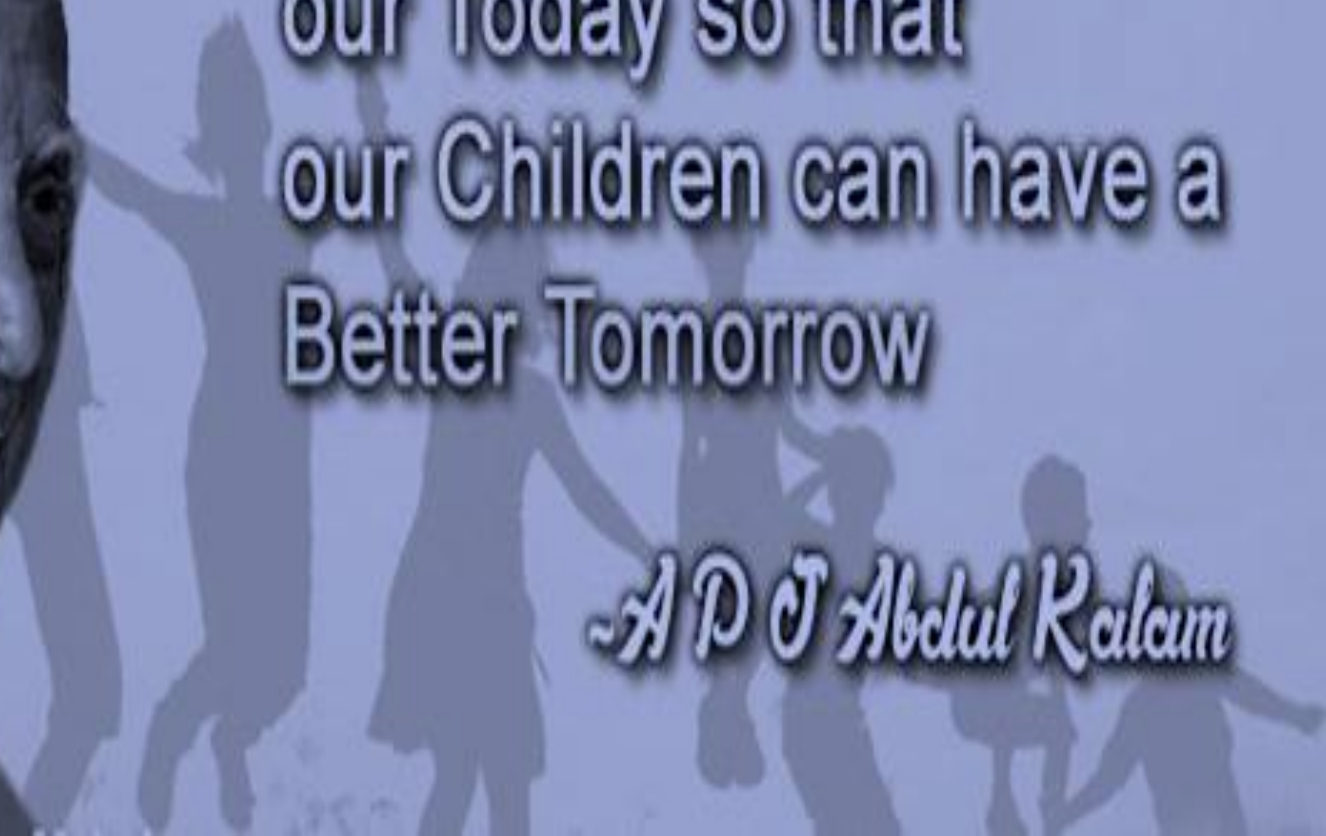






Let us Sacrifice
our Today so that
our Children can have a
Better Tomorrow

A P J Abdul Kalam





MMHRC Institute of Emergency Medicine

Former President of India Honorable Shri Dr. A. P. J. Abdul Kalam



Meenakshi Mission Hospital & Research Centre , Madurai



Meenakshi Temple

Historic Hindu Temple, built at 14th Century AD

Resuscitation of a Sick Child



Dr. Narendra Nath Jena

National General Secretary- Society for Emergency Medicine, India (SEMI)

Honorary National Professor – IMA CGP

Director , Institute of Emergency Medicine

Meenakshi Mission Hospital & Research Centre, Madurai, India



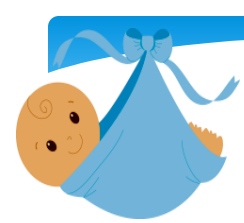
Target . . .

