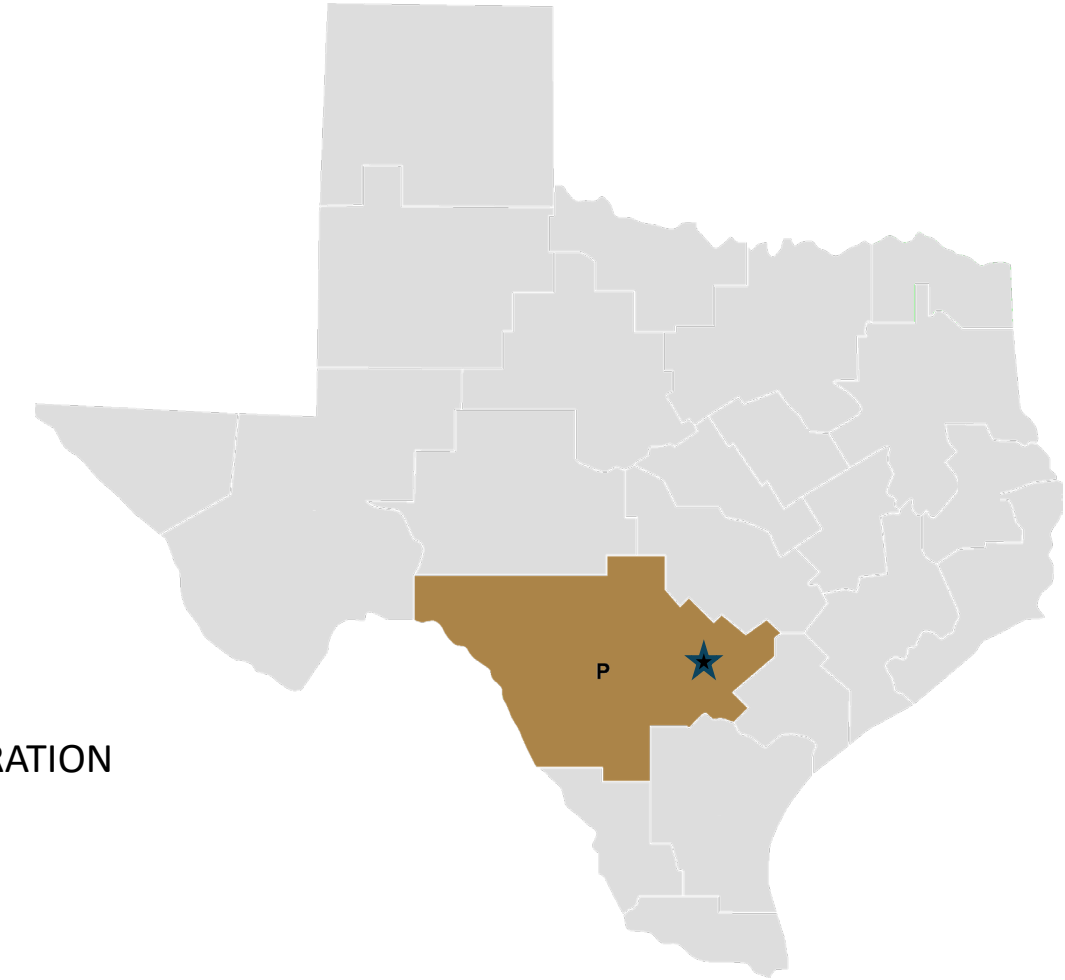
22 COUNTIES
26,000 SQUARE MILES

3M PEOPLE

71 EMS AGENCIES

18 AIR MEDICAL BASES

PUBLIC HEALTH COLLABORATION



53 HOSPITALS

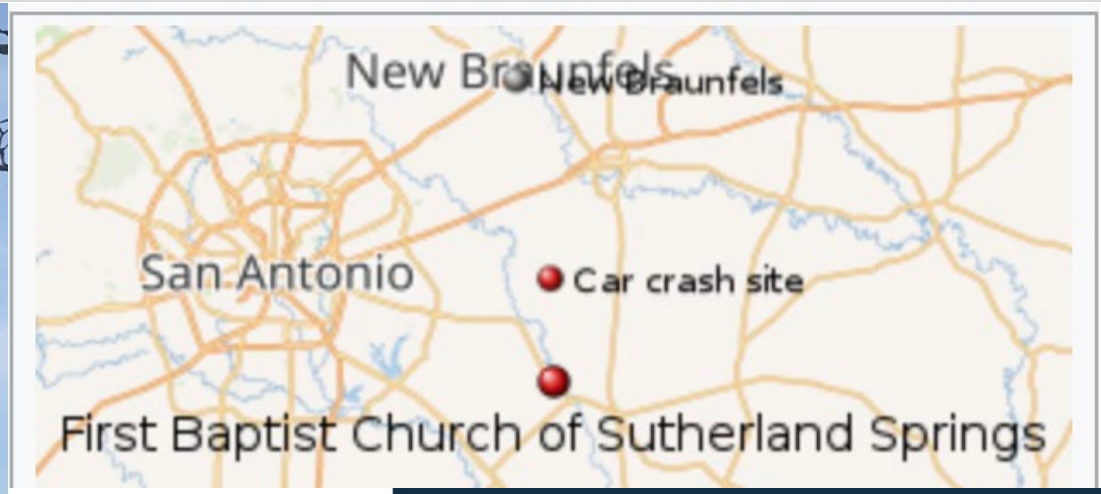
2 LVL I TRAUMA CENTERS

16 CARDIAC CENTERS

17 STROKE CENTERS

BEHAVIORAL HEALTH

ACTIVE SHOOTER Incident pushes LTOWB effort kicks into high gear



TRACIE
HEALTHCARE EMERGENCY PREPAREDNESS INFORMATION GATEWAY

MASS SHOOTINGS AND RURAL AREAS

Collaboration

