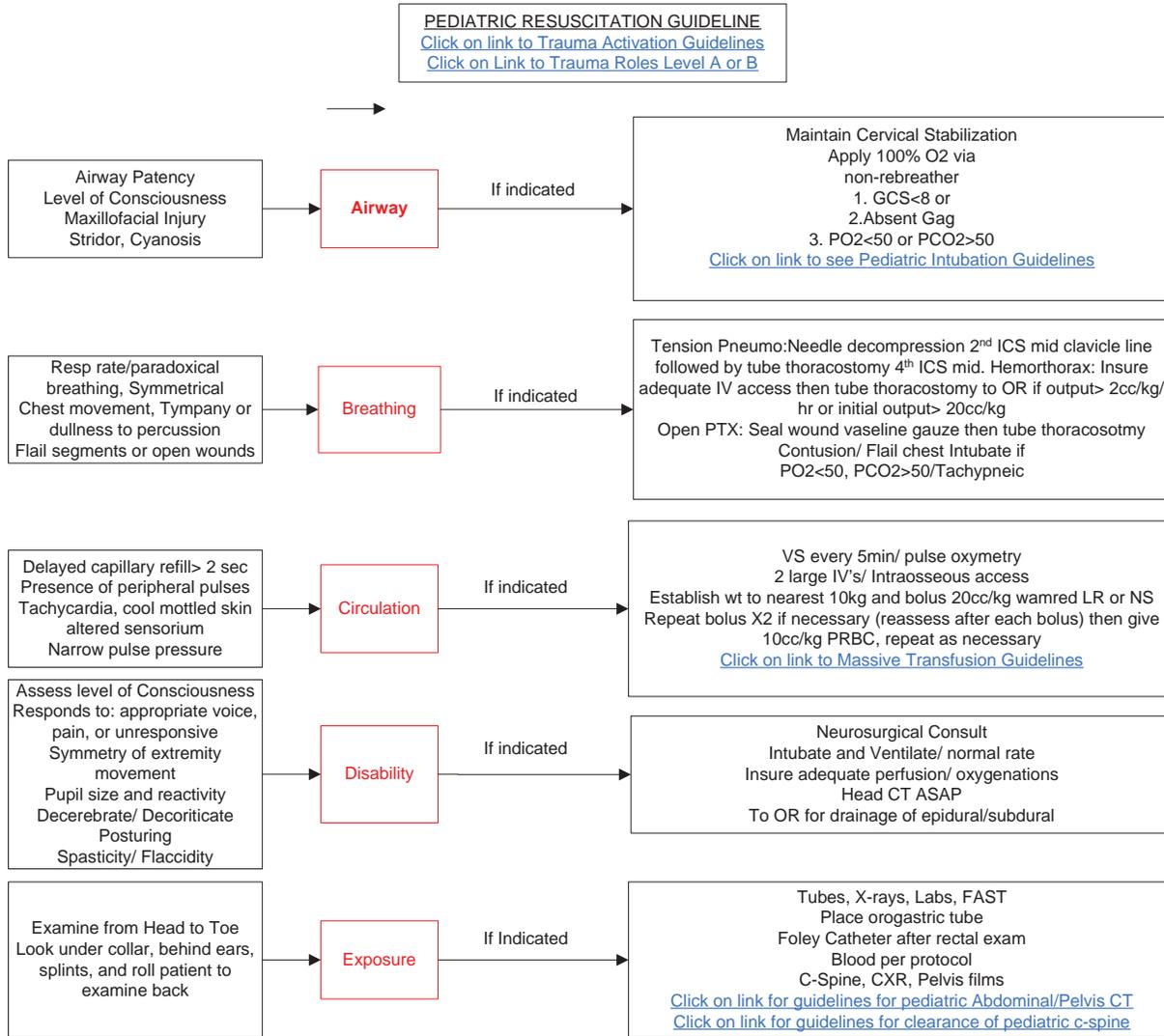


**SECTION THREE: PEDIATRICS**  
**PEDIATRIC RESUSCITATION**



9/8/10

**PEDIATRIC TRAUMA ALERT LEVEL CRITERIA**

**Age < than 16 years**

**Level A (Scene Transport)**

**Physiologic Criteria:**

GCS  $\leq$  9 at time of EMS report

SBP < 90 for patients older than 10 years of age or if 10 years of age or younger by systolic BP < 70mmHG + (2x age in years) with suspicion of shock

Respiratory Rate < 10 or > 29 with suspicion of respiratory compromise

**Anatomic Criteria:**

Penetrating injury to head, neck, torso

Penetrating injury to extremity proximal to elbow or knee with ongoing bleeding, expanding hematoma, and/or loss of peripheral pulses

Flail Chest

2 or more long bone fractures proximal to wrist or ankle

Crushed, degloved, or mangled extremity

Amputation proximal to wrist or ankle

Paralysis

Suspected Pelvic fracture with hemodynamic instability

Open or depressed skull fracture

2<sup>nd</sup> or 3<sup>rd</sup> degree Burns > 40% BSA or with suspicion of smoke inhalation or hemodynamic compromise

**Other:**

Attending Emergency Physician concern for serious injury

**Level A (Trauma transfer from OHF)**

Hemodynamically unstable trauma transfers

Patient who is intubated

Transfers with probable need of urgent surgical intervention

Received blood transfusion prior to transfer

**Level B (Scene Transport)**

**Physiologic Criteria:**

GCS > 9 and <14 (10 to 13) at time of EMS report

**Anatomic Criteria:**

Penetrating injury to extremity proximal to elbow or knee *without* ongoing bleeding, expanding hematoma or loss of peripheral pulses

2<sup>nd</sup> or 3<sup>rd</sup> degree Burns > 20% and < 40% without smoke inhalation or hemodynamic compromise

**Mechanism of Injury Criteria:**

Fall > 20 feet (One story equals approx 10 feet)

Ejection from vehicle

Death in same passenger compartment

Auto/pedestrian or auto/bicycle with patient thrown, run over, or with impact >20 MPH

Motorized off road vehicle or Motorcycle crash > 20 MPH

Motor Vehicle Crash > 35 MPH

**Other:**

Attending Emergency Physician concern for serious injury

**Level B (Trauma transfer from OHF)**

Patient accepted for transfer by trauma service

Request for trauma alert by accepting service

Hemodynamically stable pediatric trauma patient who is unintubated, but there is possible surgical intervention

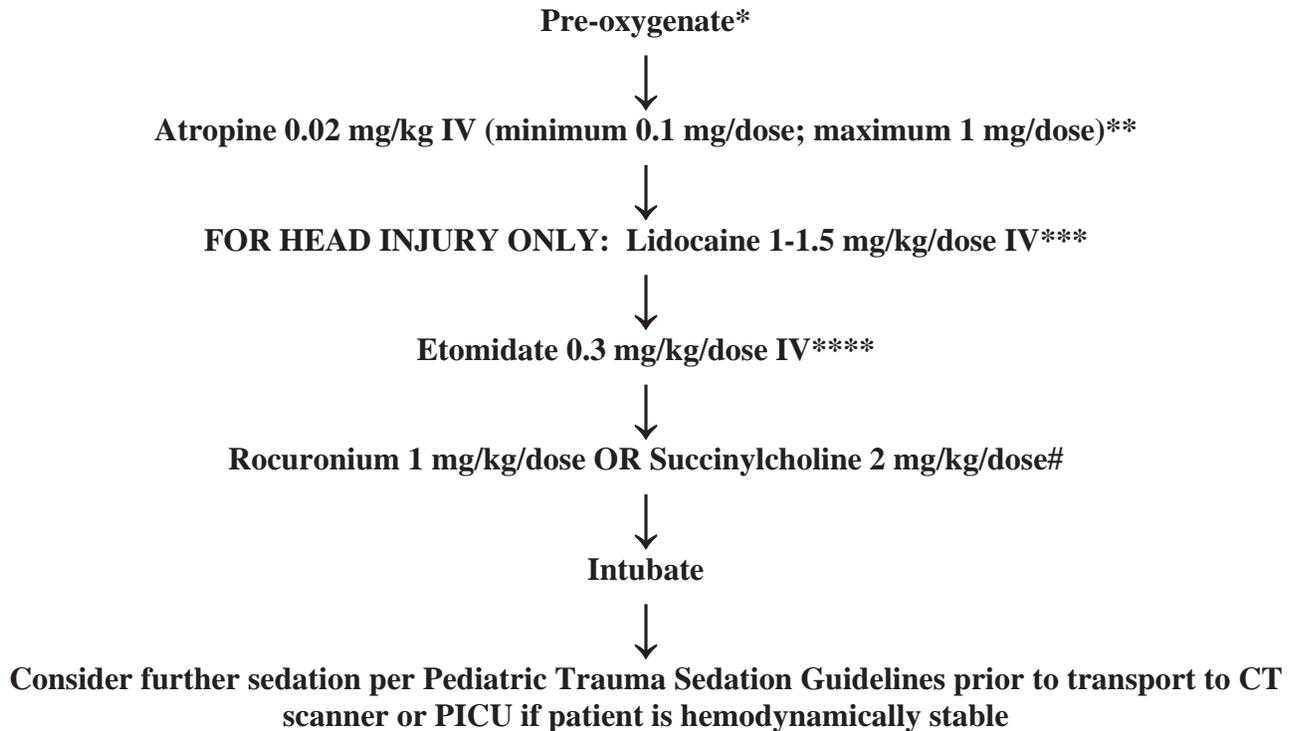
Attending Emergency Physician concern for serious illness

If a Level B patient's condition deteriorates after patient arrival, an upgrade from Level B to Level A should be initiated. This should be paged as an upgrade.

