

Common Peds Em **ER** gencies

Binh Phung, DO, FACOP, MHA

OSU Center for Health Sciences



Objectives

- Identify the clinical manifestations of common pediatric ingestions and overdose
- Know the appropriate tests for the diagnosis of common pediatric emergencies in the primary care settings
- Describe and demonstrate how to manage common pediatric illnesses and injuries in the primary care settings
- Management of pediatric burns

#OSUPeds

Ingestion/Overdose – General Overview

- General approach to a pediatric suspected ingestion

H&P

Management



Acute change in mental status

ABC (Airway, Breathing, Circulation)

Complete metabolic panel (chem 8)

Single-dose activated charcoal**

Ingestion/Overdose – Clues



Clues to causative agents of ingestion

Ask: Family members, bystanders, friends, or EMS providers

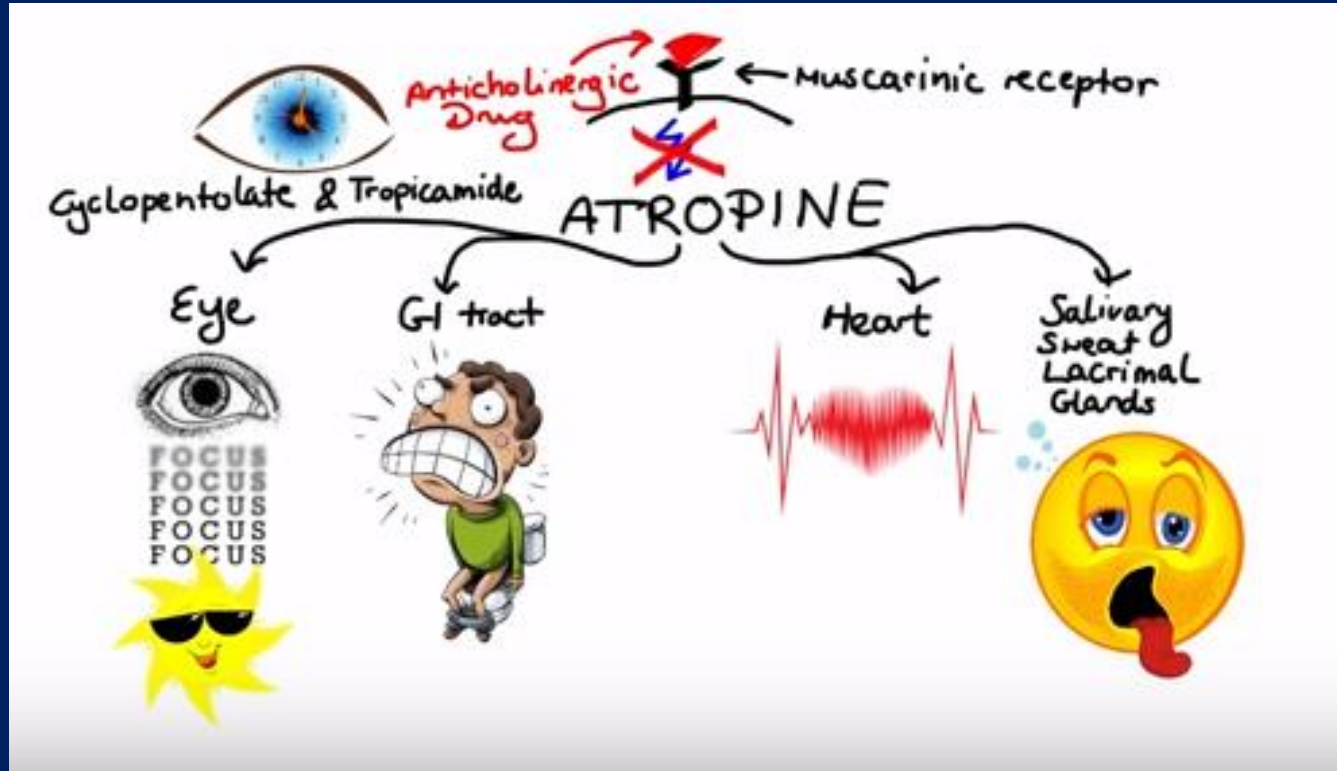


Medication name, concentration/dose, quantity, how many pills are missing, etc.

Ask about:

- All medications available at home?
- Medical conditions in family members that take Rx meds?
- Ingestion time?
- Quantity?
- Other Co-ingestants?
- Old or new bottle of medication?

Ingestion/Overdose – Anticholinergic



- Mydriasis, blurry vision, abd pain, N/V, ileus
- Tachycardia, hypertension or hypotension
- Dry mouth, Flushing, Agitation
- Urinary retention, Hyperthermia, Seizures

Benadryl
Atropine



Jimson weed plant/seeds



Deadly nightshade

Activated charcoal
(within 1 hour)

Severe persistent symptoms



Physostigmine

Ingestion/Overdose – Clonidine

- Lethargy
- Miosis
- Bradycardia
- Hypotension
- Dizziness
- “not acting right”

History & Physical

Clonidine is used for:


ADHD
Tics
Hypertension
Tourette syndrome
Withdrawal treatment
Anxiety disorders



- **A B C**

- Intubation (if respiratory distress/CNS depression)
- Baseline EKG
- IV Fluids (for hypotension)
- Dopamine or epinephrine (if IVF unsuccessful)
- Activated charcoal (if within 1-hour)
- Atropine (for bradycardia)
- Naloxone (can be used in severe)