UT Health San Antonio

STRAC
Southwest Texas Regional Advisory Council

University Health System

SAN ANTONIO MEDICAL FOUNDATION

South Texas Blood & Tissue Center

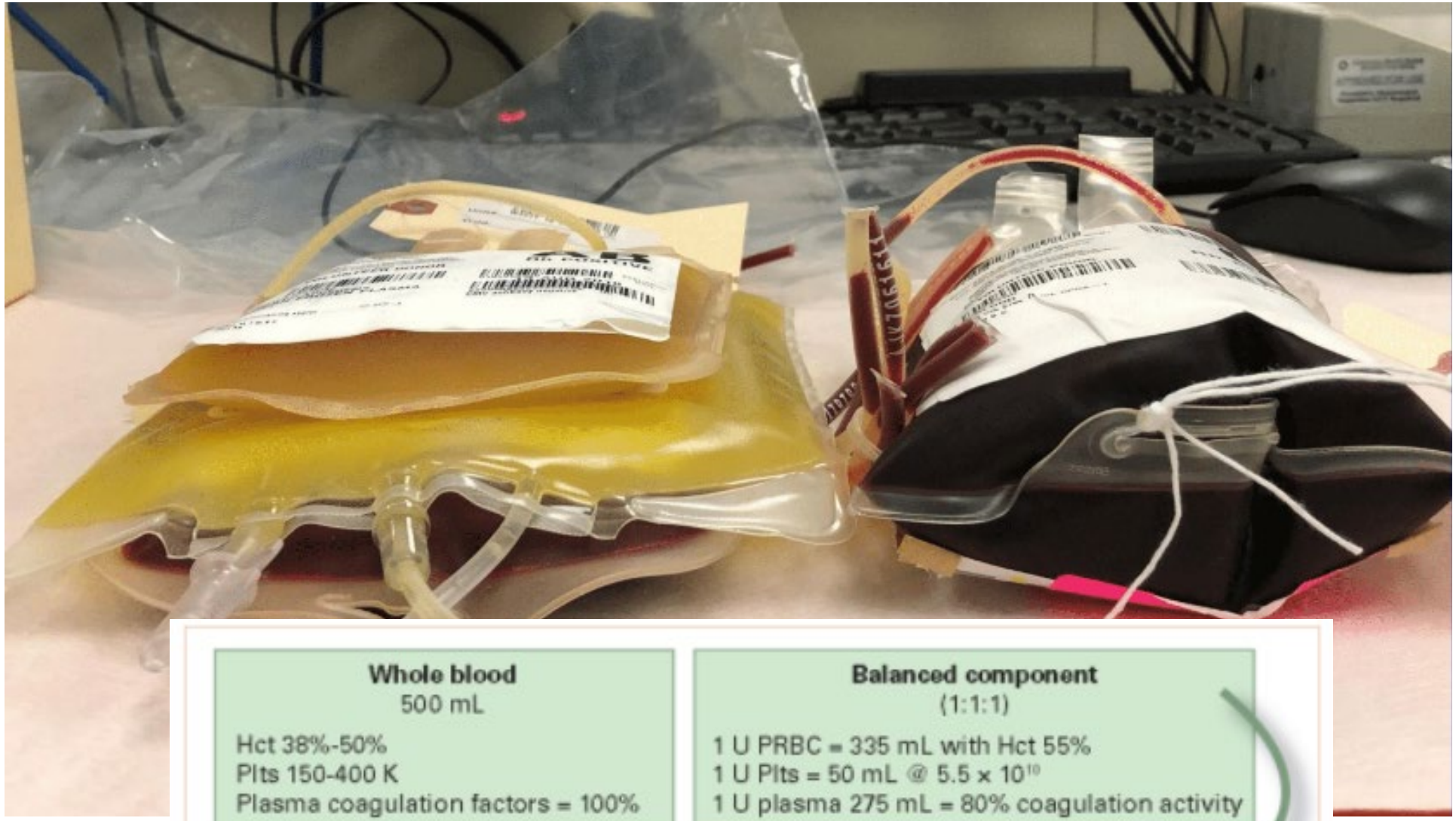
SOUTH TEXAS BLOOD & TISSUE

HEROES IN ARMS

EST. 2018

TRANSFORMING TRAUMA CARE

Whole Blood Versus Component Therapy



Whole blood
500 mL

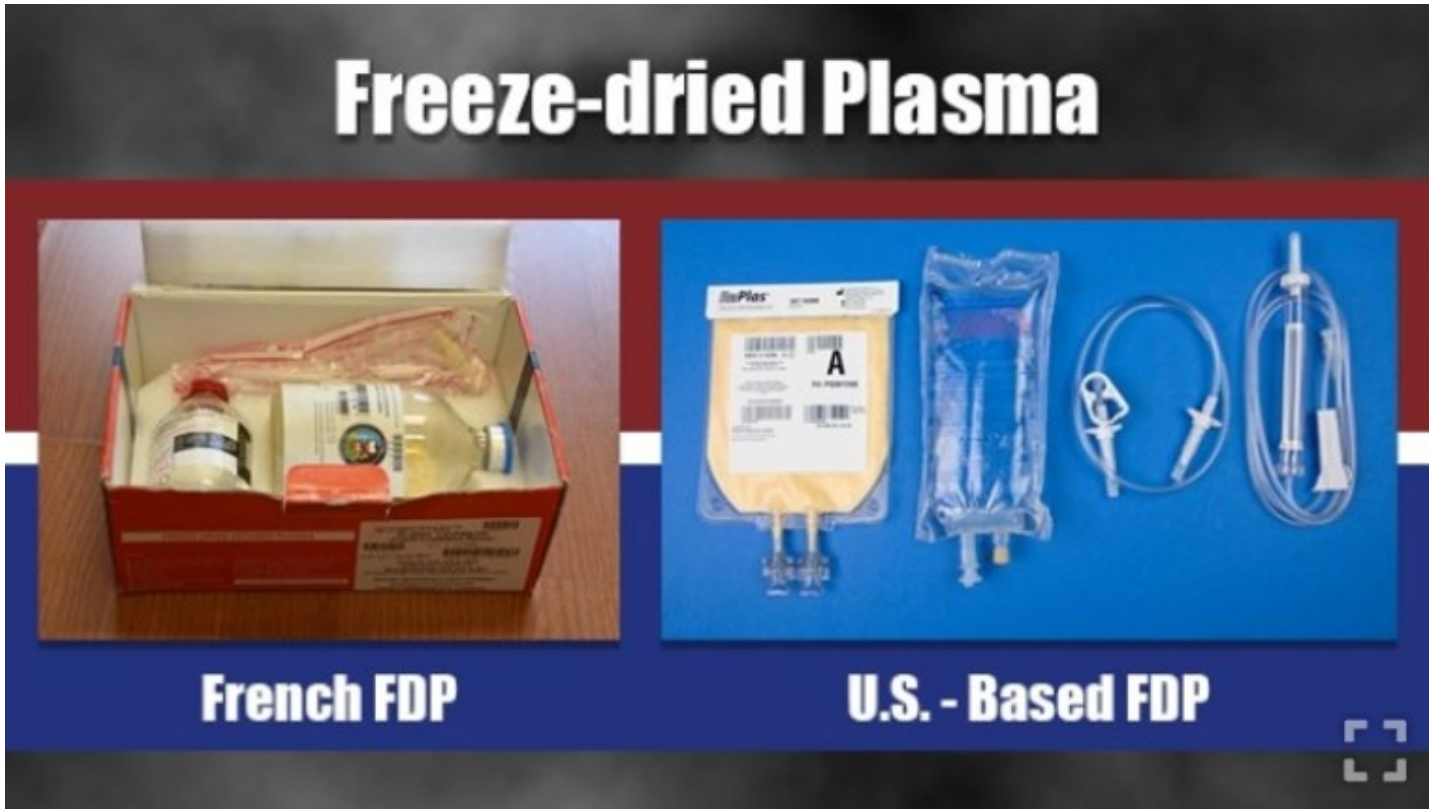
Hct 38%-50%
Plts 150-400 K
Plasma coagulation factors = 100%

Balanced component
(1:1:1)

