



RAPID

Pediatric Emergency Assessment For the EMS provider



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Pediatric Emergencies





Objectives

- To rapidly determine based on the doorway assessment, if this is a C A B or an A B C assessment pathway- and what their MOI/ nature of illness is
- Develop a *rapid* systematic approach to all pediatric patients to determine their degree of sickness, thus their transport priority



~~Children are just small adults~~





However, like adults.....

- BSI
- Scene Safe
- General Impression
 - MOI/ NOI
 - ABC/ CAB
- Patient priority, ? ALS, transport
- SAMPLE

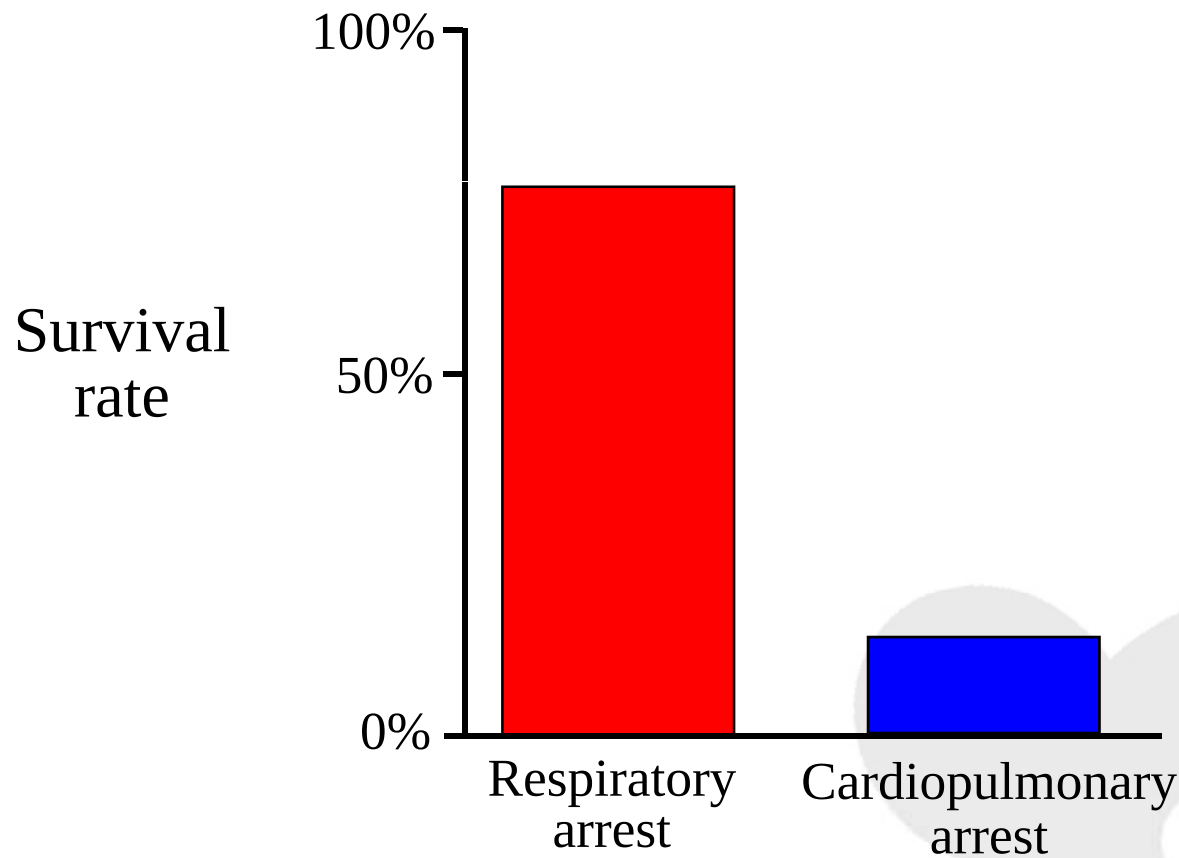


EMS has a higher rate of death in crashes than law enforcement officers and firefighters COMBINED!





Survival Following Respiratory Arrest vs. Cardiopulmonary Arrest in Children





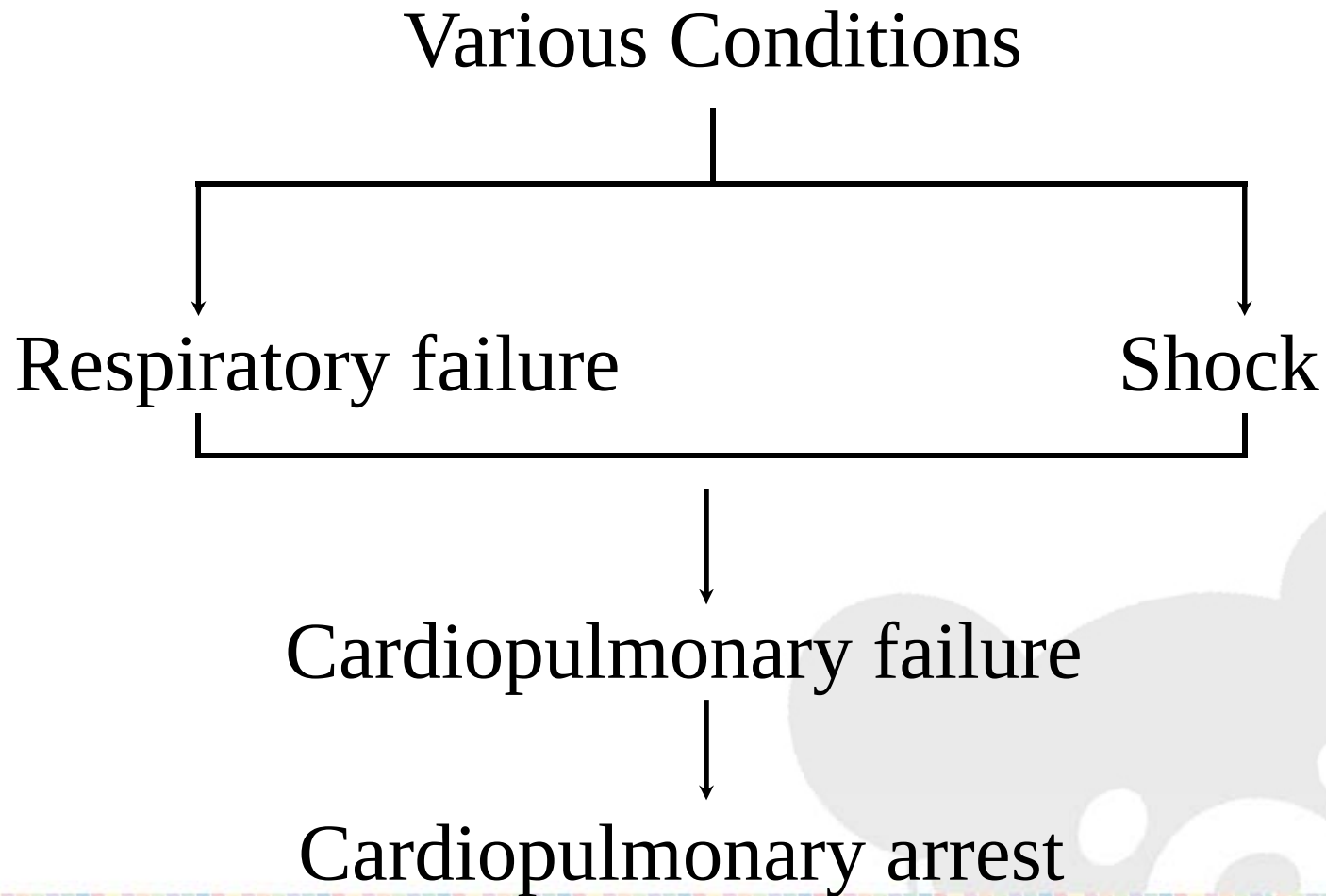
Develop A Rapid Assessment Technique

- If you don't *assess* it.....
- You can't *treat* it.....