Ingestion/Overdose – Opioid

- Pinpoint pupils
- Coma 
- Respiratory depression
- Altered mental status
- Bradycardia

History & Physical

Opioids:
Morphine (PO, subQ, IV)
Heroin
Methadone
Hydrocodone
Meperidine
Buprenorphine



- **A B C**

- Activated charcoal (if within 1-hour)
- Naloxone (0.1mg/kg) if need
- Intubation (if respiratory distress/CNS depression)

Ingestion/Overdose - Dystonia

- Hypertension
- Respiratory/CNS depression
- Cogwheel rigidity
- Abnormal tongue/jaw, movements

**History &
Physical**

**Promethazine (Phenergan)
Prochlorperazine (Compazine)
Metoclopramide (Reglan)**

Dystonia Hallmark

Findings:

Spasm of the neck
Tongue thrusting
Oculogyris crisis

- A B C

- Activated charcoal (if within 1-hr)
- Manage blood pressure
- Diphenhydramine

Ingestion/Overdose - Acetaminophen

- **A B C**
- Activated charcoal (within 1- hr)
- Assess for co-ingestants
- Measure 4-hour serum Tylenol level
- Assess via *Rumack-Matthew* normogram

↑ AST, ALT, bilirubin

STAGES of Acetaminophen Overdose

Stage 1	Days 0-1	Asymptomatic, N/V, abd pain, paleness, discomfort, LFT's normal
Stage 2	Days 1-3	RUQ pain LFT's ↑↑ (AST, ALT, bilirubin) ↑↑ INR
Stage 3	Days 3-4	Hepatotoxicity peaks Rapid & severe hepatic failure Glucose, lactate, phosphate abnormalities Encephalopathy Coma
Stage 4	Days 5+	Recovery (for those who survive Stage 3)

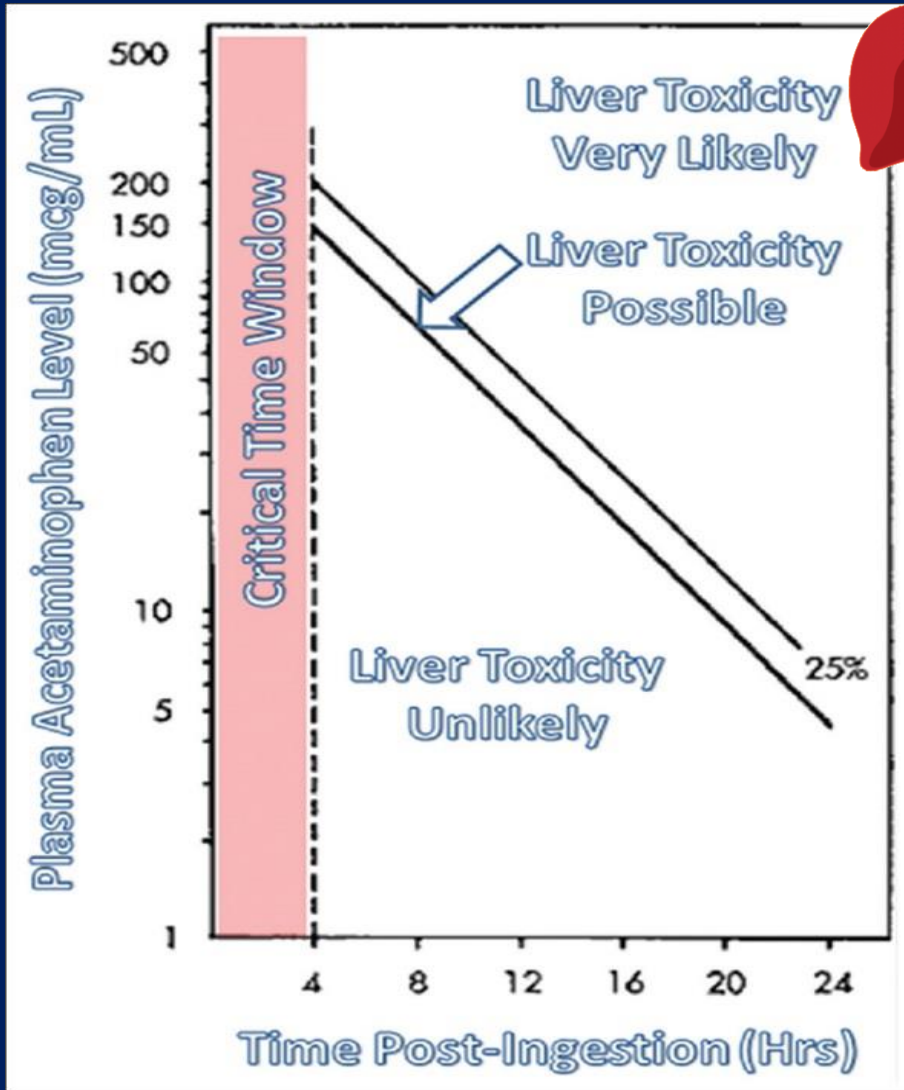


- 200 mg/kg in children
- 7.5-10 g in adults

**> 150 mg/kg in children
requires immediate
evaluation**

Ingestion/Overdose - Acetaminophen

Rumack-Matthew normogram



- **A B C**
- Labs: Serum tylenol level (4-hour post-ingestion), PT, INR, LFT's, electrolytes
- Activated charcoal (if within 1 hour)
- **Antidote therapy is most effective when initiated w/in 8-hrs of post-ingestion**
- **ORAL N-acetylcysteine (Mucomyst)** – loading dose 140mg/kg, followed by 70mg/kg Q4 hrs x 17 additional doses (a total of 1330mg/kg over 72 hrs).
- **IV N-acetylcysteine (Acetadote)** – 150mg/kg over 1 hr, then 50mg/kg over 4 hrs, then 100mg/kg over 16 hrs

