



# Tranexamic Acid and Trauma

KARL SPORER, ALAMEDA COUNTY EMS AGENCY



134%



## ORIGINAL RESEARCH

# Tranexamic Acid in Civilian Trauma Care in the California Prehospital Antifibrinolytic Therapy Study

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# California Prehospital Fibrinolytic Trial

- ▶ Tranexamic Acid
  - ▶ Inhibits Fibrinolysis
  - ▶ CRASH 2 Trial demonstrated 1.5 to 2.4% mortality benefit in severe trauma patients
  - ▶ 20,000 patients were randomized
  - ▶ Secondary studies demonstrated that earlier use improved survival



# California Prehospital Fibrinolytic Trial

- ▶ Multi center, prospective cohort with a retrospective cohort
- ▶ Three California Counties implemented TXA in 362 severe trauma patients
  - ▶ San Bernardino
  - ▶ Riverside
  - ▶ Alameda
- ▶ 362 Propensity Score Matching Cases



# California Prehospital Fibrinolytic Trial

- ▶ Primary Outcomes
  - ▶ Mortality at 24 hours, 48 hours, 28 days
  - ▶ Total Blood Products
  - ▶ Hospital and ICU length of stay

# California Prehospital Fibrinolytic Trial

- ▶ Mortality at 28 Days
  - ▶ TXA 3.6%
  - ▶ Control 8.3%
- ▶ Severely injured (ISS >15), 28 day mortality
  - ▶ TXA 6%
  - ▶ Control 14.5%
- ▶ Significant Reduction in Blood Transfusion requirements



# California Prehospital Fibrinolytic Trial

- ▶ Real World Implementation in three counties
- ▶ Hospital infusion is commonly not performed
- ▶ Average to poor EMS compliance
- ▶ Morality and Blood Transfusion improvements despite these issues

# TXA in TBI

(2 gm IV bolus appears be beneficial in ICH)

Craig Manifold, DO

Sharing information presented at the 2018 Military Health  
System Research Symposium



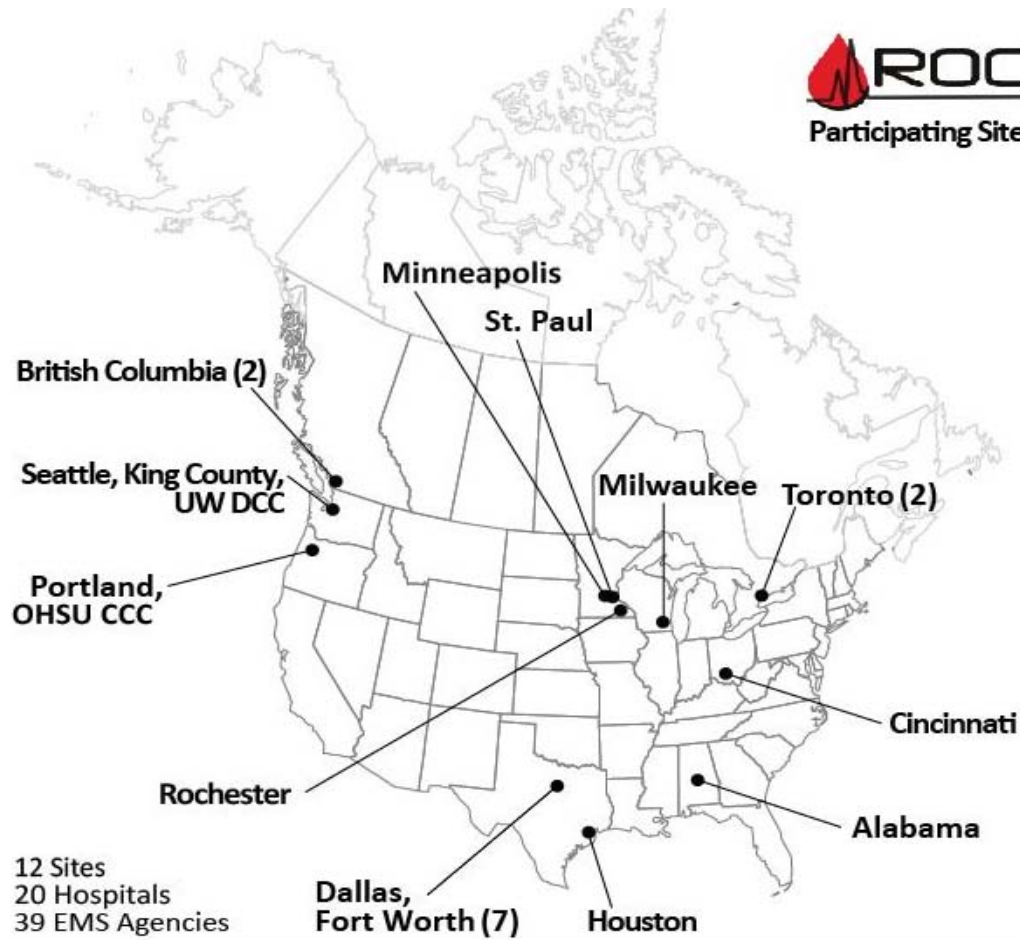
# A Two Gram Bolus of Tranexamic Acid Improves Survival After Traumatic Brain Injury in Patients with Intracranial Hemorrhage

