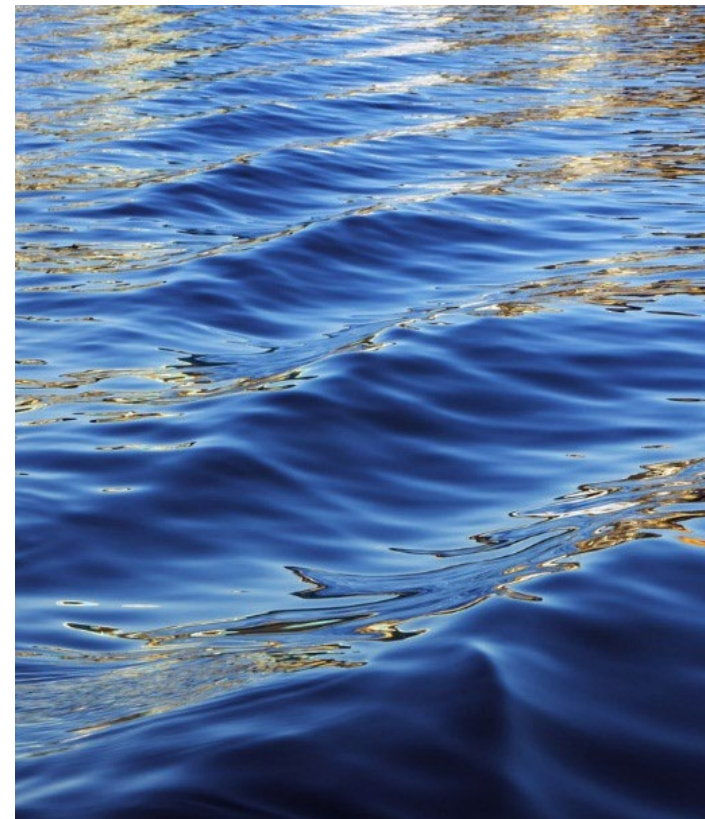




April 2025

Region 8 Trauma Advisory Council



Agenda

- Call to Order
- Attendance & Introductions
- Approval of April 9, 2025, agenda
- Approval of February 12, 2025, minutes
- Public Comment
- State Updates
 - Gary Wadaga
 - Dr. Ed Bigsby
 - Lyn Nelson

Trauma Registry Needs

StateTraumaRegistrar@michigan.gov

State of Michigan Trauma Data Dictionary

CY 2025 Michigan
Trauma Registry

DATA DICTIONARY

State of Michigan Systems of Care
Approved: April 1, 2025

*Link will be on state website
www.Michigan.gov/traumasystem*

2025 SOC Conference

Agenda

DAY 1 | Tuesday, October 7, 2025

7:30 AM – 9:00 AM	REGISTRATION & BREAKFAST
9:00 AM – 9:15 AM	Opening Remarks
9:15 AM – 10:30 AM	Telling Your Story: How to Encourage Engagement
10:30 AM – 11:00 AM	COFFEE & EXHIBITOR BREAK
11:00 AM – 12:00 PM	Breakout Sessions (100)
101	Applying Just Culture: Prehospital Case Studies
102	Paws With A Cause: Mental Health and Canine Support
103	Sign Up for System Development - How You Can Participate in the Process
104	Talking to Decision Makers: Persuasive Relationships and Communication
12:00 PM – 1:00 PM	LUNCH
1:00 PM – 2:00 PM	Breakout Sessions (200)
201	Michigan Verification Criteria Update
202	RPSRO Process and Review of Systems Issues: A Case Study
203	Assuring Continuity of Care: Just in Time Training for Patients on the Move
2:00 PM – 2:30 PM	POSTER TOUR & EXHIBITOR VISITS
2:30 PM – 3:30 PM	Breakout Sessions (300)
301	Michigan Data: Using Quality Data to Tell the Story
302	Collaboration with Office of Highway Safety Planning: Preventing Injury and Supporting Post Crash Care
303	Patient Movement: What Are We Doing, Where Are We Going?
3:30 PM – 3:45 PM	BREAK
3:45 PM – 4:45 PM	Legal Insight: Navigating Statute and Public Health Code
5:00 PM – 6:30 PM	MCA Evening Session & Dinner

Agenda

DAY 2 | Wednesday, October 8, 2025

8:00 AM – 9:00 AM	REGISTRATION & BREAKFAST
9:00 AM – 9:05 AM	Welcome Back
9:05 AM – 10:00 AM	All in Favor: Bringing Groups to Consensus
10:00 AM – 10:45 AM	POSTER TOUR & EXHIBITOR VISITS
11:00 AM – 12:00 PM	Breakout Sessions (400)
401	Bringing It Into Focus: Using EMS Data to Develop Performance Improvement Strategies
402	Stroke and STEMI Clinical Care Updates
403	Trauma Care Clinical Updates
12:00 PM – 1:00 PM	LUNCH
1:00 PM – 2:00 PM	Breakout Sessions (500)
501	That Was No Accident: Developing Protocols for Non-Accidental Trauma
502	Communications: Interfaces, Telehealth, and Real Time Consultations
503	Closing the Loop: Best Practices for Performance Improvement and Feedback Loops
2:00 PM – 2:30 PM	COFFEE & EXHIBITOR BREAK
2:30 PM – 3:20 PM	Breakout Sessions (600)
601	Hope That Doesn't Happen Again: Risk Reduction/Injury Prevention for Trauma, Stroke, and STEMI
602	MCAs and Systems of Care: Why the Relationship Matters
603	The Epilogue: Rehabilitation (A Collaborative Project with MPH)
604	Workshop: Talking to Decision Makers Part 2
3:20 PM – 3:30 PM	BREAK
3:30 PM – 4:00 PM	Closing Session

R8 Medical Coordination Center



Region 8 Medical Coordination Center
24/7 Emergency Activation Line
888-535-5806

Activation Checklist:

During your call, include the following Essential Elements of Information

- ☐ Your Name
- ☐ Your Contact Number
- ☐ Organization Name
- ☐ Reason for Emergency Assistance
- ☐ Type of Assistance Needed
- ☐ If requesting a physical resource-
 - ☐ Exact location where resource is to be delivered
 - ☐ Who will accept and sign for the resource
 - ☐ Contact information for individual accepting/signing for resource

--- Hospital Essential Elements of Information ---
--- Data Collection Sheet on next page ---

Region 8 Healthcare Coalition
PO Box 39
Gulliver, MI 49840

Updated:
04/02/2025
www.region8.org

Essential Elements of Information (EEI) Request - Hospitals Medical Surge Incident

For the Regional Medical Coordination Center (MCC) to complete.
Below is the information requested by the Community Health Emergency Coordination Center (CHECC) to maintain situation awareness for a medical surge incident.

Region:		Date and Time:	
Point of Contact at Region Submitting:			
Facility Name:			
Address:			
Name and Title:			
Phone Number:			
Email:			
Facility Report Section			
Briefly Describe the Situation:			
Estimated number of impacted adult patients:			
Estimated number of impacted pediatric patients:			
Total number of staff/personnel at facility:			
Total licensed number of beds at facility:			
Has the hospital?			
Activated their emergency response plan?	☐ Yes	☐ No	
Suspended elective surgeries?	☐ Yes	☐ No	
Activated IBA/CEDOCS?	☐ Yes	☐ No	
Step down patients where possible?	☐ Yes	☐ No	
Use unused space?	☐ Yes	☐ No	
Activated internal surge capacity?	☐ Yes	☐ No	
Other			
Contacted local staffing agencies?	☐ Yes	☐ No	
If yes, when were they contacted?			
If yes, who was contacted?			
What support is the facility requesting?			
Staffing Support:	☐ Yes	☐ No	
Patient Movement:	☐ Yes	☐ No	
Activation of Alternate Care Site:	☐ Yes	☐ No	
Activation of MI-TESA:	☐ Yes	☐ No	
Equipment/Supplies:	☐ Yes	☐ No	
Other:			
What has the MCC done to meet the needs:			
Additional Comments:			

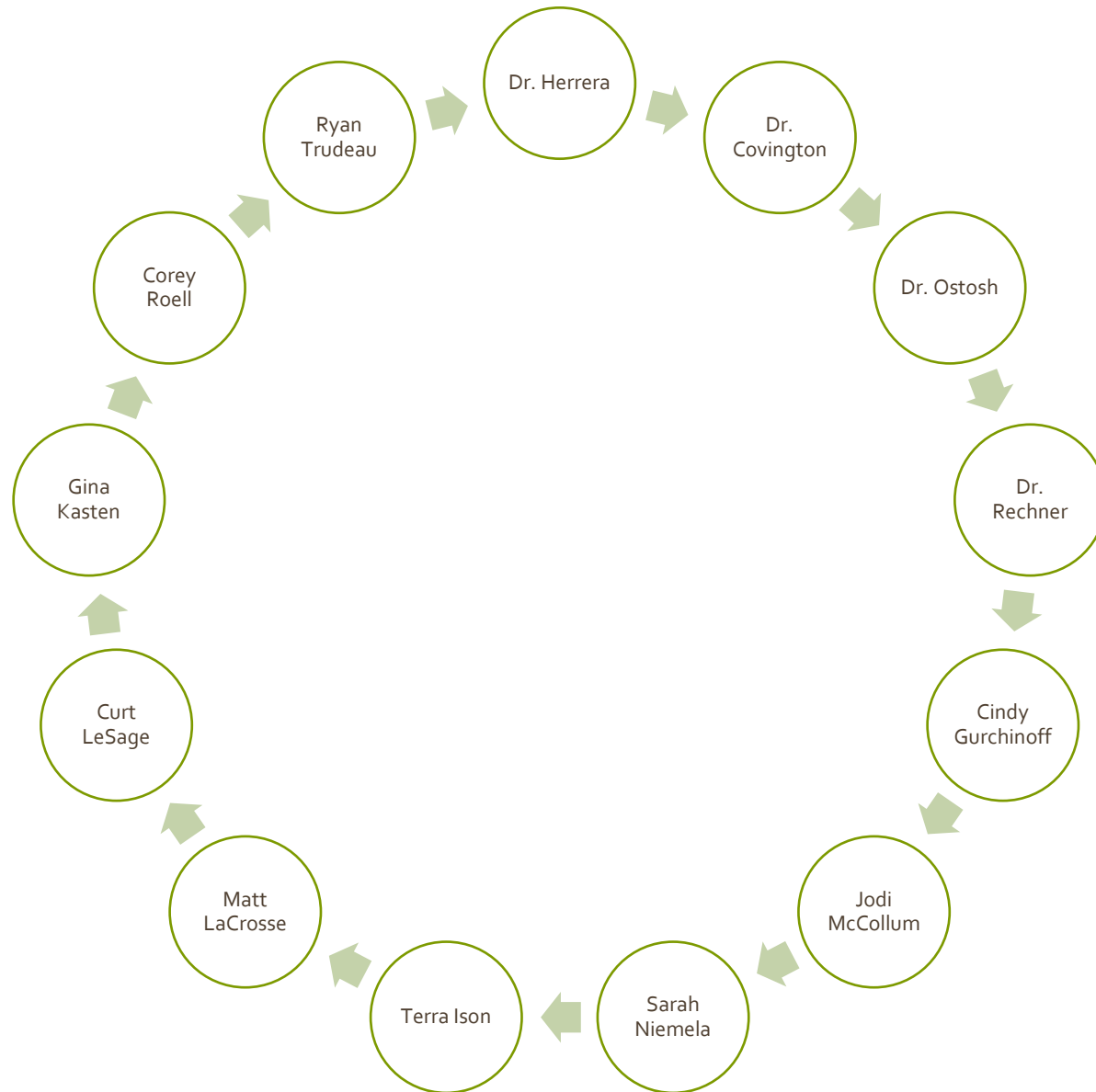
SUBMIT FORM TO: Ed.Unger@region8.org

Revision 04/02/2025



Old Business

Regional Professional Standards Review Organization (RPSRO)



	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	Injury Prevention Program List										Revision Date:		04/18/2023	
2														
3		NAME:	Lyn L. Nelson							TITLE:	Region 8 Trauma Coordinator			
4														
5														
6		EMAIL:	NelsonL7@michigan.gov							Multi-type list of injury prevention programs offered throughout the Upper Peninsula of Michigan				
7														
8														
9		PHONE:	(517) 285-3849											
10														
11														
12	County Served			Persons Served										
	Type	Program Name	Served	Agency	Contact Person	Number	Email	Address	R8TN	Notes				
13		Safety	Safe Kids Michigan	Peds, online	Michigan	Laura Rowen	517-335-9519	RowenL@michigan.gov	109 W MI Ave, Lansing 48908					
14		Boating	DNR Boating Safety	Public, online	Michigan	www.michigan.gov/dnr								
15		ORV	DNR ATV Safety	Public, online	Michigan	www.michigan.gov/dnr								
16		Snowmobile/ ORV	trail signs, flyers	snowmo	MDNR	Ron Yesney	906-228-6561	yesneyr@michigan.gov						
17	Alger	Peds	Concussion	Athletes	UPHS	Mark Stonerock		mark.stonerock@mghs.org	Sports Med Outreach, UPHS Marquette					
18	Alger	Fall	Matter of Balance	Seniors, Fall										
19	Baraga	Fall	Matter of Balance	Seniors, Fall	Keweenaw Bay Indian	Elizabeth Mayo	906-353-4531	noncorn@kbic-nsn.gov						

Sheet1

Ready Accessibility: Investigate

To-do items!