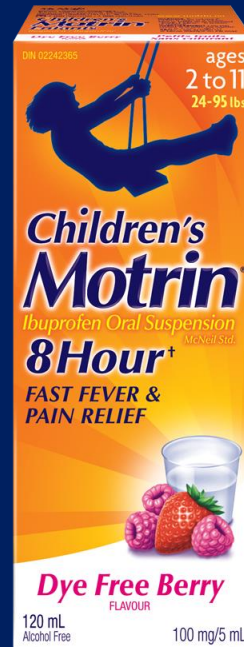
Severe persistent metabolic acidosis
Acute renal failure
Fulminant liver failure
Coagulopathy
Encephalopathy



TRANSPLANT

Ingestion/Overdose - Ibuprofen


- Abdominal pain
- GI bleeding
- Renal failure
- Metabolic acidosis



- **A B C**
- Assess for co-ingestants
- Activated charcoal
(if within 1-hour, no Sx of perforation, normal mental status, no vomiting)*
- Hemodialysis (severe metabolic acidosis)

Ingestion/Overdose – Salicylate



- Tinnitus
- Nausea/vomiting
- Hyperventilation → Respiratory alkalosis
- Severe toxicity → metabolic acidosis & seizures
- Hyperthermia 
- Coma

- 200 mg/kg = toxic
- 300 mg/kg = more significant toxicity
- 500 mg/kg = potentially fatal



- **A B C**

- Assess for co-ingestants
- Activated charcoal
- CMP, VBG
- IVF (volume resusc.)
- Alkalinization of urine
with **sodium bicarbonate**
- Maintain urine pH > 7.5

Ingestion/Overdose – Tricyclic Antidepressants

- Dry mouth
- Delirium
- Orthostatic hypotension
- Hyperthermia
- Urinary retention
- Cardiac arrhythmias
- Seizures

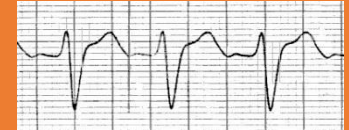


- **A B C**

- Assess for co-ingestants

- Activated charcoal

- 12-lead EKG



- Sodium bicarbonate if:

* Widened QRS > 100 ms

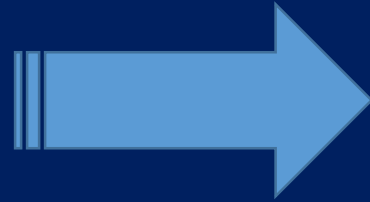
* Ventricular dysrhythmias

* Hypotension

Common meds: **Desipramine, Nortriptyline, Imipramine, Amitriptyline**

Ingestion/Overdose – Caustic Agents

- Abdominal Pain
- Vomiting
- Dysphagia
- Refusal to eat/drink
- Stridor
- Drooling
- Respiratory distress



- **A B C**
- Endoscopy within 12-24 hrs.
- **Esophageal stricture** is the main complication following caustic ingestion.
- May need repeated dilation procedures.
- Surgical correction.

ACIDS (pH < 2)

Anti-rust compounds
Swimming pool cleaners
Battery fluid (sulfuric)
Toilet bowl cleaners (Sulfuric, HCl)

ALKALINE (pH > 12)

Cleaning agents (NaOH)
Drain openers
Bleaches
Toilet bowl cleaners
Oven cleaner
Hair relaxers
Detergents



Ingestion/Overdose - Hydrocarbons

- Cough
- Pneumonitis
- Ventricular arrhythmia
- Syncope/Sudden death
- AML (with Benzene ingestion)



Common Hydrocarbons

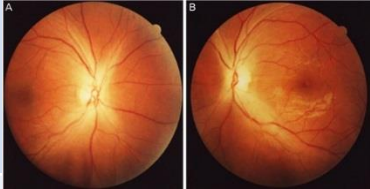
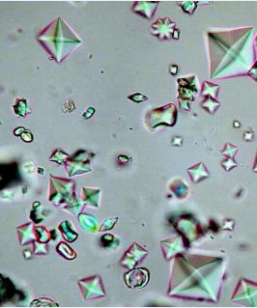
- Kerosene
- Gasoline
- Motor oil
- Turpentine
- Toluene
- Spot remover
- Solvents
- Benzene
- Rubber cement

- **A B C**
- No lavage!
- No emesis!
- No activated charcoal!
- If asymptomatic, then observe 4-6 hrs in the ER.
- CXR (r/o aspiration pneumonitis).



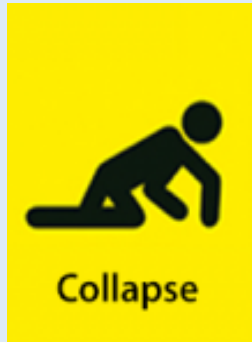
If develops ventricular arrhythmia or V-fibr, then you use lidocaine or B-blocker.

