



Pediatric Trauma

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Objectives

- Discuss the epidemiology of pediatric trauma
- Discuss unique anatomic and physiologic characteristics of children
- Review early management and transport
- Review of individual organ systems with regards to trauma management

Pediatric Trauma

- Trauma: forceful disruption of bodily homeostasis
- A serious injury or shock to the body
- Injury to living tissues caused by an extrinsic force
- Bodily injury posing a threat to human life without immediate medical intervention

Epidemiology

- Leading cause of death in children and young adults (49%)
- Boys > girls: ratio 2:1
- CNS injury causes most of morbidity
- Increased morbidity with multisystem injury
- Blunt trauma more common than penetrating
 - Later more lethal
 - Most blunt trauma accidental
 - MVA responsible for 75% childhood deaths



10 Leading Causes of Death by Age Group , Ohio, 2007

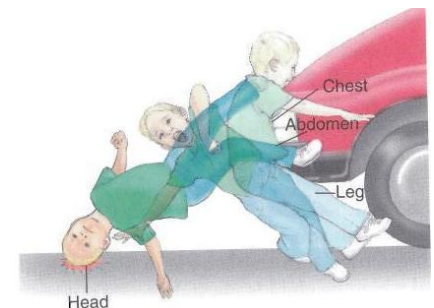
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	All ages
1	Congenital Anomalies 227	Unintent. Injury 37	Unintent. Injury 49	Unintent. Injury 44	Unintent. Injury 493	Unintent. Injury 542	Unintent. Injury 662	Malignant Neoplasms 2,279	Malignant Neoplasms 4,390	Heart Disease 22,610	Heart Disease 27,886
2	Short Gestation 216	Homicide 19	Malignant Neoplasms 18	Malignant Neoplasms 27	Suicide 171	Suicide 218	Malignant Neoplasms 579	Heart Disease 1,725	Heart Disease 2,862	Malignant Neoplasms 17,466	Malignant Neoplasms 24,975
3	SIDS 99	Congenital Anomalies 16	Homicide 13	Homicide 13	Homicide 168	Homicide 170	Heart Disease 495	Unintent. Injury 847	Low. Respiratory Disease 619	Low. Respiratory Disease 5,152	Low. Respiratory Disease 6,054
4	Maternal Pregnancy Comp. 74	Malignant Neoplasms 15	Congenital Anomalies 6	Congenital Anomalies 12	Malignant Neoplasms 58	Malignant Neoplasms 143	Suicide 234	Suicide 314	Diabetes Mellitus 587	Cerebro-vascular 5,047	Cerebro-vascular 5,828
5	Placenta Cord Membrane 70	Influenza & Pneumonia 7	Septicemia 4	Suicide 12	Heart Disease 44	Heart Disease 126	Homicide 126	Liver Disease 281	Unintent. Injury 460	Alzheimer's Disease 3,541	Unintent. Injury 4,821
6	Unintent. Injury 65	Cerebro-vascular 5	Cerebro-vascular 3	Benign Neoplasms 3	Congenital Anomalies 26	Diabetes Mellitus 29	HIV 93	Diabetes Mellitus 271	Cerebro-vascular 417	Diabetes Mellitus 2,786	Diabetes Mellitus 3,761
7	Respiratory Distress 31	Heart Disease 4	Chronic Low. Respiratory Disease 2	Cerebro-vascular 3	Cerebro-vascular 7	Congenital Anomalies 24	Diabetes Mellitus 81	Cerebro-vascular 258	Liver Disease 304	Influenza & Pneumonia 1,666	Alzheimer's Disease 3,565
8	Circulatory System Disease 25	Perinatal Period 3	Four Tied 1	Seven Tied 1	Diabetes Mellitus 6	HIV 22	Liver Disease 76	Chronic Low. Respiratory Disease 219	Suicide 189	Unintent. Injury 1,622	Influenza & Pneumonia 1,947
9	Bacterial Sepsis 24	Three Tied 2	Four Tied 1	Seven Tied 1	Septicemia 6	Cerebro-vascular 19	Cerebro-vascular 65	Nephritis 91	Nephritis 177	Nephritis 1,441	Nephritis 1,758
10	Necrot Enterocoli 19	Three Tied 2	Four Tied 1	Seven Tied 1	Two Tied 4	Septicemia 11	Chronic Low Respiratory Disease 44	Two Tied 79	Septicemia 156	Hypertensn 1,011	Suicide 1,325

Epidemiology

Incidence and mortality of pediatric trauma

Injury mechanism	Incidence (%)	Mortality (%)
Blunt	92	3
Fall	27	1
Motor vehicle injury—occupant	21	4
Motor vehicle injury—pedestrian	12	5
Bicycle	9	2
Penetrating	8	5
Gunshot wound	2	10
Stabbing	3	3
Crush	1	3

Adapted from Cooper A. Early assessment and management of trauma. In: Ashcroft KW, Holcomb GW, Murphy JP, eds. *Pediatric Surgery*. Philadelphia: Elsevier, 2005:168–84.



