



Certified Pediatric Nurse Review Course:

Emergencies, Trauma & Child Maltreatment

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Introduction

- Emergency Departments in the US see 30 million pediatric patients annually.
 - Common reasons for ED visits for children are motor vehicle collisions and firearm-related injuries.
 - Minor illnesses and trauma are also commonly seen in EDs and other urgent care settings.
 - Since the COVID-19 pandemic, there has been a nearly 45% increase in ED visits for pediatric mental health conditions, with an almost 300% increase in visits for attempted suicide or self-inflicted injury.
- Almost 85% of pediatric patients are seen in general emergency departments

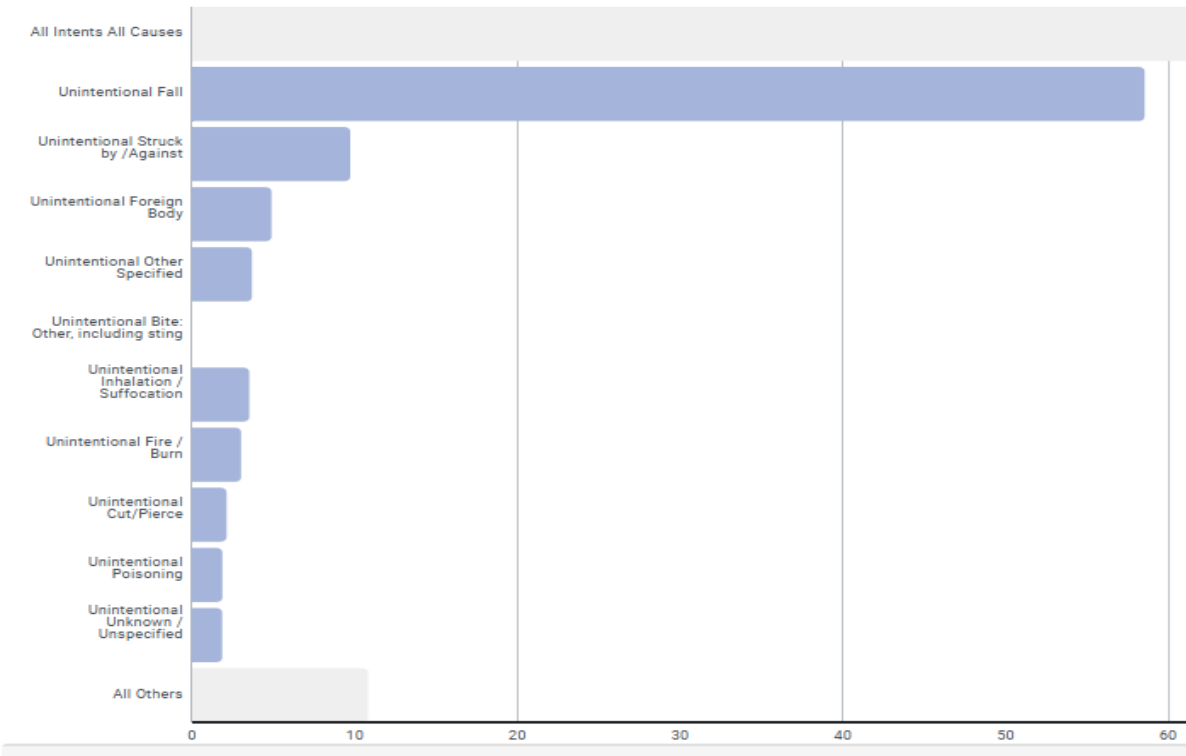
Objectives

- Recall characteristics of children that may affect response to illness or injury.
- Describe the systematic approach for pediatric emergencies and traumatic injury.
- Discuss different types of pediatric emergencies.
- Explain common interventions to manage specific emergencies.
- Recognize signs and symptoms associated with child abuse and neglect.