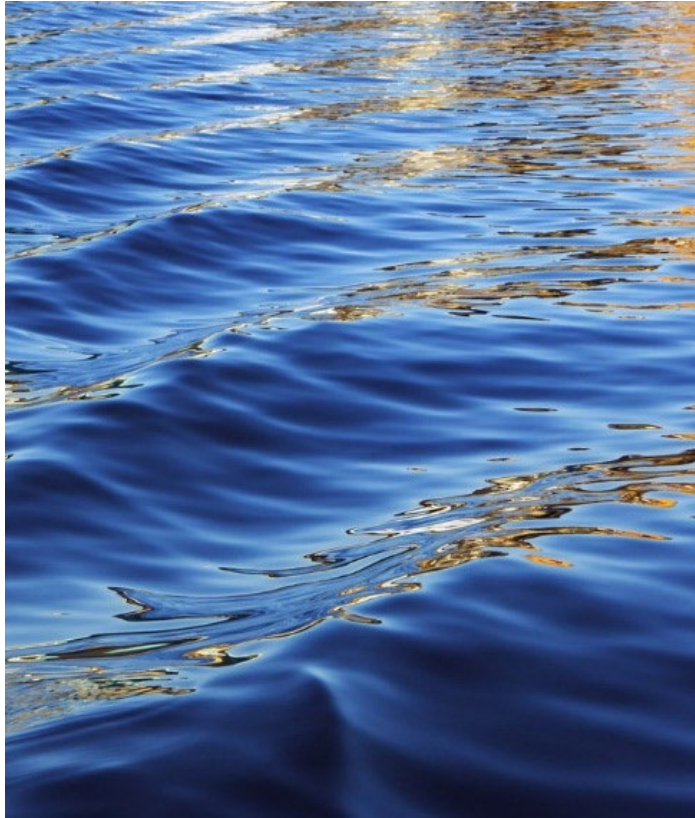
Follow up	Who	What
Ontonagon slips, trips, falls	Gina, Joel, Lyn	Meet with heat maps
Fall prevention list	Trauma Program Managers	Send updates to Lyn for Injury Prevention (IP) ad hoc
Injury prevention gaps for falls and motor vehicle crashes	Trauma Program Managers	Send to Lyn for IP ad hoc
Injury Prevention Ad Hoc	Ann, Stephen, Cindy, and who else?	Update IP Plan, form messaging strategy for Top 3 with dates per objective
2024 MCA meeting minutes	MCA staff	Direct Lyn to where they're posted or send to her

Motion to empower IP ad hoc or special meeting of RTAC?

- By December 31, 2024, the RTAC will identify and address gaps in their regional injury prevention programs, update their regional injury prevention plan, and describe the current status in the Region's annual report.
- By April 2025, establish public information and education components for the top three external cause codes that include the months for hospital trauma programs to distribute the information.
- SP3: The regional IP committee will analyze the number and type of programs that directly address the top 3 injuries programs in their region as reported in the Inventory.
- SP4: By December 31, 2024, each regional IP committee will identify and address gaps in their regional programs. IP plans will be updated. Progress on this objective will be reported on the Regional Trauma Coordinator's (RTC's) annual report.



New Business



EMS Use of Tranexamic Acid (TXA) for Trauma

William Fales, MD, FACEP, FAEMS
State Medical Director
Division of EMS and Systems of Care
falesw@Michigan.gov

Current State Hemorrhagic Protocol

 Bureau of Emergency Preparedness, EMS and Systems of Care		Michigan Trauma and Environmental HEMORRHAGIC SHOCK
Initial Date: 3/23/2018 Revised Date: 05/23/2023		Section: 2-14
Hemorrhagic Shock		
Purpose: To provide treatment for patients displaying signs and symptoms of shock attributed to hemorrhage including trauma and severe postpartum hemorrhage .		
1. Follow General Pre-hospital Care-Treatment Protocol control bleeding according to Bleeding Control (BCON)-Treatment Protocol when applicable. 2. Transport according to Adult and Pediatric Trauma Triage-Treatment Protocol and MCA Transport Protocol. 3. No intervention should delay transport. 4. Obtain vascular access. 5. For signs of hypotension <u>unaccompanied</u> by moderate to severe head trauma administer NS or LR IV/IO fluid bolus IV/IO (refer to Vascular Access and IV Fluid Therapy-Procedure Protocol). a. Adults (≥ 14 years of age): up to 1 liter b. Pediatrics (< 14 years of age): up to 20 mL/kg 6. For signs of hypotension <u>accompanied</u> by moderate to severe head trauma refer to Head Injury-Treatment Protocol for fluid administration guidelines. Consider other causes of traumatic hypotension and treat accordingly. (Tension pneumothorax see Pleural Decompression-Procedure Protocol, neurogenic shock see Shock-Treatment Protocol) 8. Hypotensive patients <u>unaccompanied</u> by moderate to severe head trauma should receive additional IV/IO fluid boluses, as indicated by hemodynamic state. a. Adults (≥ 14 years of age): repeat IV/IO fluid bolus to a maximum of 2 liters. b. Pediatrics (< 14 years of age): repeat dose of 20 mL/kg to a maximum of 40 mL/kg. c. Monitor for pulmonary edema. d. If pulmonary edema presents, stop fluids and contact Medical Control for direction. 9. Per MCA Selection, if bleeding is uncontrolled and non-compressible, administer Tranexamic Acid (TXA)		
<u>Tranexamic Acid (TXA) Included</u> ☐ Yes ☐ No Age greater than 18 years old AND <u>> 50 kg</u> 1. <u>Destination must be capable of administering 2nd dose.</u> 2. Draw up and mix 1 gram of TXA into a 100 ml bag of normal saline solution (0.9% Sodium Chloride Solution). a. Use a filter needle if the medication is supplied in an ampule. b. Apply pre-printed "TXA added" fluorescent-colored label to IV bag. 3. Administer mixed medication via piggyback into IV/IO line over 10 minutes.		



Current TXA Protocol for Head Trauma



Bureau of Emergency
Preparedness, EMS
and Systems of Care

Michigan **Trauma and Environmental** **HEAD INJURY** **MODERATE & SEVERE TBI**

Initial Date 03/24/2023
Revised Date:

Section: 2-12

meticulously prevented. Use Pressure-Controlled Bags (PCBs) and Ventilation Rate Timers (VRTs) when available.

a. Utilize basic airway adjuncts (OPA, NPA)

5. Manage Hemorrhage

a. See **Bleeding Control (BCON)-Treatment Protocol**

b. Consider **TXA**, if available, per the **Hemorrhagic Shock-Treatment Protocol**



i. Consider contacting medical control for patients who may not meet clinical criteria for **TXA** administration but hemorrhage is suspected.

e. If hypoventilation or hypoxia persists after these interventions, consider advanced airway options, go to **Airway Management-Treatment Protocol**.

5. Manage Hemorrhage

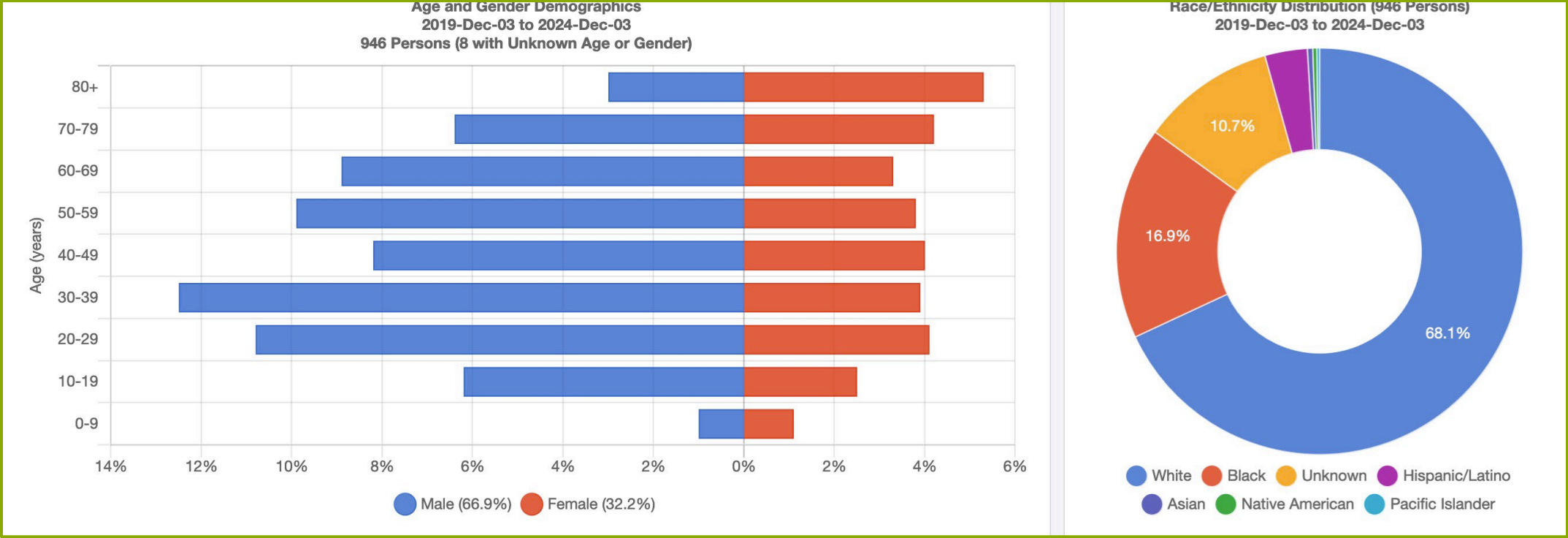
a. See **Bleeding Control (BCON)-Treatment Protocol**

b. Consider **TXA**, if available, per the **Hemorrhagic Shock-Treatment Protocol**