Progression of Respiratory Failure and Shock





Components of Pediatric Emergency Assessment

- ***General Impression-***
Determines your initial assessment
A B C –vs- C A B
- **Airway**
- **Respiratory/ Breathing**
- **Cardiovascular**
- **Disability/ Discover**
- **Exposure**





General **Impression**

Rapid visual assessment of overall perfusion

Pediatric Assessment Triangle

LOC

WOB

Color / Circulation

IMMEDIATELY LIFE THREATENING? C A B!

Or not? A B C



General Impression

- Recognize that the initial ***across the room observation*** as you approach the patient may be the single most important step in the pediatric emergency assessment
- Level of consciousness is the end result of cardiac output & oxygenation



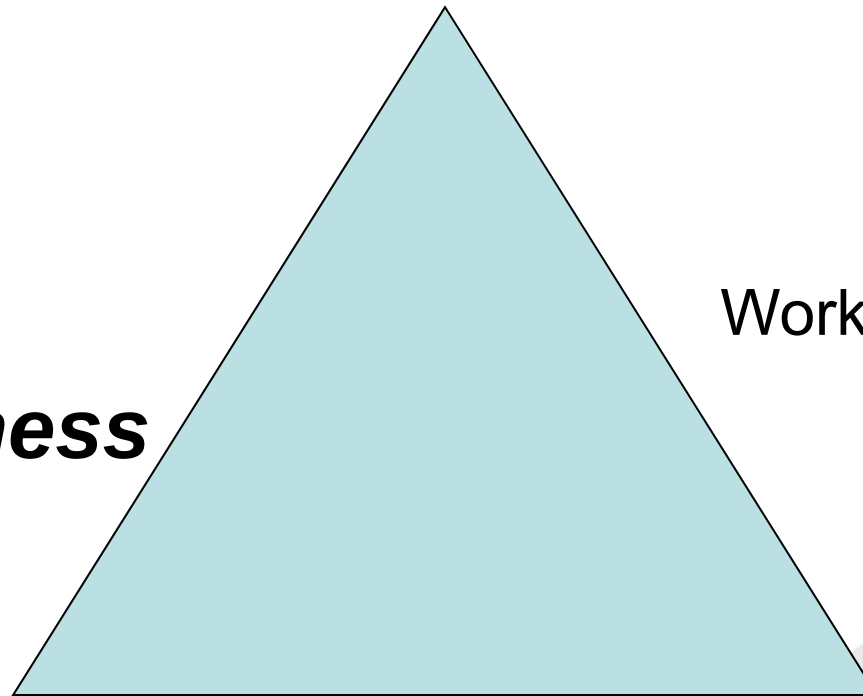
Identify Priority Patients

- ✱ Poor general impression
- ✱ Unresponsive
- ✱ Compromised airway
- ✱ Inadequate breathing
- ✱ Shock
- ✱ Uncontrolled bleeding
- ✱ Petechiae Rash



Pediatric *General* Impression

***Level of
Consciousness***



Work of Breathing

Colour/ Circulation to Skin



Level of Consciousness





A V P U

Responsiveness to stimulation

Awake

Verbal

Pain

Unresponsive





- Can you adequately assess an infant or child who is sleeping?



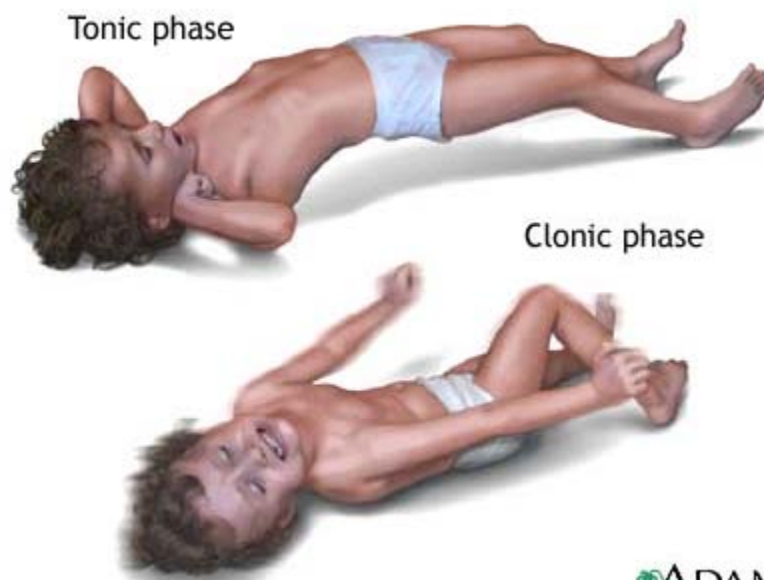






Ch
Nation





ADAM.





Pediatric *General* Impression

Appearance

***Work of
Breathing***

Circulation to Skin





Severe Respiratory Distress





Respiratory distress/ Increased Work of Breathing

- *General Assessment:*
 - $\uparrow$ or $\downarrow$ RR
 - Wheezing, prolonged exhalation
 - Stridor
 - Nasal flaring
 - Retractions
 - ***Gasping = apnea***



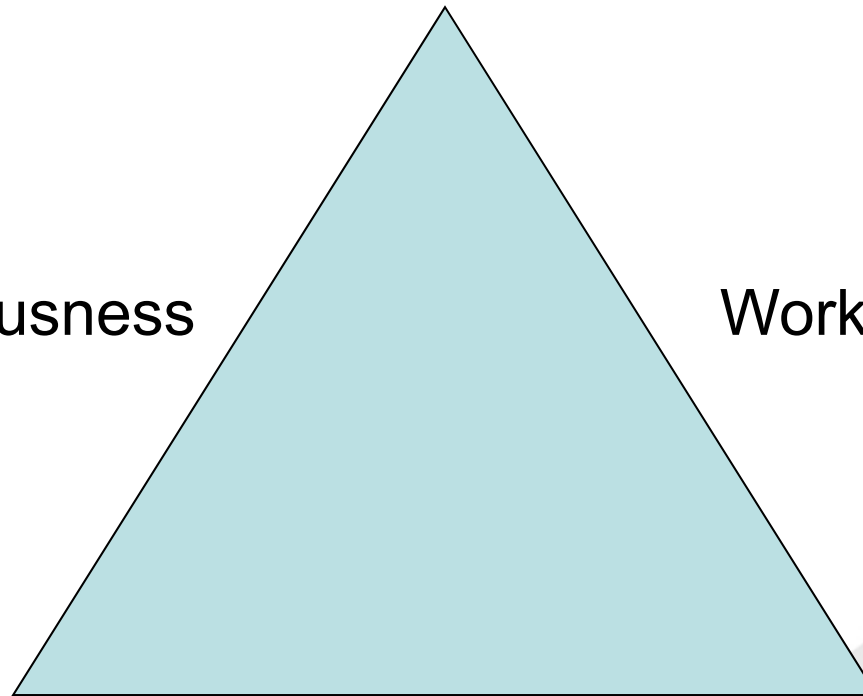




Pediatric *General* Impression

Level of Consciousness

Work of Breathing



Colour/ Circulation

Colour

- Pink
- Pale
- Mottled
- Red/ ruddy
- **Grey**
- ***Cyanotic***- Peripheral cyanosis often = circulatory failure
 - » Central cyanosis= respiratory failure