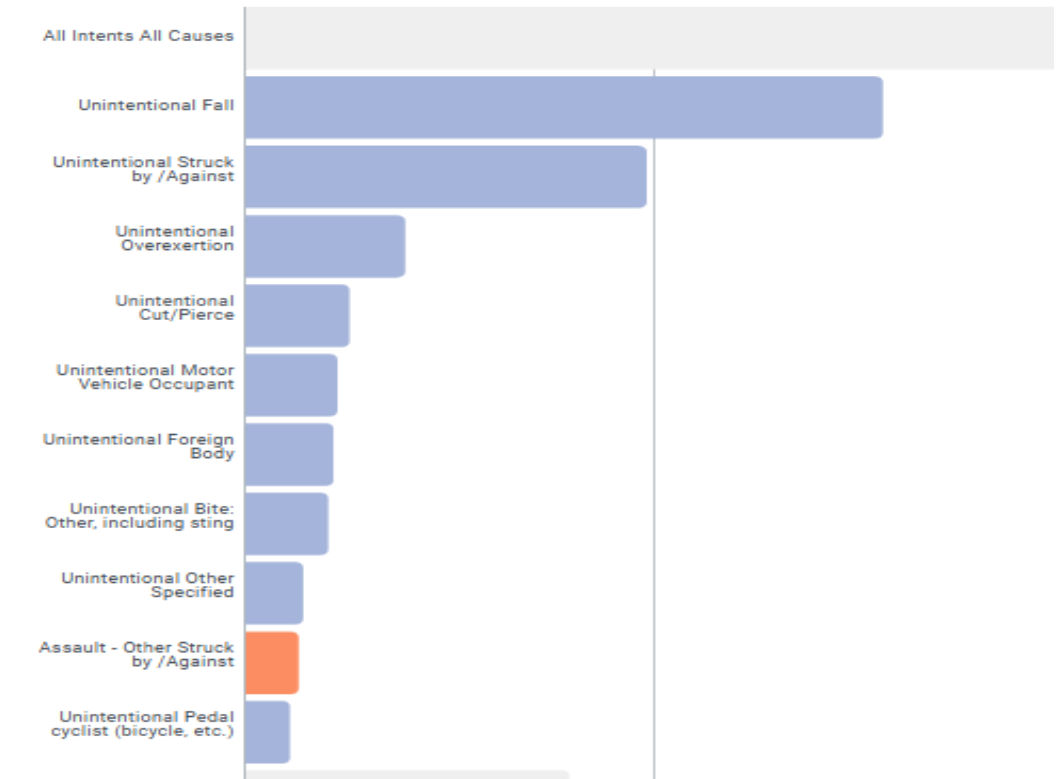


Injuries in Childhood 2019-2023

10 Leading Causes of Nonfatal Injury for ages <1
All Injuries, 2023, Both Sexes, All Cases, All Races



10 Leading Causes of Nonfatal Injury for ages 1-17
All Injuries, 2023, Both Sexes, All Cases, All Races



Deaths in Childhood 2019-2023

Ages 1-17

Top 5 Causes of Injury Death in this Age Group:

Cause	Percentage of Deaths
Unintentional Mv Traffic	25.6%
Homicide Firearm	16.6%
Unintentional Drowning	9.2%
Suicide Firearm	8.5%
Suicide Suffocation	8.3%

Age <1

Top 5 Causes of Injury Death in this Age Group:

Cause	Percentage of Deaths
Unintentional Suffocation	65.5%
Homicide Unspecified	7.0%
Unintentional Mv Traffic	4.8%
Homicide Other Spec., Classifiable	3.5%
Undetermined Suffocation	2.8%



<https://images.app.goo.gl/21oW3A5EQmK1v5p9A>

Anatomical and Physiological Features

- Smaller airways
- Increased respiratory rate
- Increased heart rate
- Hypotension is a late sign
- Greater body surface area
- Poor thermal regulation
- Head is large, neck muscles weak
- High volume extracellular fluid
- Immature regulatory system
- Protuberant abdomen



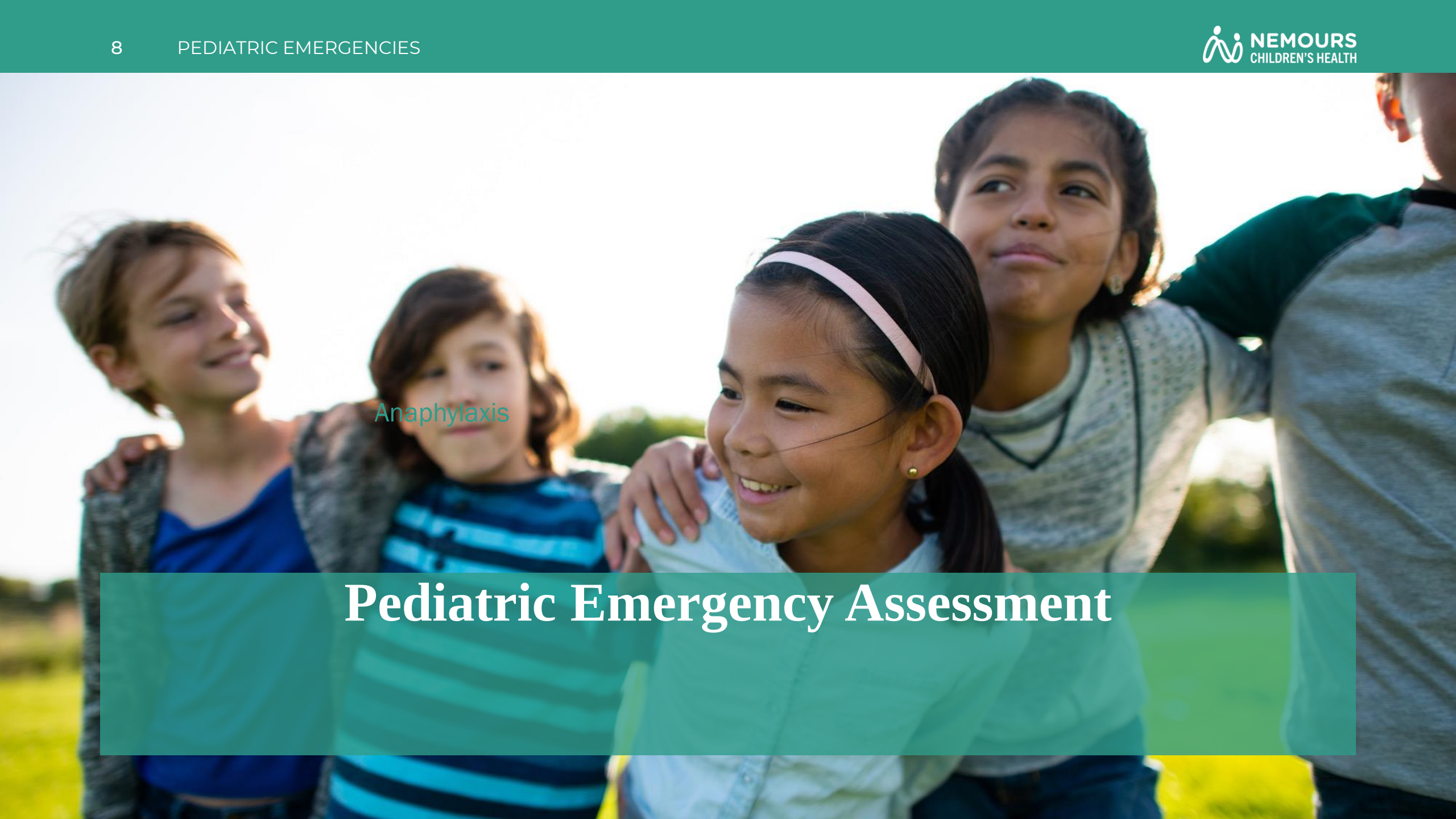
https://commons.wikimedia.org/wiki/File:Messy_toddler.JPG