- ✦ To recognize the acutely ill children in a Systematic way.
- ✦ How PALS approach is different from traditional approach?
- ✦ Pathophysiology of cardiac arrest in children.
- ✦ Differentiate between patients who do and do not require immediate intervention.



Adult Vs Children





Anatomical Differences

- Big head (especially occiput)
- Short neck
- Big tongue
- “Floppy” epiglottis
- Adeno-tonsillar hypertrophy 3 – 8yr
- Narrow airway - Flow proportional R^4



Physiological Differences



Respiratory Rate



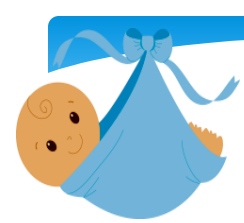
Heart rate



Blood Pressure



Ability to Compensate



Cardiac arrest

Adults

Primary cardiac event → sudden onset → revival and survival outcome better

Children

Usually secondary to hypoxia and shock → gradual onset → revival and outcome poor

Early recognition & timely intervention is the key

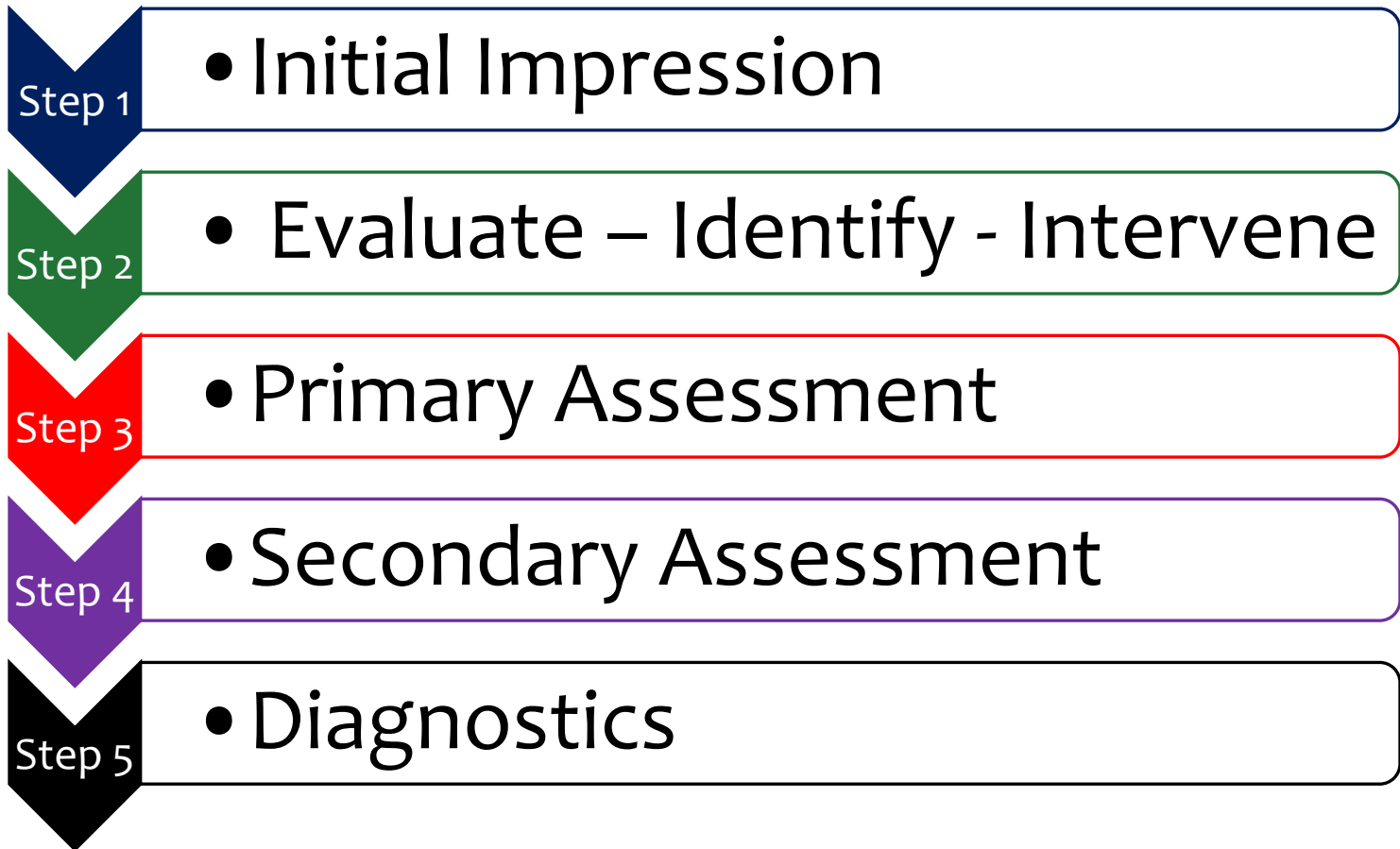


Overview



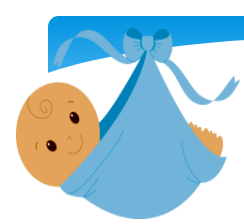