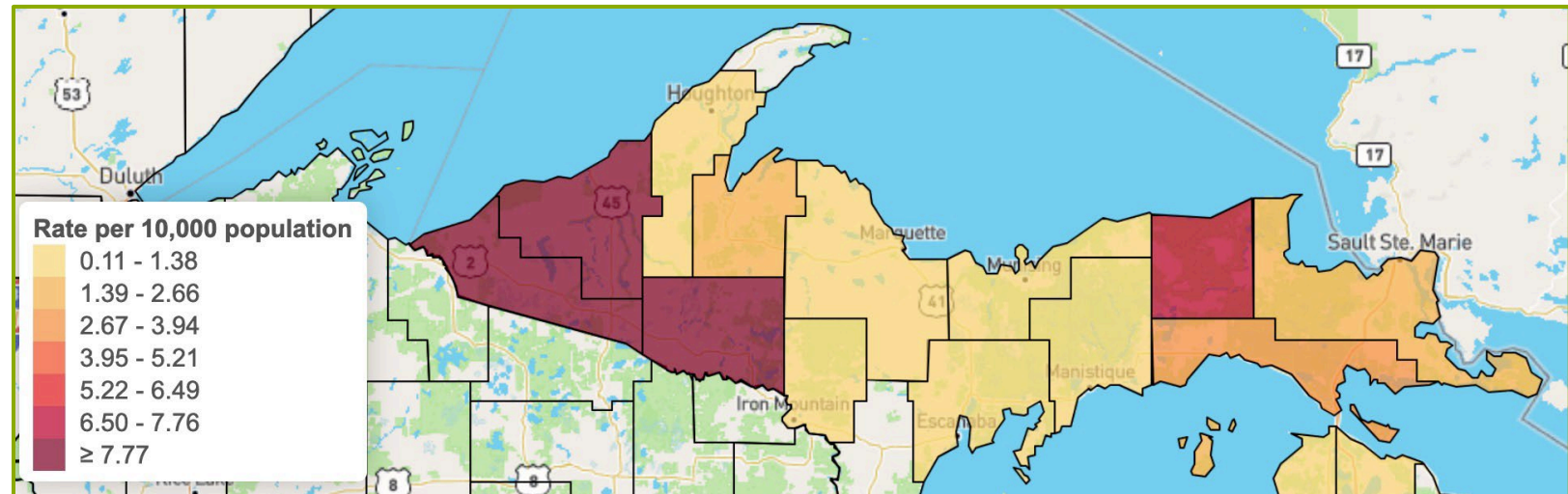
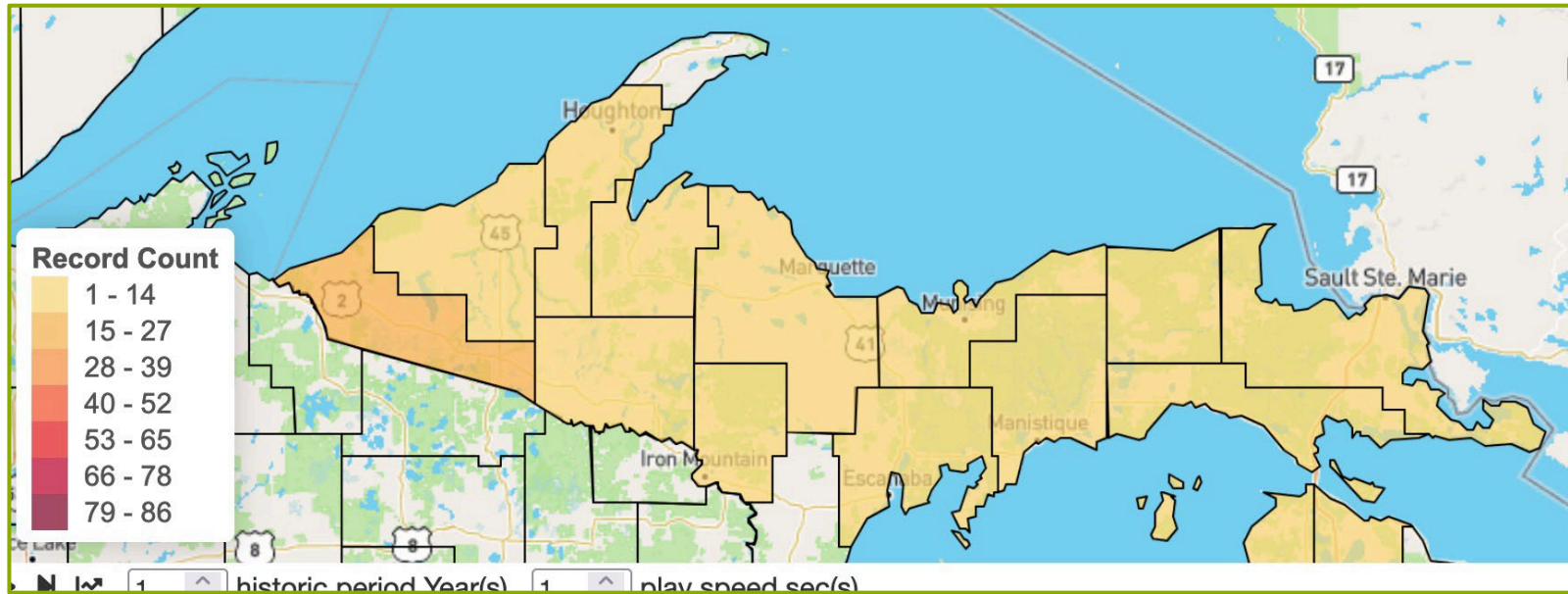


i. Consider contacting medical control for patients who may not meet clinical criteria for **TXA** administration but hemorrhage is suspected.

EMS TXA Use in Michigan 12/20-11/24 (N=946)



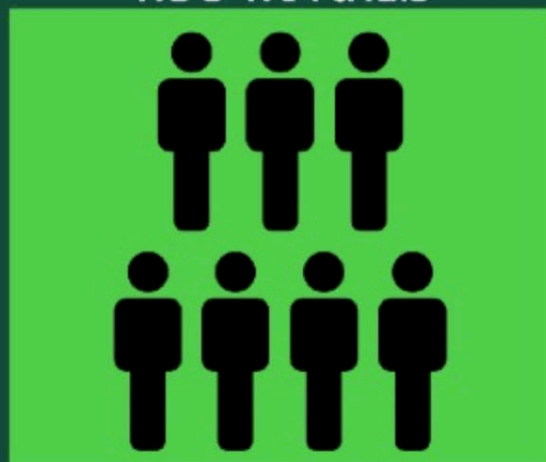
TXA Use in Michigan UP 12/19-11/24



Prehospital Tranexamic Acid Is Associated with a Survival Benefit without an Increase in Complications: Results of Two Harmonized Randomized Clinical Trials

2024

1744 injured patients
included in a harmonized
analysis of the STAAMP and
ROC-TXA trials



Randomization:
0, 1, 2 gram of Prehospital
TXA

Outcomes:
28-day mortality, 24-hour red
cell transfusion, adverse events



Prehospital TXA is associated with
dose-dependent 28-day survival
benefit and reduction in 24-hour
red cell transfusion requirements



Prehospital TXA is not associated
with an increased risk of adverse
events

Sperry JL et al. *Journal of Trauma and Acute Care Surgery*.
DOI: 10.1097/TA.0000000000004315

@JTraumAcuteSurg

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The Journal of
**Trauma and
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Tranexamic Acid in Pediatric Hemorrhagic Trauma

2022



Tranexamic acid

- ✓ Well-studied in adult trauma literature
- ✓ Clear benefit if given <3 hours from injury
- ✓ Unclear evidence in pediatric trauma



Review of Pediatric Studies

- 1) 2 retrospective combat studies → benefit
- 2) 1 prospective civilian study → benefit
- 3) 2 retrospective civilian studies → no benefit



Recommendation:

Empiric TXA may BE
CONSIDERED for pediatric
trauma if <3 hours from
injury

Borgman MA and Nishijima DK *Journal of Trauma and Acute Care Surgery*.
DOI: 10.1097/TA.00000000000003775

@JTraumAcuteSurg

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Pediatric Traumatic Hemorrhagic Shock Consensus Conference Recommendations

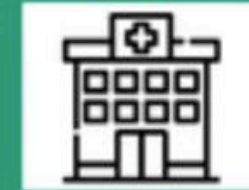
2021

Pediatric Traumatic Hemorrhagic Shock

- ✓ Common/preventable cause of death
- ✓ Limited pediatric literature detailing evidence based management



16 multidisciplinary experts
systematically evaluated
literature from six
subtopics



2 Clinical Recommendations,
14 Expert Consensus statements
and 5 Good Practice statements
for the care of pediatric trauma
patients in hemorrhagic shock

3.1: In traumatically injured children with hemorrhagic shock, the empiric use of tranexamic acid within 3 hours of injury might be considered. *Clinical Recommendation, conditional recommendation, very low certainty of evidence, 80% agreement (n=15), median 7, IQR: 7–8.*

The Journal of
**Trauma and
Acute Care Surgery®**



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UNIVERSITY



Prehospital Evidence Based Practice

Level	Direction	Primary Outcome	Patient/Process	Setting	Reference
I	Supportive (Green)	Mortality (at 24h, 48h, 1 month)	Patient	ED-Paramedic & CCP	Biffi A, Porcu G, Castellini G, et al. Systemic hemostatic agents initiated in trauma patients in the pre-hospital setting: a systematic review. Eur J Trauma Emerg Surg Dec 2022. Medline
I	Supportive (Green)	Adverse events	Patient	PH-Paramedic	Deeb AP, Hoteit L, Li S, Guyette FX, Eastridge BJ, Nirula R, Vercruyse GA, O'Keeffe T, Joseph B, Neal MD, Sperry JL, Brown JB. Prehospital synergy: Tranexamic acid and blood transfusion in patients at risk for hemorrhage. J Trauma Acute Care Surg 2022. Medline
I	Supportive (Green)	Mortality	Patient	PH-Paramedic	Ker K. Antifibrinolytic drugs for acute traumatic injury. Cochrane Database of Systematic Reviews 2015:5. Medline
I	Supportive (Green)	Mortality/survival	Patient	PH-Paramedic	Li SR, Guyette F, Brown J, Zenati M, Reitz KM, Eastridge B, et al. Early Prehospital Tranexamic Acid Following Injury is Associated with a 30-day Survival Benefit: A Secondary Analysis of a Randomized Clinical Trial. Ann Surg 2021. Medline
I	Supportive (Green)	28 day survival	Patient	PH-Paramedic	Mazzei M, Donohue JK, Schreiber M, et al. Prehospital tranexamic acid is associated with a survival benefit without an increase in complications: results of two harmonized randomized clinical trials. J Trauma Acute Care Surg. March 2024. Medline
I	Supportive (Green)	Need for blood transfusion	Patient	OR	Montroy J, Hutton B, Moodley P, Fergusson NA, Cheng W, Timmuth A, Lavallée LT, Fergusson DA, Breau RH. The efficacy and safety of topical tranexamic acid: a systematic review and meta-analysis. Transfus Med Rev. 2018 [Epub ahead of print] Medline
I	Supportive (Green)	Death	Patient	ED-MD	Roberts I, Shakur H., Coats T., et al. The CRASH-2 trial: A randomised controlled trial and economic evaluation of the effects of tranexamic acid on death, vascular occlusive events and transfusion requirement in bleeding trauma patients. Health Technol Assess 2013; 17(10):1-79. Medline
I	Neutral (Yellow)	30-day mortality from trauma	Patient	PH-Paramedic & CCT	Guyette FX, Brown JB, Zenati MS, Early-Young B, Adams PW, Eastridge BJ, et al. Tranexamic Acid during Prehospital Transport in Patients at Risk for Hemorrhage after Injury: A Double-blind, Placebo-Controlled, Randomized Clinical Trial. JAMA Surgery 2020. Medline
I	Neutral (Yellow)	Survival neurologically intact 6 months post injury	Patient	PH-Paramedic	PATCH-Trauma Investigators and the ANZICS Clinical Trials Group; Gruen RL, Mitra B, Bernard SA, McArthur CJ, et al. Prehospital Tranexamic Acid for Severe Trauma. N Engl J Med 2023. Medline
II	Supportive (Green)	Mortality	Patient	PH-Paramedic & CCT	Almuwallad A, Cole E, Ross J, Perkins Z, Davenport R. The Impact of Pre-Hospital TXA on Mortality among Bleeding Trauma Patients: A Systematic Review and Meta-Analysis. J Trauma Acute Care Surg 2021. Medline
II	Supportive (Green)	Mortality	Patient	ED-MD	Cole E., Davenport R., Willett K., Brohi K. Tranexamic acid use in severely injured civilian patients and the effects on outcomes: A prospective cohort study. Ann Surg 2015; 261(2):390-4. Medline
II	Supportive (Green)	Mortality	Patient	ED-MD	Eckert MJ., Werten TM., Tyner SD., Nelson DW., Izenberg S., Martin MJ. Tranexamic acid administration to pediatric trauma patients in a combat setting: The pediatric trauma and tranexamic acid study (PED-TRAX). J Trauma Acute Care Surg 2014; 77(6):852-8, discussion 858. Medline
II	Supportive (Green)	24-hour mortality	Patient	PH-Paramedic	El-Menyar A., Sathian B., Asim M., Latif R., Al-Thani H. Efficacy of prehospital administration of tranexamic acid in trauma patients A meta-analysis of the randomized controlled trials. Am J Emerg Med 2018; 36(6) 1079-87. Medline
II	Supportive (Green)	Cellular damage	Patient	ED-Paramedic & MD	Gruen DS, Brown JB, Guyette FX, Johansson PI, Stensballe J, et al. Prehospital tranexamic acid is associated with a dose-dependent decrease in syndecan-1 after trauma: A secondary analysis of a prospective randomized trial. J Trauma Acute Care Surg 2023. Medline
II	Supportive (Green)	In Hospital mortality at 24 and 48 hours	Patient	PH-Paramedic	Morrison JJ., Dubose JJ., Rasmussen TE., Midwinter MJ.. Military application of tranexamic acid in trauma emergency resuscitation (MATTERS) study. Arch Surg 2012; 147(2):113-9. Medline
II	Supportive (Green)	In-hospital mortality	Patient	PH-Paramedic	Morrison JJ., Ross JD., Dubose JJ., Jansen JO., Midwinter MJ., Rasmussen TE. Association of cryoprecipitate and tranexamic acid with improved survival following wartime injury: Findings from the MATTERS II study. JAMA Surg 2013; 148(3):218-25. Medline
II	Supportive (Green)	Mortality recorded at 24 hours	Patient	PH-Paramedic	Neeki MM, Dong F, Toy J, Vaezazizi R, Powell J, Wong D, et al. Tranexamic Acid in Civilian Trauma Care in the California Prehospital Antifibrinolytic Therapy Study. The western journal of emergency medicine 2018; 19(6):977-86. Medline
II	Supportive (Green)	Blunting of measures of coagulopathy	Patient	PH-Paramedic & CCT	Stein P, Studt JD, Albrecht R., Mailer S., von Ow D, Fischer S., et al. The Impact of Prehospital Tranexamic Acid on Blood Coagulation in Trauma Patients. Anesth Analg 2018; 126(2) 522-9. Medline
II	Supportive (Green)	Survival	Patient	PH-Paramedic	Wafaisade A., Lefering R., Bouillon B., Bohmer AB., Gassler M., Ruppert M., et al. Prehospital administration of tranexamic acid in trauma patients. Crit Care 2016; 20(1):143-016-1322-5. Medline