Developmental Features

- Easily distracted
- Impulsive
- Lack of experience
- Focused on single object
- Little concept of cause and effect
- Difficulty localizing sound



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Anaphylaxis

Pediatric Emergency Assessment

Initial management of the ill or injured child

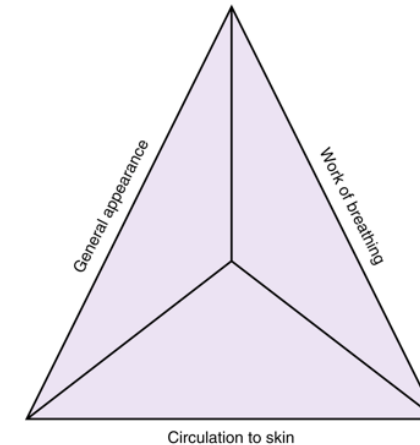
- Systematic process
- Efficient and timely
- Easy to learn and implement
- Teamwork and communication
- PALS, TNCC, and ENPC



<https://images.app.goo.gl/nqETZUEe5zeaRBC67>

Pediatric Assessment Triangle (PAT)

- Rapid assessment of 3 areas to identify how sick and how urgently treatment is required
- As the child and the family enter your visual field quickly assess the parameters using visual and auditory observation.



Pediatric Emergencies
Logee, Katherine, Sheehy's Emergency Nursing, 45, 556-575

Pediatric Assessment Triangle. From Emergency Nursing Pediatric Course: Provider Manual (ENPC). 5th ed. Des Plaines, IL: Emergency Nurses Association; 2020.

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General Appearance

- Look ill or well?
- Is child playful?
- Aware of his/her surroundings?
- Activity: running, walking, requiring assistance to ambulate, or being held?
- Crying, alert, sleepy or unresponsive?
- Interaction with the caregiver & environment?



<https://images.app.goo.gl/9sRvG8icDwDQdonA6>

Work of Breathing

- Breathing – rapid, labored, or shallow? Is the respiratory rate slow, normal or rapid?
Is there nasal flaring?
- Signs of accessory muscle use?
- Sounds such as stridor, grunting, wheezing, or coughing?
- Is the child in a sniffing or tripod position?



Circulation to Skin

- Is the child pale, dusky, cyanotic, mottled or flushed?
- Is there obvious bleeding?
- Is the child diaphoretic?

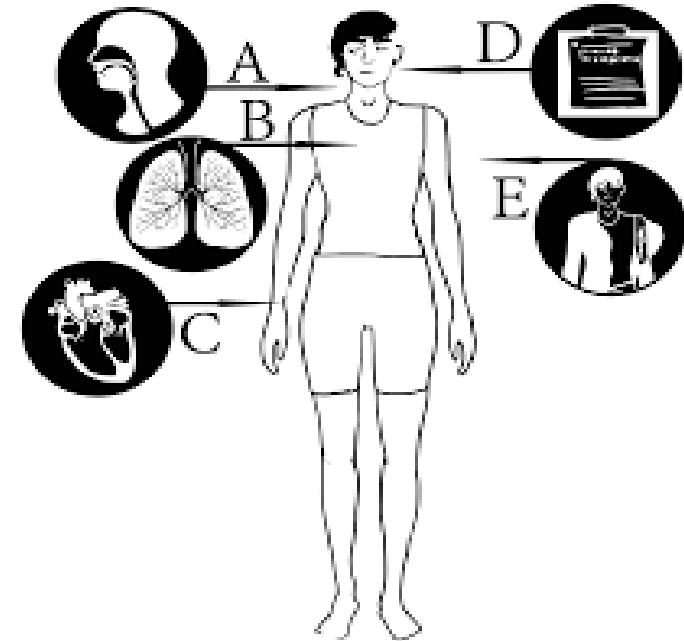
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Primary survey

The purpose of the primary survey is to rapidly identify and manage immediate life threats. It focuses on the following:

- Airway with cervical spine protection
- Breathing
- Circulation and hemorrhage control
- Disability
- Exposure