Epidemiology

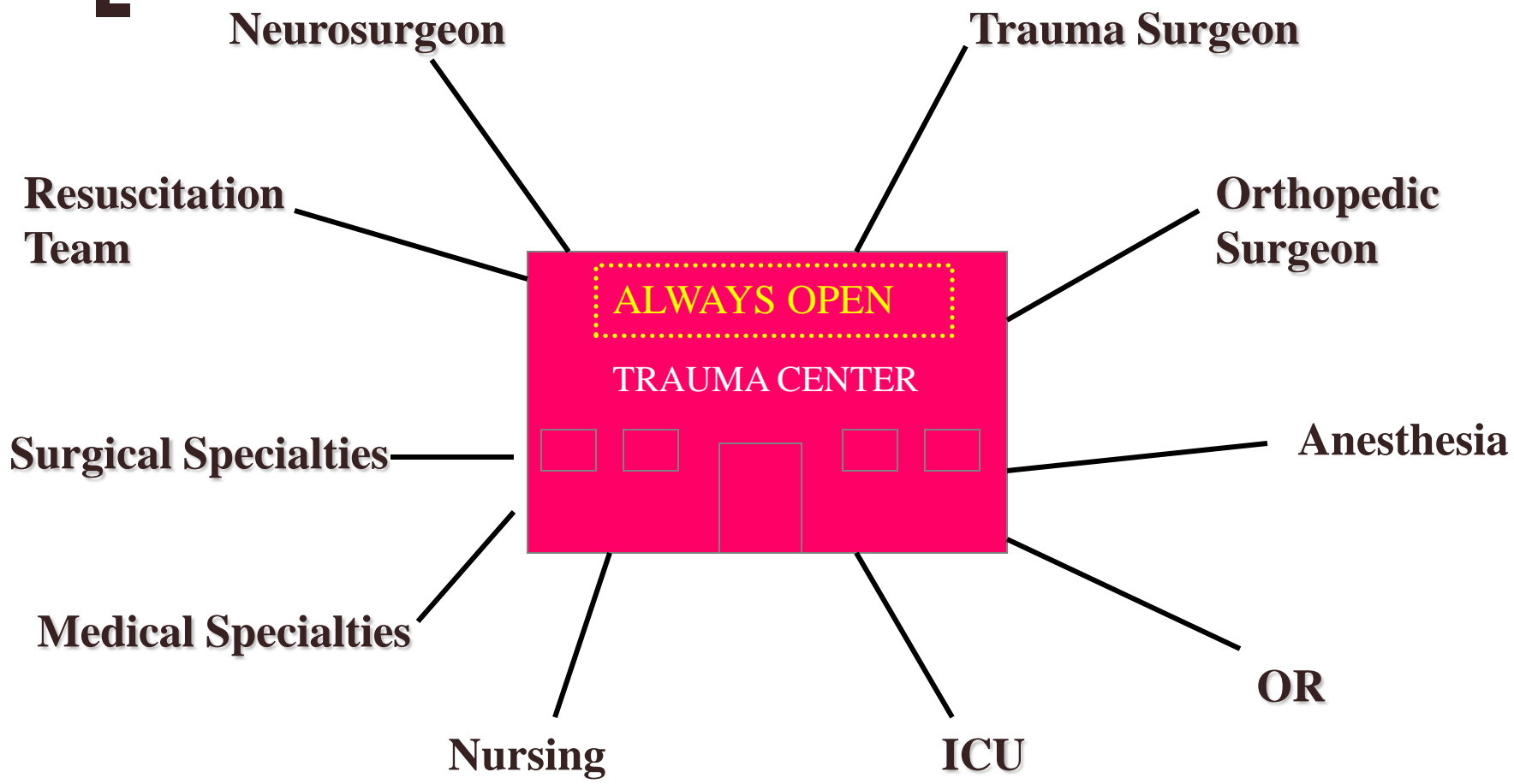
- Cost: estimated to be > 12 billion/yr
 - Immediate and long term care
 - Lost income
- Mortality
 - 50% at the scene: airway compromise, hypovolemic shock, CNS injury
 - 30% within first few hours of injury: golden hour
 - 20% within days/weeks: resulting complications, brain death



Early Management

- Pre-hospital trauma care
 - Emergency medical dispatcher instruction to lay rescuers
 - First responders/ emergency medical technicians
 - “platinum half hour”--- “golden hour”
 - “scoop and run” or “stay and play”
- Where to take the child?
 - Closest facility vs. Pediatric Trauma Center
 - Resuscitation focuses on airway management, ventilatory support, restoration of intravascular volume

Trauma Center



Rainbow Babies and Children's Hospital

- Level I Trauma Center
- Designated by the American College of Surgeons Committee on Trauma (ACS-COT)
- Meets criteria for multi-disciplinary care

Rainbow Babies and Children's Hospital

Pediatric Surgical and Trauma Services -Rehabilitation -Injury Prevention	Pediatric Emergency Medicine and dedicated Pediatric Emergency Room	Dedicated Pediatric Operating Room and PACU	Pediatric Neurological Surgery
Pediatric Intensive Care Unit	Pediatric Dental Services & Oral Surgery	Pediatric Anesthesiology	Pediatric Orthopedics
Pediatric Ground and Air Transport Services	Child Life Department	Pediatric Social Work Department	Pediatric Asthma Center
Pediatric Autism Center	Pediatric Allergy and Immunology	Pediatric Children's Cancer Center	Pediatric Cystic Fibrosis Center
Pediatric Diabetes Center	Pediatric Epidemiology	Pediatric GI Services	Pediatric Dermatology
Pediatric Cardiology	Pediatric Cardiothoracic Surgery	Pediatric Behavioral Psychology	Pediatric Endocrinology