II	Neutral (Yellow)	30 day mortality	Patient	PH-MD & CCT	Bossers SM, Loer SA, Bloemers FW, Den Hartog D, Van Lieshout EMM, Hoogerwerf N, et al. Association Between Prehospital Tranexamic Acid Administration and Outcomes of Severe Traumatic Brain Injury. JAMA Neurol 2021; 78(3):338-45. Medline
II	Neutral (Yellow)	In hospital mortality	Patient	ED-Paramedic & MD	Boutonnet M., Abback P., Le Sachac F., Harrois A., Imbert N., et al. Tranexamic acid in severe trauma patients managed in a mature trauma care system. The journal of trauma and acute care surgery 2018; 84(6) S54-62. Medline
II	Neutral (Yellow)	Hospital length of stay	Patient	Other	Cornelius BG., McCarty K., Hyland K., Cornelius A., Carter K., Smith KWG., et al. Tranexamic Acid Promise or Panacea The Impact of Air Medical Administration of Tranexamic Acid on Morbidity, Mortality, and Length of Stay. Advanced emergency nursing journal; 40(1) 27-35. Medline
II	Neutral (Yellow)	Appropriate use	Process	PH-Paramedic	Kheirbek T, Jikaria N, Murray B, Martin TJ, Lueckel SN, Stephen AH, et al. Unjustified Administration in Liberal Use of Tranexamic Acid in Trauma Resuscitation. J Surg Res 2021; 258:125-31. Medline
II	Neutral (Yellow)	Mortality	Patient	PH-Paramedic	Neeki MM, Dong F, Toy J, Vaezazizi R, Powell J, Jabourian N, et al. Efficacy and Safety of Tranexamic Acid in Prehospital Traumatic Hemorrhagic Shock: Outcomes of the Cal-PAT Study. The western journal of emergency medicine 2017; 18(4):873-83. Medline
II	Neutral (Yellow)	Myocardial injury	Patient	ED-Paramedic & MD	Stroda A, Thelen S, M'Pembere R, et al. Possible effect of the early administration of tranexamic acid on myocardial injury in patients with severe trauma. J Thromb Thrombolysis February 2024; 57(2 PG-179-185):179-185. Medline
II	Neutral (Yellow)	Development of ARDS	Patient	In-Patient	Taghavi S, Chun T, Belfi L, Malone C, Oremosu J, Ali A, et al. A Propensity-Matched Analysis of Tranexamic Acid and Acute Respiratory Distress Syndrome in Trauma Patients. J Surg Res 2022; 280:469-74. Medline
II	Neutral (Yellow)	In-hospital mortality	Patient	PH-Paramedic	Van Wessem KJP, Jochems D, Leenen LPH. The effect of prehospital tranexamic acid on outcome in polytrauma patients with associated severe brain injury. Eur J Trauma Emerg Surg 2021; 1-11. Medline
II	Neutral (Yellow)	Neutral on TXA Administration	Patient	Other	Van Wessem KJP, Leenan LPH. Does Liberal Prehospital and In-Hospital Tranexamic Acid Influence Outcome in Severely Injured Patients? A Prospective Cohort Study. World J Surg 2021; 45(8):2398-407. Medline
II	Neutral (Yellow)	Adverse outcomes	Patient	PH-Paramedic	Van Wessem KJP, Leenan LPH. Does Liberal Prehospital and In-Hospital Tranexamic Acid Influence Outcome in Severely Injured Patients? A Prospective Cohort Study. World J Surg 2021; 45(8):2398-407. Medline
II	Opposes (Red)	Reliability	Process	PH-Paramedic	Valle EJ., Allen CJ., Van Haren RM., et al. Do all trauma patients benefit from tranexamic acid? J Trauma Acute Care Surg 2014; 76(6):1373-1378. Medline
III	Supportive (Green)	In hospital 24 hr mortality from penetrating trauma.	Patient	PH-Paramedic	Broome JM, Nordham KD, Piehl M, et al. Faster refill in an urban emergency medical services system saves lives: A prospective preliminary evaluation of a prehospital advanced resuscitative care bundle. J Trauma Acute Care Surg May 2024; 96(5):702-7. Medline
III	Supportive (Green)	Management of hemorrhagic shock	Patient	PH-Paramedic	Cathers AD, Forsythe J, Sippel N, Williamson C, Kohler JE, Brazelton TB, et al. Tranexamic Acid Use in Pediatric Hemorrhagic Shock From Farm-Related Trauma: A Case Report. Air Med J 2020; 39(5):414-6. Medline
III	Supportive (Green)	Managing hemorrhagic shock	Patient	PH-MD & CCT	Lima LPST, Santos PRS, Martins HJ, Rodrigues DAS, Silva LM, Libard MBO, et al. Use of Tranexamic Acid in Traumatic Resuscitation in a Prehospital Setting: A Case Report. Air Med J 2021; 40(5):359-62. Medline
III	Supportive (Green)	Efficacy	Patient	PH-Paramedic	Vu EN, Wan WCY, Yeung TC, Callaway DW. Intramuscular Tranexamic Acid in Tactical and Combat Settings. Journal of special operations medicine: a peer reviewed journal for SOF medical professionals; 18(1):62-8. Medline
III	Neutral (Yellow)	Hyperfibrinolysis (ROTEM)	Patient		Kunze-Szikszay N., Krack LA., Wildenauer P., et al. The pre-hospital administration of tranexamic acid to patients with multiple injuries and its effects on rotational thrombelastometry: A prospective observational study in pre-hospital emergency medicine. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2016; 24(1):122. Medline
III	Opposes (Red)	Adverse event	Patient	ED-MD	Carroll ND., Restrepo CS., Eastridge BJ., Stasik CN. Left atrial thrombi following tranexamic acid in a bleeding trauma patient-A word of caution. J Card Surg 2018; 33(2) 83-5. Medline

Source: <https://emspep.cdha.nshealth.ca/FAQ.aspx>

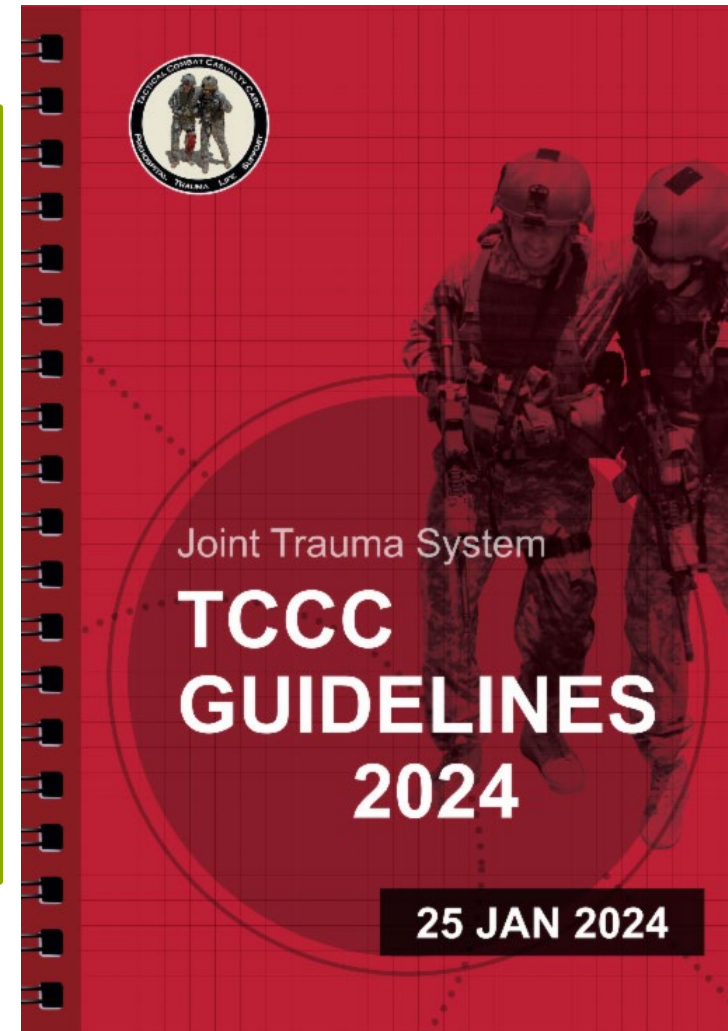
US DOD / TCCC / Defense Health Agency Changes

2024

d. Tranexamic Acid (TXA)

- If a casualty will likely need a blood transfusion (for example: presents with hemorrhagic shock, one or more major amputations, penetrating torso trauma, or evidence of severe bleeding)
- OR
- If the casualty has signs or symptoms of significant TBI or has altered mental status associated with blast injury or blunt trauma"
 - Administer 2 gm of tranexamic acid via slow IV or IO push as soon as possible but NOT later than 3 hours after injury.

