

EMSC Connects

VOLUME 6, ISSUE 11

Nov 2017

**Emergency Medical Services for Children
Utah Bureau of EMS and Preparedness**

A Word From Our Program Manager

Special points of interest:

- *Pediatric Head Injury*
- *Head Trauma*
Guideline

I hope this greeting finds you in good health and in good spirits. I can't believe the holidays are almost here. This year has passed by so fast. Speaking of "passing by" and "fast", the Thanksgiving weekend is one of the busiest travel days of the year. In 2015, 301 vehicle occupants were killed in traffic crashes across the country. More than 50% of the vehicle occupants were not wearing seatbelts.



EMS is the safety net when prevention fails. Partner with your local law enforcement and community educators to encourage safe driving practices. Remember, children need to be in the appropriate protective devices for their ages.

or newsletters, such as those below.

I would also like to remind you that the Utah Zero Fatalities Safety Summit will be held in Provo April 11 and 12, 2018. This is an opportunity to learn more about highway safety from law enforcement, educators and engineers. EMS plays a major role in the traffic management and safety. We hope you will save this date and attend.

The EMS track will host the Stop the Bleed program, opioid use as a driving distraction, and a crash survivor story. Go to: ut.zerofatalities.com to register.

Please be safe out there. Thank you for all you do for the children of Utah.

Jolene Whitney
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[The National Highway Traffic Safety Administration](#) has many traffic safety management resources that can be utilized in your PSA's



Pedi Points
Tia Dickson RN, BSN

It seems that being a pediatric trauma nurse for 2 decades does not make me immune to the “mom fails”. Though I always buckle my children in the grocery cart when I can, I have 10 months twins and few businesses have double kid seats in their carts (thank you Costco for having them!) While out shopping the other day one of my precocious babies tumbled head first out of the grocery cart. I can still hear the sickening thump as her head hit the ground. I picked her up so quickly she did not have time to cry and all thoughts of c-spine stabilization had flown from my brain. I assessed her, got them home, and cried for a while. She seemed absolutely fine other than a small goose egg in the middle of her forehead. I



This grocery cart is epic! Space for 2 kids and facing in the direction they prefer

knew what to watch for, I knew what was concerning and what would warrant a 911 call and I watched her like a hawk for the next 3 hours teetering on whether to take her in to the ER or not. I was so glad that I had recently attended the EMSC Coordinators Workshop where our Medical Director Hilary Hewes gave a great presentation on head injury in pediatrics. On that fateful afternoon as I watched my twins wreak their usual havoc in our living room, I was grateful for all the knowledge I have gained from associating with great providers. In the future I’ll be using my double stroller instead of grocery carts.

Parents and providers alike will learn some great information in this newsletter on pediatric head trauma.

The Doc Spot
Adapted from Head Injury in Pediatrics from the 2017 EMSC Coordinators Workshop by Hilary Hewes MD

Head injuries in children are very common. They account for roughly 500,000 pediatric emergency department visits per year in the US. Most often these are children with minor head injury. Head CT is the standard imaging of choice but with CT comes associated radiation. Between 1995 and 2005, the use of head CT doubled. Research is now being done to determine if this is best practice.

The difficulty when evaluating minor head trauma in pediatric patients is to identify those infants and children with clinically important traumatic brain injury (ctTBI) but also limit unnecessary radiographic imaging and subsequent radiation exposure.

Mild Traumatic Brain Injury

- History of head trauma
- Symptoms such as brief loss of consciousness, disorientation, or vomiting
- GCS 13-15 *see chart
- Symptoms usually resolve within a couple of hours; however, in a small number of patients symptoms may persist for days or weeks
- No evidence structural injury on standard neuroimaging
- Example: concussion

GLASCOW COMA SCALE (GCS)

ADULT		INFANT
Eye opening	E	Eye opening
Spontaneous	4	Spontaneous
To speech	3	To speech
To pain	2	To pain
No response	1	No response
Best motor response	M	Best motor response
Obeys verbal command	6	Normal movements
Localizes pain	5	Localizes pain
Flexion - withdraws from pain	4	Withdraws from pain
Flexion - abnormal	3	Flexion - abnormal
Extension	2	Extension
No response	1	No response
Best verbal response	V	Best verbal response
Oriented and converses	5	Coos, babbles
Disoriented and converses	4	Cries but consolable
Inappropriate words	3	Persistently irritable
Incomprehensible sounds	2	Grunts to pain/restless
No response	1	No response

Traumatic Brain Injury Facts

~300,000 sport-related TBIs occur annually in the US, predominately concussion. Sports are the second leading cause of TBI for people aged 15-24 years (MVA is #1). Two most common sports & recreation activities associated with ED visits for TBIs are football and biking.