Rainbow Babies and Children's Hospital

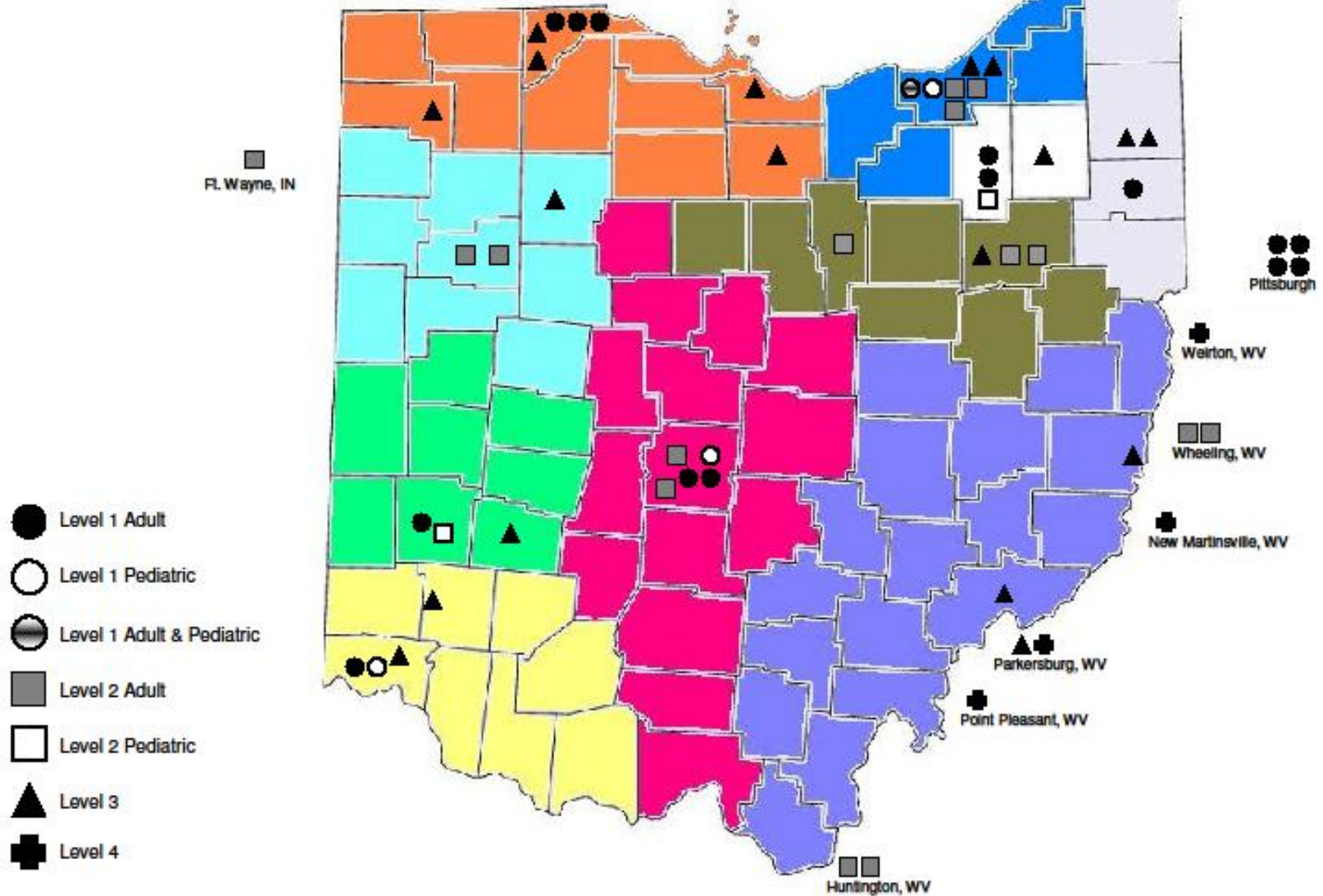
- Founded over 120 years ago
- 244-beds
- >1,300 pediatric specialists
- 500,000 outpatient visits
- ~ 180 hospitalized children daily
- ~10,000 newborns, infants, children, and adolescents are hospitalized yearly
- >26,000 emergency room patients yearly
- 5,700 children trauma patients yearly

Rainbow Babies and Children's Hospital

- The Pediatric Intensive Care Unit (PICU)
 - Cares for the most complex patients
 - Has among the best survival rates in the country
 - Leads the country in drug therapy & research
 - 23-bed unit
 - More than 1,800 critically ill children every year.

Ohio Designated Trauma Centers

Updated July 2010



Ohio Pediatric Trauma

- Patients under 16 years of age, with at least one of the following:
 - Physiologic conditions
 - Depressed or deteriorating neurologic status
 - Respiratory distress or failure
 - Endotracheal intubation and/or vent support
 - Shock
 - Injuries requiring blood product transfusions
 - Requiring invasive monitoring, ICP monitoring, vasoactive medications

Ohio Pediatric Trauma

- Patients under 16 years of age, with at least one of the following:
 - Anatomic conditions
 - Fractures and deep penetrating wounds to extremities-neurovascular or compartment injury
 - Fractures of 2 or more long bones
 - Fracture of axial skeleton
 - Spinal cord or column injuries
 - Traumatic amputation with potential for re-implantation
 - Head Injury- CSF leak, open skull/ depressed skull fracture, LOC
 - Significant penetrating wounds to head, neck, trunk
 - Significant blunt injury to chest or abdomen

ACS Transfer Recommendations

- Carotid or vertebral artery injury
- Torn thoracic aorta or great vessels
- Cardiac rupture
- Bilateral pulmonary contusions
- Major abdominal vascular injury
- Grade IV or V liver injuries
- Unstable pelvic fractures