PERFUSION





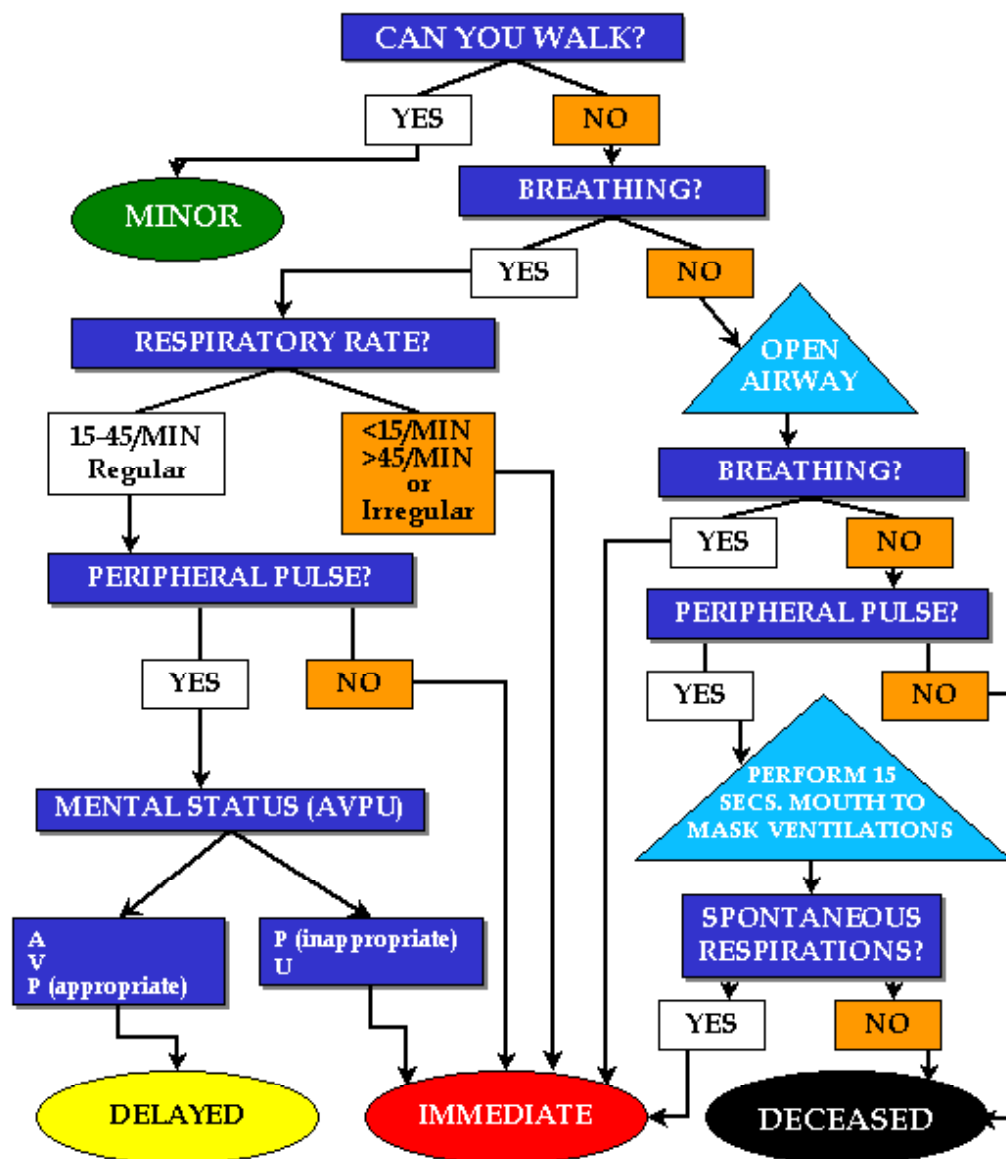


- Your *General Impression* will determine which route you take for your *Initial pediatric rapid assessment*-

C A B vs A B C

- Identify priority patients
- Need for additional resources
- Load and go
- Rendezvous

Jump START Field Pediatric Multicasualty Triage System



A=Alert
V=Responds to voice
P=Responds to pain (Appropriate or Inappropriate)
U=Unresponsive



C A B vs. A B C

- If patient is “sick!” from general impression assessment:
 - Apneic/ gasping
 - Unresponsive, responsive only to pain
 - Blue, grey, extremely pale

C A B

Check a pulse!!!!!!!!!!



C A B vs. A B C

- If the general impression shows they have *signs of life*:

A B C

Continue your rapid cardiopulmonary
assessment





Rapid Cardiopulmonary Assessment

A

Appearance Airway





Airway

**Patent?
Not?**

Or

Stridor?

Upper Airway Obstruction

FBO- Partial/ Complete-

High pitched aspiratory strider= partial extra thoracic obstruction.

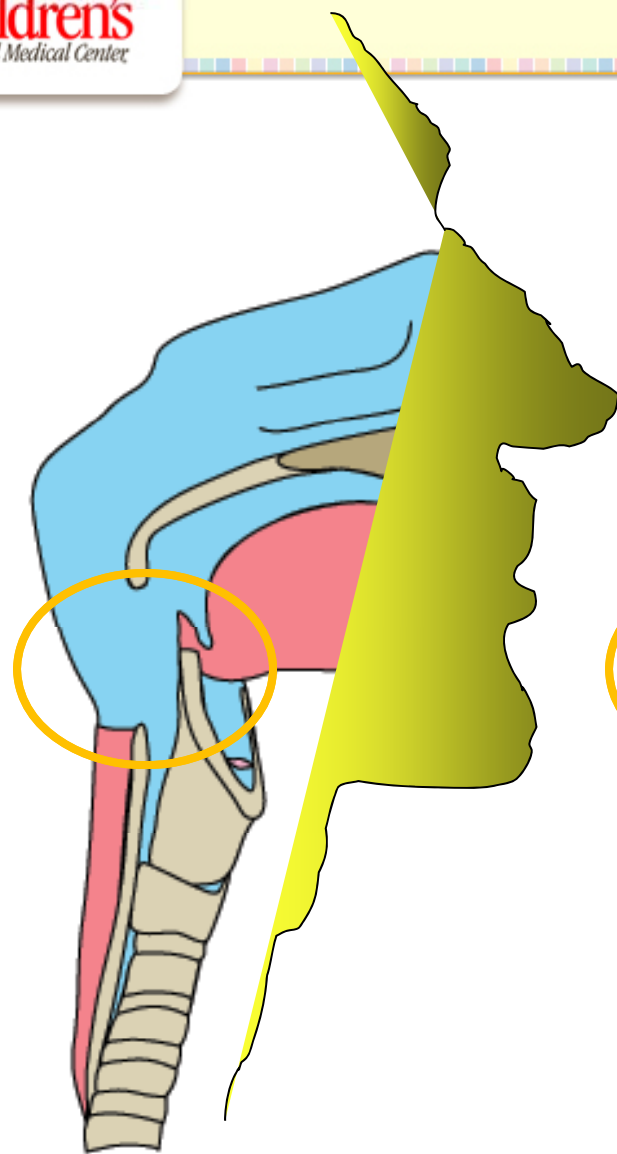
upper tracheal level.