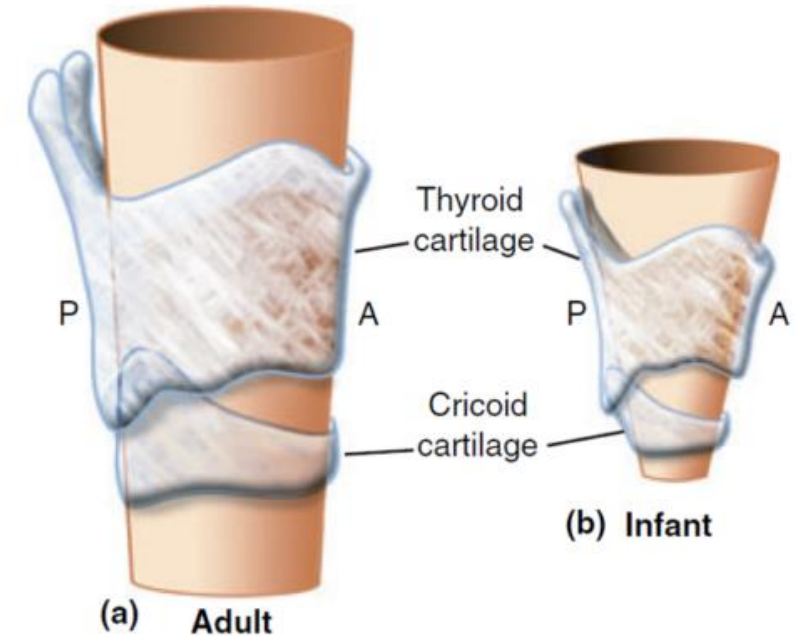


[svg - Wikimedia Commons](#)

A–Airway and Alertness w/c-spine immobilization

- Pediatric airway is smaller
- Larger tongue and smaller oral cavity
- Infants have a relatively larger occiput
- Infants are nose breathers
- Trachea is more cartilaginous and softer
- Larynx is higher and more anterior
- Shape of the epiglottis
- The trachea is short
- Cervical Spine

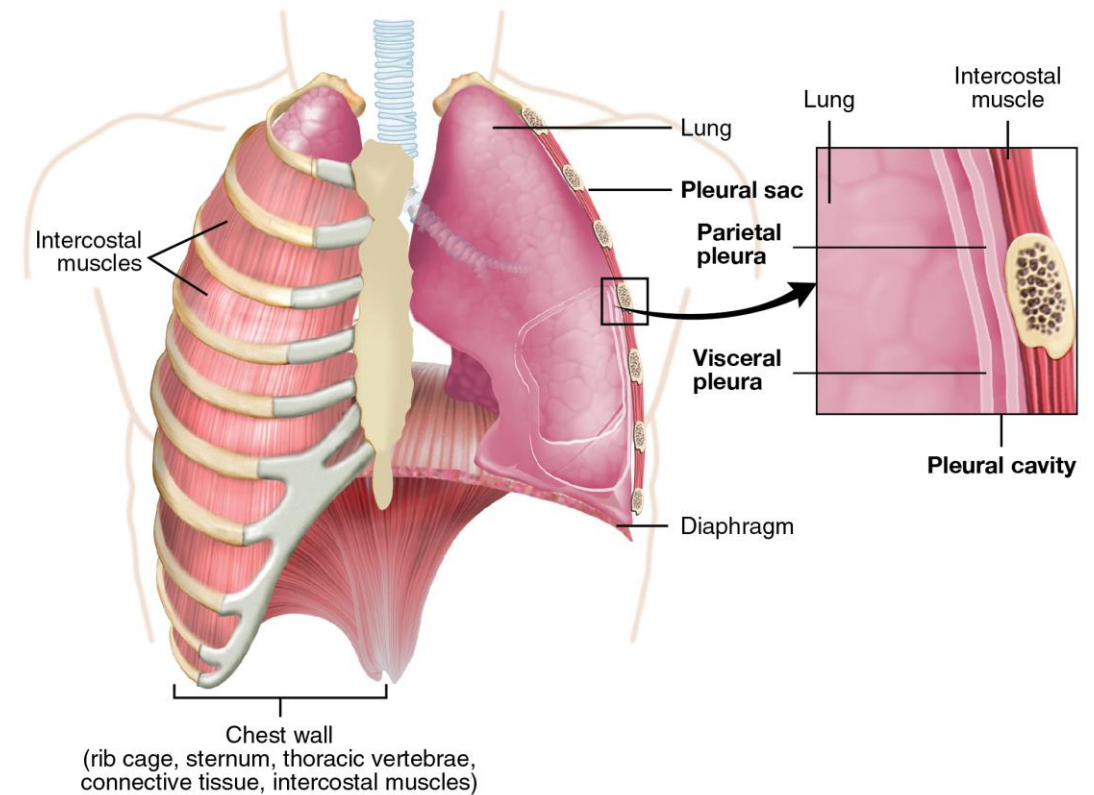
A	The patient is awake.
V	The patient responds to verbal stimulation.
P	The patient responds to painful stimulation.
U	The patient is completely unresponsive.