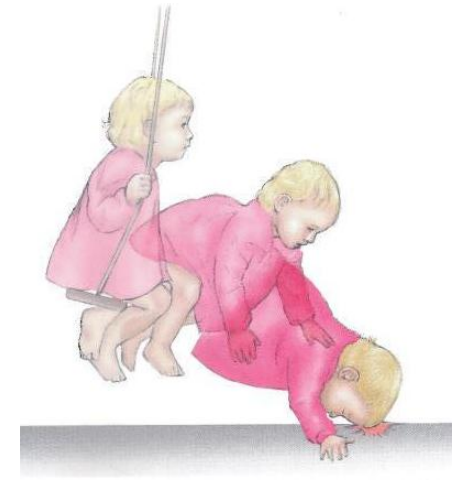
ACS Transfer Recommendations

- Fracture or dislocation with loss of distal pulses
- Penetrating injury or open fracture of skull
- GCS < 14 or lateralizing neurologic signs
- Spinal fracture or spinal cord deficits
- Significant torso injury with advance co-morbid disease
- Open long bone fractures
- >2 unilateral rib fractures or bilateral rib fractures with pulmonary contusion

Children Not Small Adults

■ Anatomical Difference

- Shape and Size
 - Variable weight and length: one size does not fit all
 - Broselow tape
- Smaller body mass
 - Affect kinetic energy transfer- multiorgan trauma
- Head proportionately larger
- Skeletal growth
 - Incomplete calcifications, active growth centers, elasticity
 - Higher frequency of incomplete fractures/ disturbances to growth
- Surface area
 - Ratio body surface to volume diminished: thermal loss
 - Temperature regulation matures by age 10 yrs



Determination of size/ weight

- BROSELOW PEDIATRIC RESUSCITATION MEASURING TAPES** provide approximate weight, vital signs and drug doses based on a child's height.

RED		PURPLE		YELLOW	
RESUSCITATION	RAPID SEQUENCE INTUBATION	RESUSCITATION	RAPID SEQUENCE INTUBATION	RESUSCITATION	RAPID SEQUENCE INTUBATION
0.005 mg/0.05 ml	Atropine 0.17 mg	Epinephrine 1st Dose (1:10,000) 0.1 mg/1 ml	Atropine 0.21 mg	Epinephrine 1st Dose (1:10,000) 0.13 mg/1.3	Atropine 0.26 mg
	Pan/Vecuronium N/A	Epinephrine High Dose/TT (1:1,000) 1 mg/1 ml	Pan/Vecuronium N/A	Epinephrine High Dose/TT (1:1,000) 1.3 mg/1.3	Atropine 0.26 mg
0.85 mg/0.85 ml	(Defasciculating Agent) N/A - 20 kg	Sodium Bicarbonate 10 mEq	(Defasciculating Agent) N/A < 20 kg	Sodium Bicarbonate 13 mEq	Lidocaine 13 mg
0.17 mg	Lidocaine 13 mg	Lidocaine 10 mg	Lidocaine 15 mg	Lidocaine 13 mg	Defibrillation
0.5 mEq	Fentanyl 25 mcg	Defibrillation	Fentanyl 32 mcg	Defibrillation	First dose 26 Joules
0.5 mg	INDUCTION AGENTS	First dose 20 Joules	INDUCTION AGENTS	Second dose (may repeat) 52 Joules	Cardioversion 13 Joules
17 Joules	Etomidate 2.5 mg	Second dose (may repeat) 40 Joules	Etomidate 3.2 mg	Adenosine	1st Dose 1.3 mg
	Ketamine 17 mg	Cardioversion 10 Joules	Ketamine 21 mg	2nd Dose If Needed 2.6 mg	Amiodarone 65 mg
	Midazolam 2.5 mg	Adenosine	Midazolam 3.2 mg	Amiodarone 65 mg	Calcium Chloride 260 mg
	Propofol 25 mg	1st Dose 1 mg	Propofol 32 mg	Magnesium Sulfate 650 mg	
	PARALYTIC AGENTS	2nd Dose If Needed 2.1 mg	PARALYTIC AGENTS		
	Succinylcholine (give atropine prior) 17 mg	Amiodarone 52 mg	Succinylcholine (give atropine prior) 20 mg		
	Pancuronium 1.7 mg	Calcium Chloride 210 mg	Pancuronium 2.1 mg		
	Vecuronium 1.7 mg	Magnesium Sulfate 525 mg	Vecuronium 2.1 mg		
	MAINTENANCE		MAINTENANCE		
	Pancuronium/Vecuronium 0.9 mg		Pancuronium/Vecuronium 1 mg		
	Lorazepam 0.4 mg		Lorazepam 0.5 mg		
KG	9 KG	10 KG	11 KG	12 KG	



Weight Estimates

- If weight unknown and Broselow tape not available- can estimate from age

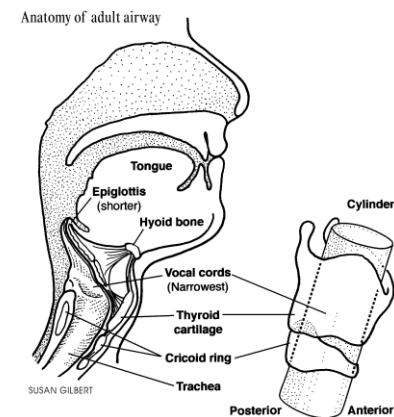
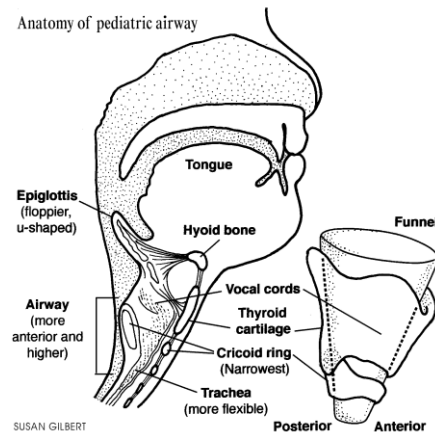