Emergency Medical Services for Children

Sideline Evaluation

For all acute head or neck injuries:

- ABCs
- Cervical spine precautions (if unconscious, has neck pain, or has a distracting injury with suspicion for neck injury)
- Neurologic and cognitive evaluation
 - *Use a [Concussion Recognition Tool](#)
- If concussion is identified, player needs to be removed immediately from activity for the day



Concussion in Small Children

- Signs/Symptoms
 - Headache
 - Vomiting
 - Inconsolable
 - Restlessness/irritability
 - Seizures
 - Dizziness or confusion
 - Change in personality
 - Change in sleep pattern
 - Changes in eating
 - Lack of interest in favorite toys

Concussion Treatment

- REST!!!
- Decrease physical activity
- Decrease cognitive activity
- Avoid screen time
- Tylenol for headache (NSAIDs have theoretical risk of increased bleeding)
- Observation for worsening of

persistent symptoms

- Other medications can be used for persistent symptoms: (amitriptyline, melatonin, etc.)

Scalp Hematomas

May be concerning if the child is younger, if the hematoma is found in a non-frontal location, if it is very large or associated with a severe injury mechanism.



More Severe Closed Head Injury

- Usually associated with severe mechanism
- GCS<14
- Declining mental status over time, progressive lethargy, worsening headache
- Signs of trauma to head other than frontal hematoma

Moderate/Severe CHI Treatment

- Start with ABC's
- If patient has a GCS<8, they likely airway protection
- Cervical spine stabilization
- Check pupils: non-reactive or unequal pupils a big red flag (but late sign!)
- Ensure adequate blood pressure: patients with head injury can have high intracranial pressure and need higher blood pressure to

maintain cerebral perfusion pressure

- Consider 3% NS or mannitol: help to decrease intracranial pressure
- Elevate head of bed
- Keep patient calm; sedate intubated patients
- Goal pCO₂ is 35-40; too high and the patient has vasodilation of cerebral vessels increasing pressure in brain; too low and you get vasoconstriction reducing the amount of blood flow to brain/ ischemia

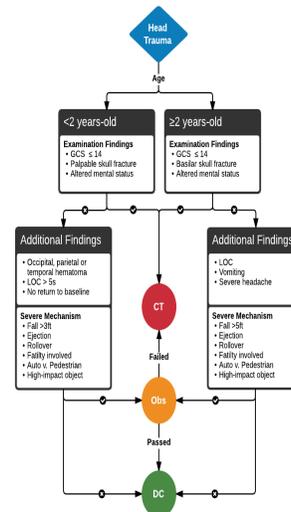
Evaluation

CT imaging is the imaging modality of choice. It is readily available and a relatively quick test. It is also good at identifying skull fractures and/or intracranial hemorrhage.

But...

It is associated with radiation and the estimated lifetime risk of cancer mortality from a head CT is substantially higher for children than for adults.

New recommendations for scanning have been proposed by PECARN (Pediatric Emergency Care Applied Research Network) based on their huge [prospective cohort study](#) involving 42,412 children < 18 years old.



Protocols in Practice

Head Injury (Traumatic Brain Injury)

HEAD INJURY (TRAUMATIC BRAIN INJURY)

ALL PROVIDERS / EMT

- Focused history and physical exam
- Cardiac monitor, CO2, and Pulse Oximetry monitoring when available
- **Treatment Plan**
 - Maintain airway. Administer oxygen to maintain SaO2 90-94%.
 - Consider spinal motion restrictions per the **Selective Spinal Immobilization Guideline**
 - Elevate head 30 degrees.
 - Monitor the level of consciousness during the transport
 - **Severe TBI (GCS <8 or AVPU "P" or "U"):**
 - Adult: Consider endotracheal intubation for airway protection (Paramedic only)
 - Pediatrics: Continue effective BVM. Utilize airway adjuncts, if needed to ensure adequate chest rise, ventilation, and oxygenation.
 - **Do not hyperventilate** unless patient shows signs of herniation: unilateral pupillary dilation or posturing. In this case, increase respiratory rate by ~10% above normal target respiratory rate (see Mild Hyperventilation Guide). Target ETCO2: 30-35 mmHg.