<https://www.openanesthesia.org/keywords/pediatric-airway-anatomy/>

B–Breathing & ventilation

- Ribs positioned more horizontally
- Thin chest wall
- Diaphragmatic breathing
- Fewer Type 1 fibers in respiratory muscles
- Respiratory rate varies with age
- Heart rate



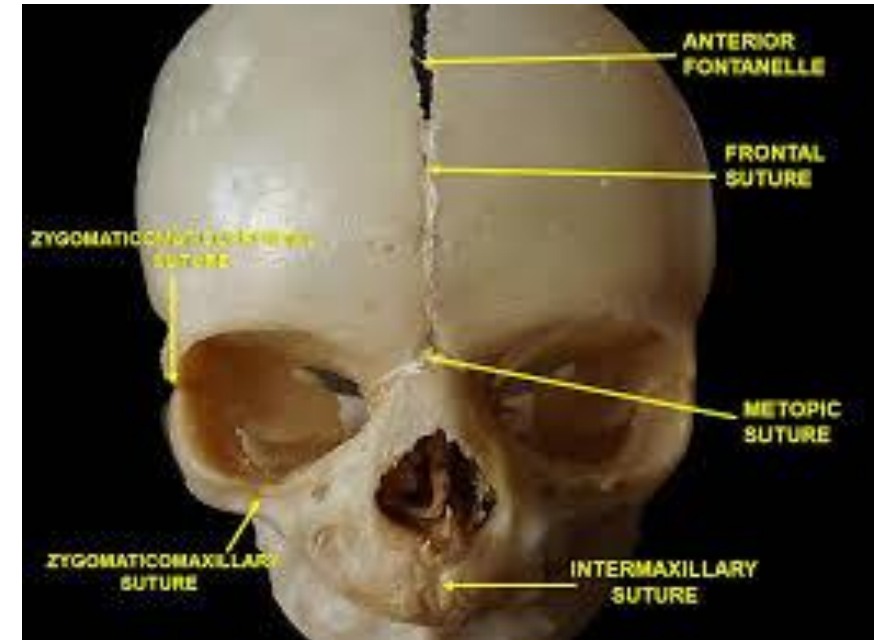
C–Circulation & Control of hemorrhage

- Blood volume is relatively larger, but absolute volume is smaller
- Systemic vascular resistance is lower
- Hypotension is a late sign
- Fixed-stroke volume
- Smaller vessels / more subcutaneous tissue



D–Disability (central nervous system)

- Open sutures, presence of fontanelle in infants
- Thinner cranial bones
- Head relatively larger
- Cognitive and psychological development varies with age



[File:Slide1MIA.JPG - Wikimedia Commons](#)

E–Exposure & Environmental control

- Relatively small size
- Higher BMR and surface area
- Increased glucose requirements but decreased glycogen stores

Secondary Survey

Head to Toe Assessment

Focused history

SAMPLE



Specific Emergencies

A photograph of four children of diverse backgrounds smiling and looking off-camera in a bright, outdoor setting. The children are standing close together, and the lighting suggests a sunny day. A semi-transparent teal banner is overlaid at the bottom of the image.

Anaphylaxis

Anaphylaxis

Anaphylaxis

Severe allergic reaction with changes in the blood vessels causing dilation without an increase in volume. Blood volume is reabsorbed within the body.

Assessment Findings

- Skin - hives and itching and flushed or pale skin
- Low blood pressure (hypotension), weak and rapid pulse
- Airway constriction - swollen tongue or throat, which can cause wheezing and trouble breathing
- Nausea, vomiting or diarrhea

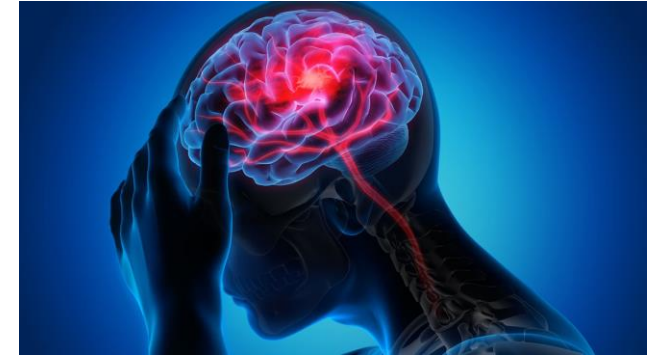
Interventions

- 911 if out of hospital, RRT/Code blue
- Meds: Epinephrine, albuterol, antihistamine, steroids
- Monitor for recurrence



Traumatic Brain Injury

Traumatic Brain Injury



Mild jolt or blow to the head resulting in rapid rotational acceleration of the brain

In pediatric head trauma, most injuries are minor

Short-lived neurologic impairment

Assessment

- Physical - light and noise sensitivity, dizzy, tiredness, headaches, vision problems, nausea/vomiting, difficulty sleeping
- Mental - Trouble thinking clearly, “foggy”, memory problems, trouble concentrating
- Emotional - anxiety, sadness, increased emotions, irritable and easily angered

Interventions

- Concussion screening, brain rest, pain management, NO sports

Post Concussion Syndrome

History of multiple repeated TBI's

Assessment

- Ongoing problems with concentration, Headache, balance

Intervention

- Rest and refrain from sports

Second Impact Syndrome

Repeated injuries to the head even without sx of TBI

It causes change to the structure and function of the brain and can be fatal

Assessment

- Diffuse cerebral swelling, herniation can occur within minutes

Intervention

- Airway management with treatment to lower ICP

Traumatic Brain Injury - Brain Bleed

Epidural Hemorrhage - bleeding between the inside of skull and dura- 90% arterial, rapid progression