- Age \leq 8 years: (Age x 2) + 8 = weight (kg)
- Age > 8 years: Age x 3 = weight (kg)

Children Not Small Adults

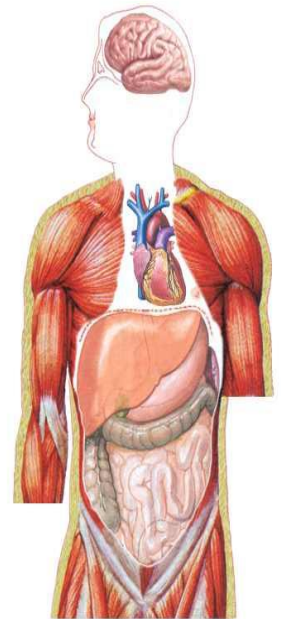
Airway

- More anterior placed
- Smaller overall diameter with larger tongues
- Shorter trachea- risk mainstem intubation / dislodged tube
- Smaller, narrower funneled shaped
 - Epiglottis changes from U shaped to thinner adult structure; drops from level of C1 to C3



Children Not Small Adults

- **Breathing:** Poor compensation for associated respiratory derangements
 - Larger oxygen consumption
 - Smaller functional residual capacity
 - Less pulmonary compliance/ greater chest wall compliance
 - Horizontally aligned ribs- diaphragm breathers
- **Abdominal organs larger**
 - More anterior and less subcutaneous fat- higher risk injury
 - Attain adult structure and function by time wt 35kg
- **Physiologic differences**
 - Variable heart rate, RR, BP
 - Infants dependent on HR for compensation/ cardiac output
 - Compensatory vasoconstriction: normal BP with early shock
 - Shock : late identification
 - Differences organ system function more pronounced < 2yrs age
- **Key to remember:**
 - Kids die from hypoxia and respiratory arrest



VITAL SIGNS BY AGE

AGE	WT kg	HR	BP	RR
0-6 m	3-6	130-180	60-80/40	40-60
1-2 y	10-12	120-160	80/40	40
2-5 y	12-18	100-120	90-100/60	30
5-10 y	18-30	80-100	100-120/80	20

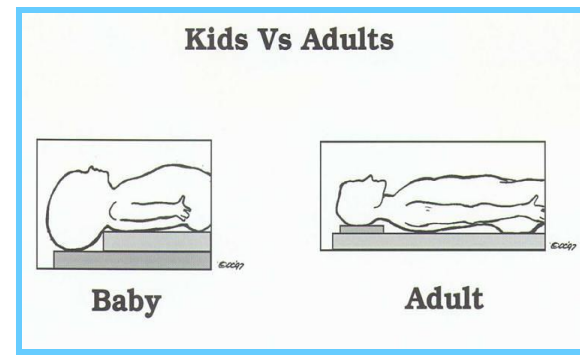
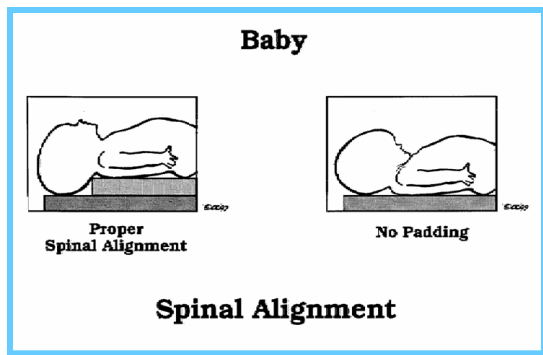
Management

- ATLS approach but need to incorporate principles of pediatric assessment
- Keep in mind neuroventilatory derangements 5x more common than hemodynamic derangements but later twice as lethal
- Primary survey
 - ABC's
 - Continuous cycle of assessment, intervention, reassessment



Management- Airway /Cervical Spine Stabilization

- All else futile if airway control ineffective
 - Goal relieve anatomical obstruction, prevent aspiration, promote adequate gas exchange
- Proper immobilization essential
 - Avoid passive flexion
 - Keep plane of face parallel / sniffing position
 - Maintain neutral alignment: padding
 - Inline traction/stability



Management- Airway /Cervical Spine Stabilization

- Supplemental O₂ – FIO₂ of 1 (100%)
- Clear airway
- Artificial airway
 - Oral airway
 - Only unconscious patient: elicit gag
 - May assist bag/mask ventilation
 - Endotracheal intubation
 - Oral not nasal
 - Aspiration risk: full stomach
 - Hemodynamic compromise
 - Less tolerant hypoxia: preoxygenation/denitrogenation
 - LMA
 - Surgical airway