Overview



Initial Impression

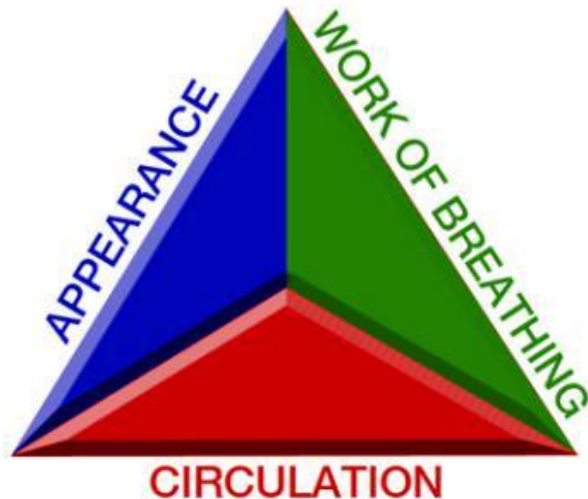




Initial Impression

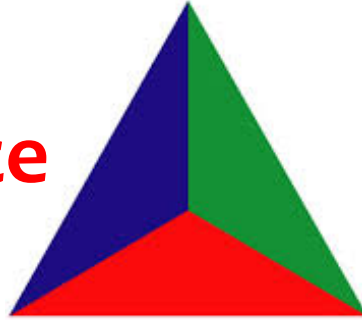
First quick look from the doorway

Pediatric Assessment Triangle





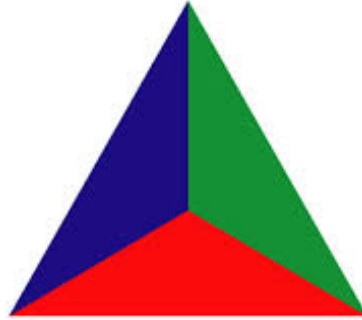
Appearance



TIC- LS

- ⊕ Tone
- ⊕ Interactiveness
- ⊕ Consolability
- ⊕ Look/stare/gaze
- ⊕ Speech/Cry





Breathing

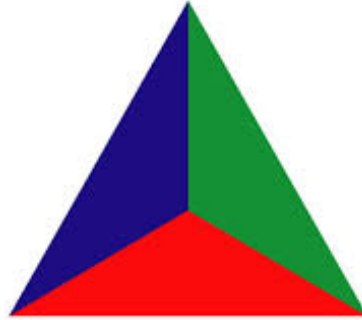
- ⊕ Work of breathing
- ⊕ Increased / Decreased / Absent breath sounds
- ⊕ Abnormal Sounds





Evaluation of Work of Breathing

	<i>Normal</i>	<i>Abnormal</i>
<i>Respiratory effort</i>	<ul style="list-style-type: none">• Regular breathing• Passive expiration	<ul style="list-style-type: none">• Nasal flaring• Accessory muscle use• Inadequate or absent respiratory effort
<i>Lung and airway sounds</i>	<ul style="list-style-type: none">• No abnormal sounds	<ul style="list-style-type: none">• Noisy breathing (wheeze or grunt or stridor)