Biphasic strider (I & E)= obstruction at

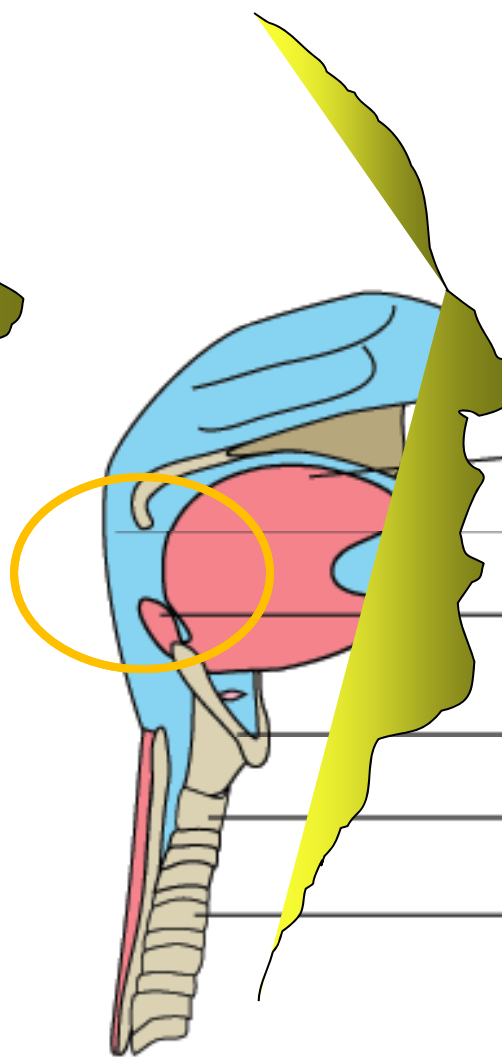
Primarily

expiratory strider= obstruction at *lower* tracheal level

- Inflammatory/ Infectious Process
- Congenital
- FBO



Adult's Upper Airway



Child's Upper Airway

Tongue is larger in proportion to mouth

Pharynx is smaller

Epiglottis is larger and floppier

Larynx is more anterior and superior

Narrowest at cricoid

Trachea narrow and less rigid



Airway Differences Between Adults and Children

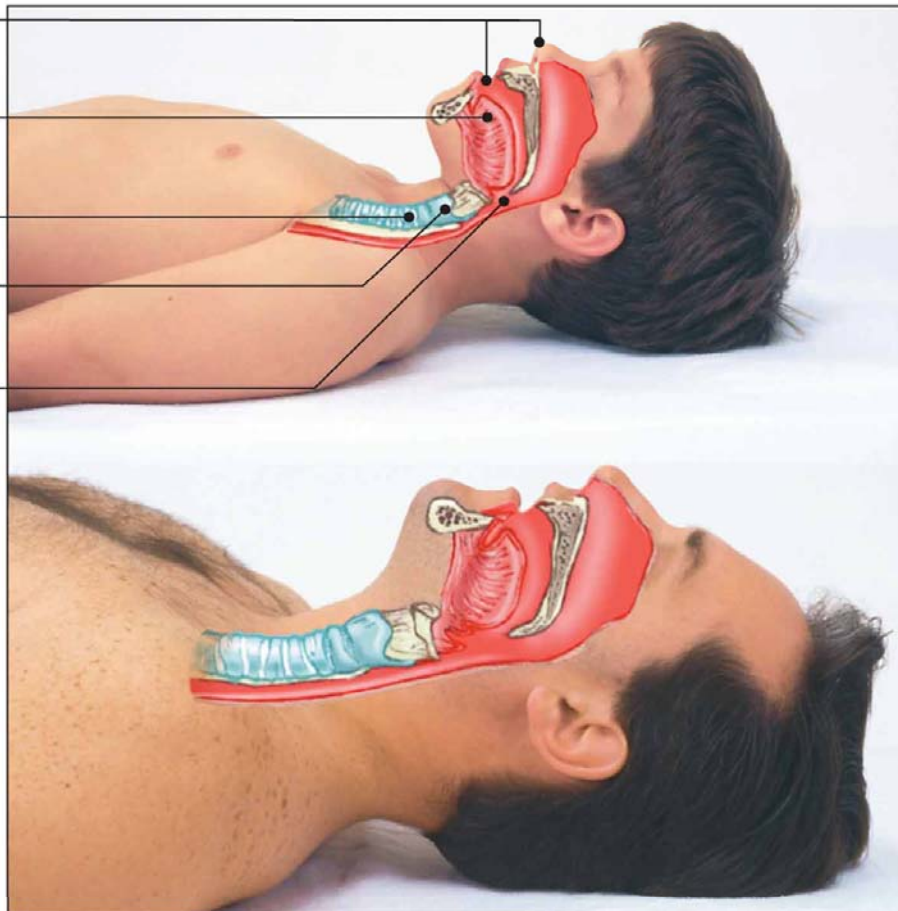
Child has smaller nose and mouth.

In child, more space is taken up by tongue.

Child's trachea is narrower.

Cricoid cartilage is less rigid and less developed.

Airway structures are more easily obstructed.



(cont.)





Partial Airway Obstruction

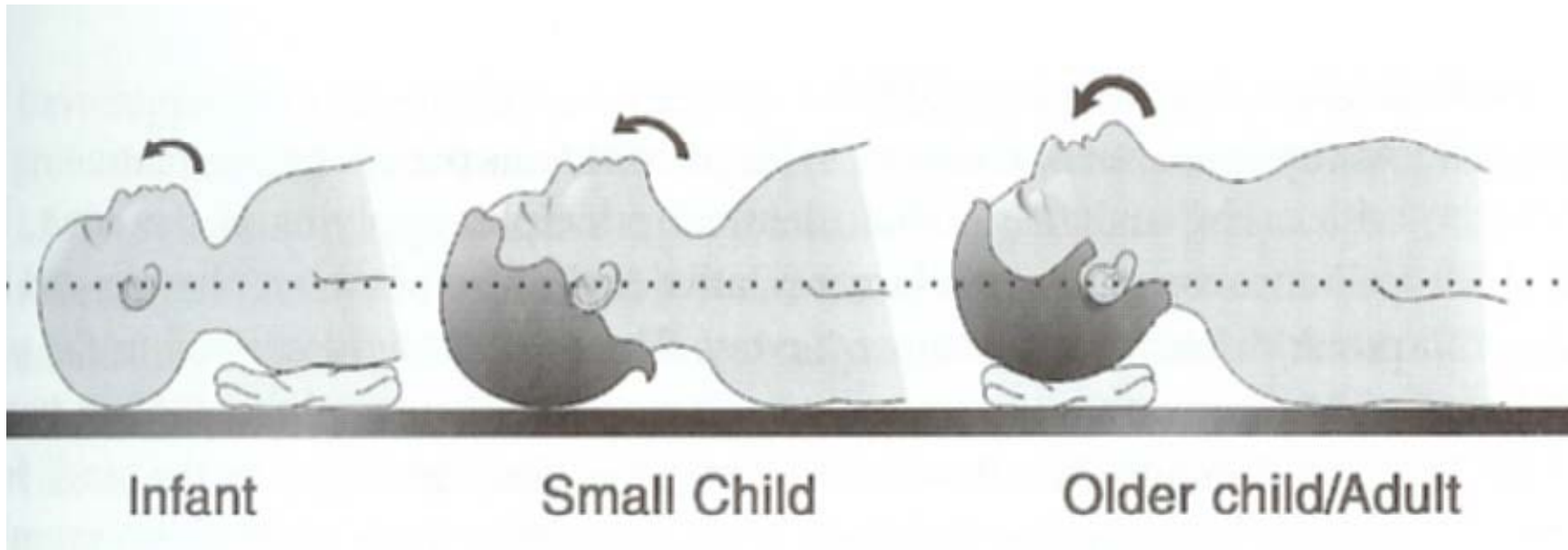
- Place in position of comfort (parent's lap okay).
- Administer high-concentration oxygen.
- Transport without agitating.