Ingestion/Overdose – Methanol vs. Ethylene Glycol

Methanol (Wood alcohol) e.g. windshield washer, paint removers, solvents	Ethylene Glycol (e.g. Anti-freeze)
Hypoglycemia, hypothermia, coma	Hypoglycemia, hypothermia, coma
Metabolic acidosis (high anion gap)	Metabolic acidosis (high anion gap)
Visual disturbance → Blindness →→ 	Hypocalcemia Renal failure Deposition of calcium oxalate crystals → → → 
IV Fluids, glucose, sodium bicarbonate as needed	IV Fluids, glucose, sodium bicarbonate as needed
FOMEPIZOLE (<i>inhibits alcohol dehydrogenase</i>)	FOMEPIZOLE
Ethanol can be used if FOMEPIZOLE is unavailable	Ethanol can be used if FOMEPIZOLE is unavailable

Ingestion/Overdose – Carbon Monoxide

- 6 main symptoms



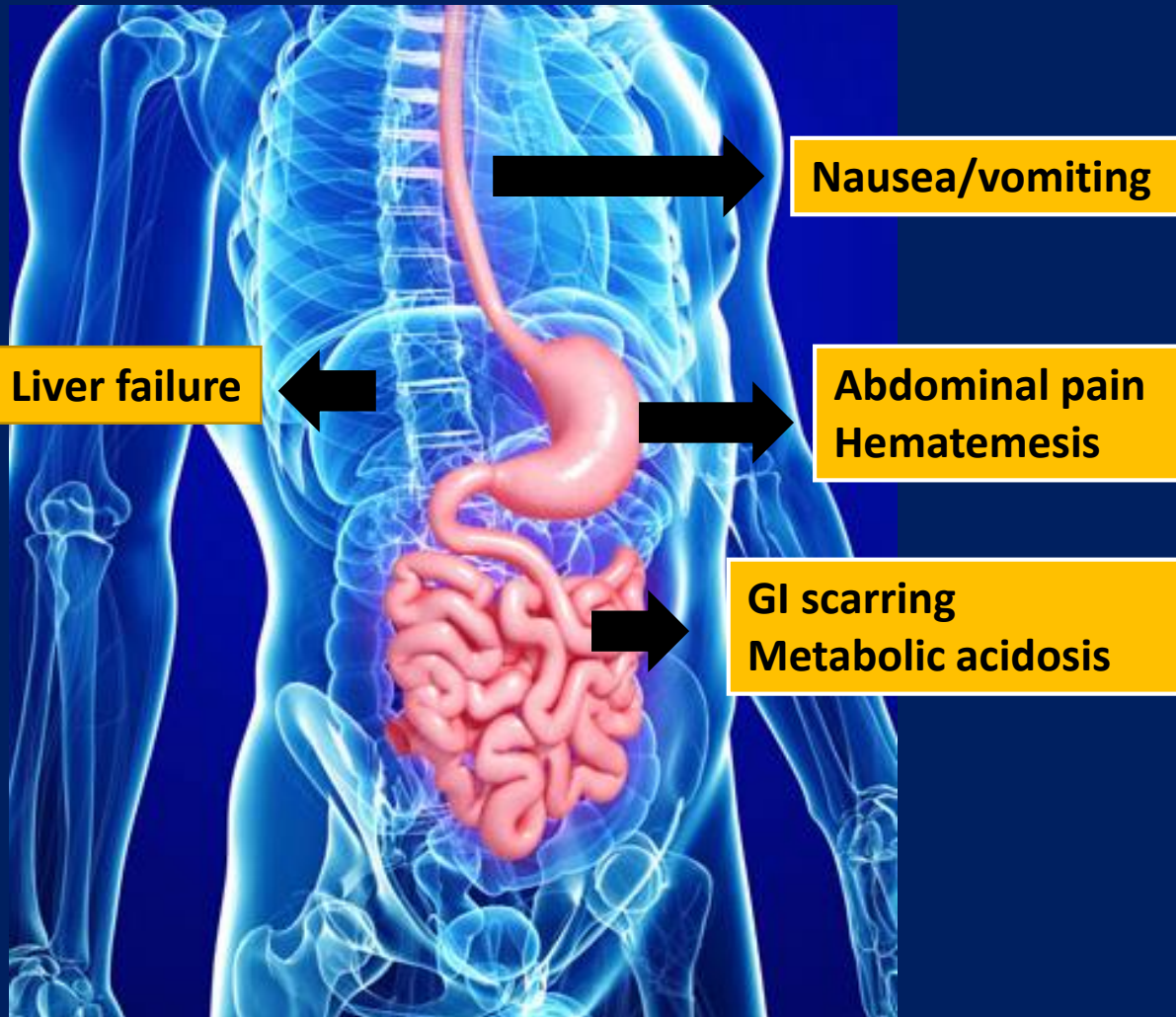
- **A B C**

- Serum CO Level
- Creatine kinase level (in severe cases)
- Management:
 - 100% FiO₂ oxygen (to enhance elimination of CO, use until CO is < 10% and symptoms resolve)
 - Hyperbaric oxygen
 - If COHb > 25% (can be used for significant CNS symptoms or cardiac dysfunction)

Common examples: Furnaces, heaters, auto-exhaust, gas generators, charcoal grills used indoor, fires, small gas engines, gas heaters in enclosed areas, and gas appliance

Ingestion/Overdose – Iron Overload

Ingestion of **> 60mg/kg/dose** is Toxic



- **A B C**
- Abdominal X-ray (KUB)
- Serum iron level > 500 mcg/dL is toxic
- Chelation with IV deferoxamine if serum iron level > 500 mcg/dL.
- **NO ACTIVATED Charcoal.**

Prenatal vitamins contain **65mg** of elemental Fe.

Children's vitamins contain **10-18 mg** of elemental Fe.