Martin A. Schreiber MD FACS  
COL, MC, USAR  
Professor of Surgery  
Oregon Health & Science University



- 3-arm randomized trial (1:1:1)
- Multi-center, multi-national
- Double-blinded
- Key coded kits placed on rigs and replaced at trauma center when used





To determine the effects of two dosing strategies of TXA on outcome following moderate to severe TBI



- No difference in favorable neurologic outcome at 6 months (primary)
- No difference in 28 day survival
- No difference in morbidity

Comparing patients who received 2 dosing strategies of TXA to those who did not receive TXA



### **Inclusion Criteria**

- Blunt or penetrating TBI
- GCS = 3 - 12
- Prehospital SBP  $\geq$  90 mmHg
- Age  $\geq$  15 y/o, or  $\geq$  50 kg, if age unknown
- IV placed
- Planned transport to participating hospital

### **Exclusion Criteria**

- GCS = 3 with no reactive pupil
- > 2 hours from time of injury or time unknown
- Any prehospital CPR
- Seizures, MI, stroke, dialysis
- Known or suspected prisoners
- Known/suspected pregnancy
- Drowning or hanging
- Burns >20% TBSA
- TXA or pro-coagulant drug
- Opt out





# Randomization Groups

- 2 gram PH bolus, 8 hour IH placebo infusion
  - BO
- 1 gram PH bolus, 8 hour IH 1 gram infusion
  - BM
- Placebo PH bolus, 8 hour IH placebo infusion
  - PB





- Enrollment from May 2015 – Mar 2017
- 967 patients randomized and received drug
  - 346\* BO
  - 312 BM
  - 309 PB

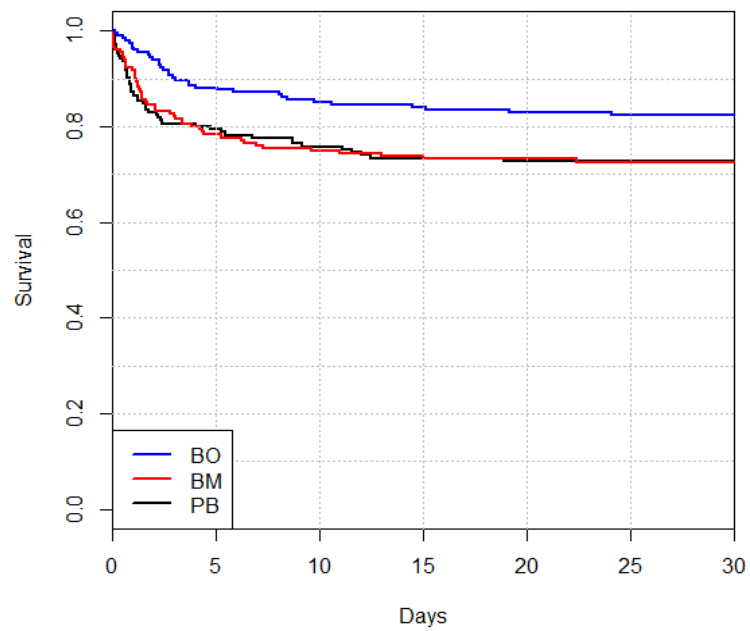
\* 1 excluded from analysis because enrolled while in police custody