Comparing head/torso ratios





B

Breathing Assessment





Breathing/ Respiratory

- Respiratory Distress?
 - ↑ WOB
 - BBS
 - ↑ or ↓ in RR
 - Grunting: Exhaling against a partially closed glottis in attempt to generate PEEP & preserve resting lung volume. *Always indicator of severe illness*
- Respiratory Failure?
 - Cyanosis
 - Poor ventilation
 - Apnea
 - Gasping



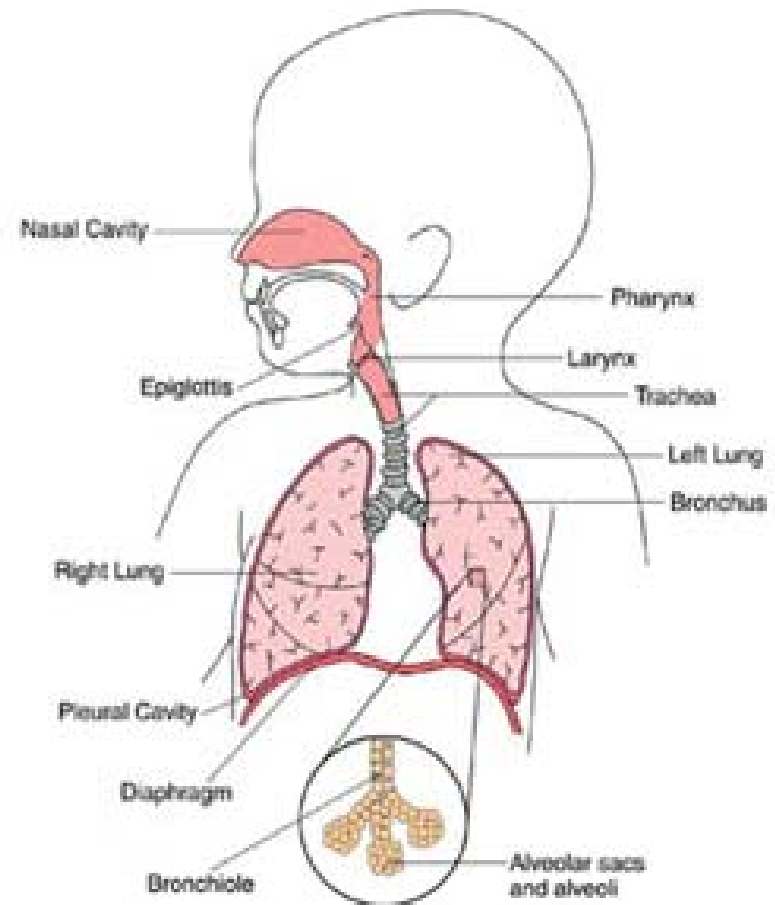


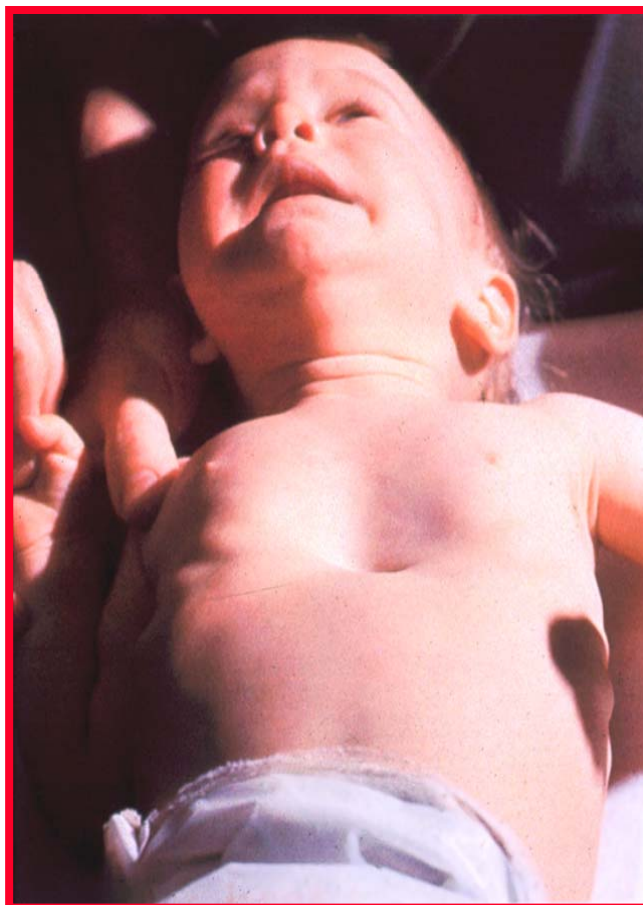
Respiratory Problems

- **Upper Airway**
 - FBO
 - Infectious/ Inflammatory
- **Lower Airway**
 - Asthma /RAD
 - Bronchiolitis
- **Parenchymal lung disease**
 - Pulmonary Edema
 - Pneumonia
- **Disordered Control of Breathing**
 - ICP
 - OD
 - Neuromuscular

Airway Anatomy

- Upper airway
 - Above the chest cavity
- Lower airway
 - Below midtrachea







Bronchiolitis

- Infants < 2 years
- Easily confused with asthma
- Common features
 - Fever, hoarseness, cough, wheezing
- Worse effects and deaths in younger infants



Nasal Cannula





Non-rebreather Mask





Pediatric Assessment Triangle

Appearance

Work of Breathing

Colour/ Circulation to Skin



9-pound newborn:

Blood volume equals less than a 12-oz (335 ml) can of a soft drink



60-pound child:

Blood volume equals about a 2-liter bottle of a soft drink



125-pound adult:

Blood volume equals about two 2-liter bottles of a soft drink



Circulatory Assessment

- Hands on!
 - **Compare pulses**
 - Central vs. distal/ peripheral
 - Effected by
 - Edema
 - Large body size
 - HR
 - BP
 - **Skin temp**
 - **Capillary Refill time**







Tachycardia + Poor Perfusion =

SHOCK





Cardiovascular VS

- **HR**
 - Know norms
 - Know extremes
 - 180, 220
 - < 60
- **B/P**
 - Choose proper equipment
 - Recognize children can be in shock, with a WNL B/P



Blood Pressure (b/p)

	Lowest acceptable Systolic pressure
0 – 28 days	60
1 month – 1 year	70
1 year+	$70 + (2 \times \text{age in years})$



Other Factors to Consider

Other reasons for decreased skin perfusion:

- Fever
- Hypothermia
 - Infants will often be hypothermic when septic
- Medications





Cardiovascular Problems

- Shock
 - Hypovolemic
 - Distributive
 - Cardiogenic
 - Obstructive
- Rhythm Disturbances
 - Tachydysrhythmias
 - Bradydysrhythmias
 - Pulseless





Shock

Categorize by:

- *Severity*
 - Compensated
 - Hypotensive
- *Type*
 - Hypovolemic
 - Distributive /Septic
 - Cardiogenic
 - Obstructive





Hypovolemic Shock

- Hx of volume loss
- ↓ LOC, tachycardiac, pallor, poor perfusion
 - Traumatic/ Hemorrhagic- Remember! ABC's and C spine protection- Ongoing assessment for life threatening conditions





Distributive Shock

- Sepsis
- Varied hx
 - Shocky perfusion
 - Pale or ruddy
 - ABC's, volume, antbx, vasoactive RX





Cardiogenic Shock

- Poor tissue perfusion r/t poor myocardial function
- CHD, post ischemic event, myocarditis, cardiomyopathy, sepsis, **toxidromes**, dysrhythmias, cardiac trauma

PUMP FAILURE

- S/S:
 - AMS
 - ↑ RR, WOB, (pulmonary edema), cyanosis
 - ↑ HR, ↓ B/P, or normal B/P, narrow pulse pressure, ↓ central pulses,
 - ↓ or absent peripheral pulses, prolonged cap refill, cool extremities
 - s/s r/t CHF



SVT

- Rate > 220 infants, >180 children
- Narrow QRS $<.09$
- Stable?
 - ☺ LOC
- Unstable?
 - AMS
 - Resp distress; failure





BLS Strategies for Shock

- Maintain Airway
- 100% Oxygen therapy
- Provide normothermia
- BVM if needed
- Bleeding control if present
- Normal (0.9%) Saline 20mL/kg x 3*
- Call for back-up if needed



ALS Strategies for Shock





Toxicology

- When a child presents in the extremis with no known etiology, toxic ingestion **MUST** be considered!
- It may change the treatment priorities in resuscitation
- It may require you to prepare non customary resuscitation Rx's.
 - Na HCO₃
 - Glucagon
 - High dose Epi





Trauma !