Pediatric Head Trauma

GENERAL OVERVIEW

- Scalp injury
- Skull fracture
- Basilar skull fracture
- Concussion/contusion
- Penetrating injuries
- Diffuse axonal injury
- Intracranial hemorrhage (ICH)
 - Subarachnoid hemorrhage
 - Epidural hematoma
 - Subdural hematoma
 - Intraventricular hemorrhage

Head CT SCAN
(w/o contrast)

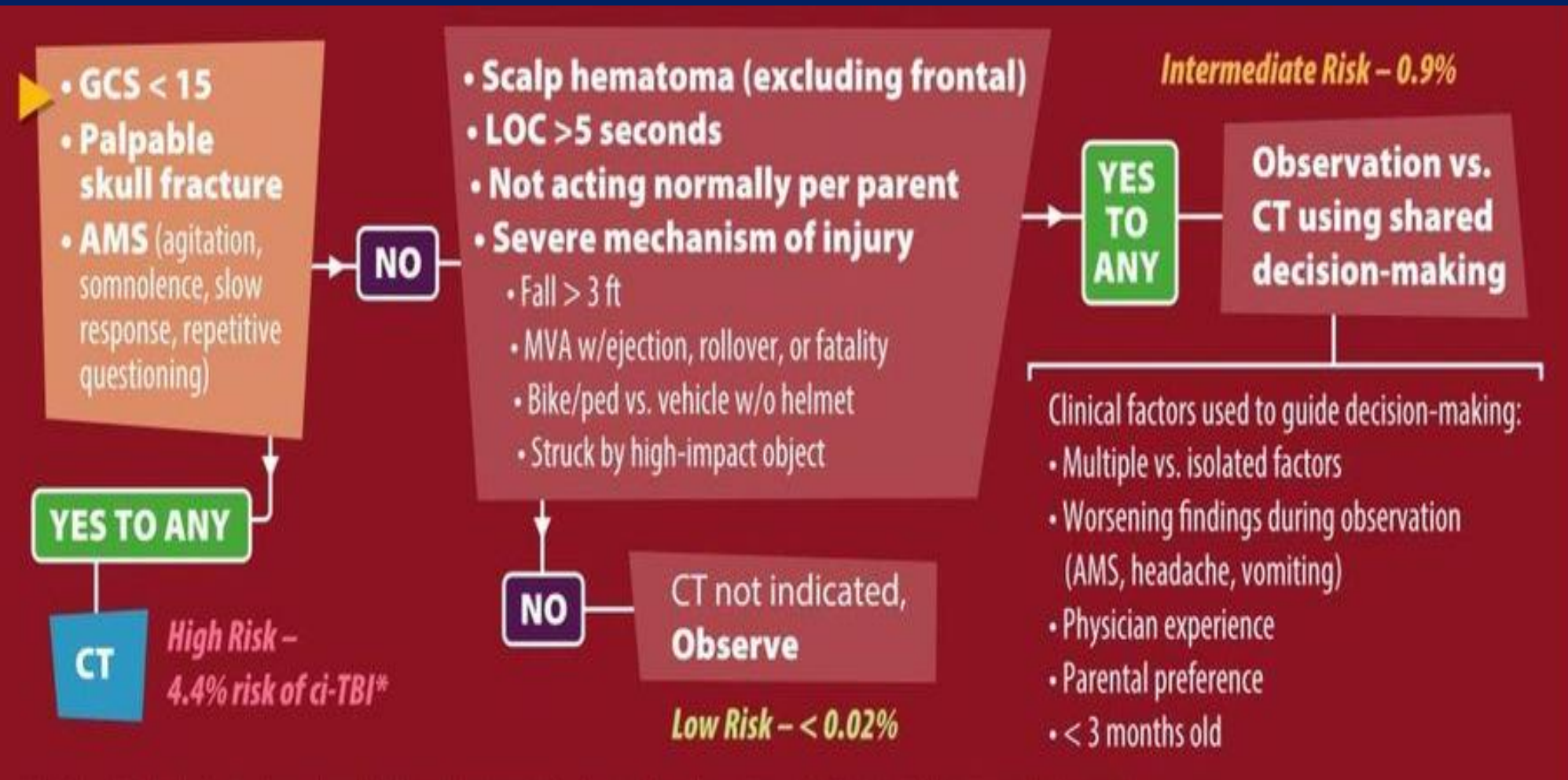
- Anisocoria
- GCS < 12
- Post-traumatic seizures
- Amnesia
- Progressive headaches
- Unreliable history or exam due to possible alcohol or illicit drug ingestion
- Physical exam findings of basilar skull fracture
- Repeated vomiting or vomiting for more than 8 hours after the injury.
- Instability after multiple trauma.