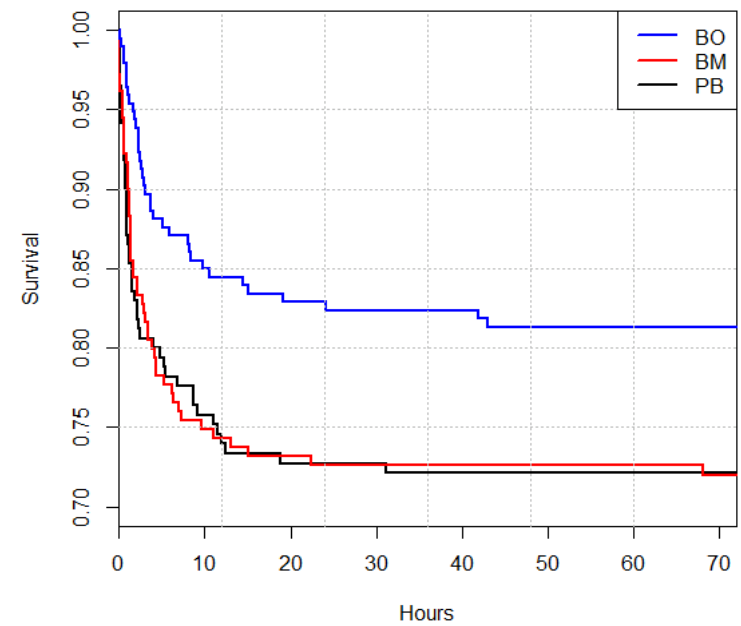
	28-Day Mortality, n (%)			OR for 28-Day Mortality (95% CI)		
				Pairwise Comparisons		
	PB	BM	BO	BM v. PB	BO v. PB	BO v. BM
<b>Mortality</b>						
All patients	53 (17)	53 (17)	41 (12)	1.01 (0.66, 1.55)	0.66 (0.42, 1.03)	0.65 (0.42, 1.02)
ICH on initial CT	51 (28)	51 (28)	36 (18)	1.03 (0.56, 1.88)	0.47 (0.25, 0.89)	0.46 (0.25, 0.86)



ICH patients through 30 days



ICH patients through 72 hours



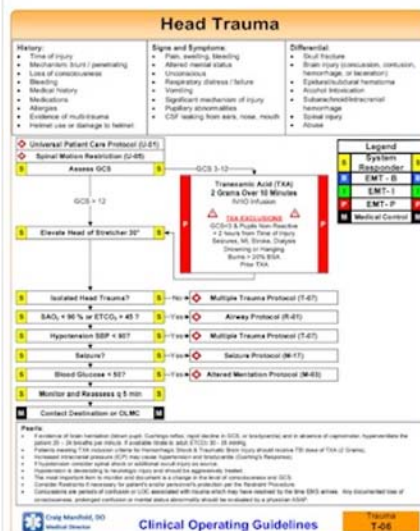
	PB N = 309	BM N = 312	BO N = 345
<b><i>Key adverse events, n (%)</i></b>			
Seizure	7 (2)	5 (2)	17 (5)
Any thromboembolic event	30 (10)	13 (4)	32 (9)
MI	1 (0)	3 (1)	2 (1)
PE	5 (2)	3 (1)	6 (2)
Thrombotic stroke	10 (3)	3 (1)	13 (4)
DVT	9 (3)	3 (1)	9 (3)
Other	10 (3)	1 (0)	13 (4)



# Conclusions

- Prehospital TXA use is feasible
- Does not result in favorable GOSE at 6 months
- Does not affect TEG on admit
- 2 grams prehospital TXA results in improved 28 day survival in patients with ICH
- 1<sup>st</sup> therapeutic with evidence for benefit in acute TBI
- What about hemorrhagic shock?









United States Army USMRAA W81XWH-13-2-0090



National Heart, Lung and Blood Institute



Institute of Circulatory and Respiratory Health  
of the Canadian Institute of Health Research



Defence Research and Development Canada



Heart and Stroke Foundation of Canada



American Heart Association





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# Prehospital Blood Transfusion in a Metropolitan City