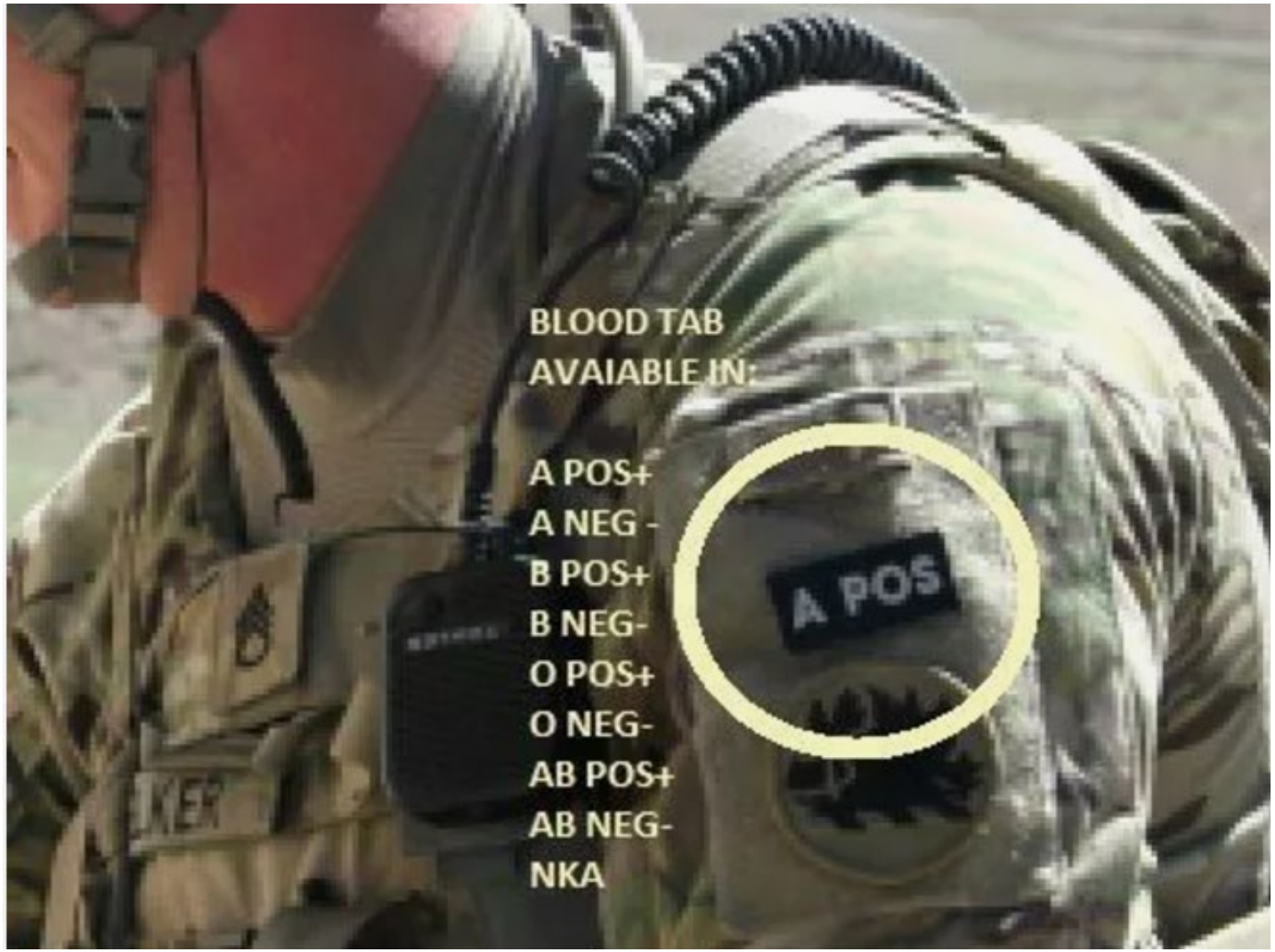
1 U PRBC = 335 mL with Hct 55%
1 U Plts = 50 mL @ 5.5×10^{10}
1 U plasma 275 mL = 80% coagulation activity

1 U PRBC + 1 U Plts + 1 U FFP = 660 mL
with an Hct 29%, Plts 88 K/μL and coagulation activity 65%

Freeze Dried Plasma For MCI



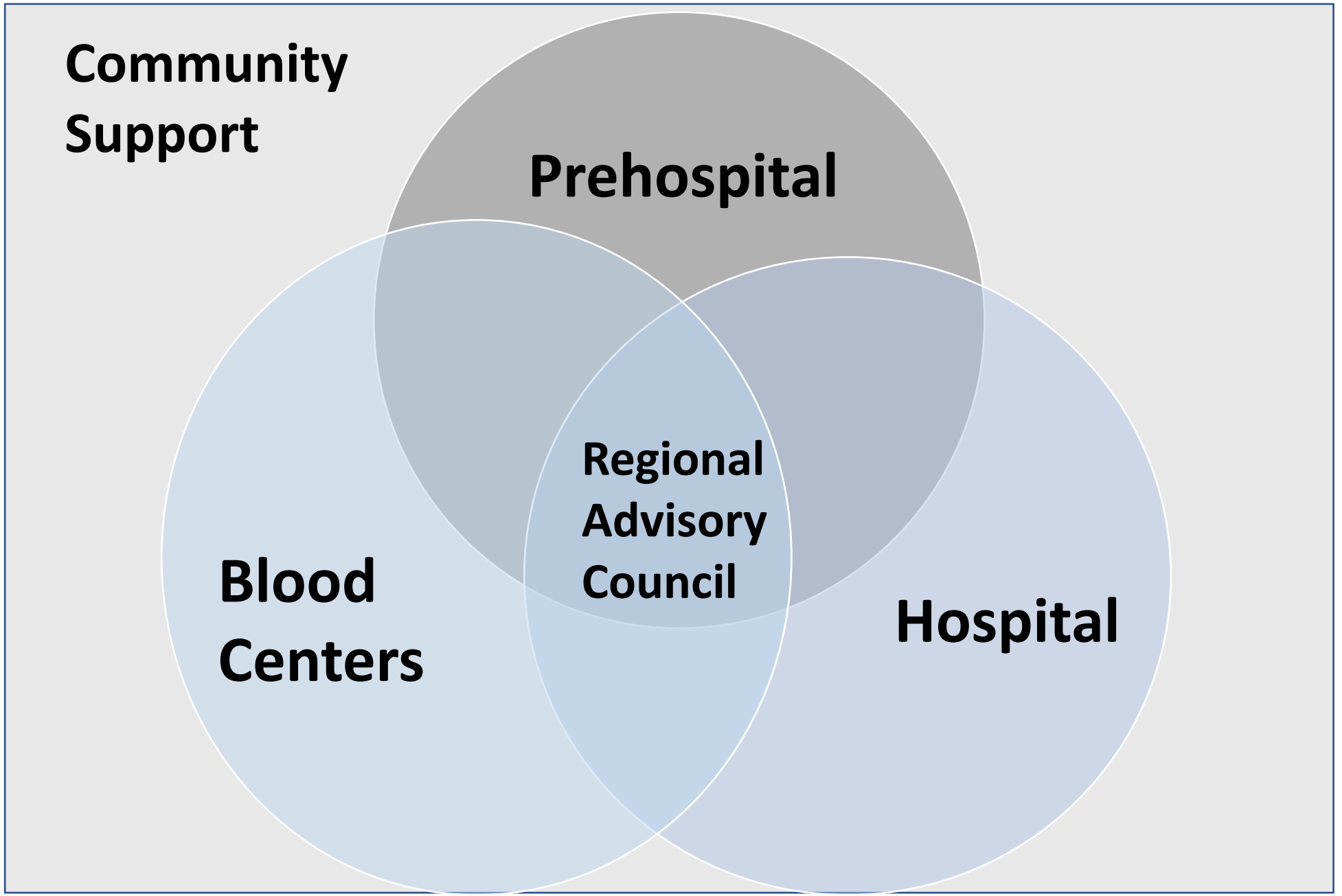
Walking Blood Bank



Deployment in a Metropolitan System

- Military City USA
- Communicate with Stakeholders
- Plan by determining MTPs to hospitals
- Write Protocols / Clinical Operating Guidelines
- Train and Teach
- Write Protocols
- Keep Blood Cold / Transfuse Warm
- Deploy / Dispatch / Treat
- Performance Improvement