Pediatric Head Trauma

Pediatric Head Trauma CT Decision Guide

Children younger than 2 years

UNDER
2 YEARS

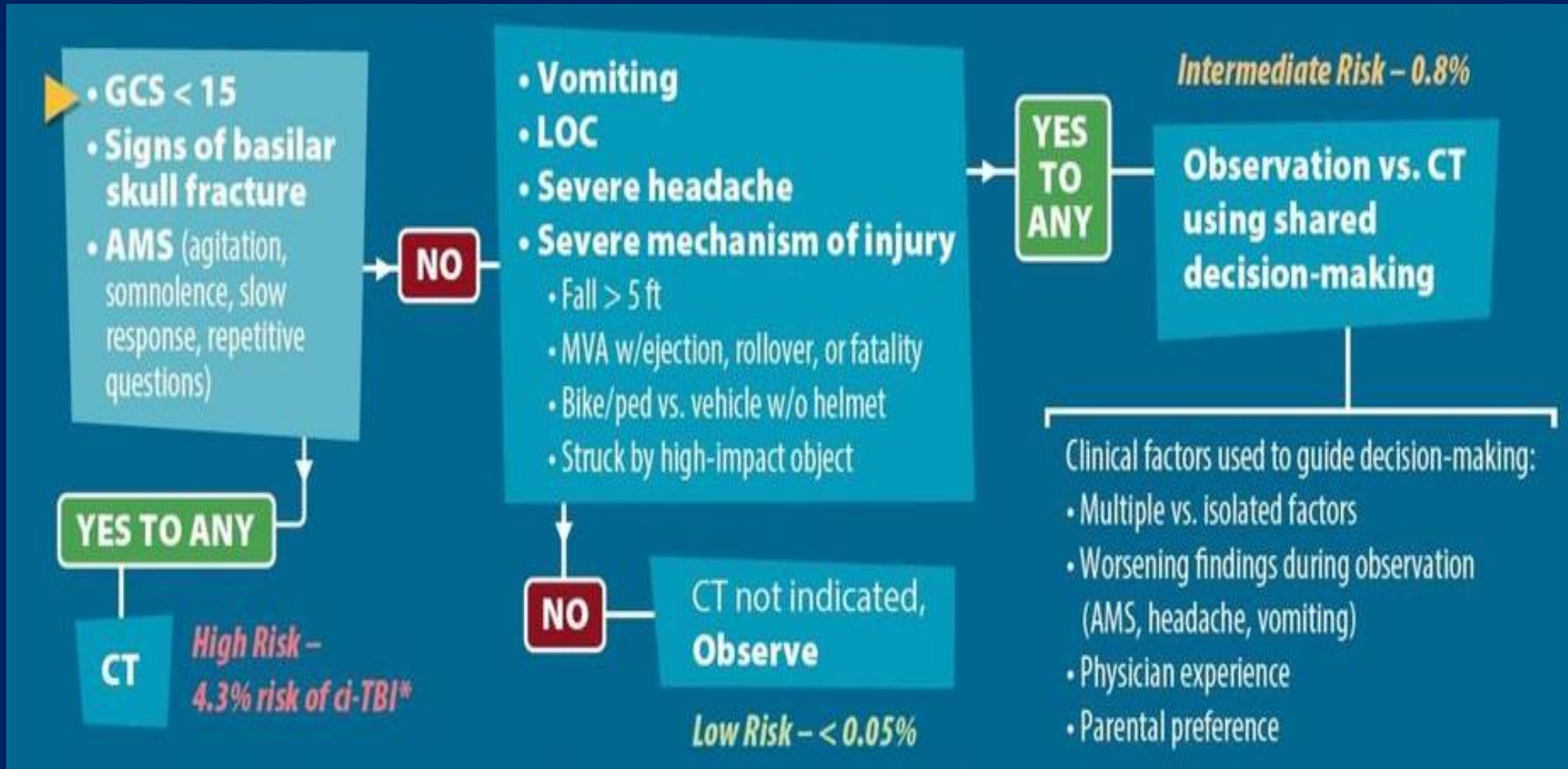


Pediatric Head Trauma

Pediatric Head Trauma CT Decision Guide

Children 2 years and older

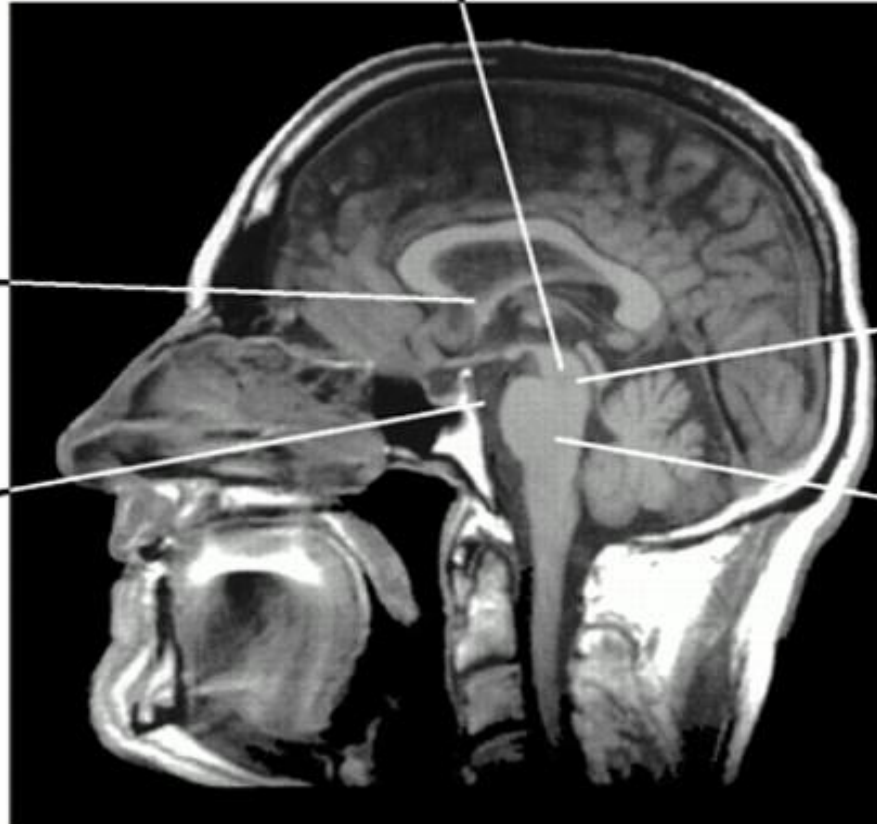
2 YEARS
& OLDER



Pediatric Head Trauma



**Fixed pupils
Midbrain injury**



**Small pupils, but reactive
Di-encephalic injury**



**Unilateral dilated pupils
CN3 compression injury
90% w/ ipsilateral hematoma**



**Large, fixed pupils
Midbrain injury**



**Small, pinpoint pupils
Pontine injury, Opiates**

Lacerations



Assess Wound

Muscles, tendons, nerves, blood vessels, or bony involvement?