Revised 11/1/2011

**PEDIATRIC TRAUMA INTUBATION ALGORITHM**

**--Maintain Inline Cervical Stabilization—  
--Apply Cricoid Pressure as Indicated--**



**\*Preoxygenate with non-rebreather at 15 L/min O<sub>2</sub> flow rate. Have suction, ETCO<sub>2</sub> detector, in-line end-tidal monitor, alternative ETT and blade sizes, appropriate BVM sizes and LMA available.**

**\*\*Suggest atropine for children less than 2 year and all patients receiving Succinylcholine; Consider atropine for all children less than 8 years old**

**\*\*\*For head injury patients only; give 5 minutes prior to induction if time permits**

**\*\*\*\*Time onset of Etomidate is 15-30 seconds; duration is 1-5 minutes**

**#Succinylcholine is contraindicated in crush injury, hyperkalemia, neuromuscular disorders, penetrating eye injuries, non-acute burn, or family history of malignant hyperthermia/pseudocholinesterase deficiency**

**MEDICATION RECOMMENDATIONS FOR PEDIATRIC TRAUMA  
SEDATION/ANALGESIA/NEUROMUSCULAR BLOCKADE IN TRAUMA CENTER**

- A. **Non-intubated Patient** with **stable** cardiopulmonary status
1. Midazolam 0.1 mg/kg (MAX 2.5 mg) slow IVP
    - Repeat dose (after 5 minutes)  
0.1 mg/kg (max 2.5 mg)
  2. Fentanyl 1 microgram/kg (MAX 50 micrograms) slow IVP
    - Repeat dose (after 3-5 minutes)  
0.5-1 microgram/kg (MAX 25 micrograms) slow IVP
    - Repeat dose (after 30 minutes)  
0.5-1 microgram/kg (MAX 25 micrograms)
- B. **Intubated Patient** with **stable** cardiovascular status
1. Midazolam 0.2 mg/kg (max 5 mg) slow IVP
    - Repeat dose (after 5 minutes)  
0.1 mg/kg (MAX 2.5 mg) slow IVP
    - Repeat dose  
0.1 mg/kg (MAX 2.5 mg) slow IVP
  2. Fentanyl 1-2 micrograms/kg (MAX 100 micrograms) slow IVP
    - Repeat dose q 5 minutes  
0.5-1 microgram (MAX 50 micrograms) slow IVP
    - Repeat dose  
0.5-1 mg/kg (MAX 50 micrograms) slow IVP
  3. Rocuronium\* 1 mg/kg IV for neuromuscular blockade
    - Repeat 0.3 mg/kg prn agitated movement
      - \* ▪ Prior sedative required
      - Beware increased air leak with uncuffed ETT and possible ↓ tidal volume/minute ventilation
      - Protect eyes
- C. **Intubated Patient** with **unstable** cardiovascular status
1. Midazolam 0.05 mg/kg (MAX 2 mg)  
**PLUS**
  2. Ketamine 1 mg/kg (MAX 50 mg)  
If > 5 minutes since last dose and uncontrolled agitation.
    - Repeat dose 0.5 mg/kg (MAX 25 mg)
    - Repeat dose 0.5 mg/kg (MAX 25 mg)
  3. Rocuronium as above

Reversal Agents

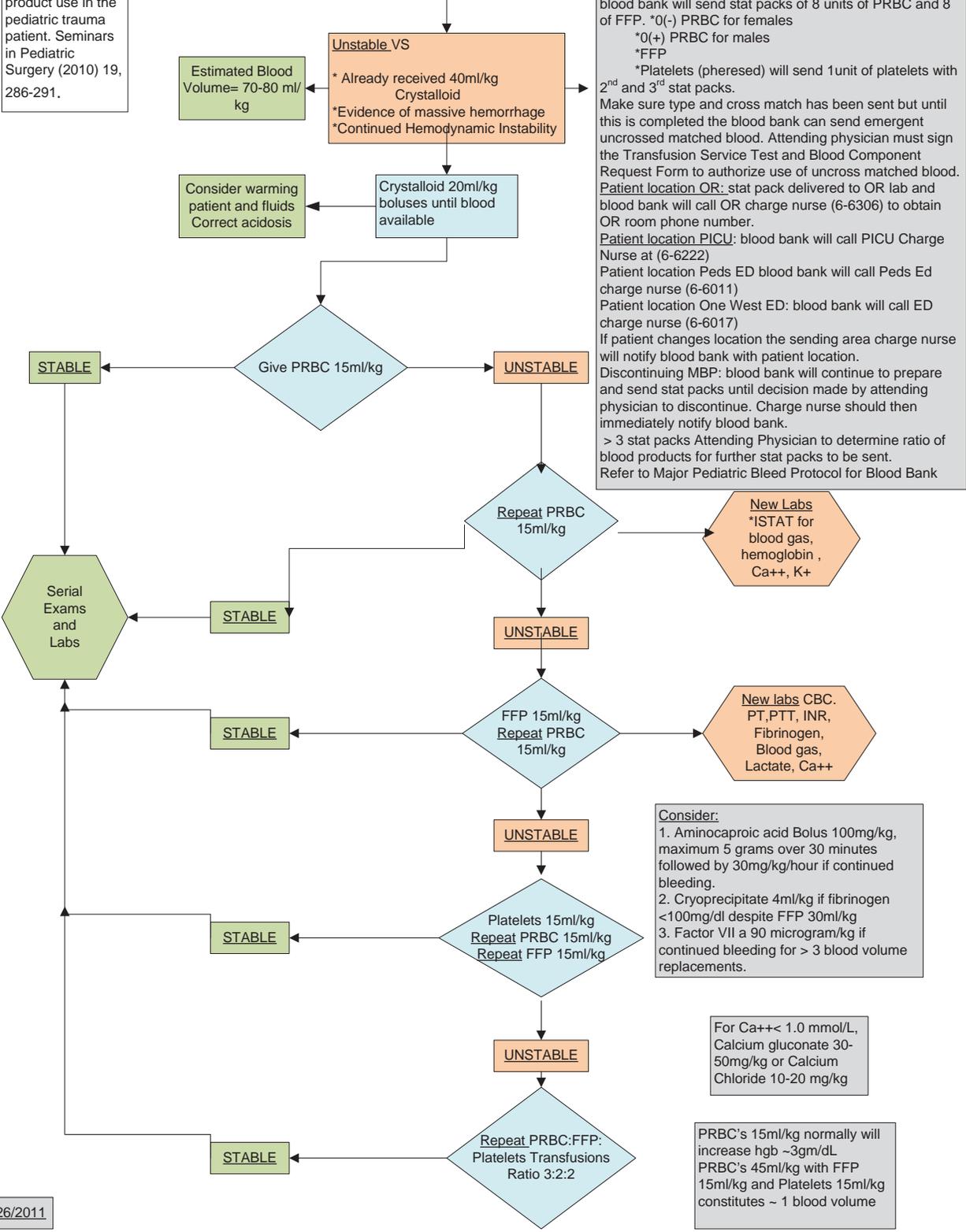
1. Naloxone (Narcan) – Mix Naloxone 0.4 mg/mL with 9 mL of normal saline for a total volume of 10 mL. Dilution concentrations will be 0.04 mg/mL.
  - a. Patients  $\leq$  20 kg: Give 0.02 mg (0.5mL) IV every three minutes until desired respiratory rate is established NOT until return of desired sensorium.
  - b. Patients  $>$  20 kg: Give 0.08 mg (2 mL) IV every three minutes until desired respiratory rate is established NOT until return of desired sensorium.
  
2. Flumazenil (Romazicon) – Children’s Hospital (including NNICU):
  - a. Patients  $\leq$  20 kg: 0.01 mg/kg IV every 1-2 minutes until desired respiratory rate is established NOT until return of desired sensorium.
  - b. Patients  $>$  20 kg: 0.2 mg IV every 1-2 minutes until desired respiratory rate is established NOT until return of desired sensorium.

New 6/4/10

**PEDIATRIC MASS TRANSFUSION GUIDELINES**

References:  
JJ Dehmer and WT Adamson, Massive transfusion and blood product use in the pediatric trauma patient. Seminars in Pediatric Surgery (2010) 19, 286-291.

Pediatric Mass Transfusion  
Guideline for Trauma Patients



**Charge nurse Notify blood bank 2-2671 re : Major Pediatric Bleed Protocol** for patient's weight, sex, name or TV #, MRN, when the stat pack is ready blood bank should call \_\_\_\_\_ phone #  
40 Kg weight and under blood bank will send stat packs of 4 Units of PRBC and 4 Units of FFP. Over 40 kg weight blood bank will send stat packs of 8 units of PRBC and 8 of FFP. \*0(-) PRBC for females  
\*0(+) PRBC for males  
\*FFP  
\*Platelets (pheresed) will send 1 unit of platelets with 2<sup>nd</sup> and 3<sup>rd</sup> stat packs.  
Make sure type and cross match has been sent but until this is completed the blood bank can send emergent uncrossed matched blood. Attending physician must sign the Transfusion Service Test and Blood Component Request Form to authorize use of uncross matched blood.  
Patient location OR: stat pack delivered to OR lab and blood bank will call OR charge nurse (6-6306) to obtain OR room phone number.  
Patient location PICU: blood bank will call PICU Charge Nurse at (6-6222)  
Patient location Peds ED blood bank will call Peds Ed charge nurse (6-6011)  
Patient location One West ED: blood bank will call ED charge nurse (6-6017)  
If patient changes location the sending area charge nurse will notify blood bank with patient location.  
Discontinuing MBP: blood bank will continue to prepare and send stat packs until decision made by attending physician to discontinue. Charge nurse should then immediately notify blood bank.  
> 3 stat packs Attending Physician to determine ratio of blood products for further stat packs to be sent.  
Refer to Major Pediatric Bleed Protocol for Blood Bank

**New Labs**  
\*ISTAT for blood gas, hemoglobin, Ca++, K+

**New labs** CBC, PT, PTT, INR, Fibrinogen, Blood gas, Lactate, Ca++

**Consider:**  
1. Aminocaproic acid Bolus 100mg/kg, maximum 5 grams over 30 minutes followed by 30mg/kg/hour if continued bleeding.  
2. Cryoprecipitate 4ml/kg if fibrinogen <100mg/dl despite FFP 30ml/kg  
3. Factor VII a 90 microgram/kg if continued bleeding for > 3 blood volume replacements.

For Ca++ < 1.0 mmol/L, Calcium gluconate 30-50mg/kg or Calcium Chloride 10-20 mg/kg

PRBC's 15ml/kg normally will increase hgb ~3gm/dL  
PRBC's 45ml/kg with FFP 15ml/kg and Platelets 15ml/kg constitutes ~ 1 blood volume

Final 4/26/2011

**CLINICAL GUIDELINES FOR THE MANAGEMENT OF SEVERE TRAUMATIC BRAIN INJURY (TBI): PEDIATRICS**

Clinical Condition: TBI and/or Intracranial hypertension/herniation

Target Population: Children <16yo with GCS ≤ 8  
**AND**  
 Abnormal head CT scan (contusion/clot/mass lesion/cerebral edema)

Objectives:

1. Establish monitoring parameters for severe TBI in children.
2. Enhance oxygen delivery to the injured brain.
3. Optimize cerebral perfusion pressure (CPP) and maintain/normalize intracranial pressure (ICP).
4. Prevent secondary injury.