A systematic approach



Communication

Quarterly Regional Whole Blood Committee Meetings and Weekly Staff Huddle

STRAC Regional Whole Blood Program

Less than 14 days

As of: Oct 16@ 14:40

14 - 21 Days

Aircraft	Location	PAR	On Hand	Needs	Unit 1 Exp	Unit 2 Exp	Last Updated
AirCare 1 (AE 148)	SA-Methodist	2	2	0	25-Oct-19	24-Oct-19	26-Sep-19
AirCare 2 (AE 147)	Pearsall	1	1	0	25-Oct-19		26-Sep-19
AirCare 5 (AE 134)	Del Rio	2	2	0	13-Nov-19	13-Nov-19	15-Oct-19
AirCare 6 (AE 136)	Jourdanton	1	1	0	12-Nov-19		11-Oct-19
AirEvac 48	Kerrville	2	2	0	8-Nov-19	8-Nov-19	14-Oct-19
AirEvac 57	Eagle Pass	2	2	0	11-Nov-19	11-Nov-19	16-Oct-19
AirEvac 71	Carrizo Springs	2	2	0	4-Nov-19	4-Nov-19	16-Oct-19
AirLife 2	SA-University	2	2	0	25-Oct-19	6-Nov-19	6-Oct-19
AirLife 3	Kerrville	2	2	0	25-Oct-19	25-Oct-19	6-Oct-19
AirLife 4	Pleasanton	2	2	0	30-Oct-19	23-Oct-19	7-Oct-19
AirLife 5	Uvalde	2	2	0	26-Oct-19	28-Oct-19	29-Sep-19
Aircraft out of TSA-P	**Location**	**PAR**	**On Hand**	**Needs**	**Unit 1 Exp**	**Unit 2 Exp**	**Last Updated**
AirEvac 47	La Grange	1	1	0	28-Oct-19		4-Oct-19
AirEvac 49	Marble Falls	1	1	0	29-Oct-19		4-Oct-19
AirEvac 93	Laredo	2	2	0	25-Oct-19	2-Nov-19	5-Oct-19
EMS	**Location**	**PAR**	**On Hand**	**Needs**	**Unit 1 Exp**		**Last Updated**
SAFD MOF 1		1	1	0	13-Nov-19		16-Oct-19
SAFD MOF 2		1	1	0	2-Nov-19		15-Oct-19
SAFD MOF 3		1	1	0	11-Nov-19		16-Oct-19
SAFD MOF 4		1	1	0	18-Nov-19		16-Oct-19
SAFD MOF 5		1	1	0	5-Nov-19		16-Oct-19
SAFD MOF 6		1	1	0	14-Nov-19		16-Oct-19
SAFD Medic 1		1	1	0	12-Nov-19		16-Oct-19
SAFD Medic 45		1	1	0	30-Oct-19		13-Oct-19
Bandera EMS		1	1	0	9-Nov-19		7-Oct-19
Bexar Co ESD 2		1	1	0	9-Nov-19		7-Oct-19
Bexar Co ESD 7		1	1	0	9-Nov-19		8-Oct-19
Bulverde-Spring Branch EMS		1	1	0	1-Nov-19		3-Oct-19
Canyon Lake EMS		1	1	0	16-Nov-19		15-Oct-19
Karnes Co EMS		1	1	0	3-Nov-19		5-Oct-19
La Salle Co EMS		1	1	0	15-Nov-19		15-Oct-19
New Braunfels Battalion 1		1	1	0	13-Nov-19		10-Oct-19
Schertz EMS		1	1	0	13-Nov-19		11-Oct-19
Wilson Co ESD 3		1	1	0	28-Oct-19		3-Oct-19
Hospitals	**Location**	**PAR**	**On Hand**	**Needs**			**Last Updated**
BAMC		?	?				
University		20	16	4			14-Oct-19
Frio Regional		1	1	0			
Medina Regional		0	0	0			
Supply	**Location**	**PAR**	**On Hand**	**Needs**			**Last Updated**
STBTC			18				16-Oct-19
		Total	**Total**	**Total**			
		65	79	4			

GroupMe: Daily par level reporting to LTOWB Leaders

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.**

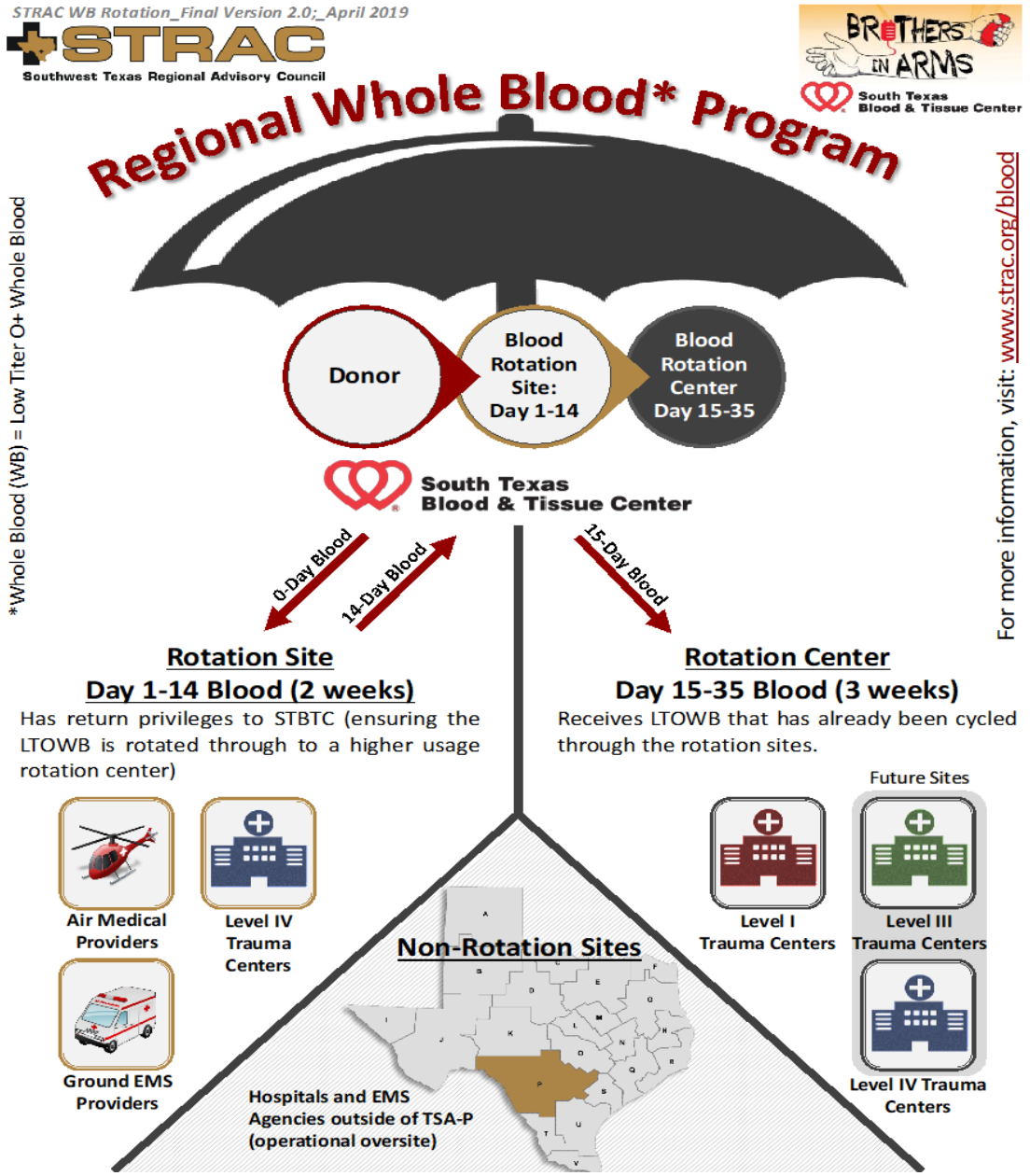
VISIT
strac.org/blood
FOR FAQs & MORE INFORMATION