Simple hand lacerations < 2 cm long will heal with conservative management.

Cleaning & Irrigation

- Saline & tap water
- Avoid using hydrogen peroxide
- Use povidine-iodine

Surgical Consultation

- Deep wounds of hand or foot
- Full-thickness laceration of the eyelid, lid, or ear
- Laceration involving nerves, arteries, bones, joints
- Severe crush injuries

Lacerations



Appropriate Suture Sizes

Face	5-0 or 6-0
Scalp & Extremities	4-0 or 5-0
Trunk	3-0 or 4-0

Suture Removal

Face	3-5 days
Scalp	7-10 days
Arms	7-10 days
Hands, Trunk, Legs, Feet	10-14 days
Palms, soles	14-21 days

Pediatric Eye Trauma

Hyphema



Blood in anterior chamber of eye.
Hospitalization, strict bed rest, eye patch,
topical eye steroids, systemic steroids, topical cycloplegics,
Sedation. Pediatric ophthalmology consult!!!

Orbital
Fracture



Black eye (Raccoon eyes), proptosis, diplopia,
limitation in extraocular movements, change in
visual acuity. Pediatric ophthalmology consult and CT scan
of the orbits with contrast!!!

Pediatric Ear Trauma

Auricular
Hematoma



Incision & drainage.
DO NOT perform needle aspiration (due to high rate of re-accumulation).

Complications:

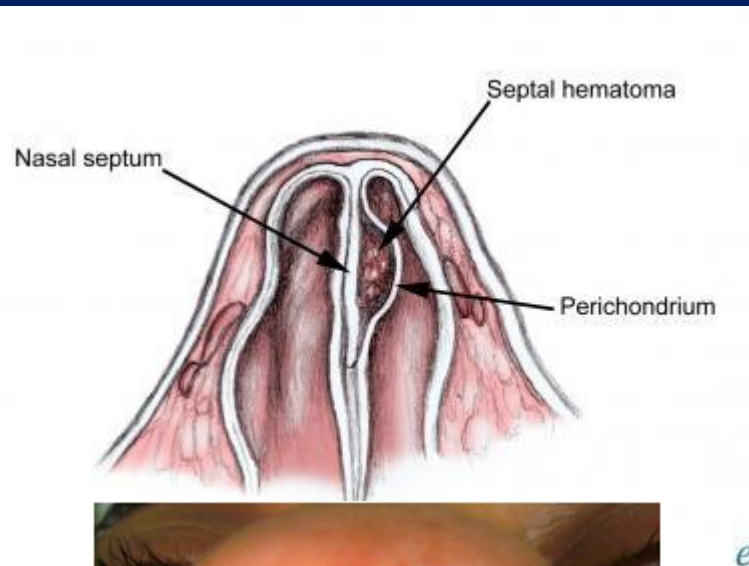
- Re-accumulation of the hematoma
- Local infection
- Chondritis
- Scar formation (“Cauliflower ear”)

#PEARLS

- DO NOT leave undrained (unless if the injury is > 7 days old).
- Apply compression dressing (rather than a simple dressing).
- Perform daily follow-up ear exams.

Nasal Septal Hematoma

Pediatric Nose Trauma



- Blood accumulation b/t septal cartilage and perichondrium (supplies blood to septal cartilage).
- **URGENT** drainage by ENT for all nasal septal hematoma.
- Evacuate the hematoma, nasal packing, topical antibiotics, and follow-up with ENT in 24-hour

Complications:

- **Septal ischemic necrosis** → Saddle nose deformity or nasal obstruction
- **Infection/Septal abscesses** → septal necrosis, osteomyelitis, cavernous sinus thrombosis, intracranial abscess

Animal Bites

- Staphylococcus species
- Pasteurella species
- Eikenella species
- Rabies (virus)



- Oral Augmentin (Amox-Clavulanate)
- IV Unasyn (Amp-Sulbactam) is the drug of choice in severe cases
- If allergic to Penicillin, then Clindamycin + Bactrim

Snake Bites



CBC, CMP, PT, PTT, INR, D-dimer, Fibrinogen, UA, blood type, x-rays to rule out retained fangs or foreign body at the affected area.

- A B C
- Remove any jewelry or constricting clothing from the affected bite area.
- Do not manipulate the wound site.
- Immobilize the affected area.
- Do not incise or perform oral suction of the affected puncture wounds.
- Admit to the hospital.
- Neurovascular assessments frequently Q2hr to rule out compartment syndrome.
- **CroFAB** (*Crotalidae polyvalent immune Fab*).