Goals of Therapy:

1. Maintain euvolemia and avoid hypotension
2. Maintain ICP < 20mmHg and CPP for age\*
3. Maintain hemoglobin > 7
4. Avoid hyperglycemia
5. Avoid hyperthermia
6. Maintain adequate oxygenation

<p>*CPP thresholds by age<sup>3,8</sup></p> <p>&lt;2 years: 45 mmHg</p> <p>2-6 years: 50 mmHg</p> <p>7-10 years: 55 mmHg</p> <p>&gt;10 years: 60 mmHg</p>
---

Initial Evaluation and Monitoring of Pediatric Patients with Severe TBI:

1. Insert ventriculostomy/external ventricular drain (preferred) or ICP monitor
  - a. Placement of ventriculostomy requires INR ≤ 1.4 and platelets > 80,000 or > 50,000 with concurrent platelet transfusion
  - b. Maintenance INR ≤ 1.5 and platelets > 50,000
2. Insert central venous catheter
3. Insert arterial catheter
4. Insert foley catheter
5. Insert esophageal (preferred if no contraindications) or rectal temperature probe
6. Insert nasogastric tube (preferred if no contraindications) or orogastric tube and place on low intermittent wall suction
7. Head of bed raised to 30° or reverse Trendelenberg to 30°
8. Consider placement of Licox Brain Monitor (Goal PbtO<sub>2</sub> ≥ 15)<sup>4,5</sup>
9. Maintain quiet room and limit visitors (Beds 1-4 preferred in PICU)
10. IV fluids: NS without dextrose, may add dextrose when > 24 hrs post-injury
11. Prevent early post-traumatic seizures: Load fosphenytoin (18mg PE/kg load, max dose 1,500 mg PE) and start daily maintenance dosing for 7 days (2.5mg PE/kg/dose q8hr, max dose 400mg PE/day)
12. Initiate sedation with midazolam continuous infusion using pediatric drip order form (<http://pedsdrips.musc.edu>). Consider lidocaine pretreatment for endotracheal tube suctioning.
13. Initiate analgesia with morphine or fentanyl continuous infusions using pediatric drip order form (<http://pedsdrips.musc.edu>)

Treatment Algorithm for Severe Pediatric TBI:

**General Measures to maintain ICP and CPP goals:**

1. Maintain core temperature between 35-37°C
2. Ensure elevation of head to 30°
3. Avoid jugular venous outflow obstruction
4. Maintain adequate oxygenation ( $\text{PaO}_2 \geq 80$ ,  $\text{SaO}_2 \geq 95\%$ ,  $\text{PbtO}_2 \geq 15$ )
5. Ventilator settings to achieve  $\text{PaCO}_2$  35-40 (Avoid  $\text{PaCO}_2 < 30$ )
6. Euvolemia (Goal CVP 8-10, normal perfusion, normal urine output)
7. Maintain blood pressure for age<sup>\*\*</sup>:
  - a. Initiate fluid resuscitation if hypovolemic with decreased perfusion
  - b. Consider vasopressor therapy with phenylephrine if patient is euvolemic and CPP below threshold for age\*  
(<http://pedsdrips.musc.edu>)
8. Consider other causes for hypotension or elevated ICP (abdominal compartment syndrome, tension pneumothorax, tamponade, etc.)

<p><b>**SBP thresholds by age<sup>6</sup></b>                  0-28 days: <math>\geq 60</math> mmHg                  1-12 months: <math>\geq 70</math> mmHg                  1-17 years: <math>\geq 65</math> mmHg + (2 x age in years)</p> <p><b>**MAP thresholds by age<sup>6</sup></b>                  1-17 years: <math>\geq 40</math> mmHg + (1.5 x age in years)</p>
---



**If ICP  $\geq 20$ mmHg for  $\geq 5$  minutes or CPP  $<$  threshold for age\*, apply the following in a stepwise manner every 5-10 minutes until resolved:**

1. Ensure general measures to maintain ICP and CPP goals are in place (Items 1-8 above)
  2. Continuous drainage of CSF if ventriculostomy present with periodic assessment of ICP as follows:
    - a. If previous ICP  $< 10$  mmHg, check ICP q1hr
    - b. If previous ICP 10-19, check ICP q 30min
    - c. If previous ICP  $\geq 20$ , check ICP q5-10min until resolved
  3. Increase sedation and analgesia if necessary
  4. Add neuromuscular blockade: Vecuronium preferred unless contraindicated  
(<http://pedsdrips.musc.edu>. Initiate per [PICU Neuromuscular Blockade Protocol](#))
  5. Initiate hyperosmolar therapy and notify PICU AND neurosurgery residents:
    - a. 3% saline bolus 4mL/kg, may repeat if serum osmolality  $< 360$ . May initiate continuous infusion of 3% saline at 0.1-1 ml/kg/hr for uncontrolled elevation of ICP<sup>9</sup>. Titrate to minimum dose needed for goal ICP $< 20$ . Maintain serum Na $< 160$  and serum osmolality  $< 360$ . Begin to decrease dose of infusion if ICP is controlled for  $\geq 24$  hrs.
- OR**
- b. Mannitol bolus 0.5 gram/kg, may repeat if serum osmolality  $< 320$
  6. Mild hyperventilation ( $\text{PaCO}_2$  30-35), maintain  $\text{PbtO}_2 \geq 15$
  7. Consider head CT scan (portable head CT scan if unstable)



**If ICP  $\geq$  20 or CPP  $<$  threshold for age\* for  $>$  30 minutes despite above medical therapy, apply the following in a stepwise manner:**

1. Notify PICU attending and neurosurgery resident/attending before consideration of each step.
2. Stat head CT scan (portable if unstable)
3. Consider moderate hypothermia (T 32-33°C) for 48 hrs if initiated within 8 hrs of injury<sup>2</sup>. After 48 hrs, slowly rewarm by 0.5-1°C every 12-24 hours to maximum temperature of 37.5°C. **Avoid** initiation of hypothermia early after severe TBI for only 24hrs duration followed by rapid rewarming<sup>3</sup>.
4. Consider pentobarbital coma
  - a. Consult neurology
  - b. Continuous EEG for goal of burst suppression
5. Consider decompressive craniectomy

Protocol for Weaning Severe TBI Treatment

Initiation: ICP controlled for  $\geq$  24 hrs without sustained elevations  $>$ 20 and no longer at risk for cerebral edema. Patient is normothermic. Stop weaning protocol at any time if ICP sustained  $>$ 20 for  $>$ 5 minutes

1. Stop barbiturates
2. Discontinue EEG when no longer in burst suppression and no evidence of seizures
3. Discontinue paralysis
4. Normalize PaCO<sub>2</sub> (35-45)
5. Decrease sodium goal by 5 mEq/L daily until at 135 mEq/L by titrating down on 3% NaCl infusion
6. Begin weaning sedatives and narcotics, consider conversion to intermittent methadone and lorazepam if withdrawal a concern
7. Remove Licox/ICP monitor if ICP  $<$  20 for  $\geq$  24 hours after therapies have been weaned as above
8. Discontinue antiepileptic therapy 7 days post-injury unless patient has history of documented seizures

Criteria for Discontinuing Severe TBI protocol:

1. Sedation is minimal, paralytics discontinued and temperature control no longer a problem
2. Most recent head CT shows stability or improvement OR clinical exam improved
3. ICP  $<$  20 for  $\geq$  24 hours after therapies have been weaned off
4. Neurosurgery discontinues ICP monitor

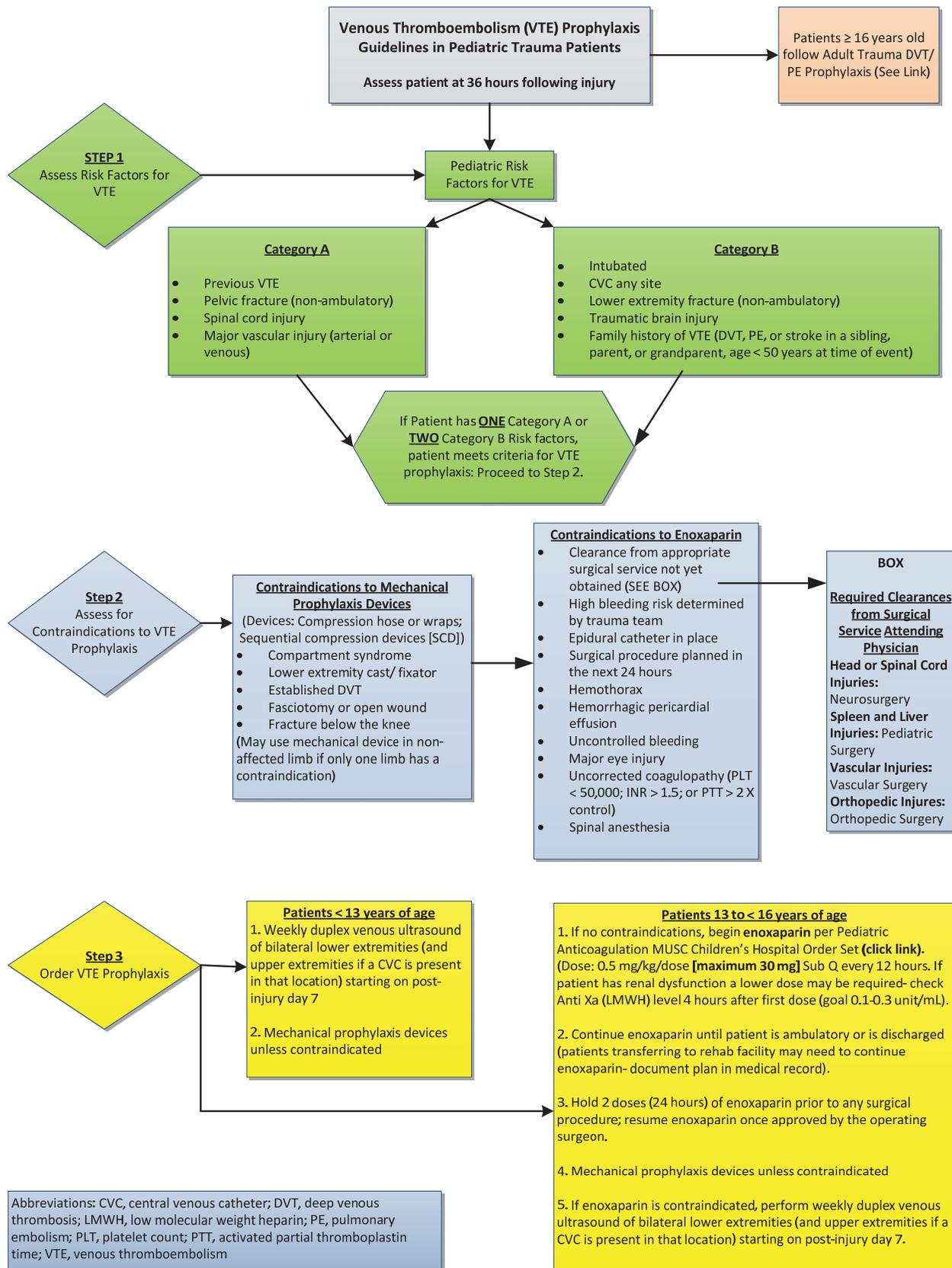
REFERENCES

1. Adelson PD, Ragheb J, Kanev P, *et al.* Phase II clinical trial of moderate hypothermia after severe traumatic brain injury in children. *Neurosurgery* 2005; 56: 740-54.
2. American Association for Surgery of Trauma; Child Neurology Society; International Society for Pediatric Neurosurgery; International Trauma Anesthesia and Critical Care Society; Society of Critical Care Medicine; World Federation of Pediatric Intensive and Critical Care Societies: Guidelines for the acute medical management of severe traumatic brain injury in infants, children, and adolescents-2<sup>nd</sup> edition. *Pediatr Crit Care Med* 2012; 13:S1-82.
3. Chambers I, Jones P, Lo T, *et al.* Critical thresholds of intracranial pressure and cerebral perfusion pressure related to age in paediatric head injury. *J Neurol Neurosurg Psychiatry* 2006; 77:234-40.
4. Figaji A, Gieggen A, Argent A, *et al.* Does adherence to treatment targets in children with severe traumatic brain injury avoid brain hypoxia? A brain tissue oxygenation study. *Neurosurgery* 2008; 63:83-92.