- **A-** airway
 - C SPINE precautions
- **B-** breathing
 - pneumo/hemo's
- **C-** Obvious (and not so) bleeding

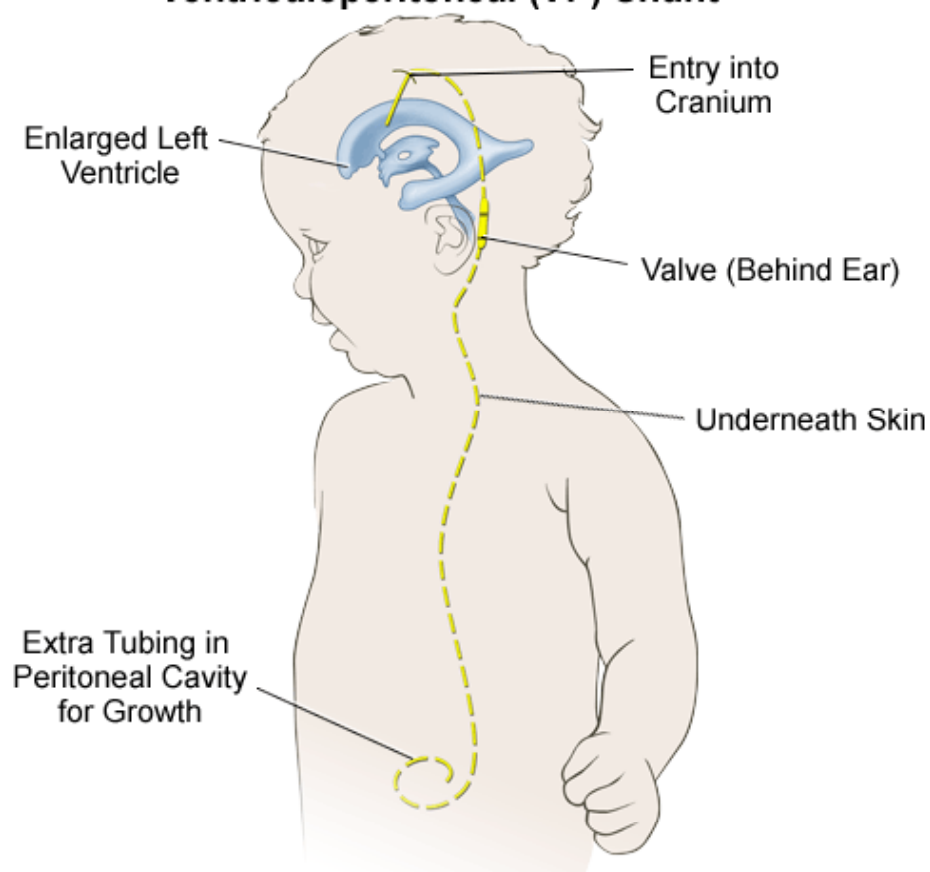
Jaw thrust



Disability- Exposure



Ventriculoperitoneal (VP) Shunt









Seizure causes

- Simple febrile seizure
- Structural brain anomaly
- Epilepsy
- Meningitis
- Traumatic Brain Injury / bleed
- Toxic ingestion





So... that was the A B C group

- Why?
- Now, for the C A B group....

- Why?





C A B

- If pt looks dead or dying...
- CHECK A PULSE
 - Respiratory arrest
 - Symptomatic bradycardia/ cardiopulmonary failure
 - Pulseless arrest
 - Asystole
 - PEA
 - Vfib/pulseless ventricular tachycardia



Bradydysrhythmias

- HR < 60
 - Poor Perfusion
 - Usually related to poor oxygenation
 - Airway related
 - Cardiopulmonary failure
 - Conduction issues, vagal
- Tx: ABC's- **CPR!!** If HR< 60 w/ poor perfusion



Pulseless Arrest

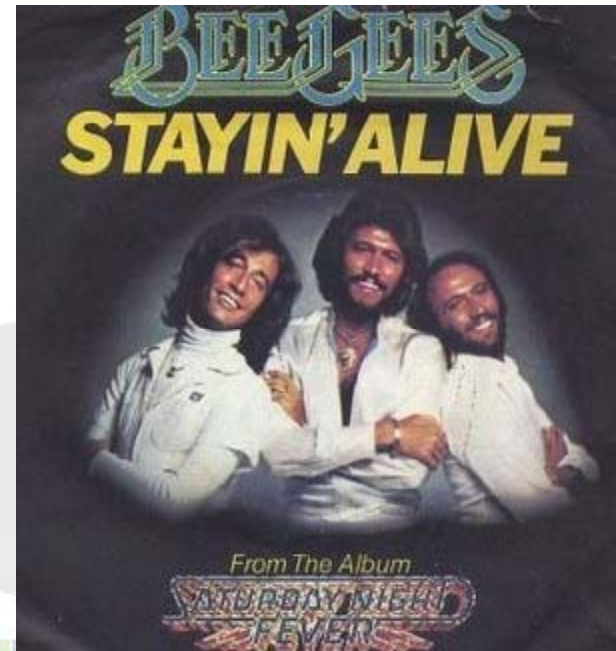
Cardiopulmonary Failure

- Start good, effective CPR
 - 15:2 (two HCP)
 - Gentle chest rise, DO NOT OVERVENTILATE
 - Compressions $\frac{1}{3}$ – $\frac{1}{2}$ diameter of chest, allow full recoil, rate 100, good compression pulse
 - First line drug of choice in ALL pulseless arrest: **EPI**



Adequate CPR ?