Source: Deployed Medicine: <https://books.allogy.com/web/tenant/8/books/b729b76a-1a34-4bf7-b76b-66bb2072b2a7/>



EMS TXA Protocol Questions

- Dosing options for adults
 - 1 g bolus + 1 g over 8 hours [current]
 - **2 g bolus [proposed]**
- TXA administration
 - Piggyback in 100 mL NS over 10 minutes [current]
 - **Slow IV push over 1-2 minutes [proposed]**
- TXA in isolated moderate to severe head trauma
 - Consider when hemorrhage suspected +/- medical control contact [current]
 - Administer in moderate to severe head trauma ($GCS \leq 12$) [proposed]
- TXA in pediatric patients
 - Age > 18 YO [current]
 - **Age 15-18 YO – expand use as in adults [proposed]**
 - **Age ≤ 14 YO – consider use in consultation with medical control, when able [proposed]**
 - 15 mg/kg

Solicitation of Stakeholder Input

Gather stakeholder input from key groups

- State Trauma Advisory Committee
- Quality Assurance Task Force
- MCEP EMS Committee / MI NAEMSP
- Trauma surgeons / Trauma medical directors
- EMS physicians, emergency physicians, PEM physicians

Current evidence and electronic survey widely distributed

- Input after reviewing the current evidence
- Evidence-based opposition with rationale
- COMING SOON.....

falesw@michigan.gov

UPDATED PEDIATRIC TRAUMA CT IMAGING GUIDELINES PERSPECTIVE FROM A MICHIGAN CRITICAL ACCESS HOSPITAL

Michigan-Region 3 Trauma Advisory Council

July 29 2024

Mark Hamed MD MBA MPH FAAFP FAEMS

Trauma Medical Director

McKenzie Health System

INTRODUCTION

- Emergency Department Physician and Medical Director- McKenzie Health System, Sandusky
- Trauma Medical Director at McKenzie
- EMS- Associate Medical Director for MCA in Sanilac County
- Public Health Medical Director- 8 Rural Counties (Thumb Counties and District Health Department #2)
- Attending Physician- Same Day Clinic/ Urgent Care- Henry Ford Health
- Vice Chair, Michigan Board of Medicine
- Leadership Council- Member-at Large for Michigan Trauma Coalition
- **Disclosure- No commercial or financial conflicts/ interests to declare**

OBJECTIVES

- Briefly overview of selected current Pediatric Trauma CT imaging guidelines
- Discuss whether introduction of Updated Guidelines and Tools caused change in CT utilization
- Discuss challenges unique to a Michigan Critical Access Hospital in adhering to the Guidelines
- Discuss the outcomes of introduction of Updated Imaging Guidelines and Tools
- Briefly discuss case scenarios utilizing Updated Guidelines

MCKENZIE HEALTH SYSTEM

- Critical Access Hospital in Sandusky, Michigan
 - 19 total hospital beds
 - Includes 6 Emergency Department beds
 - ED Volume: 5500-6000 patients/year (10-20% Pediatric patients)
 - Single Physician Coverage
 - Michigan Level IV Trauma Designation
 - 1st fully (3-year) accredited Level IV in Michigan- May 2017
 - Closest Adult Level 1- Hurley- Flint
 - Closest Pediatric Trauma Facility
 - Covenant Healthcare, Saginaw (Level 2)
 - Closest Pediatric Trauma Level 1 Facility: Children's Hospital Detroit

MCKENZIE HEALTH SYSTEM

Acute Heart Attack Ready

Acute Stroke Ready

Tele-Stroke in conjunction with Ascension Michigan)

Geriatric ED accredited (Level3)

Electronic Health Record: CPSI

Telehealth consults: Stroke, Neuro, Critical Care, Cardiology

Pilot Program with Hurley: Burn-Trauma Questions/Consults

Hospital- based EMS

3 (1 basic, 2 advanced) EMS Units covering the county

Community Paramedicine Program

MCKENZIE HOSPITAL'S RADIOLOGY RESOURCES

24/7 access to radiology (X-rays and CT)

- Radiology reads X-ray daily 7am-10pm (
- 24/7 CT reads (area based 7am-11pm, California based Rad group after hours)

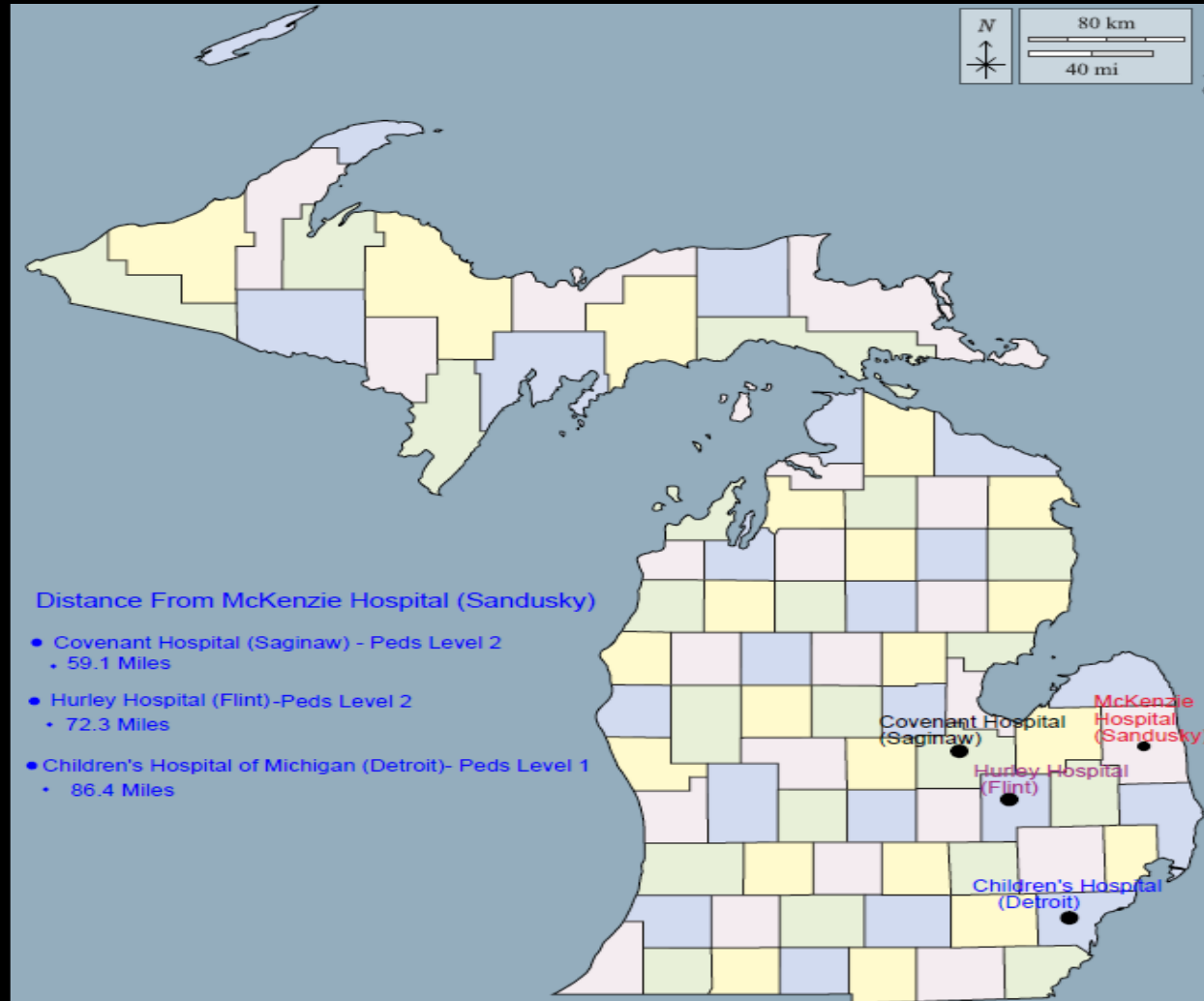
General ultrasound tech (M-F 8am-4pm)

- Doppler studies tech (sometimes weekend coverage)

Availability of portable ultrasounds in ED

- FAST exam, procedures, quick bedside diagnostics

MCKENZIE HOSPITAL CLOSEST LEVEL 1 &2 PEDS TRAUMA FACILITIES



RADIATION-RELATED CANCER RISK

Ionizing radiation from CT scans can cause lethal malignancies

Estimated lifetime risk of lethal malignancy from head CT scan

1 year old patient : 1 in 1000 to 1 in 1500

10-year-old patient: 1 in 5000

Risk highest in youngest patients; decreases with age

Smaller bodies generally receive higher dose of radiation at a smaller cross section

Leukemia, Thyroid, Breast, Skin, Urinary/Renal, Ovarian, Hepatic

APPROACHES TO MITIGATE CT-RELATED CANCER RISK PEDIATRIC PATIENTS

Alternate imaging studies

- Ultrasound , MRI (not available at our facility)
- Lower radiation risk with x-rays

Observation

- If have staff and resources; Reliable caregivers

Thorough history and physical exam

- Can help determine pre-test probability and guide decision making whether CT is indicated (see below)

Clinical-decision making tools

- Clinical prediction rules to identify risk of clinically-important injuries to help guide image ordering and/or patient disposition

C-Spine

Acute Neurologic Deficit
(Instead of Plain Films)

-OR-

As Part of Initial Evaluation of
Severe Head Trauma (GCS 3 to 13)
Instead of Plain Films

-OR-

Abnormal or Suspicious C-Spine
on Plain Films

-OR-

High Index of Suspicion for
C-Spine Injury Despite Normal
Plain Cervical Radiographs

Chest

Blunt Trauma:

< 13 Years

Abnormal CXR
(Widened Mediastinum)

≥ 13 Years

CT as Clinically Indicated

Penetrating Trauma:

If Concerned for Major Vascular Injury,
Consider CT/CTA

Abd/Pelvis

Consider CT Scan:

Requiring resuscitation to maintain
adequate vital signs with concerns for
abdominal trauma (in conjunction with
consult to Pediatric Trauma Center)

Positive abdominal exam (i.e. pain,
distention, rigidity) with positive FAST

Thoracic wall trauma

Altered mental status with concern
for abdominal trauma

**Consult with Pediatric
Trauma Center:**

Abdominal bruising/seat belt sign

Hematuria or rectal bleeding

Elevated AST (>200), ALT (>125),
Amylase, Lipase

Head

**Head CT
Recommended:**

0-6 Months

Suspected Child Physical Abuse

< 2 Years

GCS < 15

Altered Mental Status

Palpable Skull Fracture

≥ 2 Years

GCS < 15

Altered Mental Status

Signs of Basilar Skull Fracture

Consider Observation vs CT:

< 2 Years

Scalp Hematoma

History of LOC ≥ 5 sec

*Severe MOI

Not acting normally per caregiver

≥ 2 Years

History of LOC

Vomiting

*Severe MOI

Severe Headache

MICHIGAN TRAUMA COALITION TOOL

Finalized towards end of COVID Pandemic

Quick and easy to reference

Aids clinical decision for imaging studies in
pediatric trauma patients

Goal to help to ensure necessity of peds
imaging studies

Avoid repeat studies at referral centers

Incorporates recommendations that are
evidence-based guidelines using multiple
decision-making tools

*Severe Mechanism of Injury: Motor vehicle crash with patient ejection, death of another passenger, or rollover, pedestrian or bicyclist without helmet struck by a motorized vehicle, falls of more than 3 ft in patients < 2 years of age or more than 5 ft. for patients age 2 yr. or older, head struck by high impact object.

Michigan
Trauma
Coalition



NON-ACCIDENTAL TRAUMA (CHILD ABUSE)

TEN-4-FACESp

Bruising Clinical Decision Rule for Children < 4 Years of Age

When is bruising concerning for abuse in children < 4 years of age?
If bruising in any of the three components (Regions, Infants, Patterns) is present without a reasonable explanation, strongly consider evaluating for child abuse and/or consulting with an expert in child abuse.

TEN
Torso | Ears | Neck



FACES

Frenulum
Angle of Jaw
Cheeks (*fleshy part*)
Eyelids
Subconjunctivae

REGIONS

4 months and younger



Any bruise, anywhere

INFANTS

Patterned bruising



Bruises in specific patterns
like slap, grab or loop marks

PATTERNS

See the signs

Unexplained bruises in these areas most often result from physical assault.
TEN-4-FACESp is not to diagnose abuse but to function as a screening tool to improve the recognition of potentially abused children with bruising who require further evaluation.

TEN-4-FACESp was developed and validated by Dr. Mary Clyde Pierce and colleagues. It is published and available for FREE download at luriechildrens.org/ten-4-facesp.

 Ann & Robert H. Lurie
Children's Hospital of Chicago®



CERVICAL SPINE CLEARANCE TOOLS

NEXUS, CCR, PECARN

C-Spine

Acute Neurologic Deficit
(Instead of Plain Films)

-OR-

As Part of Initial Evaluation of
Severe Head Trauma (GCS 3 to 13)
Instead of Plain Films

-OR-

Abnormal or Suspicious C-Spine
on Plain Films

-OR-

High Index of Suspicion for
C-Spine Injury Despite Normal
Plain Cervical Radiographs

Figure 11. National Emergency
X-Radiography Utilization
Study (NEXUS) Criteria

Meets all low-risk criteria?