Circulation



- ⊕ Pallor / Mottling / Cyanosis
- ⊕ Petechiae or purpura
- ⊕ Bleeding wounds

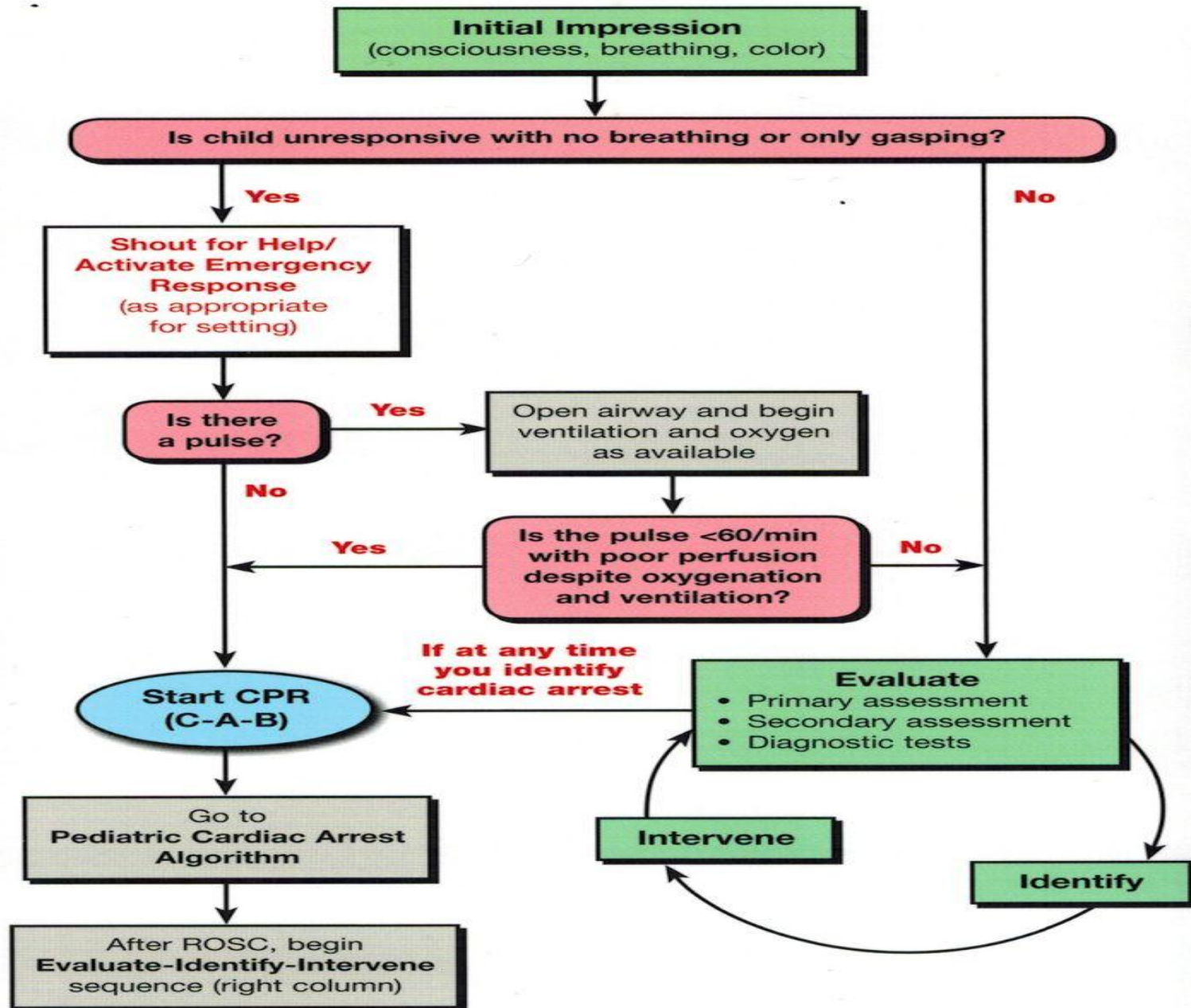




Evaluation of Skin & Mucous Membrane

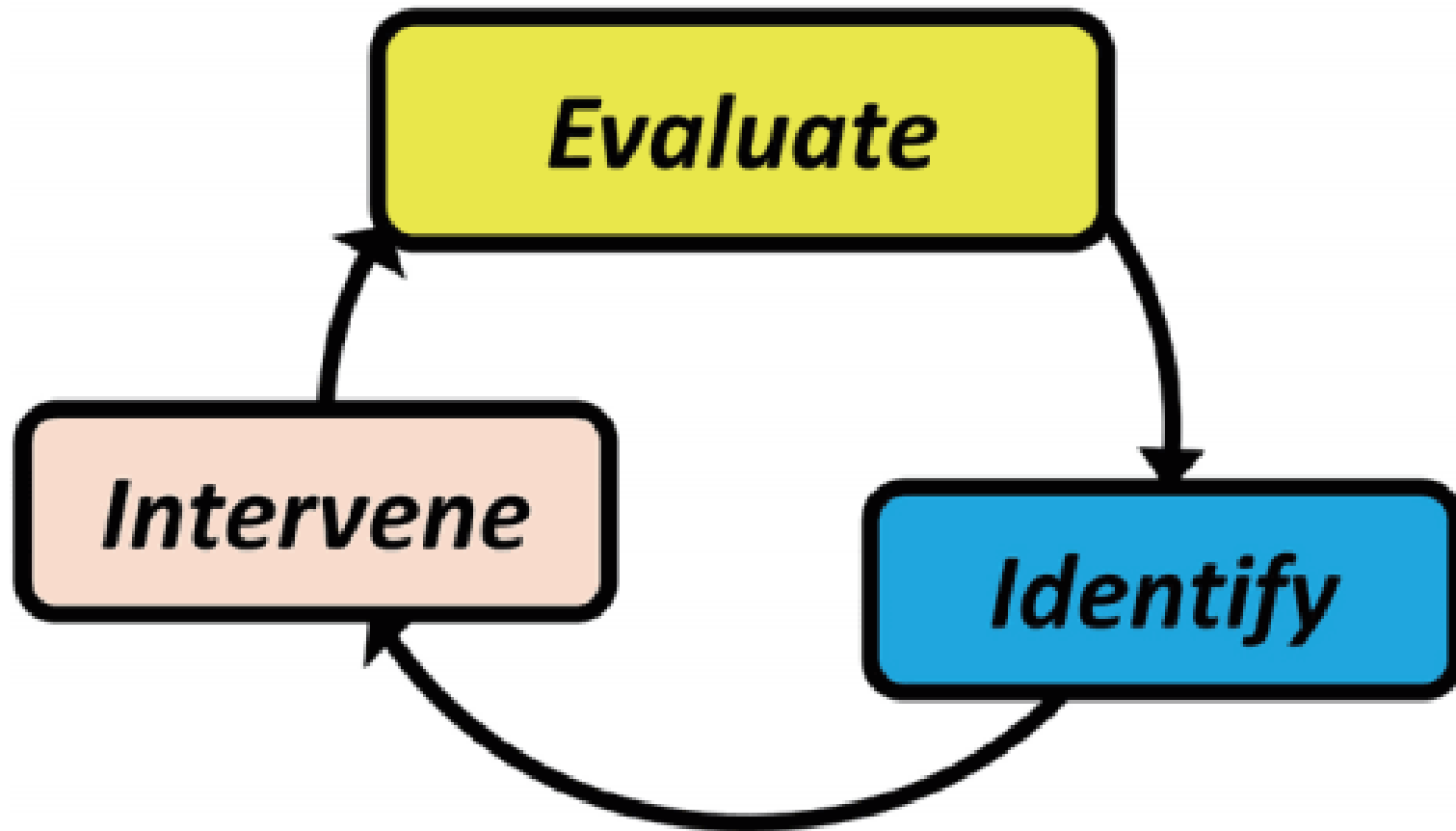
	Normal	Abnormal
<i>Skin Color</i>	<ul style="list-style-type: none">• Appears normal	<ul style="list-style-type: none">• Pallor• Mottling• Cyanosis
<i>Petechiae or Purpura or Visible bleeding wounds</i>	<ul style="list-style-type: none">• Not normal	<ul style="list-style-type: none">• Obvious significant bleeding.• Bleeding within the skin

PALS Systematic Approach Algorithm



Evaluate - Identify - Intervene





At any point → life-threatening problem → life saving interventions



Evaluate . . .

If no life threatening condition – evaluate the child's condition by using the clinical assessment tools.