- Good technique
- Good compression pulses

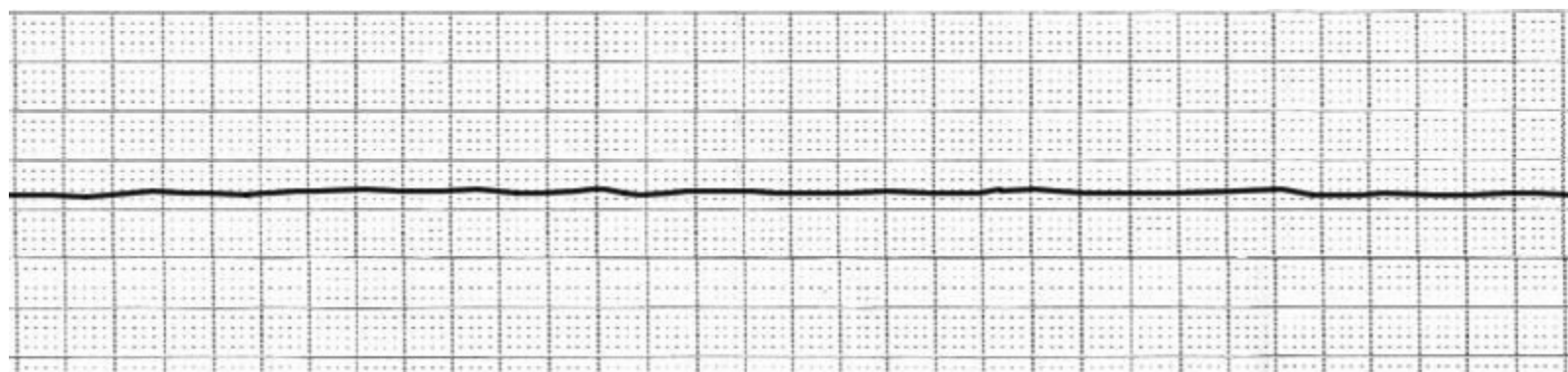


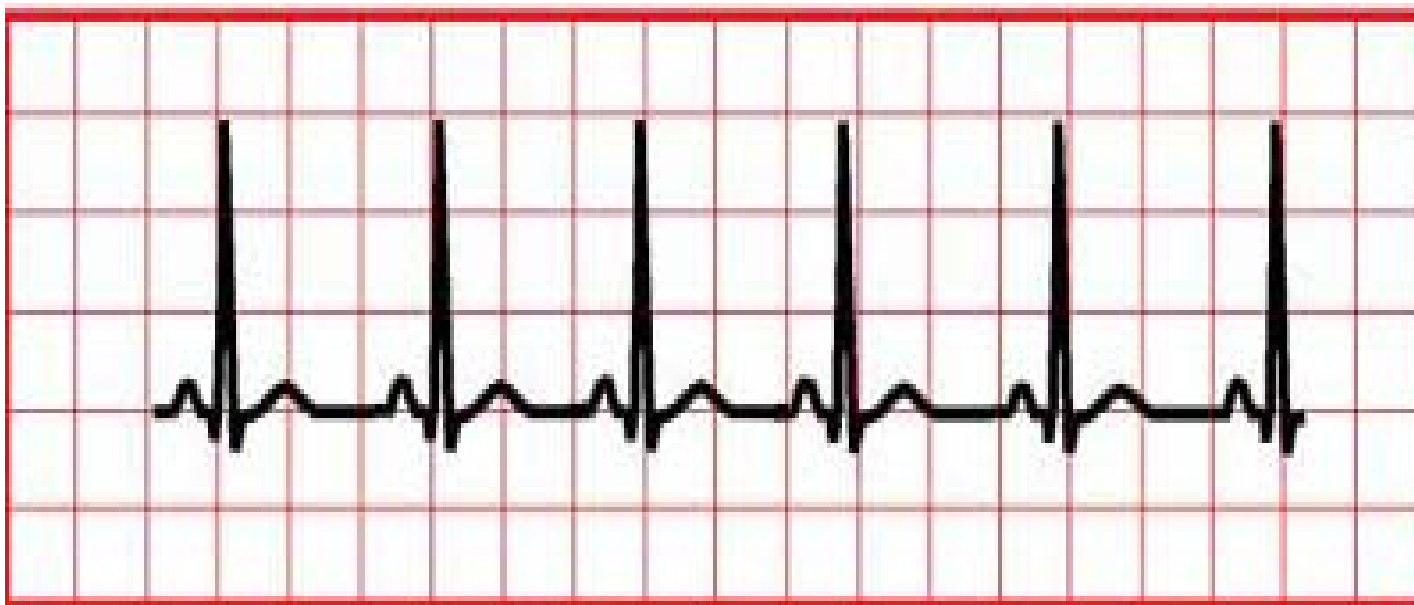


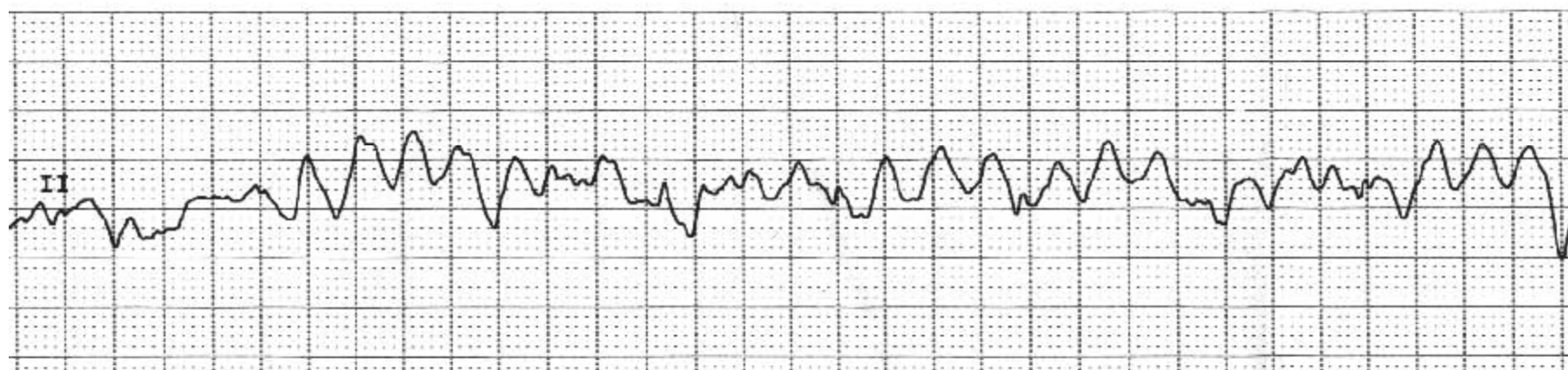
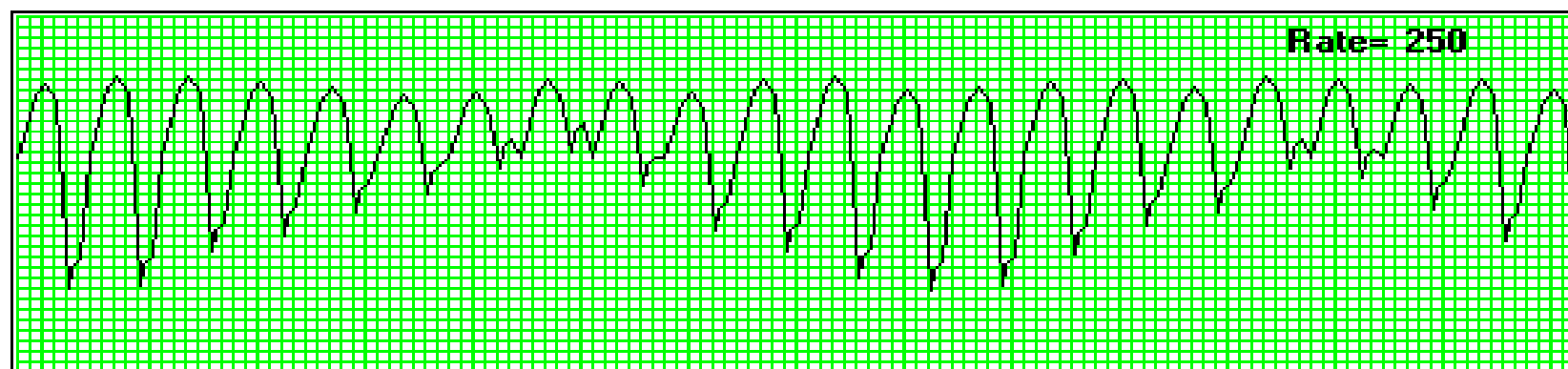
Pulseless

- **Asystole**
 - CPR, Epi
- **PEA**
 - CPR, Epi, tx cause
- **VF/ VT**
 - Defib 2j-4/kg (cont CPR during charge)
 - CPR 2 mins (despite change in rhythm)
 - 4+ j/kg
 - CPR
 - Epi (repeat q 3-5 min)
 - CPR













Practice

- Dispatched to an apartment for infant “not feeding right”
- Upon arrival you find the scene is safe...
- Infant is in the crib & the care taker states she has had vomiting and diarrhea for 2 days now. No PO intake in the last few hours.
 - Concerns?





General Impression:

Pale

Gasping

Lethargic

Patient priority ?

Resources?

Assessment priority?





C A B

- **C**irculation: Pale, cool skin, bradycardiac with weak central, no distal pulses
- **A**irway: Patent
- **B**reathing: Ineffective

CHECK A PULSE!!!!!!!!!!!!
Physiologic status?





CardioPulmonary Failure !

- Priorities:
 - C- Pt is bradycardiac and poorly perfused
 - START CHEST COMPRESSIONS!
 - A
 - Second HCP: open airway and begin
 - B
 - BVM 15:2 with 100%





- With BVM, HR returns
 - Now, switching to ABC assessment:
 - Pt is Allowing BVM (LOC??)
 - BBS clear and = (rate of ventilation with ROSC?)
 - HR 180, CRT > 4 sec's, cool from knees down

Physiologic status?

Priorities?





SHOCK!