Pediatric Airway Guidelines

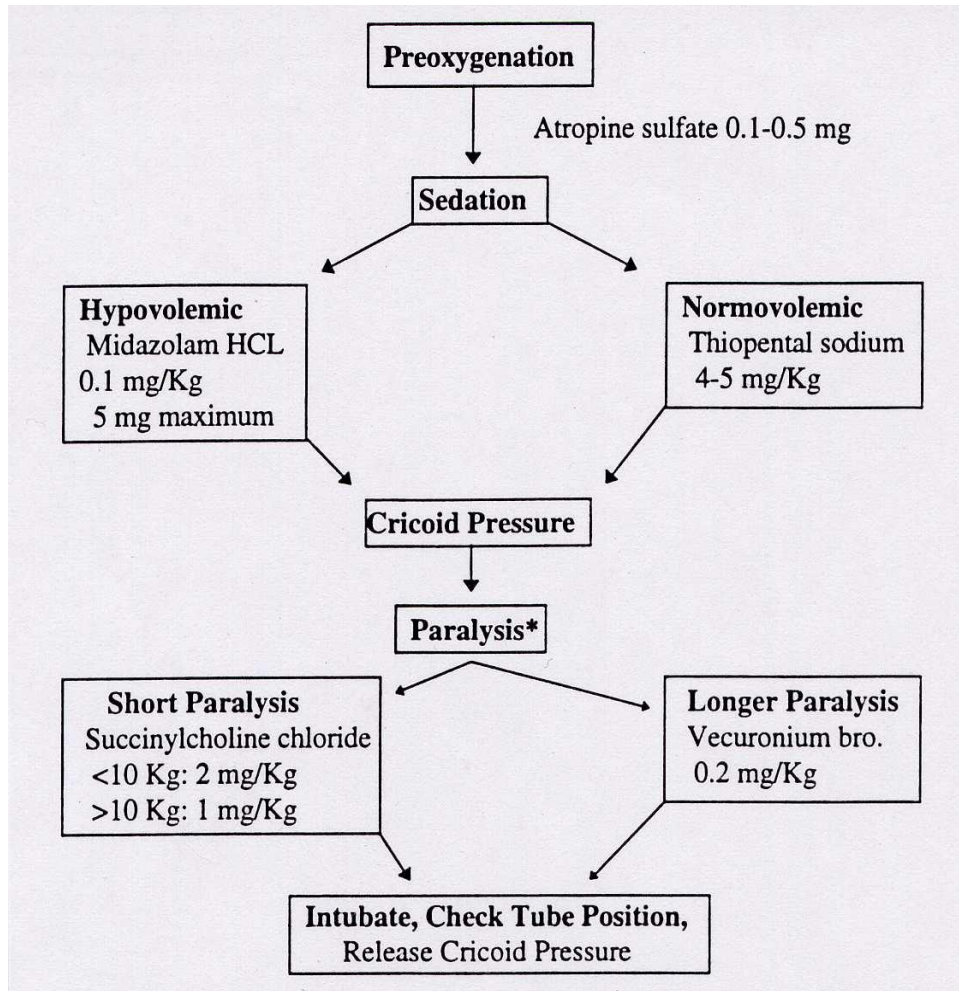
- Endotracheal Tube Size : 16 +AGE

4



- Diameter of the child's 5th digit
- Size of child's nares

Rapid Sequence



Management – Breathing

- **Inadequate ventilation**

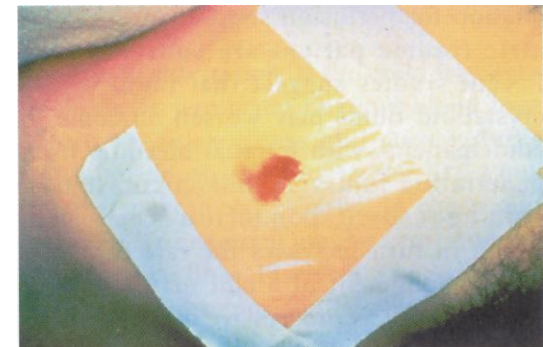
- Abnormal respiratory pattern
- Cyanosis
- Clinical evidence hypercapnia ie increased sympathetic tone

- **Avoid hypercarbia/hypoxia**

- **Persistent desaturations**

- Re-evaluate for asymmetry: pneumothorax
- Tube position if indicated

- **Consider open chest wounds**



Management- Circulation

- **Shock major concern: often missed in early stages**
 - Mobile mediastinum: compensate for obstructive lesion
 - Vasculature better able to constrict
 - Maintain SVR , thus afterload and systemic BP longer
 - Frank hypotension late sign
- **Normal blood volume: 70-80ml/kg**
 - May not see hypotension until loss of 30% blood volume
 - 10-15%: mild tachycardia
 - 30%: tachycardia, diminished peripheral pulses
 - 30-45%: decreased urine output, thready central pulses, narrow pulse pressure
 - >45%: coma

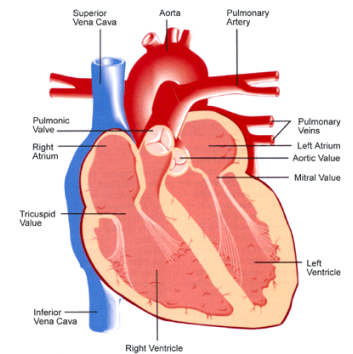
Table 3—Systemic Responses to Blood Loss in the Pediatric Patient

SYSTEM	MILD BLOOD VOLUME LOSS (<30%)	MODERATE BLOOD VOLUME LOSS (30%–45%)	SEVERE BLOOD VOLUME LOSS (>45%)
Cardiovascular	↑ Heart rate; weak, thready peripheral pulses	Low normal blood pressure, narrowed pulse pressure, markedly ↑ heart rate; absent peripheral pulses with weak, thready central pulses	Hypotension; tachycardia then bradycardia
Central Nervous System	Anxious, irritable, confused	Lethargic, dulled response to pain ¹	Comatose
Skin	Cool, mottled; prolonged capillary refill	Cyanotic; markedly prolonged capillary refill	Pale, cold
Urinary Output	Minimal ↓	Minimal	None

¹The child's dulled response to pain with this degree of blood loss (30%-45%) is often indicated by the decreased response noted when an IV catheter is inserted.