Subdural Hemorrhage - bleeding between dura and the brain presses on brain tissue

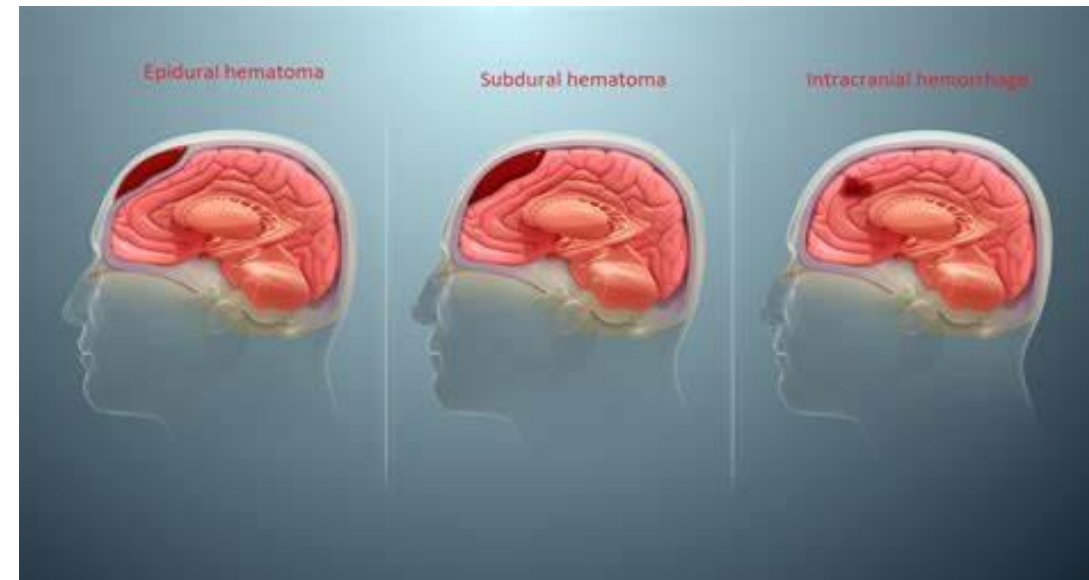
Intracerebral Hemorrhage - bleeding directly into the brain tissue

Assessment

- Monitor for changes- ABC's V/S, altered level of consciousness, GCS changes, neuro exams

Interventions

- Airway management, O₂, ICP drainage, elevate HOB, Decrease metabolic demands, anticonvulsants, Osmotic diuretics





Fractures

Fractures

Force applied to the bone exceeds the bone's ability to dissipate Energy

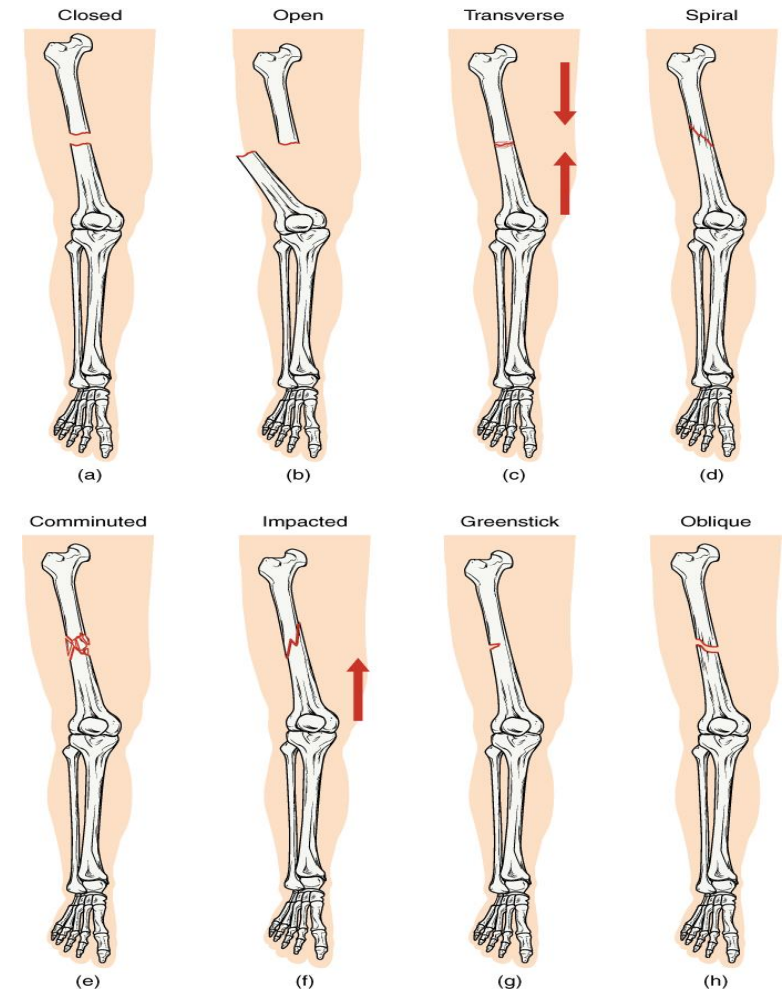
Some fractures are unique to children - still growing

Assessment

- Mechanism, pain, swelling, deformity, unable to use, muscular rigidity, P's

Interventions

- Immobilize, elevate, ice, splint/cast, reduction, irrigation, open
Needs IV antibiotics, wound care, PT, OT, check neurovascular status, cast care