1. No posterior midline cervical-spine tenderness
2. No evidence of intoxication
3. A normal level of alertness
4. No focal neurologic deficit
5. No painful distracting injuries

YES

No Radiography

NO

Radiography

The Canadian C-Spine Rule

Please check off all choices within applicable boxes:

1. Any One High-Risk Factor Which Mandates Immobilization?

- No Yes
- ☐ Age ≥ 65 years
 - ☐ OR
 - ☐ Dangerous mechanism *
 - ☐ OR
 - ☐ Numbness or tingling in extremities

☐ Yes

☐ No

2. Any One Low-Risk Factor Which Allows Safe Assessment of Range of Motion?

- No Yes
- ☐ Simple rearend MVC **
 - ☐ OR
 - ☐ Ambulatory at any time at scene
 - ☐ OR
 - ☐ No neck pain at scene when asked
 - ☐ OR (answer "yes" if no pain)
 - ☐ No pain during midline c-spine palpation
 - ☐ (answer "yes" if no pain)

☐ No

☐ Unable

☐ Yes

3. Patient Voluntarily Able to Actively Rotate Neck 45° Left and Right When Requested, Regardless of Pain?

- No Yes
- ☐
 - ☐

☐ Able

☐ No C-Spine Immobilization ***

☐ C-Spine Immobilization

* Dangerous Mechanism
-fall from elevation ≥ 3 feet/5 stairs
-axial load to head, e.g. diving
-MVC high speed (≥ 100 km/hr), rollover, ejection
-motorized recreational vehicles e.g. ATV
-bicycle collision with object e.g. post, car

** Simple Rearend MVC Excludes:
-pushed into oncoming traffic
-hit by bus/large truck
-rollover
-hit by high speed vehicle (≥ 100 km/hr)

PECARN

8 Risk Factors (when ALL absent, 98% sensitive)

- Altered Mental Status
- Focal Neurologic Findings
- Substantial Torso Injury
- Neck Pain
- Torticollis
- Conditions Predisposing to Cervical Injury
- Diving
- High-Risk Motor Vehicle Crash

Pediatric TBI Imaging Decision Making Tools

PECARN, CATCH, CHALICE



Head

Head CT Recommended:

0-6 Months
Suspected Child Physical Abuse

< 2 Years
GCS < 15
Altered Mental Status
Palpable Skull Fracture

> 2 Years
GCS < 15
Altered Mental Status
Signs of Basilar Skull Fracture

Consider Observation vs CT:

< 2 Years
Scalp Hematoma
History of LOC ≥ 5 sec
*Severe MOI
Not acting normally per caregiver

> 2 Years
History of LOC
Vomiting
*Severe MOI
Severe Headache

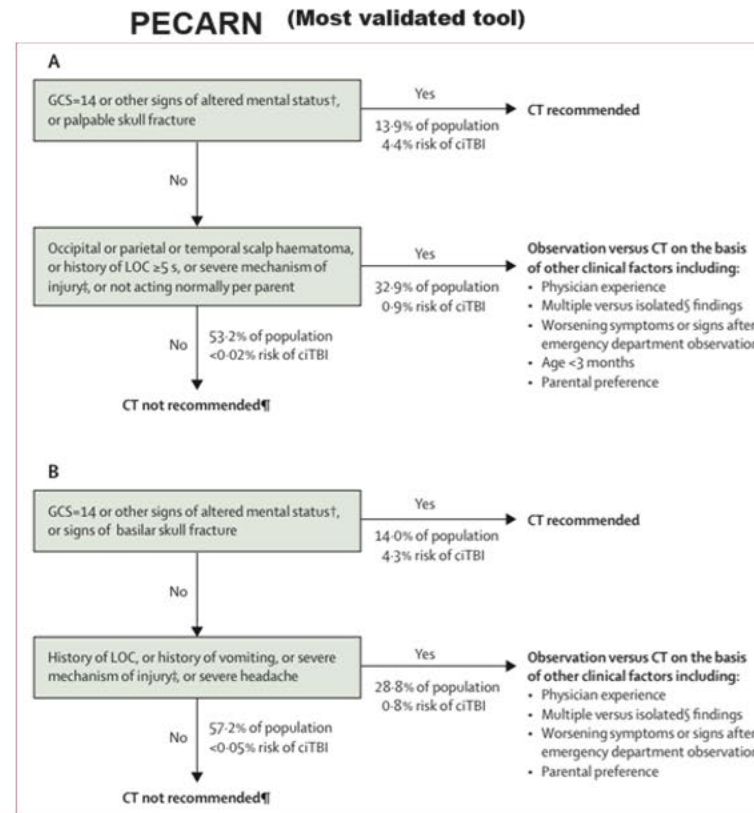


Figure 3: Suggested CT algorithm for children younger than 2 years (A) and for those aged 2 years and older (B) with GCS scores of 14-15 after head trauma*

CHALICE

The children's head injury algorithm for the prediction of important clinical events (CHALICE) rule

Computed tomography of the head is required if any of the following criteria are present.	
History	- Witnessed loss of consciousness of >5 min duration - History of amnesia (either antegrade or retrograde) of >5 min duration - Abnormal drowsiness (defined as drowsiness in excess of that expected by the examining doctor) ≥3 vomits after head injury (a vomit is defined as a single discrete episode of vomiting) - Suspicion of non-accidental injury (NAI, defined as any suspicion of NAI by the examining doctor) - Seizure after head injury in a patient who has no history of epilepsy
Examination	- Glasgow Coma Score (GCS) <14, or GCS <15 if <1 year old - Suspicion of penetrating or depressed skull injury or tense fontanelle - Signs of a basal skull fracture (defined as evidence of blood or cerebrospinal fluid from ear or nose, panda eyes, Battle's sign, haemotympanum, facial crepitus or serious facial injury) - Positive focal neurology (defined as any focal neurology, including motor, sensory, coordination or reflex abnormality) - Presence of bruise, swelling or laceration >5 cm if <1 year old
Mechanism	- High-speed road traffic accident either as pedestrian, cyclist or occupant (defined as accident with speed >40 m/h) - Fall of >3 m in height - High-speed injury from a projectile or an object
If none of the above variables are present, the patient is at low risk of intracranial pathology.	

CATCH

Canadian Assessment of Tomography for Childhood Head injury (CATCH) rule

CT of the head is required only for children with minor head injury* and any one of the following findings:	
High risk (need for neurologic intervention)	- Glasgow Coma Scale score <15 at two hours after injury - Suspected open or depressed skull fracture - History of worsening headache - Irritability on examination
Medium risk (brain injury on CT scan)	- Any sign of basal skull fracture (eg, hemotympanum, "raccoon" eyes, otorrhea or rhinorrhea of the cerebrospinal fluid, Battle's sign) - Large, boggy hematoma of the scalp - Dangerous mechanism of injury (eg, motor vehicle crash, fall from elevation ≥3 ft [≥91 cm] or 5 stairs, fall from bicycle with no helmet)

CT: computed tomography.
 * Minor head injury is defined as injury within the past 24 hours associated with witnessed loss of consciousness, definite amnesia, witnessed disorientation, persistent vomiting (more than one episode) or persistent irritability (in a child under two years of age) in a patient with a Glasgow Coma Scale score of 13-15.

PREDICTION TOOL FOR INTRA-ABDOMINAL INJURIES

PECARN IAI ALGORITHM, BATIC SCORE

Abd/Pelvis

Consider CT Scan:

Requiring resuscitation to maintain adequate vital signs with concerns for abdominal trauma (in conjunction with consult to Pediatric Trauma Center)

Positive abdominal exam (i.e. pain, distention, rigidity) with positive FAST

Thoracic wall trauma

Altered mental status with concern for abdominal trauma

Consult with Pediatric Trauma Center:

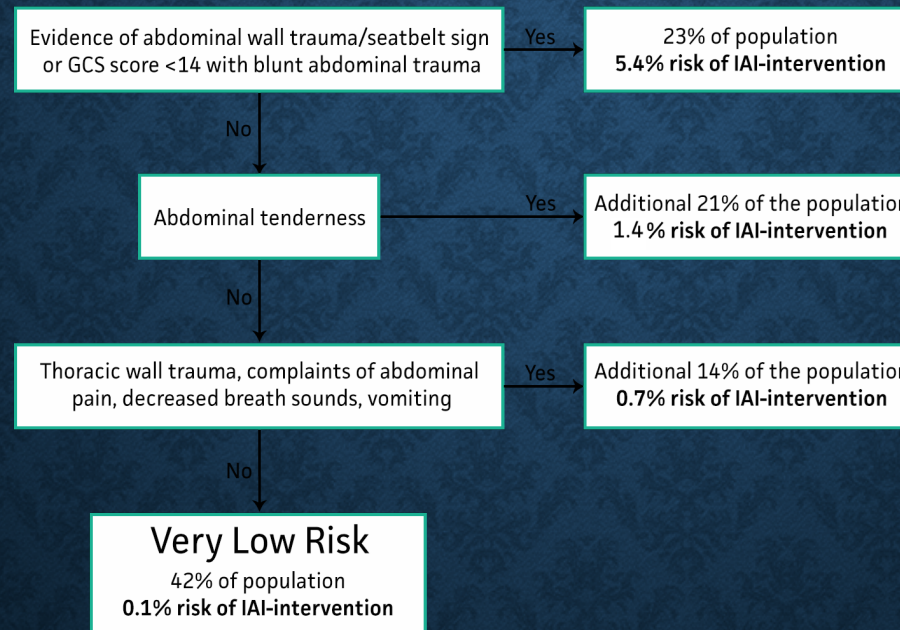
Abdominal bruising/seat belt sign

Hematuria or rectal bleeding

Elevated AST (>200), ALT (>125), Amylase, Lipase



PECARN Pediatric Intra-Abdominal Injury (IAI) Algorithm



Blunt Abdominal Trauma in Children (BATiC) score

AST>200 U/L, AST>125
Abnormal abdominal examination
Abnormal chest x-ray
Report of abdominal pain
Abnormal pancreatic enzymes (Amylase, Lipase)

CLINICAL DECISION INSTRUMENT FOR CHEST CT IMAGING

Chest

Blunt Trauma:

< 13 Years
Abnormal CXR
(Widened Mediastinum)

≥ 13 Years
CT as Clinically Indicated

Penetrating Trauma:
If Concerned for Major Vascular Injury,
Consider CT/CTA



NEXUS Chest CT Decision Instrument for CT Imaging

Identifies blunt trauma patients with clinically significant thoracic injuries.

INSTRUCTIONS
Use in awake, non-intubated, hemodynamically stable blunt trauma patients ≥15 years old in whom a CT chest is considered as part of the normal diagnostic evaluation.

When to Use ▾

Pearls/Pitfalls ▾

Why Use ▾

Clinically Major Thoracic Injuries

☒ Abnormal chest X-ray
CXR showing any thoracic injury (including clavicle fracture) or widened mediastinum

☒ Distracting injury

☒ Chest wall, sternum, thoracic spine, or scapular tenderness

All Thoracic Injuries

☒ Rapid deceleration mechanism
Fall from >20 feet/6.1 m or MVA at >40 mph/64.4 km/hr with sudden deceleration.

Diagnostic Result
All MAJOR AND MINOR criteria are ABSENT - no Chest CT by NEXUS Chest.