Management- Circulation

- Assessment: signs of shock
 - Heart rate: tachycardic
 - Pulses: loss of peripheral pulses, narrow pulse pressure, loss of central pulse- you are too late
 - Blood pressure:
 - Lower limits systolic: $70+(2 \times \text{age in years})$
 - Diastolic: $2/3$ systolic



Management- Circulation

- Basic steps to management
 - Control active hemorrhage
 - Direct pressure
 - Cognition of potential internal bleeding
 - No tourniquet or MAST
 - Correction of coagulopathies: dilutional / losses
 - Platelets, FFP: replace when greater than 2x blood volume, 80ml/kg in young child
 - Amicar
 - Factor VII

Management- Circulation

- Basic steps to management (cont.)
 - Vascular access: essential in all patients
 - Large bore peripheral catheter: ideally two sites of access
 - IO placement: do not delay
 - Central access



Management- Circulation

■ Basic steps to management (cont.)

○ Volume Replacement

■ 20-40 ml/kg warmed isotonic fluids

■ 3:1 rule

■ Over resuscitation

○ Hemorrhage/ edema vs. delayed resuscitation

■ Crystalloid vs. colloid

○ Meta- analysis showing no difference

○ Crystalloid cheaper but more important: readily available

○ Albumin : lower levels inflammatory cytokines, apoptosis

○ No hypotonic solutions

○ Isotonic saline vs. Ringers Lactate



Management- Circulation

- Basic steps to management (cont.)
 - Other fluids to consider
 - Hypertonic saline
 - Redistribution of extracellular fluid
 - Less neutrophil activation
 - Hyperchloremic metabolic acidosis
 - Albumin
 - Provides approximately 80% intravascular colloid oncotic pressure
 - 5% for acute resuscitation
 - Hydroxyethyl starch
 - Platelet dysfunction
 - Plasma volume expansion 24-36hr

Management- Circulation

- Basic steps to management (cont.)
 - Blood products
 - 3:1 rule
 - PRBC: Hct depends on anticoagulant used
 - Citrate phosphate: 65%-75%
 - Adenine anticoagulants: 50%-60%
 - Type and cross ASAP: start with O negative trauma pack
 - Blood warmer
 - Platelet replacement: After 2x blood volume replacement
 - Blood replacement products

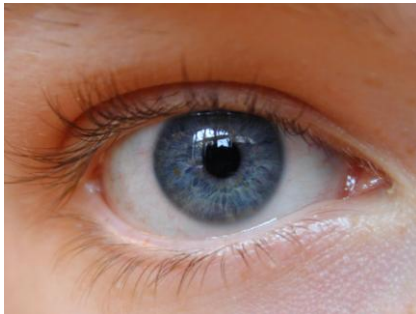
Management- Disability / Exposure

- Abbreviated neurologic exam
 - Cognitive
 - GCS
 - AVPU
 - Pupils
 - Early sign of developing intracranial hypertension
 - Asymmetry, sun setting
 - Motor
 - Early detection spinal cord injury

Glascow Coma Scale

■ Eye Opening (4)

1. NO EYE OPENING
2. TO PAIN
3. TO COMMAND
4. SPONTANEOUSLY



■ Motor (6)

1. NONE
2. EXTENTION*
3. FLEXION*
4. WITHDRAWL*
5. LOCALIZES*
6. OBEYS COMMANDS

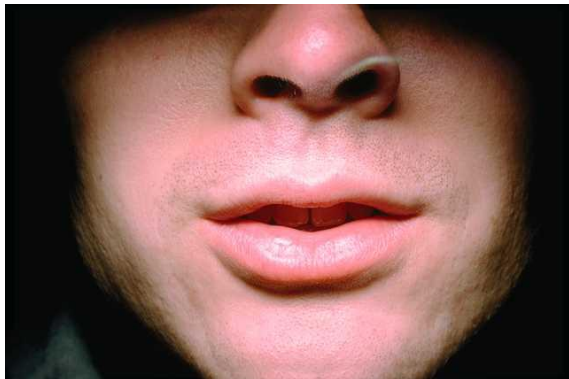


* TO PAIN

Differences In GCS Verbal

■ ADULT (5)

1. NO RESPONSE
2. INCOMPRHENSIBLE
3. INAPPROPRIATE
4. CONFUSED
5. ORIENTATED



■ PEDIATRIC(5)

1. NO RESPONSE
2. INCONSOLABLE
3. CONSOLABLE
4. INAPPROPRIATE INTERACTIONS
5. SMILES, ORIENTATED



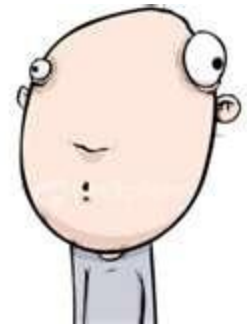
Hypothermia

- Children have a higher body to surface area to mass ratio
- Hypothermic infants are more difficult to resuscitate
- Lose heat easily
- Resuscitation area, ED, Radiology, OR should be warmed with high humidity
- Minimize exposure: keep covered as much as possible
- Warmed IV fluids



CNS Injury

- Leading cause of death in pediatric trauma
- 85-90% minor: GCS > 12
- Keep on alert: initial exam and scans do not always tell the truth---- ICH occurs with time
- Anatomical difference kids vs. adults
 - Infants with fontanelles/open sutures: edema without ICH
 - Felt to have more plasticity
 - Larger heads---- more torque
 - Soft cranium: thus parenchymal injury without fractures
 - Less myelin so increased risk affect from shearing forces
 - Prone to reactive hyperemia