Mild Hyperventilation Guide for Signs of Herniation		
Age	Normal Ventilation Rate	Mild Hyperventilation Rate
Neonate	40	44
Infant	30	33
Child	20	22
Adult	10	12

- Open skull fractures should be covered with dry sterile dressings. Do not apply pressure unless needed to stop severe hemorrhage.
- **Key Considerations**
 - TBI may be painful. However, excessive pain medications can cloud serial neurological assessments. Pain medications should generally be avoided in a patient with altered mental status after TBI. If pain is severe, give small doses only until pain is manageable.
 - Patients with TBI may be confused or combative. Consider restraints if needed to protect patient or personnel.
 - Loss of memory, prolonged confusion or altered mental status associated with trauma may indicate a significant head injury.
 - Avoid hypoxia (SaO2 should be 90-94%).
 - Do not allow the patient to be hypotensive. Try and keep SBP >110 using the **Shock and Fluid Therapy Guideline**.
 - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

PEDIATRIC (<15 years)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

AEMT

- | | |
|--|--|
| <ul style="list-style-type: none"> □ Advanced airway, vascular access, and fluid therapy per IV/IO Access and Shock and Fluid Therapy Guidelines □ Check blood pressure every 5-10 minutes. □ Follow the Traumatic Brain Injury pressure management under the Shock and Fluid Therapy Guideline. | <ul style="list-style-type: none"> □ Advanced airway, vascular access, and fluid therapy per IV/IO Access and Shock and Fluid Therapy Guidelines □ Check blood pressure every 5-10 minutes. □ Initiate NS 20ml/kg for hypotension OR if unable to obtain blood pressure □ If hypotensive patient shows no improvement with initial treatment, may repeat NS 20 ml/kg up to a total of 60 ml/kg |
|--|--|

Protocols in Practice –continued

PARAMEDIC

- ❑ **Persistent hypotension unresponsive to fluids**
 - ① **Epinephrine (1:1000) 2–10 mcg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg.
 - And/or
 - ① **Norepinephrine 0.3-3 mcg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg.

PARAMEDIC

- ❑ **Persistent hypotension unresponsive to fluids**
 - ① **Epinephrine (1:1000) 0.1–2 mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg.
 - And/or
 - ① **Norepinephrine initial dose: 0.05 - 0.1 mcg/kg/min**, titrate to max of 2 mcg/kg/min to maintain SBP >70 + (age in years x 2) mmHg

News From National

New injury prevention research has been presented at the American Academy of Pediatrics (AAP) 2017 National Conference & Exhibition in Chicago. This research should be viewed as preliminary until published in a peer-reviewed journal.

[Study Finds Female Youth Soccer Players Five Times More Likely than Boys to Return to Play Same Day Following Concussion](#) | AAP Newsroom

"A NEW STUDY FOUND GIRLS WERE SIGNIFICANTLY MORE LIKELY THAN BOYS TO RETURN TO PLAY THE SAME DAY FOLLOWING A SOCCER-RELATED CONCUSSION, PLACING THEM AT RISK FOR MORE SIGNIFICANT INJURY"

As a follow up to the September EMSC Connects Newsletter on Opioids in Pediatrics...

[Study Finds Increasing Number of Children Arrive at Emergency Departments Addicted to Opioids](#) | AAP Newsroom

[Substance Misuse and Abuse CDC Launches Campaign to Help States Fight Prescription Opioid Epidemic](#)



Did You Know?

Stop the Bleed has been launched nationally

Launched in October of 2015 by the White House, Stop the Bleed is a national awareness campaign and a call to action. Stop the Bleed is intended to cultivate grassroots efforts that encourage bystanders to become trained, equipped, and empowered to help in a bleeding emergency before professional help arrives.

No matter how rapid the arrival of professional emergency responders, bystanders will always be first on the scene. A person who is bleeding can die from blood loss within five minutes, therefore it is important to quickly stop the blood loss. Those nearest to someone with life threatening injuries are best positioned to provide first care. According to a recent National Academies of Science study, trauma is the leading cause of death for Americans under age 46.