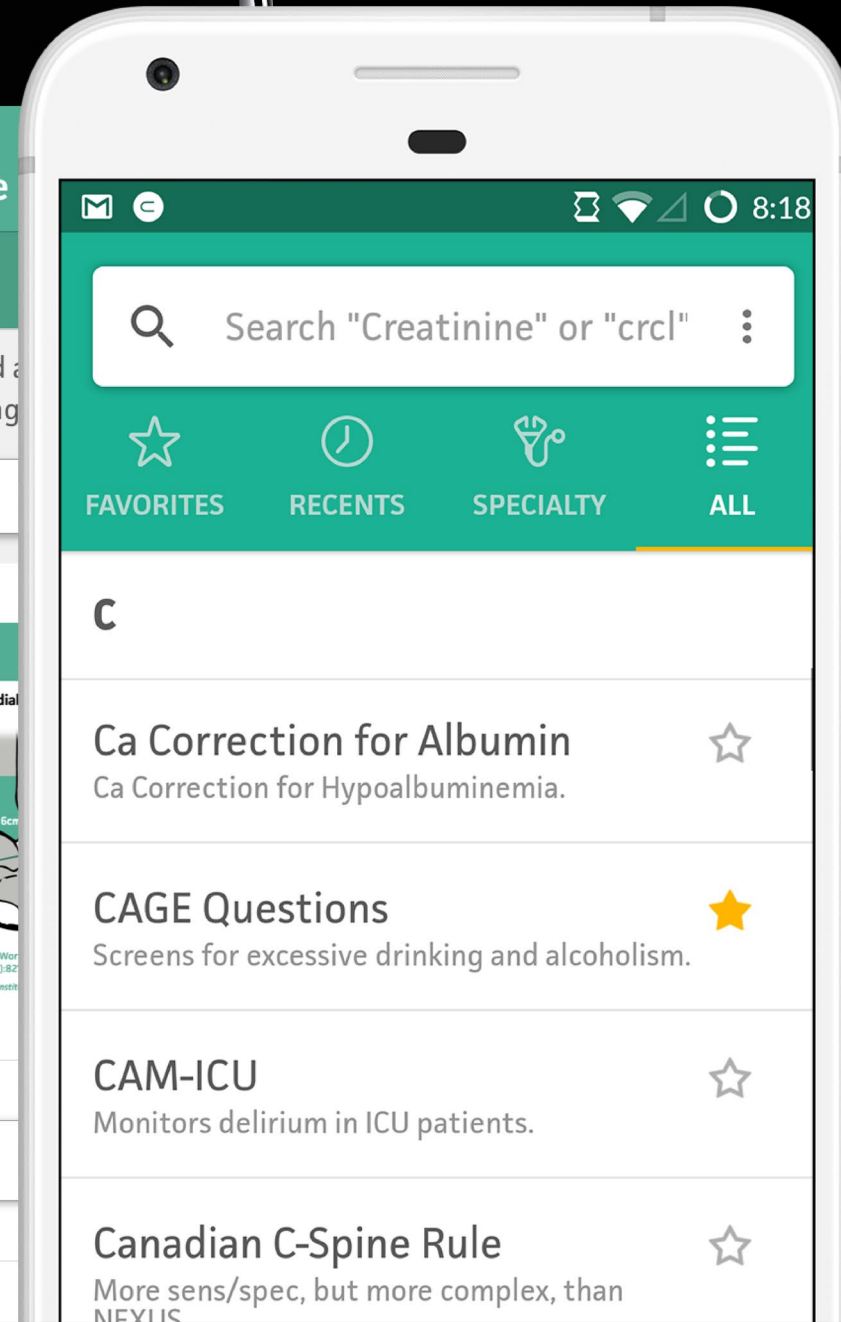
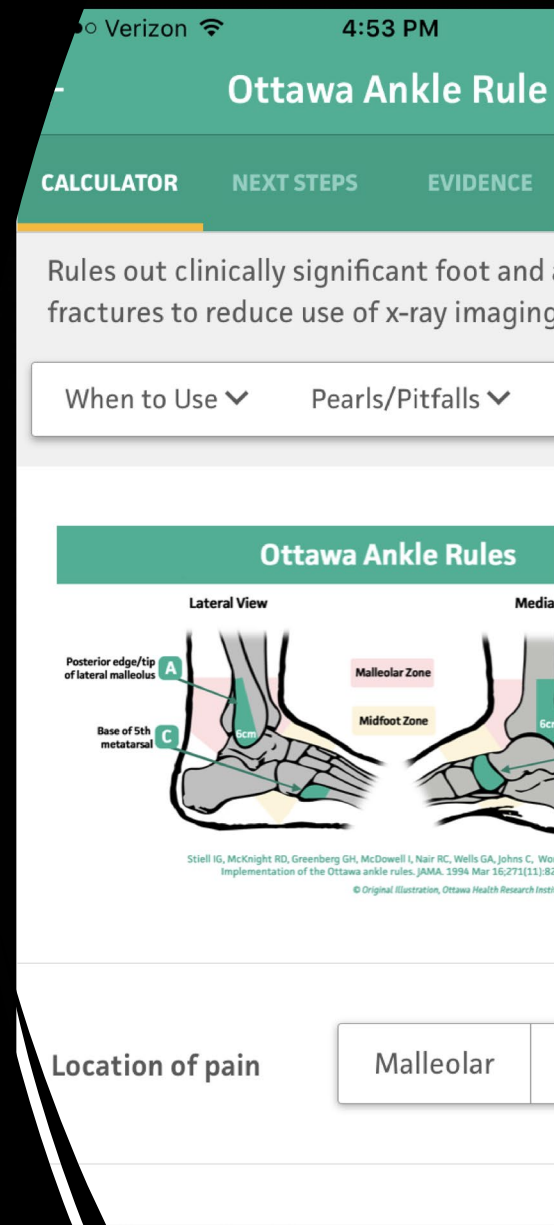
Major injury: 99.2% sensitive, 31.7% specific
Major or minor injury: 90.7% sensitive, 37.9% specific

Copy Results 📄

Next Steps >>>

MDCALC WEBSITE AND SMARTPHONE APP

- Contains hundreds of Clinical Decision Tools, Risk Stratifications and Algorithms
- Website: www.mdcalc.com
- Available on IOS and Android Devices also
- Free download



MD+ CALC



Search "QT interval" or "QT" or "EKG"



Popular



Recents



Favorites



Specialty



CME Calcs



Guidelines



All

CME Calcs

NEXUS Chest CT Decision Instrument for CT Imaging

Identifies clinically significant thoracic injuries in blunt trauma patients.



CME

NEXUS Chest Decision Instrument for Blunt Chest Trauma

Blunt chest trauma decision making.



CME

NEXUS Criteria for C-Spine Imaging

Rules out need for imaging; simple.



CME

Ottawa Ankle Rule

Rules out clinically significant foot and ankle fractures.



CME

PECARN Pediatric Head Injury/Trauma Algorithm

Clears peds head injury without imaging.



CME

PECARN Pediatric Intra-Abdominal Injury (IAI) Algorithm

Rules out clinically important blunt abdominal injuries.



Pediatric NEXUS II Head CT Decision Instrument for Blunt Trauma

Pediatric head trauma.



CME

PECARN Pediatric Intra-Abdominal Injury (IAI) Algorithm

Identifies children at very low risk of clinically important blunt abdominal injuries.

INSTRUCTIONS

Use in patients <18 years old presenting with blunt abdominal trauma within 24 hours of injury. Do not use in patients with penetrating trauma, pre-existing neurologic disorders impeding a reliable exam, or pregnancy. Do not use in patients transferred from another hospital where abdominal CT or diagnostic peritoneal lavage was already performed.

When to Use ▾

Pearls/Pitfalls ▾

Why Use ▾

Evidence of abdominal wall trauma or seatbelt sign

No

Yes

GCS <14 and blunt abdominal trauma

No

Yes

Abdominal tenderness

No

Yes

≥1 of the following:

No

Yes

- Thoracic wall trauma
- Complaint of abdominal pain
- Decreased breath sounds
- Vomiting

0.1 %

Risk of intra-abdominal injury requiring intervention

Very low risk

Consider deferring CT abdomen.

Copy Results 📄

Next Steps »»

PECARN Pediatric Head Injury/Trauma Algorithm

Predicts need for brain imaging after pediatric head injury.

INSTRUCTIONS

Note: This only applies to children with **GCS** scores of 14 or greater.

When to Use ▾

Pearls/Pitfalls ▾

Why Use ▾

Age

<2 Years

≥2 Years

GCS ≤14 or signs of basilar skull fracture or signs of AMS

AMS: Agitation, somnolence, repetitive questioning, or slow response to verbal communication

No

Yes

History of LOC or history of vomiting or severe headache or severe mechanism of injury

Motor vehicle crash with patient ejection, death of another passenger, or rollover; pedestrian or bicyclist without helmet struck by a motorized vehicle; falls of more than 1.5m/5ft; head struck by a high-impact object

No

Yes

PECARN recommends No CT; Risk <0.05%, "Exceedingly Low, generally lower than risk of CT-induced malignancies."

Copy Results 📄



NEXUS Criteria for C-Spine Imaging

Clears patients from cervical spine fracture clinically, without imaging.

When to Use ▾

Pearls/Pitfalls ▾

Why Use ▾

Focal neurologic deficit
present

No 0

Yes +1

Midline spinal
tenderness present

No 0

Yes +1

Altered level of
consciousness present

No 0

Yes +1

Intoxication present

No 0

Yes +1

NEXUS Chest CT Decision Instrument for CT Imaging

Identifies blunt trauma patients with clinically significant thoracic injuries.

INSTRUCTIONS

Use in awake, non-intubated, hemodynamically stable blunt trauma patients ≥ 15 years old in whom a CT chest is considered as part of the normal diagnostic evaluation.

When to Use ▾

Pearls/Pitfalls ▾

Why Use ▾

Clinically Major Thoracic Injuries

**Abnormal chest X-ray**

CXR showing any thoracic injury (including clavicle fracture) or widened mediastinum

**Distracting injury****Chest wall, sternum, thoracic spine, or scapular tenderness**

All Thoracic Injuries

**Rapid deceleration mechanism**

Fall from >20 feet/6.1 m or MVA at >40 mph/64.4 km/hr with sudden deceleration.

Diagnostic Result

All MAJOR AND MINOR criteria are ABSENT - no Chest CT by NEXUS Chest.

Major injury: 99.2% sensitive, 31.7% specific

Major or minor injury: 90.7% sensitive, 37.9% specific

Copy Results 📄

Next Steps >>>

NO FACILITY-WIDE ED PEDS IMAGING POLICY

- At our facility, there was no uniform wide Peds CT imaging policy in place
 - Recommendations, however, no formal policy
 - Most physicians worked at other facilities with varying policies/protocols
- **Prior** Emphasis on Clinical Decision Tools
 - Imaging decisions often didn't follow evidence-based guidelines or Risk stratification tools
 - Physician comfort caring for peds patient
 - Some physicians insisted on **same general adult trauma** work-ups (pan CT scanning) for low-risk peds trauma
- **Post** Emphasis on Clinical Decision Tools
 - Obtained dedicated ED-based ultrasound (rather than bringing from Rad dept)
 - Informed physicians new Peds Trauma Imaging Guidelines and available Internet/App Tools
 - Reminded to document on ED Note
 - **Clinical and Risk Stratification per Clinical Decision Tool/Calculator**
 - **Shared-Decision Making/ Discussion with Parent**

MCKENZIE HOSPITAL PEDIATRIC CTS ORDERED

COMPARISON OF TWO DISTINCT 24-MONTH PERIODS*

- **May 2017** – April 2019**

- 290 CTs ordered for 262 Pediatric Trauma Patients
 - CT Head 113 (39%)
 - CT Abdomen/Pelvis 93 (32%)
 - CT Cervical Spine 46 (16%)
 - CT Chest/Thorax 23 (8%)

- Blunt Trauma: 95%
- Penetrating: 5%

- **Transferred to higher level Trauma Facility: 11%**

**May 2017-Michigan Level IV Trauma Designation

- **May 2022-April 2024**

- 245 CTs ordered for 214 Pediatric Trauma Patients
 - CT Head 85 (35%)
 - CT Abdomen/Pelvis 71 (29%)
 - CT Cervical Spine 26 (11%)
 - CT Chest/Thorax 20 (8%)

- Blunt Trauma: 93%
- Penetrating: 7%

- **Transferred to higher level Trauma Facility: 8%**

*ED Volume significantly decreased 2020-2021 due to Covid , avoided this time period to study due to under-representation of typical sample

APPROPRIATE UTILIZATION OF CT STUDIES PEDIATRIC TRAUMA PATIENTS

May 2017 – April 2019

- CT Head: 76%
- CT C-Spine: 79%
- CT Chest/Thorax: 84%
- CT Abd/Pelvis: 77%

- Overall: 79%

May 2022-April 2024

- CT Head: 88% ( 12%)
- CT C-Spine: 86% ( 7%)
- CT Chest/Thorax: 93% ( 9%)
- CT Abd/Pelvis: 92% ( 15%)

- Overall: 89.5% ( 10.5%)

CHALLENGES TO ADHERING TO IMAGING GUIDELINES

Parents

Lack of transportation/Lack of follow up capability

Insisting/Demanding Test for low-risk injuries

- CT Head:
 - <4-year-old (especially non-verbal/developmental delayed)
 - School sport injuries

Health System

Workflow: No EHR integration with Risk-Decision Calculator tools

- Our current EHR (CPSI) not user friendly, product lacks risk calculator/tools, lacks pop-up alerts
- Would have to manually document shared decision-making
- Would have to manually copy /paste risk calculator results onto ED note

Physicians

Fear of negative parent reviews, satisfaction scores

- **Rural Communities: “word of mouth” very powerful**
- Verbal/online threat to bypass our ED in future

Clinical Intuition: Fear of “missing” a diagnosis

Fear of malpractice

Habit

- Used to “Pan-CT Scanning Adults” especially post 2017 Trauma IV Designation
- More “time-efficient” than Ultrasound or Observing child

Concern that parents may not truly understand risks:

- Education level of parent to monitor child appropriately
- Concern they may downplay issues
- **Recommendation**: Pre-Printed Handouts explaining cancer risks of radiation vs low probability of positive imaging test

GENERAL OUTCOMES OF UPDATED PEDS IMAGING CAMPAIGN

1. Augmented our push towards more appropriate utilization of CT for Peds Trauma

- Clinical Decision /Risk Calculators
- MDCalc Website and App

+10% overall improvement in appropriate utilization of Peds CT

2. Our Peds Trauma Level 1 and 2 partners

Familiarity and understanding of our rural community limitations

- Lack of resources
- Rural transportation, patient social / economic challenges

Provided real time support

- Appropriate testing /management recommendations
- Helped to facilitate appropriate transfers and to avoid unnecessary transfers

Post-Transfer Case Reviews, Outcomes, Feedback

- Used to inform and educate providers/ staff, develop protocols/protocols, etc

CASE SCENARIOS

Disclaimer

The following case scenarios are based on actual events.