LOW TITER O+ WHOLE BLOOD RECIPIENT

WHOLE BLOOD

"You did what???"
Laminated card for medics to give to receiving hospitals

- Rotation System to minimize costs to EMS agencies, and be good stewards of the “gift of life”
- Standardized transfusion criteria
- Regionally approved equipment list
- Region wide clinical documentation and data collection processes
- Developed a robust, loyal blood donor population



Real-time Whole Blood paperwork process

STRAC
Southwest Texas Regional Advisory Council

Prehospital Blood Product Transfusion Record

Patient Name:	Transporting Agency Run / Case #:	Receiving Facility Medical Record #:
[redacted] TH	NBFD 19[redacted]	SAMMC 20-[redacted]

Product Unit Number (Affix sticker below, or write unit number)	Product Type (Check One)	Transfusion Date & Start Time	Transfusion Complete* (Check One)	Transfusion Reaction** (Check One)	Transporting Medic/RN Initials
1. W1409 19 072411 8[E]	☐ PRBC ☐ Plasma ☑ LTOWB	8/12/19 0100	☐ Yes ☑ Ongoing	☐ Yes ☑ No	JPS 461
2. Affix Sticker Here or Write Unit #	☐ PRBC ☐ Plasma ☐ LTOWB		☐ Yes ☐ Ongoing	☐ Yes ☐ No	
3. Affix Sticker Here or Write Unit #	☐ PRBC ☐ Plasma ☐ LTOWB		☐ Yes ☐ Ongoing	☐ Yes ☐ No	
4. Affix Sticker Here or Write Unit #	☐ PRBC ☐ Plasma ☐ LTOWB		☐ Yes ☐ Ongoing	☐ Yes ☐ No	

Name of Air Medical or Ground Agency:	Receiving Facility (Check One):	Type of Call (Check One):
NEW BRAUNFELS FD	☐ University Hospital ☑ Brooke Army Med Center ☐ Other: _____	☑ Scene Call ☐ Interfacility Transfer
Aircraft ID / Medic Unit #: NBFD Medic 3	**Comments:** Stabbing patient	

**If blood product transfusion is ongoing at time of patient transfer to hospital, document "Ongoing."*
***Document actions taken in 'Comments' Section at the time of patient drop-off at receiving hospital.*

Mandatory Blood Product & Blood Form Tracking:

☐ Transporting crew keep **White Copy**; give the yellow and pink copies *AND* the blood bag to the Emergency/Trauma Team.

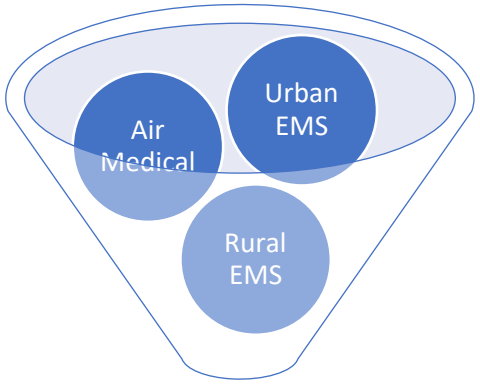
☐ Emergency Department keep **Yellow Copy**; give the **Pink Copy** *AND* the blood bag to the Blood Bank/Transfusion Services.

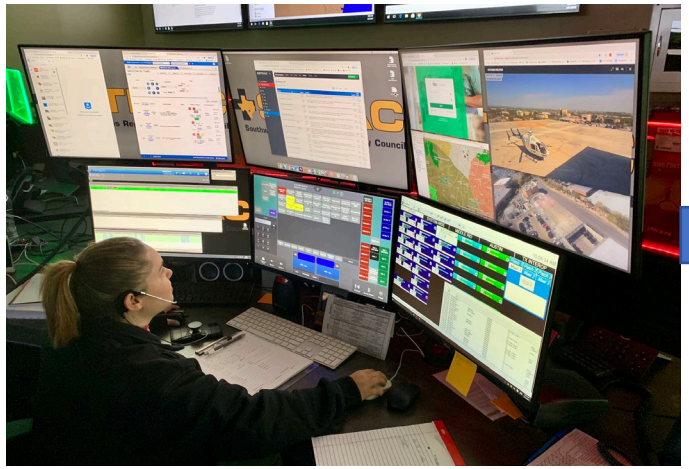
Blood Bag & Form given to: Jennifer Michel (PRINTED NAME) _____ (SIGNATURE)

Actions to take for suspected transfusion reaction:
- ✓ STOP TRANSFUSION
- ✓ Disconnect tubing from infusion site; flush site with normal saline
- ✓ Keep line open with normal saline
- ✓ Re-initiate new transfusion if deemed clinically essential
- ✓ Document actions taken in 'Comments' section

Transporting Crew: Please send a copy to **MEDCOM** via text image **(210) 417-7016**, or email MEDCOM@strac.org, or FAX: (210) 233-5825