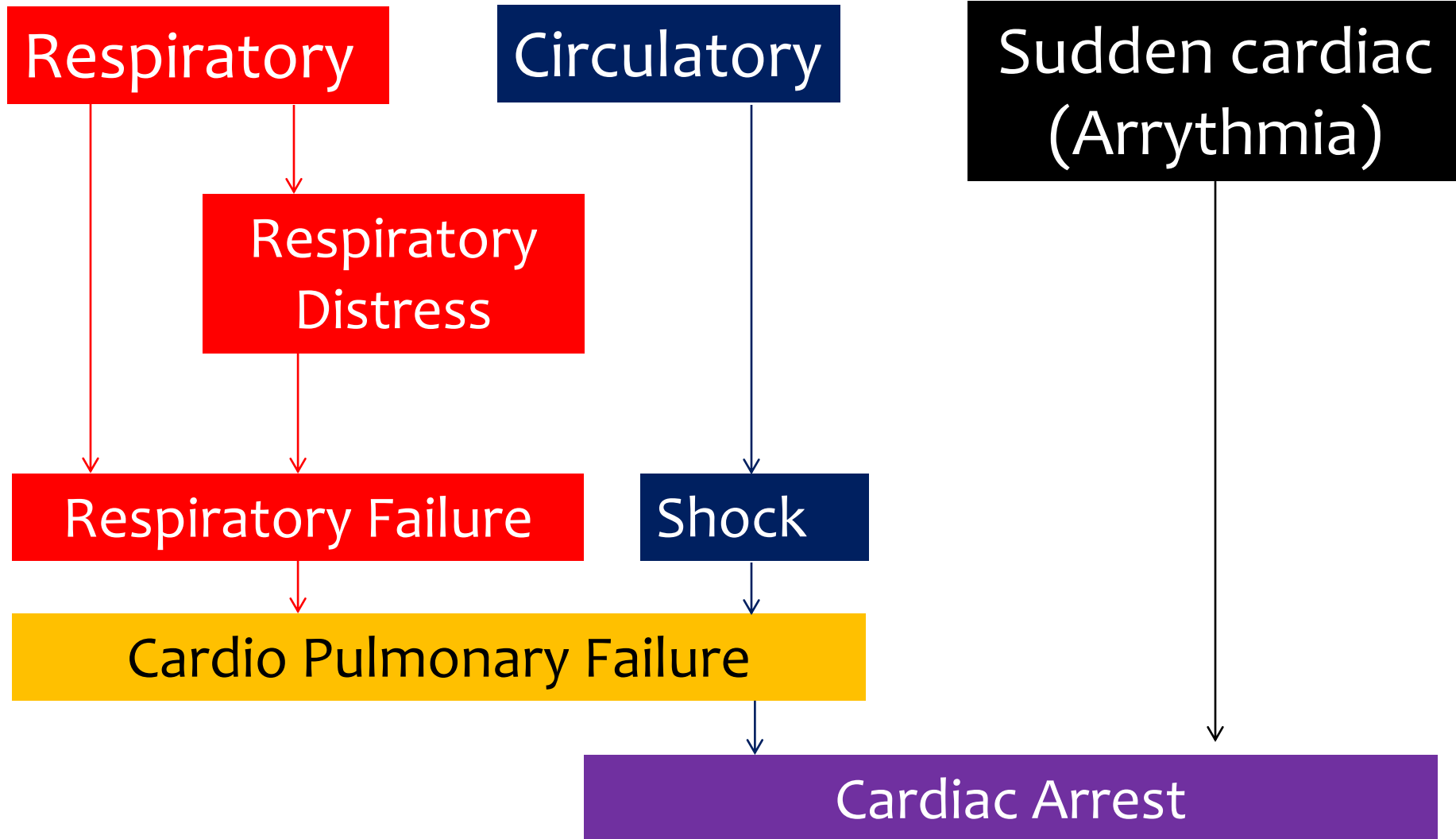
**Primary
Assessment
ABCDE approach**

**Secondary
Assessment**

**Diagnostics
Assessments**



Identify - Life Threatening Conditions





Type & Severity of Respiratory Problems

	Type	Severity
Respiratory	<ul style="list-style-type: none">• Upper Airway obstruction.• Lower Airway obstruction.• Lung tissue disease.• Disordered Control of breathing	<ul style="list-style-type: none">• Respiratory distress.• Respiratory failure.



Type & Severity of Cardiac Problems

	Type	Severity
Circulatory	<ul style="list-style-type: none">• Hypovolemic shock• Distributive shock.• Cardiogenic shock• Obstructive shock	<ul style="list-style-type: none">• Compensated shock• Uncompensated shock



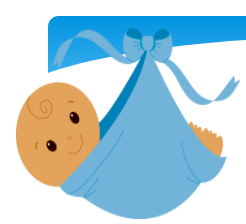
Intervene . . .