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6. Haque IU and AL Zaritsky. Analysis of the evidence for the lower limit of systolic and mean arterial pressure in children. *Pediatr Crit Care Med* 2007; 8:138-44.
7. Hutchison JS, Ward RE, Lacroix J, *et al.* Hypothermia therapy after traumatic brain injury in children. *N Engl J Med* 2008; 358: 2447-2456.
8. Mehta A, Kochanek P, Tyler-Kabara E, *et al.* Relationship of intracranial pressure and cerebral perfusion pressure with outcomes in young children after severe traumatic brain injury. *Dev Neurosci* 2010; 32:413-9.
9. Peterson B, Khanna S, Fisher B, *et al.* Prolonged hypernatremia controls elevated intracranial pressure in head-injured pediatric patients. *Crit Care Med* 2000; 28: 1136-43.

4/18/12

**PEDIATRIC TRAUMA VTE GUIDELINES**

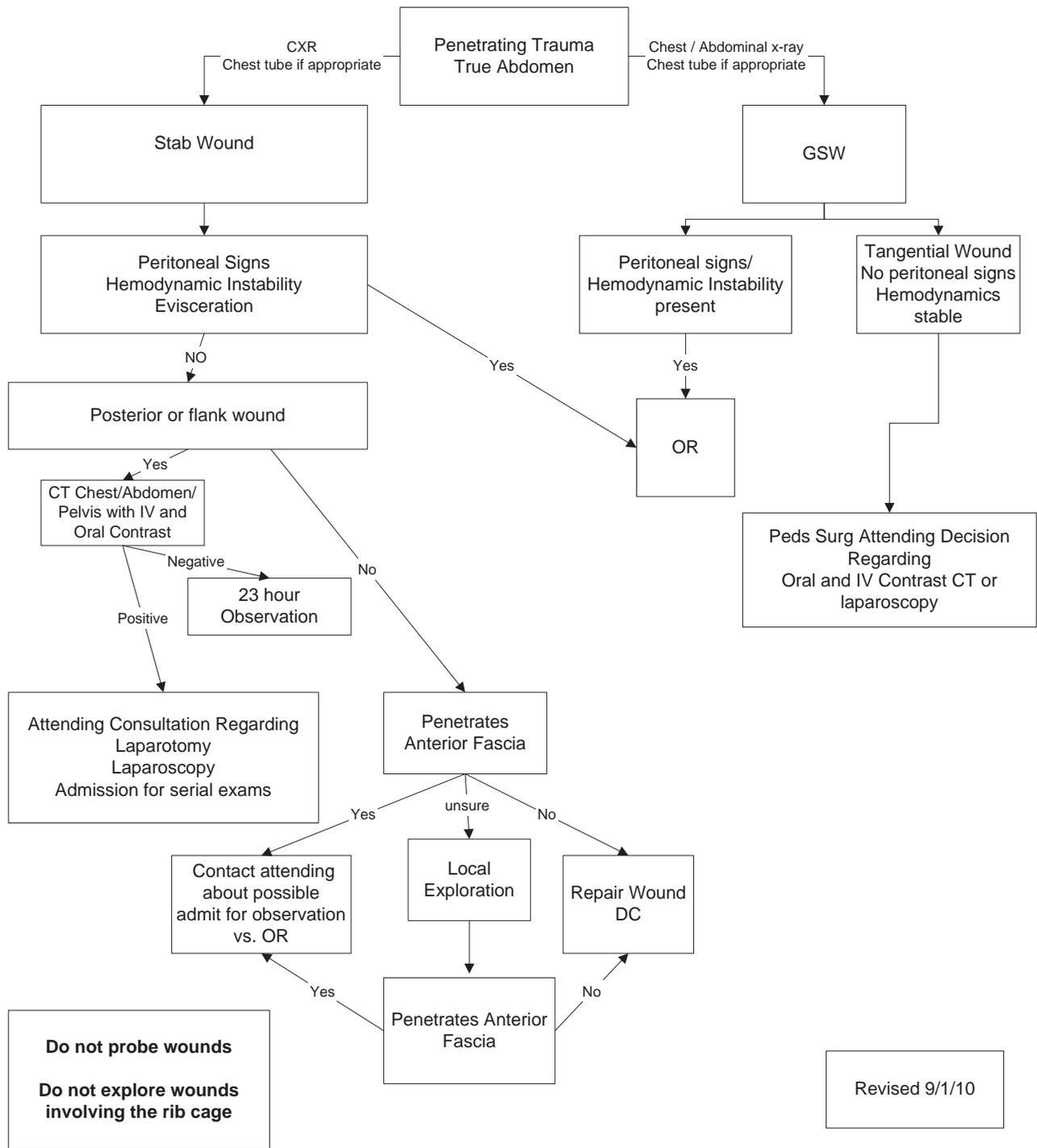


2/21/11

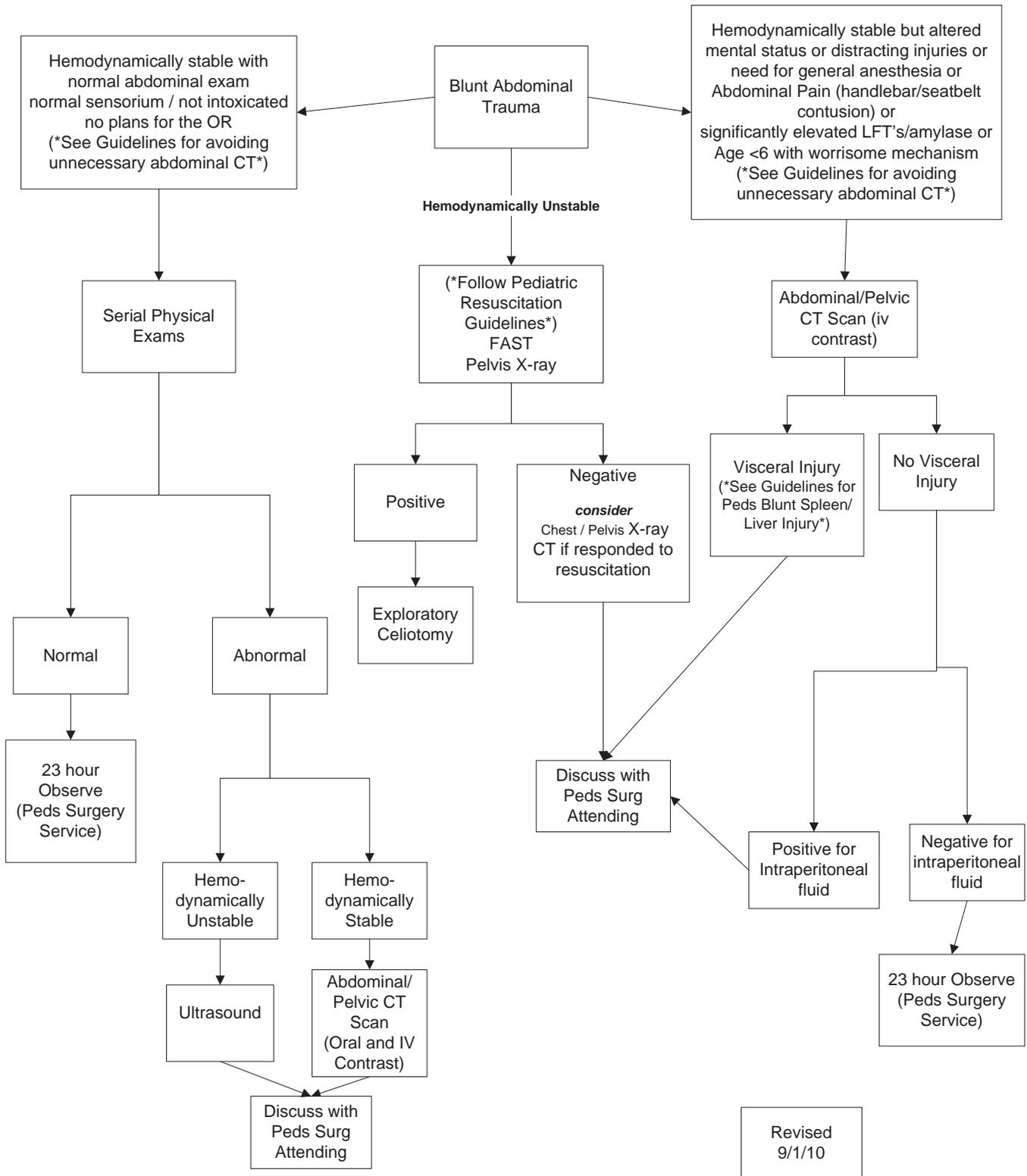
**LINK TO CHILDREN'S EMERGENCY SERVICES TRAUMA ACTIVATION ORDERS**

LINK TO PICU TRAUMA ADMISSION ORDERS

**EVALUATION OF PEDIATRIC PENETRATING ABDOMINAL TRAUMA**



**EVALUATION OF PEDIATRIC BLUNT ABDOMINAL TRAUMA**



**GUIDELINES FOR AVOIDING UNNECESSARY ABDOMINAL CT SCANS IN CHILDREN MEETING TRAUMA B ACTIVATION CRITERIA**

Abdominal CT scan is NOT a mandatory part of the initial evaluation of Trauma B Pediatric patients if the following criteria are present:

A. Patient characteristic

1. GCS 14 or higher
2. Age 6 years or greater
3. Systolic blood pressure normal for age
  - a. 0 to 10 years of age, greater than  $70 + 2(\text{age in years})$  mmHg
  - b. 11 to 16 years of age, greater than 90 mmHg
4. No unexplained tachycardia for age
  - a. 0 to < 1 year: less than 180 beats per minute
  - b. 1 to 3 years: less than 150 beats per minute
  - c. 4 to 8 years: less than 135 beats per minute
  - d. 9 to 16 years: less than 110 beats per minute
5. No barriers to performing a reliable abdominal examination
6. Normal abdominal examination (patient does not have the following exam findings)
  - a. Seat belt sign
  - b. Tenderness
  - c. Distension

B. Initial laboratory results

1. Aspartate aminotransferase (AST) less than 200
2. Normal amylase
3. Hematocrit greater than 30%
4. Microscopic urinalysis with less than 5 RBC/hpf

References:

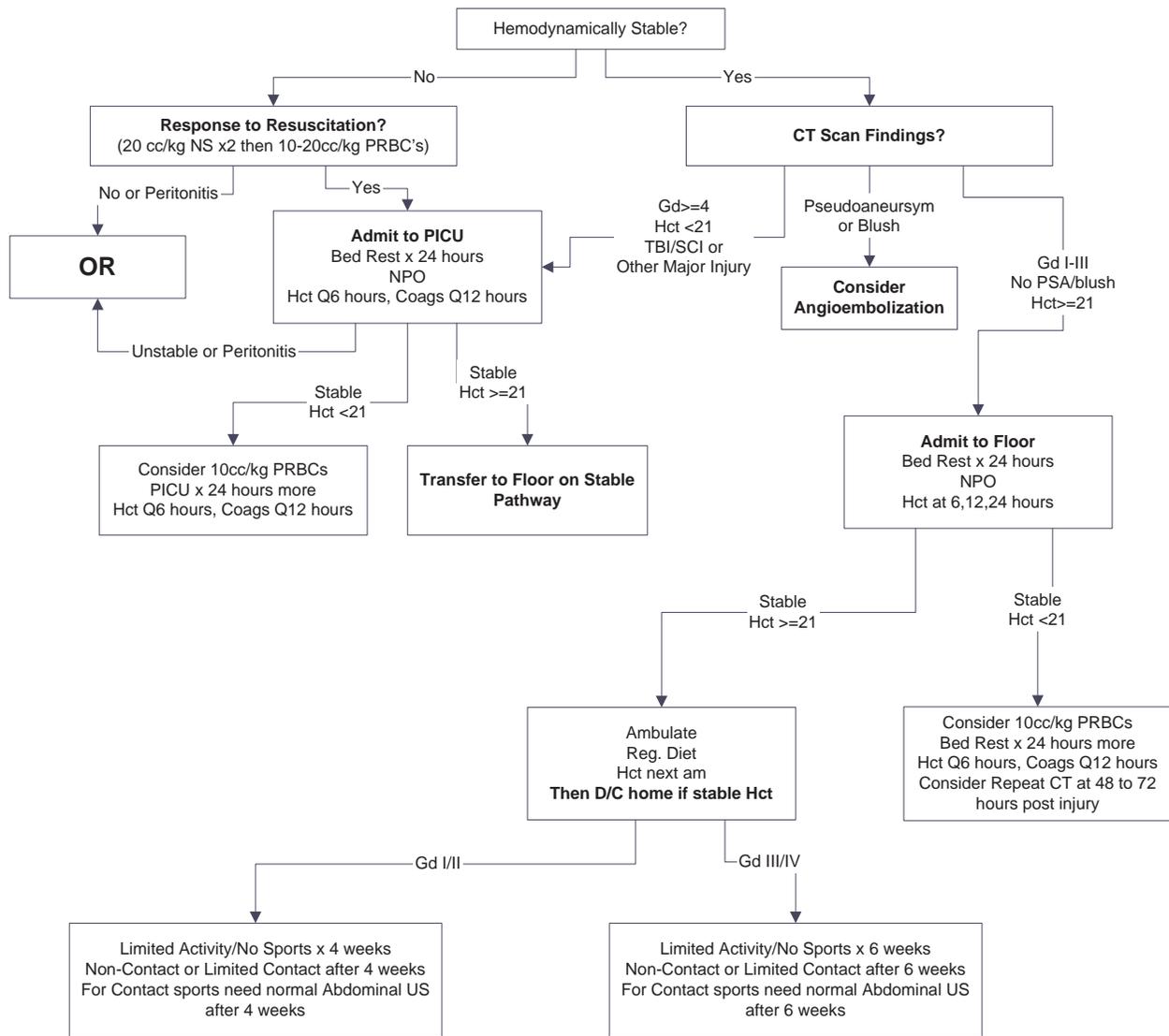
Holmes JF, Mao A, Awasthi S et al. Validation of a Prediction Rule for the Identification of Children with Intra-Abdominal Injuries After Blunt Torso Trauma. *Ann Emerg Med*, 2009; 54: 528-533.

Cotton BA, Beckert BW, Smith MK et al. The Utility of Clinical and Laboratory Data for Predicting Intraabdominal Injury Among Children. *Journal of Trauma*, 2004; 56: 1068-1075.

Isaacman DJ, Scarfone RJ, Kost SI et al. Utility of Routine Laboratory Testing for Detecting Intraabdominal Injury in the Pediatric Trauma Patient. *Pediatrics*, 1993; 92: 691-694.

New 06/04/10

**PEDIATRIC BLUNT SPLENIC / LIVER INJURY**



**References:**

- 1) Prospective validation of evidence-based guidelines for resource utilization in children with isolated spleen or liver injury. Stylianos S and the APSA Trauma Study Group. JPS (2002) 37, 453-6.
- 2) Variation in the management of pediatric splenic injuries in New England. J Trauma (2004) 56, 328-33.
- 3) Outcomes from pediatric solid organ injury: role of standardized care guidelines. Stylianos S. Current Opin Pediatr (2005) 17, 402-6.
- 4) Throwing out the "grade" book: management of isolated spleen and liver injury based on hemodynamic status. McVay MR et al. JPS (2008) 43, 1072-76.
- 5) The failure rate of nonoperative management in children with splenic or liver injury with contrast blush on computed tomography: a systematic review. van der Vlies CH et al. JPS (2010) 45, 1044-49.

9/1/10

**PEDIATRIC BURN POLICY / PROCEDURE MANUAL AND BURN ORDERS**

<https://www.musc.edu/medcenter/policy/PedsManual/C120.pdf>

<https://www.musc.edu/cce/ORDFRMS/pdf/picuburnadmit.pdf>

**CLASSIFICATION OF SPORTS BY CONTACT**

<b>CONTACT OR COLLISION</b>	<b>LIMITED CONTACT</b>	<b>NON-CONTACT</b>
Basketball	Baseball	Archery
Boxing	Bicycling	Badminton
Diving	Cheerleading	Body Building
Field Hockey	Canoeing or Kayaking (white water)	Bowling
Football - Tackle	Fencing	Canoeing or Kayaking (flat water)
Gymnastics	Field Events - High Jump	Crew or Rowing
Ice Hockey	Field Events - Pole Vault	Curling
Lacrosse	Floor Hockey	Dancing - Ballet
Martial Arts (Judo, Karate)	Football - Flag	Dancing - Modern
Rodeo	Handball	Dancing - Jazz
Rugby	Horseback Riding	Field Events - Discus
Ski Jumping	Racquetball	Field Events - Javelin
Soccer	Skating - Ice	Field Events - Shot Put
Team Handball	Skating - In-line	Golf
Water Polo	Skating - Roller	Orienteering
Wrestling	Skiing - Cross-country	Power Lifting
	Skiing - Downhill	Race Walking
	Skiing - Water	Riflery
	Skateboarding	Rope Jumping
	Snowboarding	Running
	Softball	Sailing
	Squash	Scuba Diving
	Ultimate Frisbee	Swimming
	Volleyball	Table Tennis
	Windsurfing	Tennis
	Surfing	Track
		Weight Lifting

## ADMISSION TO THE PEDIATRIC TRAUMA SURGERY SERVICE

In general, Pediatric Trauma patients will be admitted to the Pediatric Surgery service. Patients with trauma isolated to a single organ system may be admitted to the specific surgical service.

### List of patients who must be admitted to the Pediatric Surgery/Trauma service:

- 1) Level A and B traumas patients with multi-system injuries being admitted to the hospital.
- 2) Patients with traumatic injuries involving either the chest or the abdomen.
- 3) Patients with vascular injuries.
- 4) Patients with an isolated extremity fracture with a mechanism predictive of more extensive injuries (e.g. status post high-speed MVC or pedestrian vs. auto).
- 5) Patients with burns, caustic ingestions, or electrical injury.
- 6) Care of spinal cord injury will be coordinated between Pediatric Trauma, Neurosurgery and Pediatric Critical Care service.
- 7) Pediatric Trauma patients admitted to a surgical service in the PICU require mandatory consultation of the Pediatric Critical Care service.
- 8) Smoke inhalations without burns are to be admitted to the Pediatric Critical Care Service.

### Indications for Pediatric Surgical Consultation:

- 1) All trauma patients with a presumed isolated injury which is moderate to severe\* admitted to the PICU within 24 hours from injury should be evaluated by the Pediatric Trauma Service (e.g. direct transfer patient with a closed head injury requiring intubation and management by a Neurosurgeon should have a Peds Surgery consult to evaluate for other injuries).
- 2) All trauma patients with a presumed isolated injury which is moderate to severe\* admitted to the floor within 24 hours from injury should be evaluated by the Pediatric Trauma Service (e.g. direct transfer patient with a closed head injury requiring observation and management by a Neurosurgeon should have a Peds Surgery consult to evaluate for other injuries even if a partial evaluation was performed at an outlying hospital).

### Suspected Non-accidental Trauma (NAT):

- 1) All NAT patients with multiple significant injuries should be admitted to the Pediatric Trauma Service with appropriate level of care (floor or PICU).
- 2) If operative intervention is required or imminent, the appropriate surgical service should be consulted.
- 3) All NAT patients with a presumed isolated injury which is moderate to severe\* admitted within 24 hours of injury should be evaluated by the Pediatric Trauma Service.
- 4) If NAT patient is found to have an isolated injury which is moderate to severe\*, admission to appropriate surgical service is recommended.
- 5) If NAT patient is found to have an isolated injury which is minor\*\*, admission to General pediatrics is acceptable.

*For children admitted to non-surgical service to evaluate for non-accidental trauma, consultation to Pediatric Surgery within the first 24 hours is recommended and may facilitate evaluate of occult injuries.*

- 6) All NAT patients should have consultation by Pediatric Forensic Services (VIP) and Social work (Please see guidelines for SW consultation).

### Blunt Head Trauma

- 1) Child Abuse Pediatric (CAP) should be consulted on all patients under the age of 2 years admitted to the Pediatric Intensive Care Unit (PICU) or Pediatric Intermediate Care Unit (PIMCU) with a blunt injury to the head unrelated to a motor vehicle collision.

\*Examples of moderate to severe head injury would include skull fracture, epidural hematoma, subdural hematoma, DAI, subgaleal hematoma or head laceration with transfusion requirement, and TBI with LOC > 1hour. Example of severe extremity injury would include mangled/crushed extremity or vascular compromise.

\*\*Examples of minor head injury would include concussion, headache or brief LOC with no significant head CT findings. Examples of minor extremity trauma would include bruising or soft tissue injury without fracture or isolated fracture without vascular injury and without a mechanism predictive of other organ system injuries.

**CLEARANCE OF THE CERVICAL SPINE IN PEDIATRIC TRAUMA ALERT PATIENTS**

Evaluation of the cervical spine is required for all pediatric trauma alert patients. Documentation of cervical spine clearance should be entered in the medical record for all patients at the time of clearance of the cervical spine.

The Neurosurgery service will be consulted when a patient has neurologic deficits, cervical tenderness or other symptoms suggestive of a cervical spine injury.

A pediatric trauma patient will be considered to have low probability for injury if he or she is clinically stable and meets all five of the following criteria<sup>1</sup>:

- No midline cervical tenderness
- No focal neurologic deficit
- Normal alertness
- No intoxication
- Not distracted by a painful injury

Pediatric trauma patients having low probability of injury as defined by these criteria require no further imaging or other studies. A note will be placed in the chart by the senior resident or attending responsible for this assessment.

If any of these criteria cannot be determined, radiographic clearance of the cervical spine will be obtained. In addition, radiographic clearance of the cervical spine may be pursued if the Team Leader or Attending suspects a cervical spine injury on historical or clinical grounds.

**Cervical spine clearance in pediatric trauma alert patients who require cervical spine radiographs:**

Pediatric Trauma Alert patients requiring C-spine clearance will remain in a cervical collar until the cervical spine is cleared.

To clear the C-spine, radiographic cervical spine evaluation must be obtained. A 3-view C-spine series will be completed to include lateral, AP, and odontoid views.

Clearance of the odontoid films may not be appropriate in all patients, especially in children under age 5 without symptoms.

If plain films are not adequate to clear the C-spine, neurosurgery consultation will be obtained.

Once radiographic evaluation of the C-spine is completed and cleared for evidence of injury by a radiology attending or senior radiology resident, re-examination of the neck is performed.