- Severity:
 - Hypotensive
- Etiology:
 - Hypovolemic
- Treatment
 - ABC's and VOLUME!
- Reassessment after initial volume:
 - Lethargic
 - Spontaneous RR: 40, BBS clear & =
 - » HR 170, CRT > 4 sec's



Case Scenario #2

- Called to the home for an infant who is blue and not breathing.... CPR in progress
- Thoughts?





- AOS and escorted to the nursery where a mom is sitting, rocking her baby...

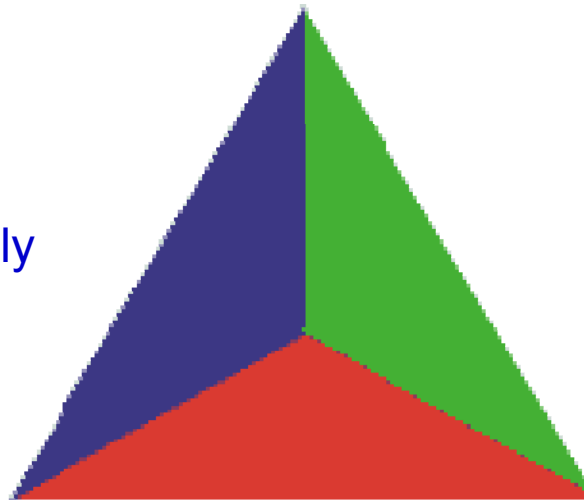




Pediatric Assessment Triangle:

Appearance

Resting comfortably



Circulation to Skin

Pink, well-perfused

Work of Breathing

No retractions or abnormal airway sounds





A L T E

- Apparent life threatening event...
- Combination of....
 - Frightening experience
 - Apnea
 - Colour change
 - Change in muscle tone
 - Choking or gagging





Epidemiology

- 1-2% infants < 2 years, most 2-3 months
- Almost 1/2 infants who looked fine to EMS were dx later in ED with..
- Dx after event
 - GI
 - Unknown
 - Neurologic
 - Respiratory
- 1-38% death rate after event



- There may be a serious underlying cause for the ALTE, and field assessment is difficult, parental anxiety may be high-
- Transfer all infants with an ALTE event to the ED





Maryland Protocol: ALTE



The Maryland
Medical Protocols
for Emergency Medical Services Providers

Effective September 1, 2006
With Jurisdictional Implementation by January 1, 2007.

Maryland Institute for
Emergency Medical Services Systems

D. APPARENT LIFE-THREATENING EVENT (ALTE)



1. Initiate General Patient Care.

2. Presentation

An episode in an infant or child less than 2 years old that is frightening to the observer and is characterized by some combination of the following:

- a) Apnea (central or obstructive)
- b) Skin color change: cyanosis, erythema (redness), pallor, plethora (fluid overload)
- c) Marked change in muscle tone
- d) Choking or gagging not associated with feeding or a witnessed foreign body aspiration



Maryland Protocol: ALTE

3. Treatment

- a) Perform an initial assessment utilizing the Pediatric Assessment Triangle.
- b) Obtain a description of the event including nature, duration, and severity.
- c) Obtain a medical history with emphasis on the following conditions:
 - (1) Known chronic diseases
 - (2) Evidence of seizure activity
 - (3) Current or recent infections
 - (4) Gastroesophageal reflux
 - (5) Recent trauma
 - (6) Medications (current or recent)
- d) Apply Oxygen.
- e) Be prepared to assist with ventilation if this type of episode occurs again during transport.
- f) Assess environment for possible causes.



- g) Place patient on cardiac monitor.
- h) Consider initiating an IV/IO of LR KVO.



Maryland Protocol: ALTE



MOST PATIENTS WILL APPEAR STABLE AND EXHIBIT A NORMAL PHYSICAL EXAM UPON ASSESSMENT BY RESPONDING FIELD PERSONNEL. HOWEVER, THIS EPISODE MAY BE THE SIGN OF UNDERLYING SERIOUS ILLNESS OR INJURY. FURTHER EVALUATION BY MEDICAL STAFF IS REQUIRED AND IT IS ESSENTIAL TO TRANSPORT ALL PATIENTS WHO EXPERIENCED ALTE.



IF THE PARENT OR GUARDIAN REFUSES MEDICAL CARE OR TRANSPORT, PROVIDER SHALL CONTACT A PEDIATRIC BASE STATION PHYSICIAN.



Summary

- Develop a rapid systematic approach to the pediatric patient- beginning with the initial impression
- Decide immediately based on that initial impression if this is a **C A B** or an **A B C** primary assessment
- Begin rescue treatment based on the whether you assign the CAB or ABC track for assessment
- Always evaluate the response to your interventions for its effectiveness
- Practice assessing well children!
- Any infant with an ALTE should be seen in the Emergency Department



THANKS to....

Dr. Lou Roming

- Miami Children's
 - Pediatric Emergency Medicine
 - Medical Director NAEMT
 - Medical Advisor to Miami Dade Fire Rescue
 - and so much more!*

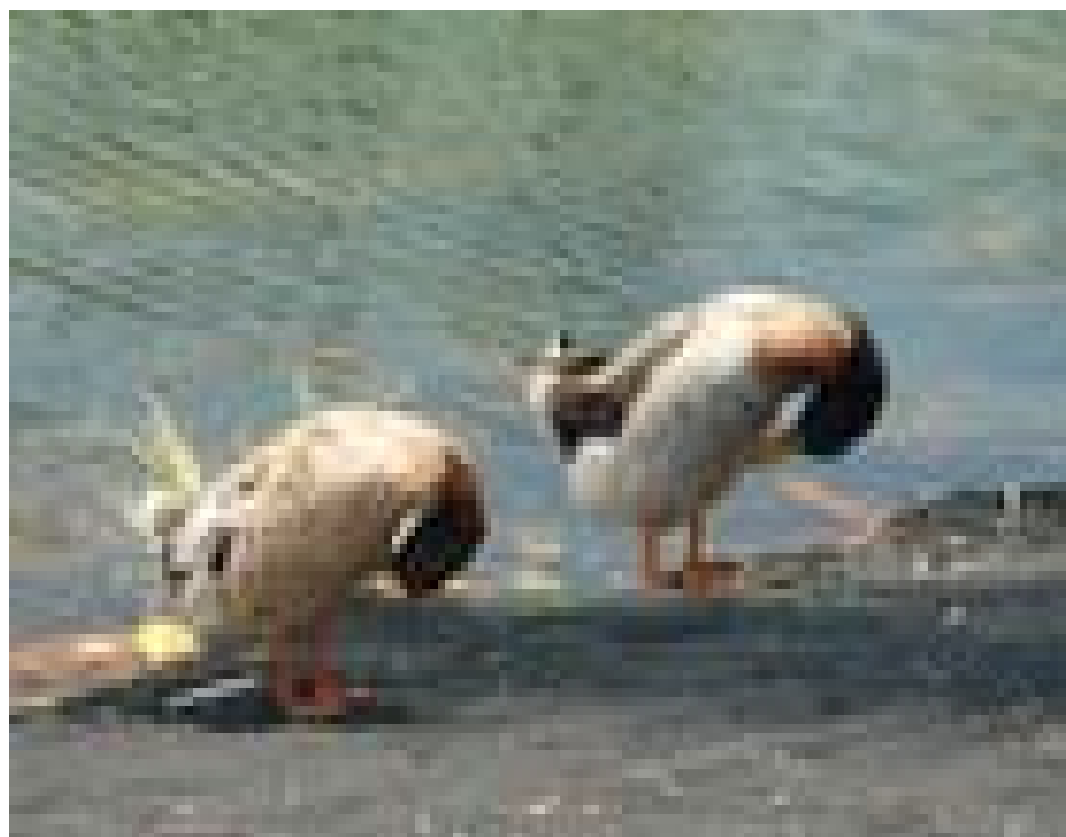
www.jumpstarttriage.com







Thank You



dlynn@cnmc.org