Some of the details may have been modified to help protect patient privacy.

CASE 1



An 18-month-old female

Five-foot fall from table, hitting head

No LOC

Somewhat more tired than normal

Discussion with parents

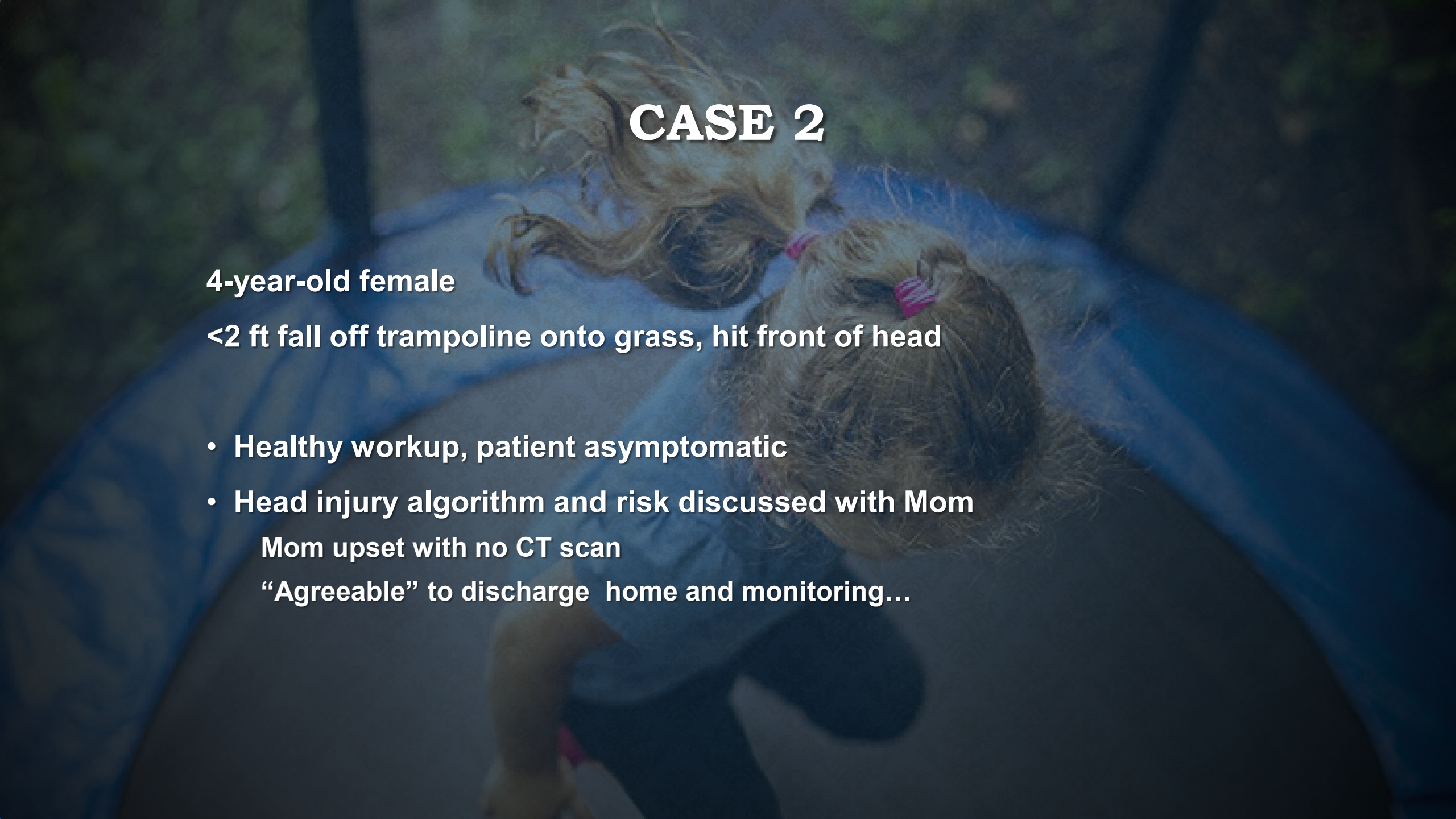
CT Scan vs Observation

Parents don't have own car, won't be able to find a ride back if deteriorates

Were agreeable to CT scan

Negative CT Head

Discharged home



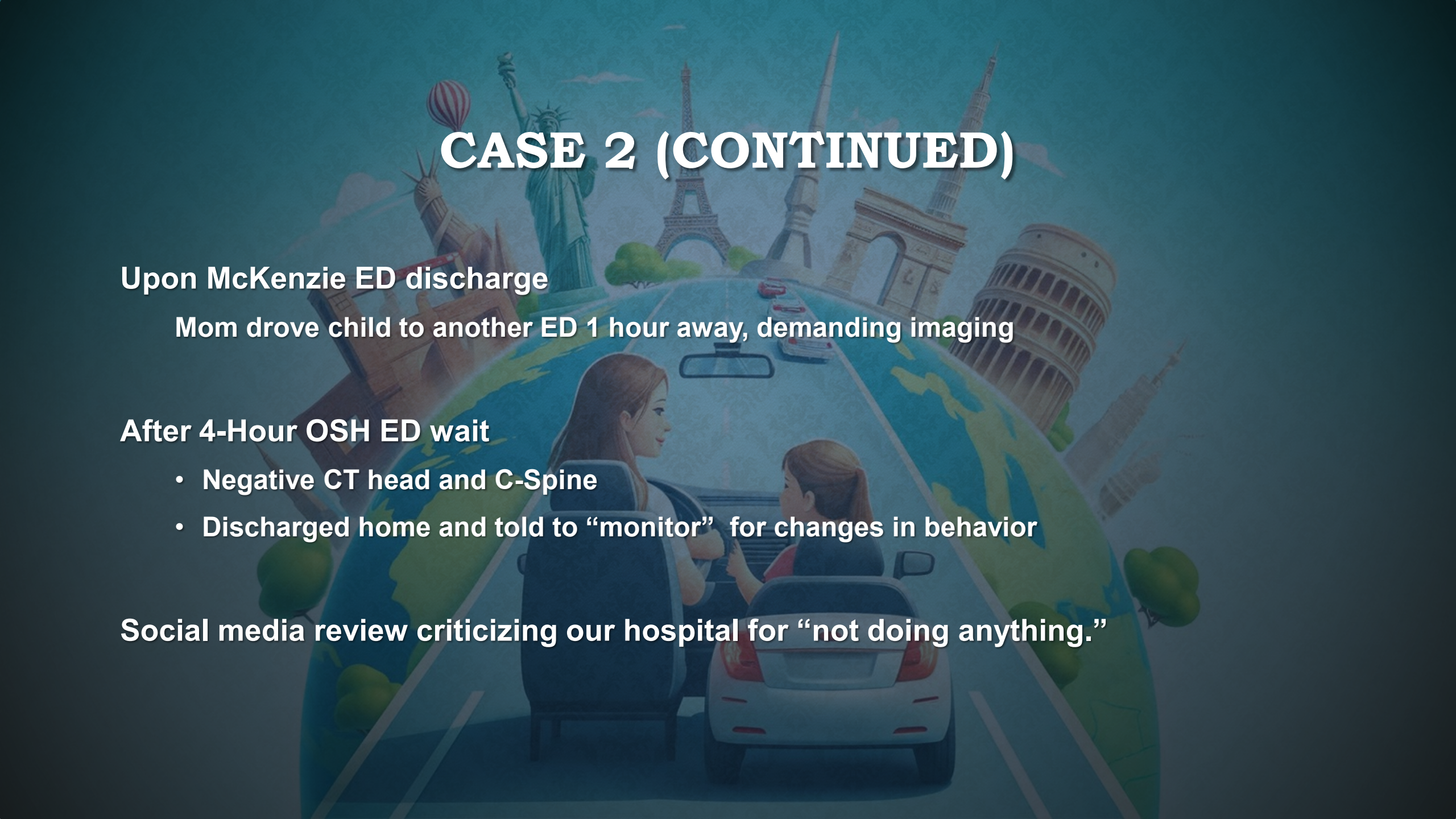
CASE 2

4-year-old female

<2 ft fall off trampoline onto grass, hit front of head

- **Healthy workup, patient asymptomatic**
- **Head injury algorithm and risk discussed with Mom**
Mom upset with no CT scan
“Agreeable” to discharge home and monitoring...

CASE 2 (CONTINUED)



Upon McKenzie ED discharge

Mom drove child to another ED 1 hour away, demanding imaging

After 4-Hour OSH ED wait

- Negative CT head and C-Spine
- Discharged home and told to “monitor” for changes in behavior

Social media review criticizing our hospital for “not doing anything.”



CASE 3

“Stoic” 6-year-old boy unwitnessed fall from a tree

Says he landed on “buttocks”

- “Didn’t feel like walking” , was “tired”

Parents both work in health care

- Messaged child’s PCP, told to take Tylenol for pain
- Make an appointment for a week later
- If concerns, go to the ED

36 hours later....not being himself, no appetite, reports headache

- Swelling on right side head noticed
- Told mom that he fell on buttocks, then *hit head against a tree* trunk on way down

Brought to the ED

CASE 3 (CONTINUED)

CT Head:

Acute right epidural hematoma with surrounding mass effect resulting in 8 mm of midline shift to the left.

Acute nondisplaced right temporal bone fracture.

Transferred to Ped Level 1 Trauma Center

- Neurosurgery consulted
 - Craniotomy with evacuation of hematoma
 - Improvement of midline shift
- Discharged to home 4 days later in stable and improved condition



TAKE AWAY POINTS

- A large-scale educational campaign to reduce unnecessary pediatric CTs is feasible
- Can contribute to improved quality, safety, and efficient peds trauma care
- Can reduce:
 - ✓ Burdensome, unnecessary transfers from rural hospitals
 - ✓ CT-associated cancer risk in pediatric patients
 - ✓ Overall healthcare expenditures
- Unique challenges exist in resource-scarce/rural communities
- Keys to improve adherence to guidelines and patient outcomes
 - Ease of use and reference of Risk Tools/Guidelines
 - Consistent communication/collaboration between Primary Trauma Centers with Rural Hospital

Questions?

Feel free to email me at Mhamed@McKenzieHealth.org

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Snowmobile spreadsheets due April 15

Already submitted:

- Aspirus Ironwood
- Aspirus Iron River
- Aspirus Keweenaw
- Baraga
- Helen Newberry Joy
- MyMichigan Sault
- UP Health System Marquette

Survey Monkey conducted to determine what tele-health options are currently available in emergency departments and in-patient units. **Thank you!** Analyzed and tables were sent to Dr. Bigsby for inclusion in the next workgroup meeting.

Continue to impress upon EMS personnel to appropriately document transfer patients versus emergency scene patients.

Registrars to use the fields that express the patient is being transferred out or has been transferred into their facility.

R8 Patient Movement Workgroup



Reports





Injury Prevention



Communications



Infrastructure

~ Data elements



Regional performance improvement

- ~ EMS trauma protocols
- ~ ATLS & ACS-COT Best Practices



Continuum of care



Education

- ~ Until Help Arrives liability script
- ~ What is Trauma – which months?



Member announcements
Public comment
Adjournment