Fracture Complications

Compartment Syndrome

Increase in pressure inside the fascial compartment causes decreased blood flow

Assessment

Monitor 7 P's: Pain, Pressure, Pulses, Paresthesia, Paralysis, Pallor, Poikilothermia, perfusion pressure

Interventions

Neutral positioning, cast removal, fasciotomy

Osteomyelitis

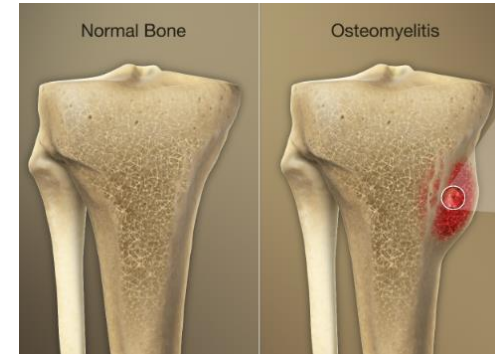
Inflammation of the bone, usually due to a bacterial infection from an open wound

Assessment

Redness at site, pain, fever, chills, elevated WBC's

Interventions

X-ray, MRI, antibiotics may need drainage and surgical debridement



[3D Medical Animation Staphylococcus Aureus.jpg - Wikimedia Commons](#)



Poisoning

Poisoning

Exposure to a chemical or other agent that adversely affects functioning

Top 10 Pediatric Substance Exposures

- Household cleaning substances
- Analgesics
- Cosmetics/personal care products
- Foreign bodies/toys
- Dietary supplements/herbal/homeopathic remedies
- Antihistamines
- Vitamins
- Topical Preps
- Pesticides
- Plants

An estimated **80,000 children** go to the **emergency room** with **poisonings** each year. **Poison-proof** your home by:

Keeping **household pesticides, cleaners, and other chemicals** out of children's reach.

Reading the label and carefully follow directions when using pesticides, cleaners, and chemical products.



Post the Poison Control Center's national hotline:
1-800-222-1222
near every telephone in your home

<https://www.dvidshub.net/>

Poisoning

Fatalities due to serious poisoning

- Analgesics
- Fumes/Gas/Vapors
- Stimulants and Street Drugs
- Batteries
- Cardiovascular Drugs
- Cough and Cold meds
- Alcohols
- Chemicals
- Antihistamines
- Other Unknown Nondrug Substance

Poisoning

Assessment: Important Questions

- What substance was found near child?
- What medications or substances are in the home?
- What was the approximate amount ingested?
- How much available before and how much available after?
- What time was the ingestion?
- Were there any odors at scene of ingestion?
- Was the child alert when ingestion was discovered?
- Have they remained alert since?
- How has the child behaved since ingestion?
- Is there any history of substance abuse?

Poisoning Antidotes

Toxin	Antidote
Acetaminophen	N-acetylcysteine
Anticholinergics	Physostigmine
Benzodiazepines	Flumazenil
Beta Blockers	Glucagon
Calcium Channel Blockers	Glucagon
Cyanide	Amyl Nitrate
Digoxin	Digibind
Heparin	Protamine Sulfate
Iron	Deferoxamine

Poisoning Antidotes

Toxin	Antidote
Insulin	Glucose
Lead	Succimer (DSMA)
Methanol	Ethanol
Opioids	Naloxone
SSRI's	Cyproheptadine
Sulfonylurea	Octreotide
Tricyclic antidepressants	Sodium Bicarbonate
Warfarin	Vitamin K



Child Maltreatment

Child Maltreatment

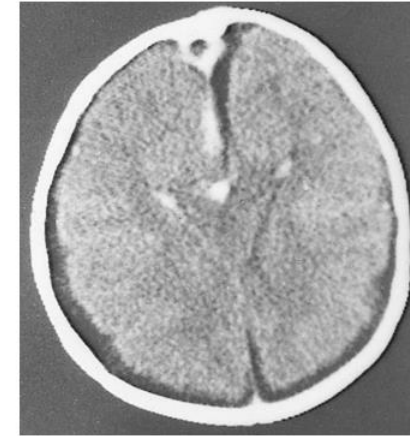
Forms of Abuse

Physical Abuse

Physical Neglect

Sexual Abuse

Emotional Abuse



Abuse and Neglect
Dillahunty, Angela, Sheehy's Emergency Nursing, 49, 607-630

Subdural Hematoma Secondary to Shaken Baby Syndrome From Zitelli BJ, Davis HW. Atlas of Pediatric Physical Diagnosis. 4th ed. St Louis, MO: Mosby; 2002. Courtesy the Division of Neuroradiology, University Health Center of Pittsburgh.

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ClinicalKey®

Abuse is defined as acts of commission, neglect as acts of omission.

Child Abuse Red Flags

- Bruising in different stages of healing
- Fractures that require a tremendous force
 Ribs, Metaphyseal, Spiral
- The description of how an injury happened does not match level of force
- History discrepancies
- Pattern injuries

Child Abuse

The TEN-4 FACES P mnemonic is helpful in suspected child abuse.

Remember to evaluate areas of suspicion a “toddling” child would not normally injure on their own.

Look for bruising that does not fit the story, petechiae as a sign of injury around the eyes and behind the ears, and patterned bruising from objects that may have been used to strike or punish a child.