Version July 2019; FINAL

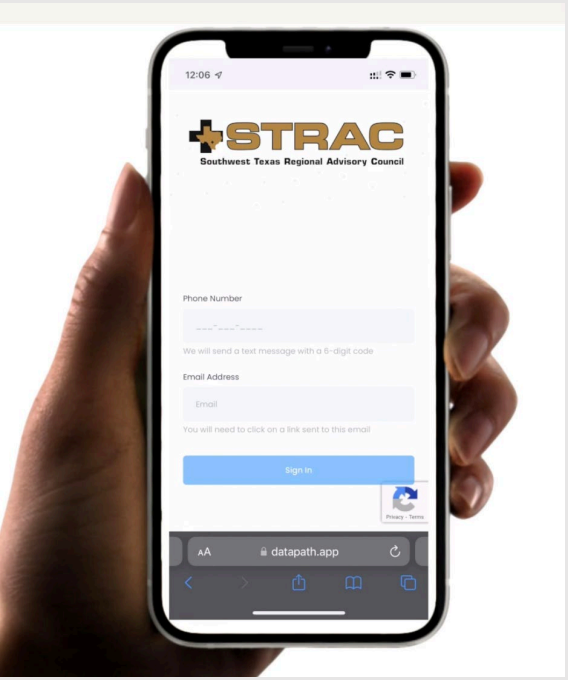


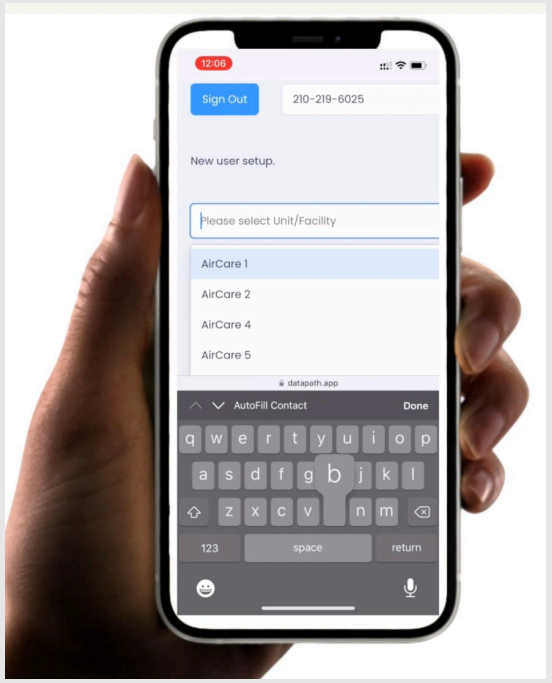


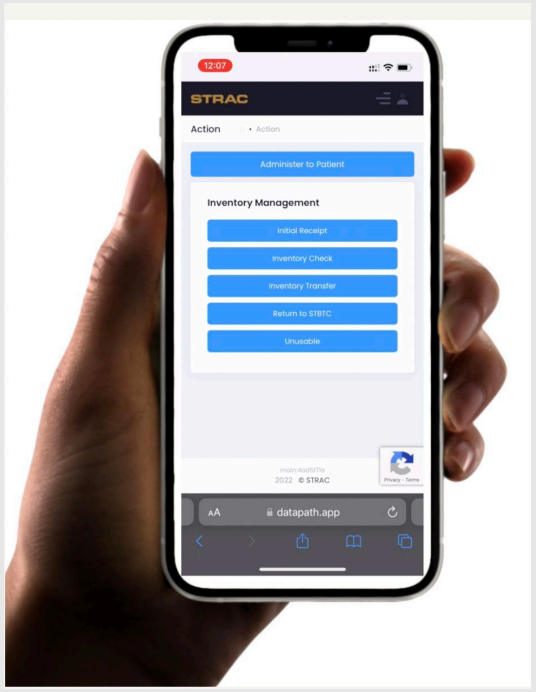
STRAC MEDCOM

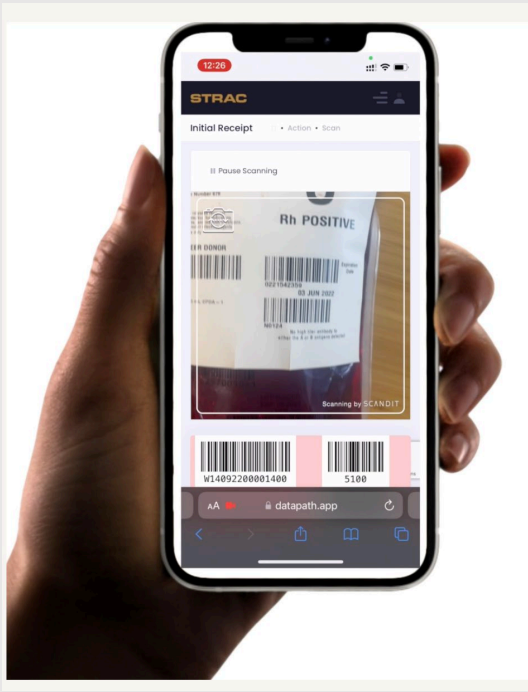
- Trauma Ctr ED
- Trauma Ctr Blood Bank
- Research
- Home Agency WB POC

Whole Blood Inventory Phone App









STRAC
Southwest Texas Regional Advisory Council

THE JOURNAL OF AABB

transfusion.org

TRANSFUSION

SUPPLEMENT ARTICLE | Free Access

Prehospital whole blood reduces early mortality in patients with hemorrhagic shock

Maxwell A. Braverman, Alison Smith, Douglas Pokorny, Benjamin Axtman, Charles Patrick Shahan, Lauran Barry, Hannah Corral, Rachelle Babbitt Jonas, Michael Shiels, Randall Schaefer, Eric Epley, Christopher Winckler, Elizabeth Waltman, Brian J. Eastridge, Susannah E. Nicholson, Ronald M. Stewart, Donald H. Jenkins ✉, ... See fewer authors

First published: 16 July 2021 | https://doi.org/10.1111/trf.16528

UT Health San Antonio
Emergency Health Sciences

Office of the Medical Director

National Coalition for Prehospital Blood

Enabling Prehospital Blood Transfusion throughout the US

PREHOSPITAL
BLOOD TRANSFUSION
INITIATIVE COALITION

Vision

- Prehospital blood products are available to every bleeding patient for whom these products are medi
- Every provider is properly and appropriately reimbursed for prehospital blood products.

Mission

- Establish reimbursement coverage, from both government and commercial payors, for prehospital bl
- Ensure prehospital blood transfusion is included appropriately in the prehospital clinical scope of pra and jurisdictions across the United States.

Texas Coalition for Prehospital Blood

Governor's EMS/Trauma Advisory Council
Prehospital Whole Blood Task Force Agenda

Vision:
Provide Texans with emergency blood transfusions when and where they need it regardless of location.

Mission:
The mission of the Prehospital Whole Blood Task Force is to enhance emergency medical response capabilities, improve patient outcomes through the sustainable integration and utilization of whole blood transfusion in prehospital settings.

Purpose:
Our purpose is to improve survival rates and outcomes for patients across Texas by ensuring timely access to whole blood, promoting best practices in prehospital transfusion and fostering collaboration among emergency medical services, hospitals, blood banks, Regional Advisory Council's, and other stakeholders. We are dedicated to increasing blood donations, advancing education, research, and policies that support the effective and efficient use of whole blood as a life-saving intervention in prehospital care.

Goals/ Tasks:

- Establish Regional Rotation Systems to ensure lowest wastage and highest efficiency
- Develop an Approved Products List that is supported by participating blood centers
- Develop and Implement a Common Operational Picture of PH WB
- Develop additional MCI Push Packs that can be rapidly deployed
- Develop and Implement Walking Blood Bank (WBB) procedures, prioritizing our rural facilities and communities.