On the basis of identification of child's condition

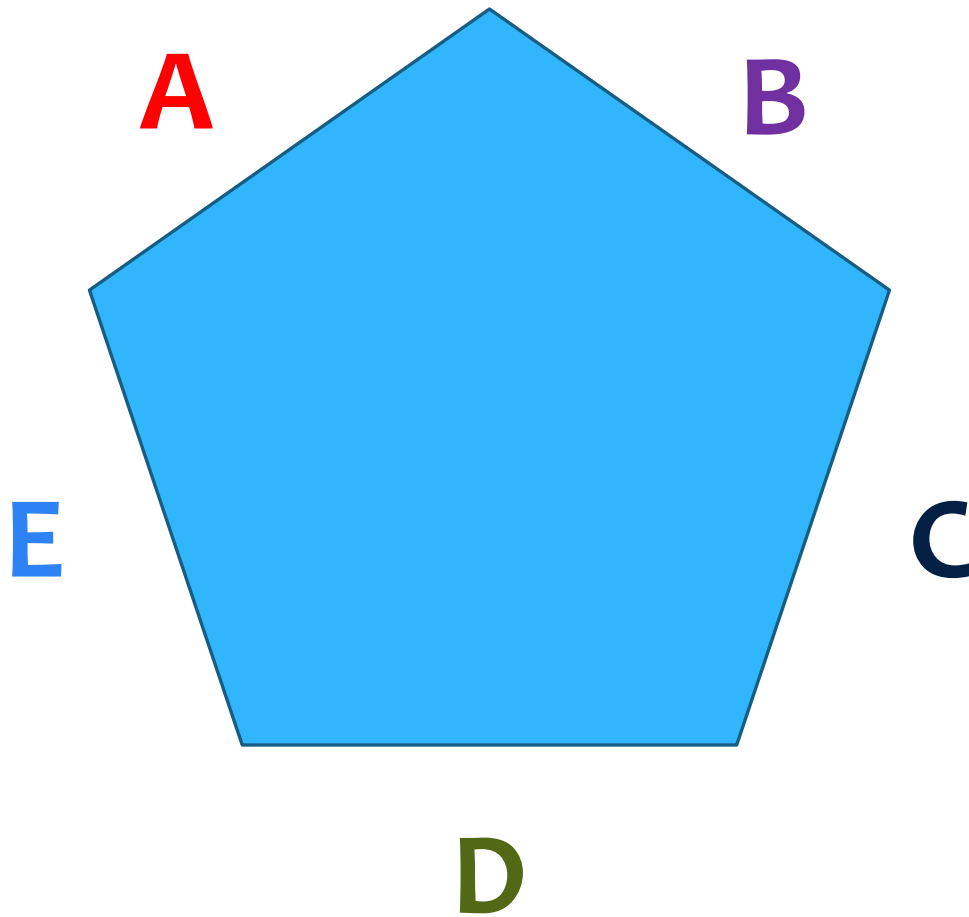
- ✦ Position the child to maintain an open / patent airway.
- ✦ Activating Emergency response system
- ✦ Starting CPR
- ✦ Obtaining the code cart and monitor
- ✦ Administering O₂
- ✦ Supporting ventilation
- ✦ Starting medication

Primary Assessment

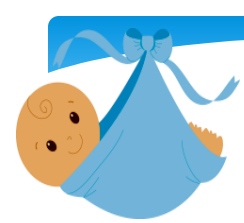




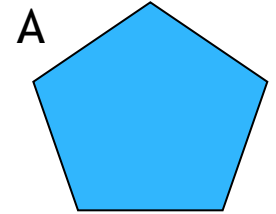
Primary Assessment



- ⊕ Airway
- ⊕ Breathing
- ⊕ Circulation
- ⊕ Disability
- ⊕ Exposure



Airway



Look for the movement of chest or the abdomen

Listen for the air movement and breath sounds

Categorize :

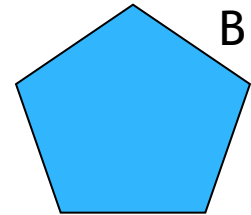
Clear : *Open & unobstructed*

Maintainable : *Maintainable by simple measures*

Non Maintainable : *Needs advanced measures*



Breathing



1. Respiratory rate
2. Respiratory effort
3. Chest wall expansion and air movement
4. Lung and airway sounds
5. Pulse oximetry



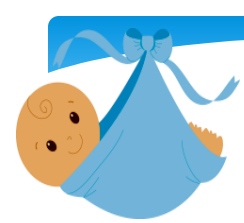
Respiratory rate

- * Increased RR than age specific- Tachypnea
- * Tachypnea is the first sign of respiratory distress
- * Bradypnea is more ominous than tachypnea
- * A fall in respiratory rate should always be evaluated along with changes in sensorium
- * Beware of RR above 60 or below 10 at any age group



Respiratory efforts

- * **Nasal Flaring**
- * **Retractions**
 - * Mild to moderate – subcostal, sub-sternal, intercostal
 - * Severe distress – supra-sternal, supraclavicular.
 - * Retractions associated with
 - * *Stridor* seen in UAO
 - * *Wheeze* seen in LAO
 - * *Grunting* seen in lung tissue disease