If patient has no pain or tenderness on documented exam, C-spine may be considered cleared and collar removed. Clinical and radiographic clearance will be documented in the chart by a senior surgical resident or Attending. The neurological exam must be documented in the chart in detail.

If radiographic clearance has been documented, but if patient remains symptomatic or unexaminable, neurosurgery consultation will be obtained.

If radiographic clearance cannot be obtained, patient will remain in collar and neurosurgery consultation will be obtained.

<sup>1</sup> Hoffman JR, Mower WR, Wolfson AB, et al. Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma. N Engl J Med 2000;343:94-99.

**PEDIATRIC LEVEL A TRAUMA TEAM ROLES IN THE ADULT EMERGENCY ROOM****Purpose:**

In order to provide optimal care to trauma victims, it is necessary to avoid confusion during patient resuscitations. Therefore, the following protocol will guide the roles and responsibilities of the trauma resuscitation team in order to assure that the resuscitative needs of the trauma victim are met and performed in an orderly manner. The goal is efficient, quiet, rapid resuscitation, so that patients will be delivered to definitive care in the least amount of time possible, thereby assuring the best possible outcome. Patient privacy as mandated by HIPPA will be maintained by limiting and enforcing the number of people in the trauma resuscitation area during patient evaluation. Emergency Medicine and/or Trauma Surgery Attending Physicians will be responsible for this enforcement.

Physicians and staff involved in patient evaluation and resuscitation are required to comply with their assigned roles and only their assigned roles. (Additional confirmatory physical examinations, ultrasounds examinations, etc. may be completed at the discretion of the Trauma Surgery Attending Physician or Emergency Medicine Attending Physician after completion of primary survey, resuscitation, and secondary survey including radiological evaluations and other secondary survey adjuncts.

**I. Inner Core Care Providers (within the red line in resuscitation bay)****Trauma Team Leader**

(Adult Surgery attending, or Pediatric Attending Surgeon) or Adult ED attending until surgery attending arrives, or PGY4 or more senior surgical resident. ED PGY3 can assume role of team leader under direct supervision of the trauma attending surgeon or Pediatric Attending Surgeon when senior surgery resident is unavailable (in the operating room for example) or agrees to trade off that role. EM PG3's may also participate in discussions regarding patient management with trauma team leader and trauma surgery attending).

1. Identifies inner core trauma team members prior to patient arrival.
2. Obtains report from EMS.
3. Coordinates and communicates to the team the plan of care.
4. Performs, assists, or directs performance of necessary lifesaving procedures in accordance with
5. Contacts appropriate consultants as needed.
6. If the attending surgeon is not present during resuscitation, team leader discusses case with attending surgeon and emergency room attending prior to patient leaving trauma resuscitation area.
7. Determines level of care needed once patient leaves ED.
8. Completes patient admission note or emergency department physician documentation if patient is discharged or expires in the Emergency Department.
9. Responsible for assuring family notification and discussing patient situation with family as soon as possible after family arrives.
10. Responsible for assuring that History and Physical, admission orders, and other necessary documentation including resident MD signature is completed and reviewed for accuracy.

**MD 1**

(PGY 2 or more senior surgery resident. EM PG2 or more senior residents may assume role of MD 1 if agreed to, before patient arrival, by trauma service resident (and attending) who would otherwise assume that role.)

1. Performs primary survey including GCS and reports finding to the team
2. Assist with surgical airway if necessary.
3. Performs FAST exam at direction of team leader.
4. Assists or performs procedures at direction of team leader.

**MD 2**

(PGY1 or more senior surgical residents. EM PG1 or more senior residents may assume role of MD 2 if agreed to before patient arrival, by trauma service resident (And attending) who would otherwise assume that role.)

1. Removes clothing and jewelry and applies warm blankets. (For lesser injured patients and/or for those without risk of spine injury, every effort should be made to preserve clothing intact unless otherwise directed by trauma team leader.)
2. Performs secondary survey.
3. Assists or performs procedures at direction of team leader.
4. Responsible for closure of lacerations if team leader states appropriate.
5. Assists, at direction of team leader, in completion of History and Physical.

**Pediatric RN 1 (Procedure)**

1. Prepares trauma bay for patient arrival based on report from EMS.
2. Obtains primary peripheral IV access and draws blood work coordinating this with the performance of the primary survey at discretion of team leader.
3. Responsible to ensure that patient receives all medications.
4. Administers IV fluid and blood products and informs team leader and RN 2 of fluids infused
5. Maintains Level I Infuser Device when in use or defers to available nurse.
6. Performs any additional nursing assessment after stabilization of patient.
7. Inserts orogastric / nasogastric tube and/or urinary catheter if requested by team leader.
8. Remains with patient as Procedure RN 1 accompanying patient to CT Scan, etc.
9. Gives report to receiving unit and accompanies patient anywhere needed to be transported OR, PICU, Floor, etc.
10. If receiving unit not ready, transports patient to the Pediatric ED once patient stabilized and appropriate CT scans are completed and continues role as Procedure RN 1
11. Responsible at the beginning of every shift to go over to the Adult Emergency Department to check the presence of any needed supplies/ equipment which may be necessary in trauma resuscitation. (Check list to be developed)
12. In the event where the PEDs ED RN assigned to Pediatric Trauma is unable to perform the role of Pediatric RN1 in a Level I Trauma because of extreme high acuity in the PED, and leaving the PED will jeopardize the care of patients in the PED, the Pediatric ED Charge RN will notify the Adult ED Charge RN at the beginning of his/ her shift, or at least prior to patient arrival to discuss and determine who will have this assigned role if needed. The RN should then report to One West for Level I Trauma alert to assist Adult RN1 with care for a brief period of time until patient stabilized, and lines secured, etc. Patient should still be transferred to the PED once stabilized if patient not going immediately to OR, PICU, or floor. Documentation of the high acuity should be completed by Charge RN, and info sent to RN Manager.

**RN 2 (Recorder)**

1. Responsible for making sure Trauma Team leader is aware of each recorded set of vital signs, fluid intake, and lab results
2. Completes trauma resuscitation flow sheet.
3. Assists as needed at request of RN 1, and Team Leader with patient care.
4. Responsible for obtaining patient valuables and recording in the nurse's note and securing them with the admission clerk or family member per hospital / emergency department policy. and procedure.

**Emergency Department Technician (EDT)**

1. Assures that all equipment and supplies for trauma patient care are available, complete, and ready for emergent use including daily and post resuscitation check of oxygen tanks in trauma bay.
2. Starts trauma clock when patient arrives.
3. Attach patient to cardiac monitor, pulse oximetry, and BP monitor and takes temperature.
4. Obtains and sets-up procedure trays.
5. Applies patient identification band. Two identibands are needed if patient goes to the OR.
6. Assists with drawing lab specimens, obtain EKG as directed.
7. Assist team as needed to restrain patient as ordered by Team Leader.
8. Assist with splinting of extremities as requested by team leader.
9. Assist with patient transport and applies portable monitor.

**Airway 1 (Anesthesia attending, Pediatric ED attending/ or Adult Attending, EM Senior resident, or Peds ED Fellow)**

1. If requested by Team Leader, performs airway assessment and management including assurance of appropriate and proper airway placement maintains cervical spine precautions until C-spine cleared by team leader. Informs nursing staff of administered medications. Once airway established and secured, leaves bedside.
2. Senior Surgery resident may assume role of ED resident in airway management if agreed to by ED attending (usually as a “trade off” when an EM resident assumes the MD 1 or MD 2 role).
3. If Pediatric ED Attending is not able to assume Airway 1 role he/ she will contact the Adult ED Attending preferably at the beginning of his/ her shift, but at least prior to patient arrival to discuss and determine who will have this assigned role if needed. Pediatric Attending may assume this role and trade off at any time with Adult ED Attending under the direction of the Team Leader. Peds ED Attending or Adult ED Attending should request the “trading off” of roles at anytime necessary to secure the airway of a pediatric patient. Peds ED Attending will be responsible for documentation of any procedures, treatments performed or managed, or medications ordered on progress note.
4. Under direct supervision of the Peds ED Attending, the Peds ED Fellow may assume the role of Airway1 or after he/she has completed the month of Anesthesia AND their month of Trauma

**Airway 2 (Anesthesia attending, ED attending, EM resident, Surgery resident, or PEM Fellow)**

1. Assists Airway 1 with management of airway (cricoid pressure etc). May assist at the request of Pediatric Respiratory Therapist in securing airway once airway established. Once secured leaves bedside.
2. Junior or Senior Surgery residents may assume role of ED resident in airway management if agreed to by ED attending (usually as a “trade off” when an EM resident assumes the MD 1 or MD 2 role).
3. Under direct supervision of the Peds ED Attending, the Peds ED Fellow may assume the role of Airway 2 with Pediatric Patients or after he/she has completed the month of Anesthesia AND their month of Trauma

**Pediatric Respiratory Therapist Supervisor or Respiratory therapist covering Peds ED**

1. Obtain pulse oximetry reading and respiratory rate and quality of breathing.
2. If patient not intubated, supplies oxygen to all patients by mask, unless otherwise directed by Team Leader.
3. Responsible for airway maintenance, i.e., suctioning, securing and periodic assessment.
4. Obtains ABG's as indicated or ordered.
5. Assists with intubation if no physician available for Airway 2 role.
6. Assesses to assure continued proper placement of airway.
7. Attach patient to End Tidal CO2 monitor when intubated, secure ETT.
8. Insures adequate amount of oxygen and vent equipment available for transport (checks O2 tank on trauma stretcher prior to patient arrival if possible).
9. Accompanies intubated patients to O.R., I.C.U., CT scan, etc. and reconfirms airway position after patient movements completed.
10. Pediatric Respiratory Therapist may request for assistance from Supervisor to assist in the set up of Ventilator while airway is being secured.

**Radiologic Technologist**

1. Assures x-ray equipment available including adequate number of lead aprons and cassettes.
2. Assures radiation protection for other Trauma Team members while taking x-rays
3. Takes x-rays when directed by Trauma Team Leader with consideration of C-spine injury until ruled out.
4. Immediately processes films.

**Charge Nurse**

1. Removes patients and/or family members from Rooms 2, 2a and 3 whenever possible to more private areas to avoid unnecessary exposure to the chaos of the trauma resuscitation.
2. Assists RN 1 and/or RN II if necessary. *Note. Charge nurse should not remain in trauma resuscitation area if not directly involved in patient care*

**II. Outer Core Care Providers**

**(Must stay behind red line unless replacing an inner core trauma team member or at direction of trauma team leader)**

**Trauma Surgery Attending**

1. Has overall responsibility and authority for trauma resuscitation and is responsible for overseeing all team members to assure compliance with standards and protocols.
2. Assures HIPAA compliance and patient privacy is maintained.

**Pediatric Surgery Attending**

1. May assume role of Team Leader and overall responsibility for management of patient following consultation with the Trauma Surgery Attending.
2. Role will replace Trauma Surgery Attending if deemed necessary.

### **Emergency Medicine Attending**

1. Initiates trauma alert as per established trauma alert criteria. In the absence of trauma surgery attending, monitors resuscitation for appropriateness and efficiency of care, serving as primary responsible physician. Communicates with trauma attending as needed and determines need for surgery attending presence in the Emergency Department.
2. Assures HIPAA compliance and patient privacy is maintained

### **Children's Hospital Pharmacist**

Physicians may consult the Pediatric Standard Concentration Information for drips located on the MUSC Children's Emergency Department Portal.