Spider Bites



Black Widow

Brown Recluse

PainFUL

PainLESS initially (then becomes painful 6-8 hrs later)

More frequent systemic manifestation (e.g. hypertension)

Less frequent systemic manifestation

“Target” or “halo” lesion may appear at the bite site

Tissue necrosis and induration at the bite site

Symptomatic treatment

Symptomatic treatment

No anti-venin

No anti-venin

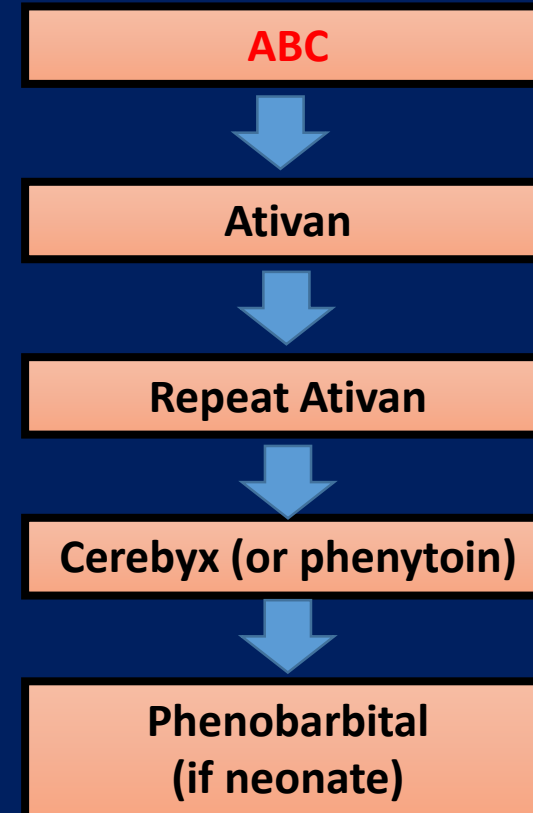
Status Epilepticus

- Seizures without regaining consciousness between attacks, or prolonged seizures lasting > 30 mins

- A B C
- Administer 100% oxygen
- Glucose check ASAP
- Insert IV access
- Blood work (CMP, CBC, Urine drug screen, anti-epileptic drug trough)
- Start IV fluids
- Once patient is stable, can include lumbar puncture and neuroimaging for workup.

Status Epilepticus

- Place on cardiac, CPO, etc.
- IV Ativan (*Lorazepam*) 0.1mg/kg x 1
- Can repeat Ativan 0.05mg/kg x 1 after 10-15 minutes if seizures persist
- Consider Diastat (*rectal diazepam*) if no IV access available
- If seizures still persist, then load with Cerebyx (*fosphenytoin*) 20mg/kg
- If seizures still persist, consider phenobarbital (if in neonates)
- Admit to PICU
- EEG monitoring



Pediatric Burns

Types



1st degree burn



Superficial skin

Painful
Dry
Redness
Blanches with pressure



2nd degree burn



Partial thickness of skin

Painful
Blistering
Moist



3rd degree burn



Full thickness of skin

Painless
Full thickness of skin
Discolored

Pediatric Burns

- **A**irway, **B**reathing, **C**irculation.
- IV access (get 1 or 2 large bore catheters).
- Establish severity & depth of burn injury
- Debride any open blisters.
- Fingers & toes should be wrapped and separated with gauze.
- Cover all partial-thickness wounds with antibiotic ointment.
- Cleanse minor burn wounds with mild soap.
- Check tetanus status.

Immerse the burn (wound) in cold water for 30 mins → cool minor burn under running tap water

DO NOT use ice water or apply ice directly to the burn wound.

Pediatric Burns

Minor Burns

- Superficial burn wound < 10% total body surface area (TBSA) → outpatient basis (unless child abuse is suspected)
- Apply *Silvadene* cream
- Apply dressing
 - Eliminate air movement over the wound
 - Decrease insensible water loss
- Change dressings daily



Pediatric Burns

Moderate - Severe Burns

- Superficial burn wound > 20% total body surface area (TBSA) → inpatient burn unit → IVF (b/c of GI ileus)
- < 20% of TBSA can be managed with oral and IV fluids

Rule of Nines

Pediatric



Patient's PALM approximates 1% total body surface area

Parkland Formula

(Only applies to 2nd and 3rd degree burns)

Volume of Lactated Ringers solution
 $4 \text{ mL} \times \text{Total body surface area of burn (\%)} \times \text{Body Weight (kg)}$

First half of the solution over the
first 8 hrs

Second half of the solution over the
next 16 hrs

Pediatric Burns

When to Transfer to Burn Center?

- Any partial-thickness burns $> 20\%$ of TBSA in a patient of any age OR $>10\%$ OF TBSA in children < 10 yrs old.
- 3rd degree burns covering $> 5\%$ of TBSA.
- 2nd degree burns or 3rd degree burns involving critical areas (e.g. hands, feet, perineum, or major joints)
- Burns associated with inhalation injury.
- Electrical or lightning burns.
- CIRCUMFERENTIAL burns on the extremities OR chest

In Tulsa

Alexander Burn Center

1120 S. Utica Ave.

Tulsa, OK 74104

918.579.4580

In OKC

INTEGRIS Paul Silverstein Burn Center

3300 NW Expressway, 3rd Floor

Oklahoma City, OK 73112

405.919.3345



Pediatric



POTPOURRI

Questions?



References

- Red Book 2018 Report of the Committee of Infectious Diseases. American Academy of Pediatrics.
- Nelson's Textbook of Pediatrics.

**That's enough
todaying for
today.**

I'm done.

Common Peds Em **ER** gencies

THANK YOU FOR YOUR TIME



#000A