CNS Injury

- Variable Presentation
 - Altered mental status: LOC , irritability
 - Full fontanelle, split sutures, palpable deformities
 - Ecchymosis, hematomas
 - Asymmetrical, dilated or non-reactive pupils
 - Sun setting eyes, disconjugate gaze
 - Rapid deterioration vs. completely normal
 - GCS not good predictor in infants: trust overall exam

CNS Injury- Management

- **Avoid hypoxic ischemic event**
 - Maintain adequate oxygenation and ventilation
 - Do not hyperventilate/hypoventilate
 - Intravascular volume resuscitation
 - Maintain MAP:
 - >70 adolescent
 - >60 child
 - >50 infant
- Isotonic fluids
- Optimal ventilation
- Control glucose load
- ICP precautions
- Osm therapy

Spinal Injuries

- Uncommon , only 5% but can be deadly
- Anatomical differences
 - Interspinous ligaments and joint capsules more flexible
 - Vertebral bodies wedge anterior: tend to slide forward in flexion
 - Facet joints are flat
 - Larger head: angular forces applied to upper neck relatively greater

[Spinal Injuries]



Spinal Injuries- Management

- **KEEP IMMOBILIZED**
 - Collar that fits/ rolls for infants
 - Side rolls
 - Head straps as well as those to control trunk/extremities
- X-ray vs. CT
 - How high suspicion for injury
 - Limitations of clinical exam: distracting injuries
- Surgical fixation when indicated
- Steroids out of favor

Thoracic Injuries

- Occur in 6% pediatric trauma victims
- Major contributor to mortality
- 90% related to blunt trauma
- Marker for injury severity

Life-threatening Injuries

- Airway injury
- Tension pneumothorax /Massive hemothorax
 - Tension pneumo leads to hemodynamic instability
 - Tracheal deviation, acute respiratory distress, hemodynamic instability not explained by hemorrhage
- Cardiac injury and tamponade
 - Chest pain, dysrhythmias, myocardial dysfunction
 - Sudden death: Commotio Cordis
 - Cardiac tamponade- obstructs venous return and cardiac output
 - Beck's Triad: pulsus paradoxus, quiet precordium, distended neck veins
 - Unexplained tachycardia in the younger child
- Rib fractures / Flail chest: lost continuity with thorax
 - Paradoxically movement- in inspiration, out expiration
 - Requires controlled mechanical ventilation; intubation in the field

Abdominal Injuries

- **Blunt trauma cause in 83% with 9% mortality**
- **Pay attention to physical exam**
 - Skin loss, ecchymosis, puncture wounds, distension, guarding, rebound tenderness
- **Labs: may not see bump with initial labs**
 - LFT's, Amylase, Lipase, ABG- acid/base status, UA
- **Diagnosis by radiographic studies**
 - CT preferred method
 - Fast Exam- beside ultrasound
 - Peritoneal Lavage falling out of favor

Burns

■ Severity

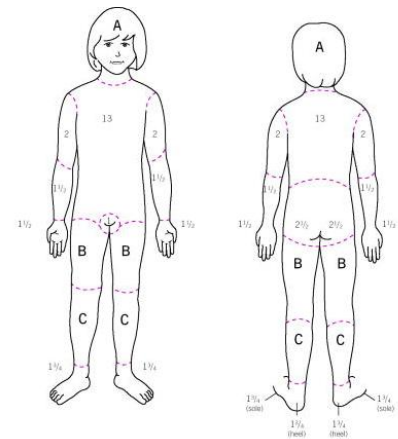
- First degree: superficial involvement of epidermis
- Second degree: epidermis and partial dermis
- Third degree: full thickness, nerve damage, eschar

■ Infants: inflicted, immersion, spills

■ Older kids: flames, fire crackers

■ Assessment

- Rules of nine vs. 1% palm
- Often underestimate



	<1yr	1yr	5yr	10yr	15yr	Adult
A half of head	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2	3 1/2
B half of thigh	2 3/4	3 1/4	4	4 1/4	4 1/2	4 3/4
C half of leg	2 1/2	2 1/2	2 3/4	3	3 1/4	3 1/2

Burns

- Transfer directly to a verified burn center
 - Burns >10% total body surface area
 - Full thickness burns of the face, hands, feet, genitalia, perineum or major joints
 - Third degree burns in any age group
 - Electrical burns (including lightening injury)
 - Chemical burns and inhalation injury

Burns Combined with Traumatic Injuries

- Select destination based on which set of injuries create the greatest risk to life and limb
- Severe injuries with minor burns =
Trauma Center
- Severe burns with minor injuries =
Burn center

Child Abuse: Clues

History

- story \neq injuries
- history changing
- injury \neq development
- delay seeking help
- inappropriate level of concern

Physical Exam

- multiple old and new bruises
- posterior rib #, sternum #, spiral # < 3
- immersion burns, cigarette

Summary

- Trauma leading cause mortality in pediatrics requiring multidisciplinary approach to management
- Rapid organized assessment and intervention required to optimal outcome; dependent on constant reassessment
- Children are not small adults- need for understanding of anatomical and physiologic differences for optimal care
- Rapid aggressive management of the pediatric trauma patient can lead to positive outcomes, even with the most severe injuries
- What happens in the field and on transport sets the stage for things to come

Physician Access

- We are just a phone call away! One call puts you in touch with the Transfer and Referral Center and an attending physician in the pediatric Emergency Department.

216-844-PEDS (7337)

- If the injuries are particularly severe you will be placed in conference call with the pediatric trauma surgeon on duty as well.



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