1. Assist in the drawing up of emergency medications and preparing drips for Level A Trauma patients
2. Assist as consultant/ reference to physicians for dosing of pediatric medications

### **ASB**

1. Assigns patient a pre designated trauma alert packet with number and activates number with registration.
2. Notifies operator of absent Trauma Team member within the Resuscitation Area.
3. Page consultants at request of Trauma Team Leader.
4. Directs all incoming calls to appropriate personnel.

### **Chaplain**

1. Obtain patient identification and assist with notifying family members and relays information to RN 1 or RN 2.
2. Facilitates communication between family, patient, and staff.
3. **Support families and child interaction**
4. Provide religious and spiritual support to patients, families and staff.
5. Provide grief support.
6. Collaborate with HSC's, Security, and Guest Relations, to provide information for families and assists with directing them to appropriate areas within the hospital.
7. Remains in trauma admitting area only for as long as necessary to complete roles.

### **Child Life Specialist**

1. **Works with chaplain with any assistance they may need with family intervention**
2. **Supports alert child during procedures and trauma process.**
3. **Remains in trauma area only for as long as necessary to assess needs and complete roles.**

### **EMS personnel directly involved in patient transport to ED**

1. Deliver patient from scene to trauma admitting area.
2. Immediately following patient delivery and movement on to gurney, move behind red line to answer additional questions or leave admitting area to complete required paperwork.

### **Trauma Student, ED A-Side Student**

1. Assists with patient management and documentation as requested by and under direct supervision of trauma surgery attending, trauma team leader and/or Emergency Department attending.
2. In general any additional students beyond one trauma service student and one EM student may observe at the discretion of the trauma surgery attending (or EM attending in absence of trauma surgery attending) as long as their presence does not result in excessive overcrowding of the trauma admitting area or impair trauma team function.

**Trauma Program Manager or Pediatric Trauma Coordinator**

1. Monitors trauma team performance as per ACS guidelines
2. Identifies PI issues for later review.

**Security**

1. Assures staff and patient safety when such concerns exist.
2. Assists with crowd control at request of attending trauma surgeon and/or attending EM physician.
3. Coordinates interactions with involved police agencies.
4. If no issues identified requiring presence in admitting area, will leave trauma admitting area and be available if needed.

**Hospital Supervisor**

1. Identifies and addresses issues in hospital function related to trauma center activities
2. Assists ATC with bed assignment
3. If no issues identified requiring presence in admitting area, will leave trauma admitting area and be available on pager if needed.

**III. OB Trauma alerts:**

**OB Attending Physician and Nurse (paged on OB trauma alert system)**

1. Respond to trauma bay with FHT monitor and OB Ultrasound.
2. After primary assessment and in consultation with team leader will place FHT monitor and perform US to determine fetal age\size.
3. Responsible to remain with mom and maintain FHT monitoring throughout resuscitation.
4. Accompany patient maintaining FHT monitoring to all procedures or radiology examinations within the hospital.
5. OB attending physician determines when FHT monitoring may be interrupted or terminated.

**Neonatal Stabilization Team and Pediatric Emergency Department**

1. Per Adult ED policy the One West PCT will bring the Panda Bed to the Trauma Bay area
2. Pediatric Charge RN will receive OB Trauma alert. Adult ED charge nurse notifies Pediatric ED charge nurse if impending delivery possible.
3. Pediatric charge nurse will notify pediatric attending.
4. Pediatric attending and Pediatric nurse will respond to trauma area and act as first responder in the case a neonate is born until Neonatal Stabilization Team arrives.
5. Neonatal Stabilization Nurse and NICU Charge nurse paged with the OB trauma team will respond and assess the need to page the Neonatal Stabilization Team (infant delivery possible).
6. If Neonatal Stabilization Team paged they will respond with the appropriate equipment to oversee care of the infant.
7. Pediatric Respiratory Supervisor will respond to the OB Trauma alert to assist with establishment of airway and ventilation of the infant.
8. Pediatric Surgery Attending will be notified by Neonatal Stabilization Team if necessary.

**IV. Excluded from resuscitation area**

1. Residents on services not directly involved in trauma patient care
2. Residents/students rotating in Emergency Department but not directly involved in trauma patient care
3. Hospital Volunteers
4. Nursing personnel not directly involved in trauma patient care
5. Attending Physicians not directly involved in trauma patient care
6. EMS personnel not involved in patient transport
7. Others not directly involved in acute care of patient

Revised 6/7/10

**Clarification Of Pediatric Trauma Roles In Level A Trauma (One West)**

Following a meeting of the Pediatric and Adult Emergency Medicine Group, Pediatric and Adult Trauma Surgeons, ED Nurse Managers, and Trauma Coordinators the following clarification of roles of the Emergency Medicine Attending Physicians during Level A Trauma Alerts in One West was determined on January 6<sup>th</sup>, 2010.

1. Following the determination that a pediatric patient will be a Level A Trauma Alert in One West, the Adult Emergency Department Attending will serve as the Initial Resuscitation/ Responder, serve as team leader if necessary (\*see roles), and serve as the Emergency Department Physician of Record. This will include documenting the initial Emergency Medicine Trauma Note. Their involvement will continue until an official hand off of care occurs, including a conversation with the Pediatric Emergency Medicine Attending and appropriate documentation on the chart. Following this hand off of care the Pediatric Emergency Medicine Attending will assume Emergency Department Care of the patient. The timing of this hand off of official care will be determined on a case by case basis, but will be well communicated to the entire trauma team particularly the procedural RN caring for the patient.
2. The Pediatric Emergency Medicine Attending will respond to all Pediatric Trauma alerts and be available for initial assessment and stabilization of airway if necessary.
2. Any procedures or medications the Pediatric Emergency Medicine Physician Orders during the initial resuscitation will be documented in a procedural note on the chart.
3. Once patient is stabilized and CT Scan complete, patient should be moved to the Pediatric Emergency Department immediately if bed in PICU or Floor status not ready.

**\*Trauma Team Leader**

(Adult Surgery attending, or Pediatric Attending Surgeon) or Adult ED attending until surgery attending arrives, or PGY4 or more senior surgical resident. ED PGY3 can assume role of team leader under direct supervision of the trauma attending surgeon or Pediatric Attending Surgeon when senior surgery resident is unavailable (in the operating room for example) or agrees to trade off that role. EM PG3's may also participate in discussions regarding patient management with trauma team leader and trauma surgery attending).

**Trauma Surgery Attending**

1. Has overall responsibility and authority for trauma resuscitation and is responsible for overseeing all team members to assure compliance with standards and protocols.
2. Assures HIPAA compliance and patient privacy is maintained.

**Pediatric Surgery Attending**

1. May assume role of Team Leader and overall responsibility for management of patient following consultation with the Trauma Surgery Attending.
2. Role will replace Trauma Surgery Attending if deemed necessary.

6/1/10

**LEVEL B TRAUMA TEAM MEMBER ROLES- PEDIATRIC TRAUMA****Information:**

In order to provide optimal care to trauma victims, it is necessary to avoid confusion during patient resuscitations. Therefore, the following protocol will govern the roles and responsibilities of the trauma resuscitation team in order to assure that the resuscitative needs of the trauma victim are met and performed in an orderly manner. The goal is efficient and rapid resuscitation, so that patients will be delivered to definitive care in the least amount of time possible, thereby assuring the best possible outcome.

**I. Inner Core Care Providers****Trauma Team Leader**

Pediatric Surgery service and/or Pediatric EM Attending will be the first responders for Peds Level 2 traumas sent to Pediatric Emergency Department. Pediatrics Surgical Chief Resident, Adult Trauma on call Chief Resident, PGY4 or more senior surgical resident may act as team leader. ED PGY3 assigned to the Pediatric ED can act as team leader under direct supervision of the Pediatric ED attending, trauma attending surgeon or surgical PGY4/5)

**Major Responsibility:** Assures proper resuscitation in accordance with ATLS Standards, performs or supervises emergency procedures and directs team members. Also identifies members of the Inner Core Team and confirms their proper positions at the patient's bedside.

1. Obtains report from EMS
2. Identifies team members
3. Coordinates and communicates to the team the plan of care
4. Orders appropriate medications per Broslow tape weight estimate
5. Performs, assists, or directs performance of necessary lifesaving procedures
6. Contacts appropriate consultants as needed
7. If the attending surgeon is not present during resuscitation, team leader discusses case with attending surgeon and/or emergency room attending prior to patient leaving trauma resuscitation area
8. Determines final disposition of patient
9. Arranges for PICU bed or CH floor bed if necessary and notifies RN 1 of bed location.
10. Signs emergency resuscitation record prior to patient leaving unit
11. Completes patient admission note or emergency department physician documentation if patient is discharged or expires in the Emergency Department
12. Responsible for assuring family notification and discussing patient situation with family as soon as possible after family arrives

**Pediatric Emergency Medicine Attending**

**Major responsibilities:** Initiates Trauma II alert as per established guidelines. The PEM attending will be present upon patient arrival for all Trauma II alerts and be responsible for verbally confirming which providers are assuming which role.

Monitor resuscitation for appropriateness and efficiency of care, serving as primary responsible physician in physical absence of trauma attending from trauma resuscitation area. Communicates with trauma attending as needed and determines need for surgery attending presence in the Pediatric ED

**MD 1**

(PGY 2 or more senior surgery resident or PGY 2 or more senior ED resident)

1. Performs primary survey including GCS and reports finding to the team
2. Assist with airway if necessary
3. Performs FAST exam at direction of team leader
4. Assists or performs procedures at direction of team leader

**SECTION THREE: PEDIATRICS**

**MD 2**

(PGY1 or more senior surgical residents. The EM resident assigned to the ED and resident currently on trauma service will both respond and they will determine who will assist at the bedside)

1. Performs secondary survey
2. Rectal exam
3. Assists or performs procedures at direction of team leader.
4. Responsible for closure of lacerations if team leader states appropriate
5. Assures proper completion of H&P. If ED resident available completes ED history and physical form.
6. Resident on trauma service completes trauma history and physical form
7. Resident on trauma service completes admission orders

**RN 1 Pediatric nurse (Procedure)**

1. Responsible to ensure Pediatric ED room prepared for patient arrival based on report from EMS
2. Confirms Broslow Tape Weight Estimation
3. Obtains primary peripheral IV access and draws blood work per protocol
4. Responsible to ensure that patient receives all medications. May either obtain and administer or delegate to another available nurse
5. Controls fluids (IV and blood products) and informs RN 2 of fluids infused with each new bag of blood products or crystalloids
6. Maintains Level I Infuser Device when in use or defers to available nurse
7. Performs any additional nursing assessment during and after stabilization and needed procedures are completed
8. Inserts orogastric or nasogastric tube after confirming with team leader which is appropriate
9. Inserts urinary catheter, if not contraindicated
10. Communicates clearly all fluids, blood products, medications, procedures completed to Team Leader and to RN2
11. Prior to patient arrival RN 1 and RN 2 will determine who will be the primary nurse. The primary nurse will give report to receiving unit and accompanying patient outside the ED.