TEN-4-FACESp Bruising Rule

Kids are kids, and sometimes they play in ways that result in minor cuts, scrapes, and bruises. These minor injuries are often found on bony areas of the body like knees, shins, elbows, and foreheads. However, there are other types of bruises that should be a red flag for possible abuse.

When is bruising concerning for abuse in children younger than 4 years of age? If bruising in any of the three components – Regions, Infants, Patterns – is present, strongly consider evaluating for child abuse and/or consulting with an expert in child abuse.

REGIONS	
“TEN” Torso Ears Neck 	“FACES” Frenulum Angle of Jaw Cheeks (fleshy part) Eyelids Subconjunctivae
INFANTS “4” = infants ages 4 months and younger 	PATTERNS “p” = patterned bruising 

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

TEN-4-FACESp is a useful acronym to help screen children under 4 years of age with bruising to identify when a bruise is more likely to be caused by abuse than accidental injury. The TEN-4-FACESp is not intended to diagnose abuse. **Scan the QR code to learn more.**



Child Abuse Reporting

Healthcare workers are mandated reporters for suspected abuse

A report should be made if you have a reasonable suspicion of abuse.

The reporter need not be certain but just have a reasonable suspicion of abuse. If a mandated reporter fails to report a case of suspected abuse, they can be charged with a misdemeanor.

More importantly, the child may suffer future abuse leading to additional injury and death.

Human Trafficking

Human trafficking generally falls into one of two categories:

- Sex Trafficking - a commercial sex act is induced by force, fraud, or coercion, or in which the person induced to perform such act has not attained 18 years of age
- Labor Trafficking- the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services using force, fraud, or coercion for the purpose of involuntary servitude, peonage, debt bondage, or slavery

Knowledge Check Questions



Knowledge Check Question 1

- Which choice below describes the Pediatric Assessment Triangle (PAT) in rapid assessment, and what are the key parameters evaluated?
 - A) General appearance, work of breathing, circulation to skin
 - B) Heart rate, respiratory rate, blood pressure
 - C) Level of consciousness, pupil size, motor response
 - D) Skin color, temperature, capillary refill

Knowledge Check Answer 1

- Which choice below describes the Pediatric Assessment Triangle (PAT) in rapid assessment, and what are the key parameters evaluated?
 - **A) General appearance, work of breathing, circulation to skin**
 - B) Heart rate, respiratory rate, blood pressure
 - C) Level of consciousness, pupil size, motor response
 - D) Skin color, temperature, capillary refill

Knowledge Check Question 2

- Which of the following is NOT a common intervention for managing anaphylaxis in pediatric patients?
 - A) Epinephrine administration
 - B) Albuterol administration
 - C) Antihistamine administration
 - D) Insulin administration

Knowledge Check Answer 2

- Which of the following is NOT a common intervention for managing anaphylaxis in pediatric patients?
 - A) Epinephrine administration
 - B) Albuterol administration
 - C) Antihistamine administration
 - **D) Insulin administration**

Knowledge Check Question 3

- What are the unique considerations for managing fractures in pediatric patients compared to adults?
 - A) Pediatric bones are more brittle and prone to complete breaks.
 - B) Pediatric bones are still growing, requiring careful assessment of growth plates.
 - C) Pediatric bones heal slower than adult bones.
 - D) Pediatric bones do not require immobilization.

Knowledge Check Answer 3

- What are the unique considerations for managing fractures in pediatric patients compared to adults?
 - A) Pediatric bones are more brittle and prone to complete breaks.
 - **B) Pediatric bones are still growing, requiring careful assessment of growth plates.**
 - C) Pediatric bones heal slower than adult bones.
 - D) Pediatric bones do not require immobilization.

Knowledge Check Question 4

- What are the two main categories of human trafficking, and what are the key indicators for each?
 - A) Sex trafficking and labor trafficking; indicators include force, fraud, and coercion
 - B) Drug trafficking and labor trafficking; indicators include force, fraud, and coercion
 - C) Sex trafficking and drug trafficking; indicators include force, fraud, and coercion
 - D) Labor trafficking and organ trafficking; indicators include force, fraud, and coercion

Knowledge Check Answer 4

- What are the two main categories of human trafficking, and what are the key indicators for each?
 - **A) Sex trafficking and labor trafficking; indicators include force, fraud, and coercion**
 - B) Drug trafficking and labor trafficking; indicators include force, fraud, and coercion
 - C) Sex trafficking and drug trafficking; indicators include force, fraud, and coercion
 - D) Labor trafficking and organ trafficking; indicators include force, fraud, and coercion

Knowledge Check Question 5

- How do developmental features such as impulsivity and lack of experience affect the management of pediatric emergencies?
 - A) They make children more prone to injuries and complicate the assessment process.
 - B) They have no significant impact on emergency management.
 - C) They simplify the assessment process due to predictable behavior.
 - D) They reduce the likelihood of injuries in emergency situations.

Knowledge Check Answer 5

- How do developmental features such as impulsivity and lack of experience affect the management of pediatric emergencies?
 - A) **They make children more prone to injuries and complicate the assessment process.**
 - B) They have no significant impact on emergency management.
 - C) They simplify the assessment process due to predictable behavior.
 - D) They reduce the likelihood of injuries in emergency situations.

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