Texas Prehospital Trauma Concepts

MARCHES

- Massive Hemorrhage Control
- Airway
- Respiratory
- Circulatory
- Hypothermia
- (Eyes/Spinal Restriction)

Cadaver Laboratory Training

- Pleural Decompression
- Cricothyrotomy
- Distal Femur IO
- Amputations
- Clamshell Thoracotomy
- Reductions
- Emergency C-Sxn

Traumatic Circulatory Arrest

- De-emphasize chest compressions
- Emphasize Hemorrhage Control
- Emphasize Fixing Obstructive Shock
- Thoracotomy

The Correct Analgesics for Certain Trauma

- Tylenol
- NSAID

Reductions for Dislocations

- Anterior Shoulder Dislocation
- Patellar Dislocation

Digital Blocks for Finger Injuries

- Lidocaine is only pain management needed

EMT

- Stop **Massive Bleeding** as first action
  - Tourniquet
  - Compress large vessel in the wound by hand against bone
  - Wound packing
  - Apply pressure dressing with firm direct pressure
  - If in arrest or peri-arrest from any blunt trauma or penetrating trauma at or below umbilicus may apply abdominal aortic junctional tourniquet
- Establish Simple **Airway** with NPA or OPA and suction secretions if needed
- Support **Respirations**
  - BVM with **Oxygen**, if needed
  - If in arrest or profound shock, needle thoracostomy on affected side or bilateral if indicated
    - 4-5th intercostal space anterior axillary line (nipple level) above rib is preferred location
    - 2nd intercostal space, mid-clavicular is alternative location
- Support **Circulation**
  - Reassess tourniquets, bleeding wounds
  - Use pelvic binder for pelvis fractures
  - If in arrest, start CPR, may establish IO access
- **Hypothermia**- after primary and secondary head to toe assessment is completed- remove wet clothing and cover with blankets.
- Penetrating **Eye Injuries** should be covered with eye shield with zero pressure on the eye
- **Spinal Motion Restriction Guideline** should be considered for falls, MVC and blunt trauma

Paramedic

- **Scene time less than 10 minutes** with only EMT level skills to be done prior to load
- **Airway** – consider advanced airway management or surgical crichothyrotomy
  - Capnography is required for all patients being ventilated
  - Capnography for all patients who meet any ONE Red OR Blue trauma criteria
- **Respiration –** consider needle or open thoracostomy if unable to ventilate effectively or in profound shock/arrest with thoracic trauma
- **Circulation –** IV/IO with boluses of fluid, **Whole Blood (WB)** preferred in trauma, **Lactated Ringers (LR)** for burn patients and **Normal Saline (NS)** if WB or LR not available
  - **TXA** per TXA Guideline
  - Pelvic binder for pelvic instability and reassess all bleeding wounds for hemostasis

Trauma Fluid Administration Guidelines—Administer appropriate fluid if any of the following are met

- Systolic Blood Pressure < 70 mmHg **OR**
- Systolic Blood Pressure < 90 mmHg with Heart Rate ≥ 110 beats per min **OR**
- ETCO2 < 25 **OR**
- Witnessed traumatic arrest < 5 min prior to provider arrival and continuous CPR throughout downtime **OR**
- Age ≥ 65 yo and SBP ≤ 100 **AND** HR ≥ 100 beats per minute

- **Pain –** consider Pain Management Guideline
- **Spine –** maintain spinal motion restriction, if indicated

MARCHES

Massive Hemorrhage Contral

Airway

Respiratory

Circulation

Hypothermia prevention

EMT

- Perform MARCHES according to Trauma General Patient Care Guidelines
- Do not start chest compressions until
  - **M**assive bleeding is controlled, Tourniquets for extremity, Hemostatic packing
  - **A**irway management with BVM / NPA / OPA or SGA as needed
  - **R**espirations are addressed for possible tension hemo/pneumothorax with a minimum of needle decompression bilaterally
- If massive bleeding below the diaphragm suspected – put the IO in the humerus
- Manual chest compressions after the above(LUCAS only to be used in transport)

Paramedic

- **Dispatch**- It is OK to tell the caller not to perform chest compressions and to focus on MARCH. examples- **M.** Stop any hemorrhage. **A.** Place the patient in a lateral recovery position. **R.** Injured lung down. C. Reassess wounds **H.** Cover the patient
- **Penetrating Traumatic Arrest**- with or without signs of life should have transport initiated rapidly, any exceptions need to call OMD immediately, **ideal scene time < 5 minutes**. If **M.A.R.** done by BLS on scene, load and go - all other interventions en-route
- **Blunt Traumatic Arrest**- **M.A.R.** on scene and call OMD for transport or termination guidance. If ROSC then immediately transport
- **Massive Hemorrhage** – Control massive bleeding if not done. AAJT for suspected uncontrolled bleeding below the diaphragm
- **Airway** – Advanced airway management SGA/ETT or surgical cricothyrotomy
- **Respiration** – Open thoracostomy bilaterally
- **Circulation** – Reassess all wounds for hemostasis. Once decision to transport then:
  - **Whole Blood (WB) preferred in trauma arrest with possible hemorrhagic shock. Normal Saline (max 1L) if WB not available**
  - **TXA** 2 grams IV/IO push per TXA COG
  - Pelvic binder for pelvic instability or for blunt mechanism likely to result in pelvic fracture
  - Chest Compressions to circulate oxygenated blood
- **Hypothermia** – minimize heat loss
- Pausing chest compressions to reassess and redo the above is appropriate
- Consider field termination if worked on scene and M.A.R. has been dealt with
  - Medical Direction may request transport based on specifics of the case
  - End Tidal CO_2, Cardiac Motion on US if available, monitor, physical signs of life, and downtime are factors influencing transport decisions

Prehospital traumatic cardiac arrest: Management and outcomes from the resuscitation outcomes consortium epistry-trauma and PROPHET registries

Christopher C D Evans [1], Ashley Petersen, Eric N Meier, Jason E Buick, Martin Schreiber, Delores Kannas, Michael A Austin, Resuscitation Outcomes Consortium Investigators

Affiliations + expand

PMID: 27070438 PMCID: PMC4961534 DOI: 10.1097/TA.0000000000001070

Free PMC article

Survival and neurologic outcome after traumatic out-of-hospital cardiopulmonary arrest in a pediatric and adult population: a systematic review

Jörn Zwingmann, Alexander T Mehlhorn, Thorsten Hammer, Jörg Bayer, Norbert P Südkamp, Peter C Strohm