**RN 2 Pediatric Nurse (Recorder)**

1. Responsible for making sure Trauma Team leader is aware of each recorded set of vital signs, fluid intake, and lab results
2. Perform documentation of the trauma resuscitation based on patient assessment and procedures performed by the trauma team.
3. Assists as needed at request of RN 1, and Team Leader with vital signs and fluids.
4. Responsible for obtaining patient valuables and recording in the nurse's note and securing them with the admission clerk or family member per hospital / emergency department policy and procedure
5. Documents arrival time of team members and patient

**Pediatric Emergency Department Technician (EDT)**

1. Attach patient to cardiac monitor, pulse oximetry, and BP monitor and takes temperature.
2. Places Broslow Tape for weight estimation
3. Remove clothing and jewelry and applies warm blankets.
4. Obtains and sets-up procedure trays
5. Applies patient identification band. Two identibands are needed if patient goes to the OR
6. Assists with drawing lab specimens, obtain EKG as directed
8. Assist team as needed to restrain patient as ordered by Team Leader.
9. Assist with splinting of extremities as requested by team leader
10. Assist with patient transport and applies portable monitor
11. Check Oxygen tank daily and after each trauma

**Anesthesia or PED ED Attending**

If requested by team leader performs airway assessment and management including assurance of appropriate and proper airway placement, maintains cervical spine precautions until C-spine cleared when requested by team leader. Informs nursing staff of medications given

**Respiratory Therapist**

Maintenance of airway and proper ventilator support if directed by Team Leader.

1. Obtain pulse oximetry reading and respiratory rate
2. If patient not intubated, supplies oxygen to all patients by mask, unless otherwise directed by Team Leader
3. Responsible for airway maintenance, i.e., suctioning, securing and periodic assessment
4. Obtains ABG's as indicated or ordered
5. Assists with intubation
6. Obtains and sets-up vent
7. Attach patient to End Tidal CO2 monitor when intubated
8. Insures adequate amount of oxygen and vent equipment available for transport (checks O2 tank on trauma stretcher prior to patient arrival if possible)
9. Accompanies intubated patients to O.R., I.C.U., CT scan, etc. and reconfirms airway position after patient movements completed

**Radiologic Technologist**

Rapidly and efficiently performs all X-rays as ordered by Trauma Team Leader, develops and immediately makes films available to Team Leader.

1. Assures x-ray equipment available including adequate number of lead aprons and cassettes
2. Assures radiation protection for other Trauma Team members while taking x-rays
3. Takes x-rays as directed by Trauma Team Leader with consideration of C-spine injury until ruled out
4. Immediately develops films

**II. Outer Core Care Providers****Pharmacist**

Children's Hospital Pharmacist should respond if requested by Team Leader or RN1 or RN2 to Level II Pediatric Trauma. (Page using 2-3333)

**ASB**

Assures completion of necessary admission paperwork and handles all incoming and outgoing telephone calls

1. Assigns patient a pre designated trauma alert packet with number and activates number with registration
2. Notifies operator of absent Trauma Team member within the Resuscitation Area.
3. Page consultants at request of Trauma Team Leader (Using 2-3333 pages additional help per request)
4. Directs all incoming calls to appropriate personnel
5. Obtains admitting physicians name from trauma team leader

**Chaplain**

Help with notification of family and assist family members once they arrive at MUSC.

1. Obtain patient identification and assist with notifying family members and relays information to RN 1 or RN 2
2. Facilitates communication between family, patient, and staff.
3. Support families during visitation with patient.
4. Provide religious and spiritual support to patients, families and staff.
5. Provide grief support.
6. Collaborate with HSC's, Security and Guest Relations, to provide information for families and assists with directing them to appropriate areas within the hospital. (Page using 2-3333)

**HSC, Security, Charge Nurse and/or Guest Relations**

Maintains crowd control and helps with family members support

**PAINFUL PROCEDURES ON PEDIATRIC PATIENTS IN MUSC EMERGENCY DEPARTMENT**

**POLICIES:**

This protocol will allow Pediatric Emergency Medicine, Pediatric Critical Care, Anesthesia, and Emergency Medicine attendings to provide safe and effective conscious sedation to children who must undergo painful procedures in the MUSC ED.

**This protocol is for Pediatric Patients in the MUSC ED ONLY.**

1. Pediatric conscious sedation may be provided only by attendings from Pediatric Emergency Medicine, Pediatric Critical Care, Anesthesiology, and Emergency Medicine. Attendings must remain in the department with the patients until they are conscious and alert.
2. Patients must remain on cardiac monitoring and pulse oximetry throughout the period of sedation. Suction will be turned on and remain available at the bedside at all times. A specific ED nurse will remain with the patient during this period and will document the patient's status on the standard conscious sedation sheet according to the MUSC ED protocol. A period of recovery of not less than one hour will occur after administration of medications until the patient is deemed to be fully awake by the attending physician responsible.
3. This protocol will be used for procedures that will take less than 30 minutes. Appropriate procedures include but are not limited to:
  - A. Small Burns
  - B. Lacerations
  - C. Orthopedic Procedures
  - D. I & D's
  - E. Lumbar Punctures
4. This protocol is contraindicated for sedation for reasons other than painful procedures including but not limited to:
  - A. Major Trauma
  - B. Agitation
  - C. CT Scan
  - D. patients with suspected increased intracranial pressure.
5. Medications used will include:
  - A. Ketamine in doses of 1 to 2 mg/kg IV or 4 mg/kg IM
  - B. Addition of atropine 0.01 mg/kg or glycopyrrolate 0.005 mg/kg should be considered for anticholinergic effect.
  - C. Midazolam 0.05 mg/kg may be added to prophylax against dysphoric reactions,. These reactions are more common in older children.

IMPLEMENTED:

REVISED:

**PEDIATRIC GLASGOW COMA SCALE****Eye opening**

Spontaneous	4
Opens to speech	3
Opens to pain	2
No response	1

**Motor**

Spontaneous/to Command	6
Localizes to pain	5
Withdraws to pain	4
Flexion (decorticate)	3
Extension (decerebrate)	2
No response	1

**Verbal**

Coos, babbles, cries appropriately/oriented	5
Irritable, consolable cry/confused, disoriented	4
Persistent cry or scream/inappropriate cry or scream inappropriate words	3
Grunts, agitated, restless/incomprehensible sounds	2
No response	1

**PEDIATRIC TRAUMA SOCIAL WORK CONSULTS**

**\*Weekdays\***

1) Inpatient

-Business Hours

- Inpatient SWs will screen admitted pts daily to identify and screen trauma and burn pts.
- Inpatient SWs will complete appropriate assessment, intervention, and education and will document SW intervention in progress notes.
- If regular assigned SW is out, covering SW will also screen for trauma & burn pts and provide appropriate intervention.
- Unit RN or Secretary should page assigned SW when Trauma or Burn pt. is admitted/consult is requested.
- SW will continue to communicate with burn RNs to identify and coordinate pts being admitted for burns
- ED SW will communicate to inpatient SW any interactions with pts being admitted through the ED during the day.

-After Hours

***\*\*Follow standard inpatient procedure for contacting SW\*\****

- If Trauma/Burn pt. is admitted with an urgent SW need, page assigned SW.
- If a Trauma pt. is admitted without an urgent need but consult is requested, RN/MD should leave a voice message or email for assigned SW (as posted on all Peds Units) or may wait to contact SW during business hours.

2) Emergency Department

-Business Hours

- Page ED SW to consult.

-After Hours

***\*\*Follow standard ED procedure for contacting SW\*\****

- If trauma pt. presents in ED with an urgent SW need, page on-call ED SW.
- If trauma pt. presents in ED with non-urgent concerns for SW follow-up, leave a message for assigned ED SW.

**\*Weekends\***

1) For SW consult requests without immediate SW needs:

- RN or MD should page on-call SW during business hours when SW consults are needed for routine assessment and education.
- RN or MD should leave a message on Department voicemail (2-9535) to request consults after hours if pt. is admitted after hours without immediate concerns.

*NOTE: If pt. is going to be inpatient until regular business hours (Monday) & doesn't have immediate SW needs, on-call SW may defer consult to assigned SW.*

2) For SW consult requests when immediate SW needs are indicated:

- RN or MD should page on-call SW to assist.

02/21/11

**SW INTERVENTION FOR ALCOHOL SCREENING:**

- 1) RN or MD should contact SW for positive CRAFFT, positive Blood Alcohol level, or pt. admission of substance use in order to provide appropriate SW intervention.
- 2) SW will screen CRAFFT as part of SW assessment to ensure completion.
- 3) SW intervention will consist of pt. and family education on substance use and community resources available to them. SW will complete appropriate community referrals if pt/pt's family agree to them.
- 4) SW will document SW intervention in progress notes.

02/21/11

**TRAUMA PATIENT: ALCOHOL SCREENING GUIDELINE**

**Resource if questions: Melanie Stroud, RN or Debbie Kerness, LMSW** August, 2010

**STEP 1** All Pediatric Trauma Alerts Level A and B ages 12 years old and older will have a Blood Alcohol Level drawn with their Trauma Panel Labs in the Emergency Department

**STEP 2**

Screen Process

When patient stabilized registered nurses will screen admitted patients 12 years and up that are Trauma A and Trauma B patients with the CRAFFT tool located on the admission data base

Patients ineligible for further screening include the following:

- Patient is 12 years old or older with severe brain injury, high spinal cord injury or unable to participate due to extent of injury

Patients eligible for further screening/ consultation by social work for further follow-up

- Patient answers yes to any of the CRAFFT screening questions and/ or has a positive blood alcohol level.

**CRAFFT screening tool**

Have you ever ridden in a **CAR** driven by someone (including yourself) who was “high” or had been using alcohol or drugs? **Yes or No**

Do you ever use alcohol or drugs to **RELAX**, feel better about yourself, or to fit in? **Yes or No**

Do you ever use alcohol/ drugs while you are by yourself **ALONE**? **Yes or No**

Do you **FORGET** things you did while using alcohol or drugs? **Yes or No**

Do your family or **FRIENDS** ever tell you that you should cut down on your drinking or drug use? **Yes or No**

Have you gotten in **TROUBLE** while you were using alcohol or drugs? **Yes or No**

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**STEP 3**

If both blood alcohol and screening result negative result, screening process is complete.

If positive (answers yes to any of the CRAFFT questions or if Blood Alcohol screens positive) MD or RN will call for Social Work consult.

- SW will screen CRAFFT as part of SW assessment to ensure completion.
- SW will conduct psycho/social assessment to determine patient needed resources
- SW intervention will consist of patient and family education on substance use and community resources available to them.
- SW will complete appropriate community referrals if patient/patient’s family agree to them.
- SW will document SW intervention in progress notes.
- Any pertinent info social worker will communicate with multidisciplinary team.

Ehrlich, Peter, Maio, Ron, Drongowski, Robert, Wagaman, Mathew, Cunningham, Rebecca, Walton, Maureen. Alcohol Interventions for Trauma Patients are NOT just for Adults: Justification for Brief Interventions for the Injured Adolescent at a Pediatric Trauma Center. *The Journal of Trauma* 69:1, July 2010.

02/21/11