Your County EMSC Coordinators were trained and became instructors our workshop. They are happy to come to your agency and community events to teach you and yours. Who is your County Coordinator? Contact Tdickson@utah.gov



November 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2 PGR-ECMO	3	4
5	6	7	8	9 PGR-Digital Health	10	11
12	13	14 EGR	15	16 PGR- Behavioral Care	17	18
19	20	21	22	23 	24	25
26	27	28	29	30 PGR-Communication		

Pediatric Education Around the State

Pediatric Grand Rounds (PGR) are educational/CME offerings webcast weekly (Sept-May) at 0800-0900 you can watch live or archived presentations. It is geared towards hospital personnel. But will qualify for BEMSP CME Access at <https://intermountainhealthcare.org/locations/primary-childrens-hospital/for-referring-physicians/pediatric-grand-rounds/>

EMS Grand Rounds (EGR) This offering alternates with Trauma Grand Rounds every other month, it is geared towards EMS. Live viewings qualify for CME credit.

There are 2 ways to watch

1. Live real time viewing via the internet at: www.emsgrandrounds.com If you would like to receive CME for viewing this presentation live, email Zach Robinson (Zachary_robinson@hsc.utah.edu)
2. Delayed viewing at your personal convenience, a week after the presentation at: www.emsgrandrounds.com

Nov 14th 2:00 pm—3:00 pm *Pelvic/Abdominal Trauma* Scott E. McIntosh, MD, MPH

Peds EMS Lecture Series (PEL) Free monthly pediatric CME/CEU presentations from Primary Children’s Emergency Department Attending Physicians to Utah’s EMS. Offered every 3rd Thursday. Contact Lynsey.Cooper@imail.org for info. Currently on hold.

Project ECHO Burn and Soft Tissue Injury (ECHO) has a pediatric and adult component. CME/CEU and MD CME available

<https://crisisstandardsofcare.utah.edu> click request access and follow instructions.

Upcoming Peds Classes, 2017

For PEPP and PALS classes throughout the state contact Andy Ostler Aostler@utah.gov

For PALS and ENPC classes in Filmore, Delta and MVH contact Kris Shields at shields57@gmail.com

Save the Date

February 22-23, 2018 [40th annual Neonatal and Pediatric Transport Conference](#)

April 11-12, 2018 [Zero Fatalities Safety Summit](#)



Emergency Medical Services for Children Utah Bureau of EMS and Preparedness

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WE ARE ON THE WEB

[HTTPS://BEMSP.UTAH.GOV/](https://bemsp.utah.gov/)

The Emergency Medical Services for Children (EMSC) Program aims to ensure that emergency medical care for the ill and injured child or adolescent is well integrated into an emergency medical service system. We work to ensure that the system is backed by optimal resources and that the entire spectrum of emergency services (prevention, acute care, and rehabilitation) is provided to children and adolescents, no matter where they live, attend school or travel.

Happenings

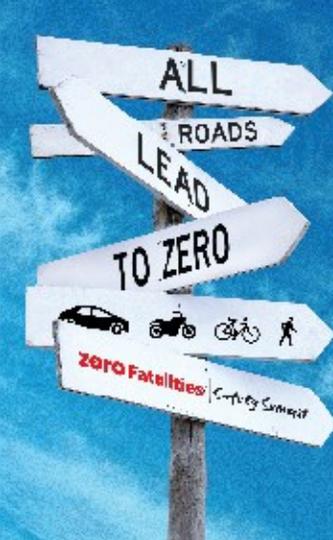
Nominations are needed for Emergency Medical Services Injury Prevention Advocate of the Year Award

The Zero Fatalities Awards Program recognizes individuals and organizations that have made an outstanding effort to change the attitudes and behaviors of motorists which has resulted in the reduction of crashes, injuries, and fatalities in Utah.

Please nominate a hospital, an EMS agency, an EMSC coordinator, or EMS personnel who have contributed to EMS injury prevention in the State of Utah. Nominees will be evaluated on impact to community, program effectiveness, creativity, innovation, and overall dedication to the field of EMS Injury Prevention related to traffic safety. Please note that the activities and programs must have taken place during calendar years 2016-2018.

Submissions must be received by February 1, 2018. Please contact Allan Liu, our EMSC Coordinator, at aliu@utah.gov or 801-273-6664 for the submission form. The online submission form is located at:

<https://docs.google.com/forms/d/e/1FAIpQLSc-oGDq7DQg6doCjNlzv-oHGoUT-R-X1Ca8IsjsBS3537geqg/viewform>



DO YOU KNOW AN ADVOCATE FOR ZERO?

How about an organization that has improved traffic safety in your area? Nominate them today for one of our many 2018 Zero Fatalities Safety Summit Awards. Recipients will be honored at the Summit, April 11-12, 2018, at the Utah Valley Convention Center. Multiple award nominations are accepted.

NOMINATE SOMEONE