PMID: 22770439 PMCID: PMC3580693 DOI: 10.1186/cc11410

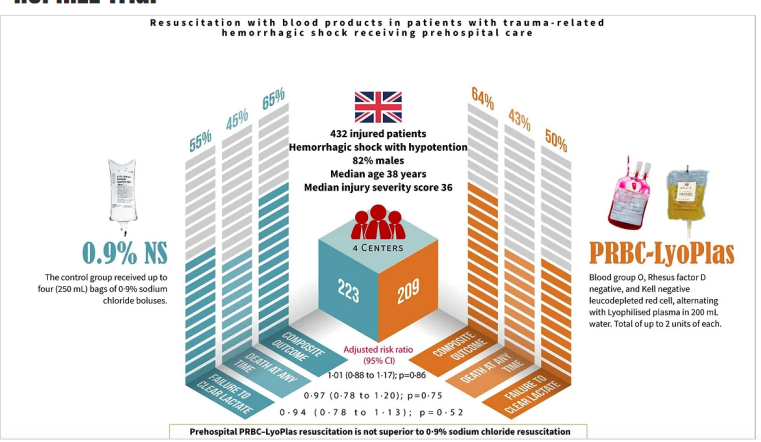
Free PMC article

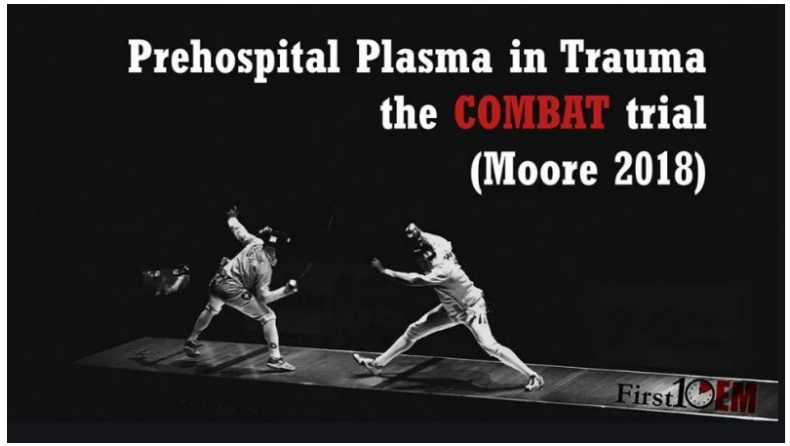
Prehospital TCA Survival Percentages

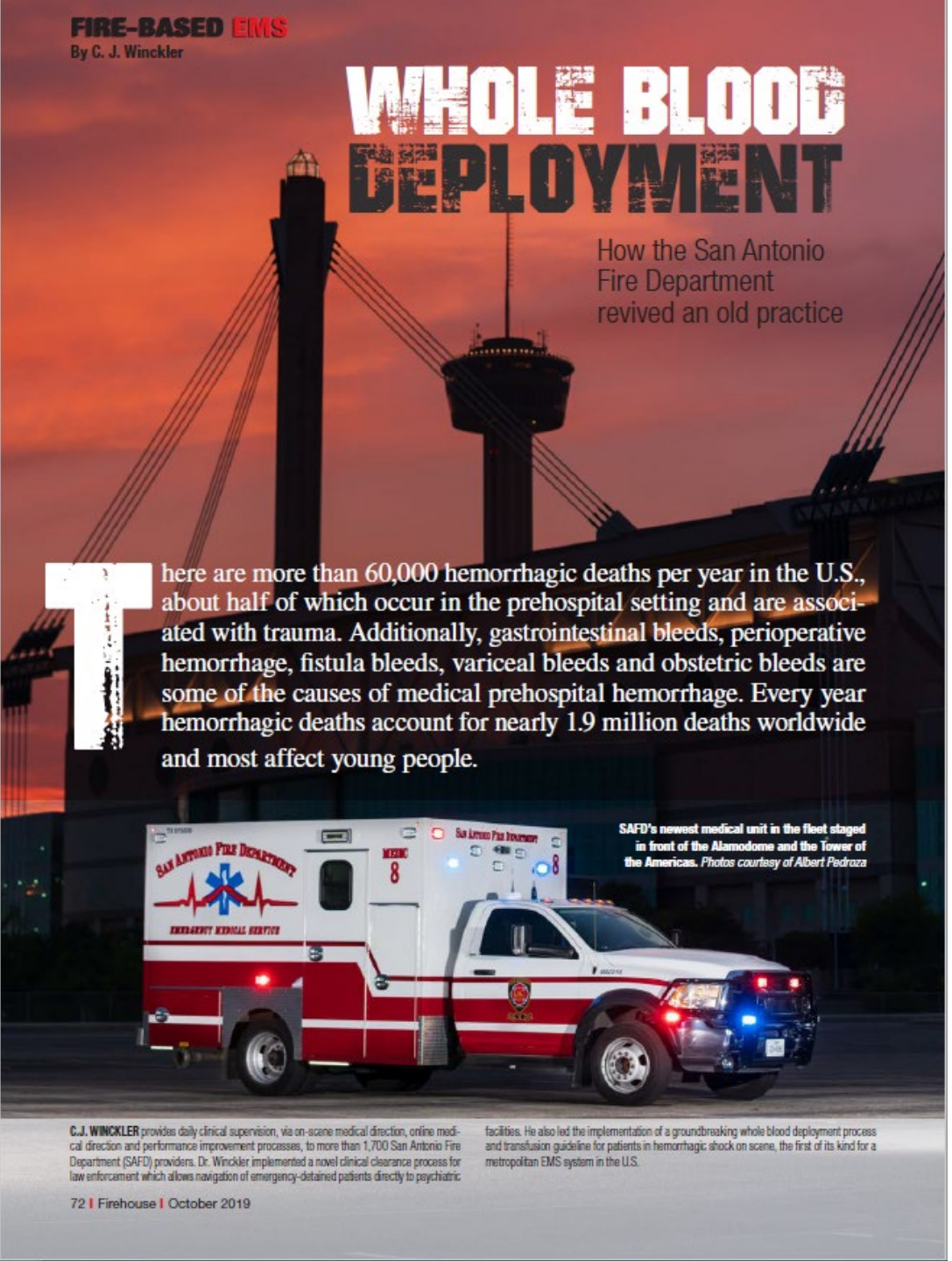
- 2,300 patients
- 145 total patients survived (6.3%)
- More patients with blunt injuries survived
  - 7.4 % to 3.65%

- 5391 adult patients
- 1243 pediatric patients
- 475 total survived (7.2%)

Prehospital Blood Totally Saves Lives—Possibly But Difficult to Prove







Prehospital Whole Blood Totally Saves Lives—Possibly But Not Easy To Prove

- Who is the Control Group?
- Metropolitan vs Suburban vs Rural
- All need to be worked out
- FARS connected to NEMSIS

Take Away Points

- Prehospital Blood is One Part of Saving Lives--MARCHES
- Build a System of Prehospital Blood Transfusion and Rotation to Not Waste Blood
- Broad collaboration with critical stakeholders to make prehospital blood available to ALL Patients
- National EMS Blood Initiatives Needed
  - Track data
  - CQI/CQA
  - Reimburse

Sanford EMS Administers Whole Blood for First Time; Helps Save Life

PHILIP MAENZA, JR. SAYS HE BELIEVES THE PROGRAM IS HEAVEN-SENT.

July 20, 2025 by Gabriel Ostler

Attended the Whole Blood Academy in San Antonio

- https://www.kvrr.com/2025/07/20/sanford-ems-administers-whole-blood-for-first-time-helps-save-life/

Next-Level Teamwork Saves Motorcyclist—But There is No Prehospital Blood in South Dakota

‘Next-Level’ Teamwork Praised After SD Motorcycle Rescue

October 17, 2025 Curated By Dan Landrigan

1 MIN READ SHARE TO:

A Texas emergency physician credited Sturgis EMS and volunteer firefighters for their “next-level” teamwork during a response to a motorcycle accident at this year’s Sturgis Motorcycle Rally, according to the *Sturgis Information Publication*.

The incident involved a motorcycle rider whose bike ran off the road and over a 30- to 40-foot cliff. Responders had to treat the patient while on the cliff, and firefighters, police and medics had to rig a rope system to pull the patient back to the road for transport.

Dr. C.J. Winckler, a South Dakota native and San Antonio Fire Department deputy medical director, helped stabilize the injured rider before crews arrived, and he later wrote a letter of appreciation to the city for the work of its first responders.

Winckler called their professionalism “stellar” and said the response was faster and smoother than some big-city rescues he’s witnessed.


HEROES IN ARMS PROGRAM SAVING LIVES

Questions

Contact

C. J. Winckler MD, LP

- winckler@uthscsa.edu

William Bullock EMTP

- William.Bullock@sanantonio.gov

David Wampler PhD, LP

- wamplerD@uthscsa.edu

UT Health San Antonio
Emergency Health Sciences

Office of the Medical Director