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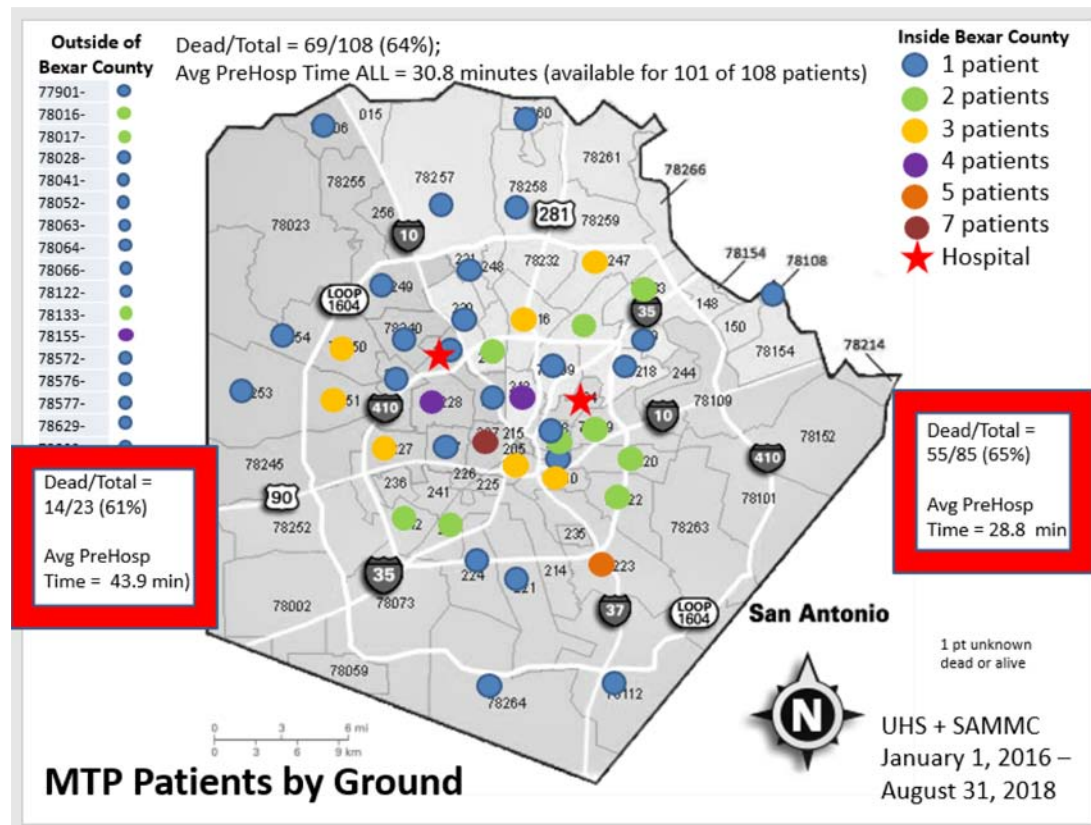
Collaboration

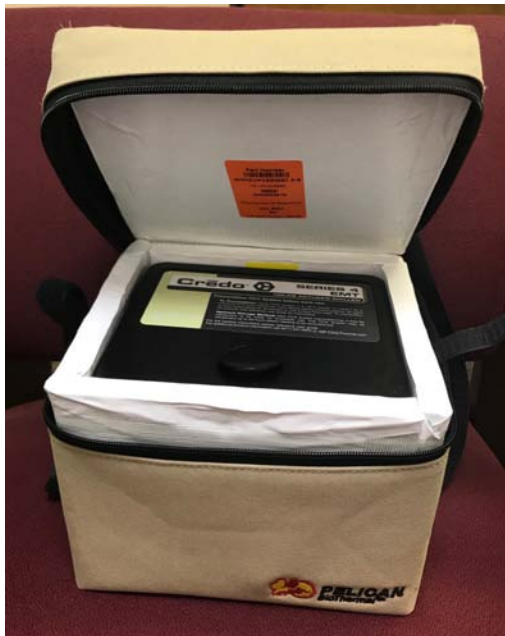


**TRANSFORMING TRAUMA CARE**

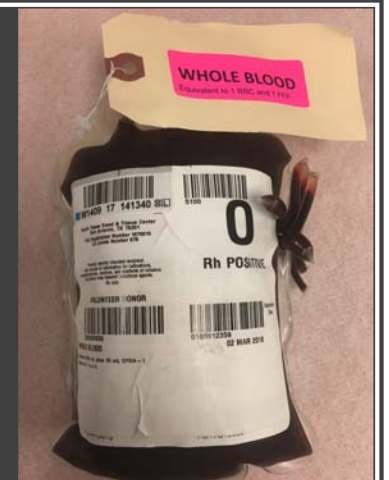


Plan





Equip and  
Train





Deploy



# Save Lives

## Woman survives traumatic crash thanks to new resource on SAFD EMS units

By Sarah Acosta - Reporter, Joe Herrera - Photojournalist

Posted: 8:40 PM, February 19, 2019

Updated: 3:29 AM, February 20, 2019





Questions?

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