Respiratory efforts

- * **Sea-saw respirations**

- * Often seen in infants with neuromuscular incoordination

- * Chest wall expansion and air movement

- * **Lung and airway sounds**

- * *Stridor / Grunting / Gurgling / Wheeze / Crackles*



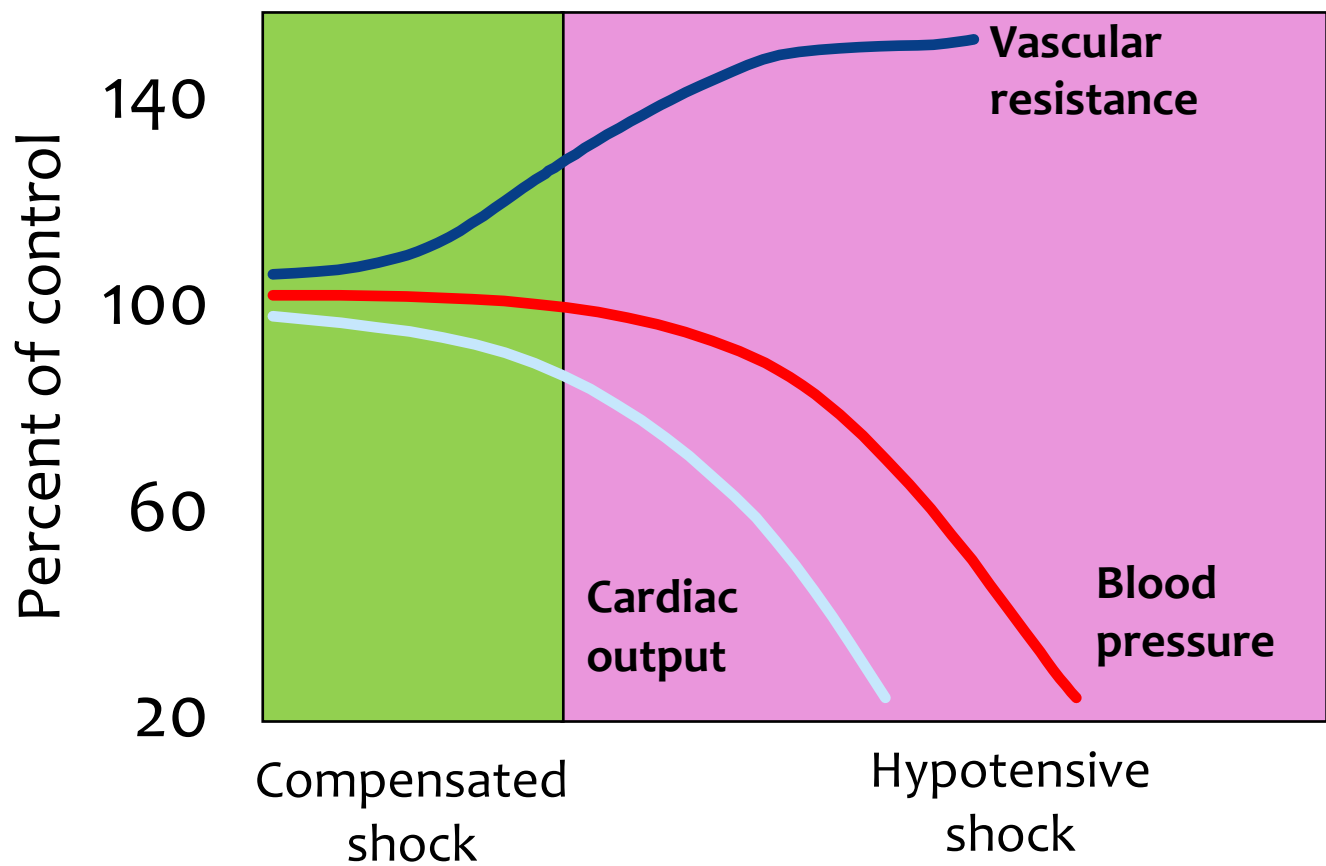
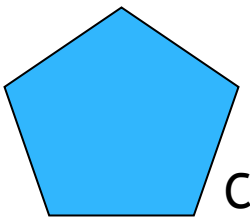
Pulse oximetry

- * Detects low O₂ saturation before clinically apparent cyanosis/ bradycardia
- * SpO₂ > 94% in RA - adequate oxygenation





Circulation

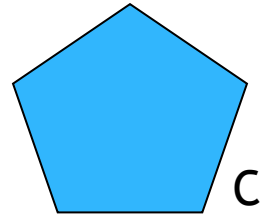


Hemodynamic Response to Shock



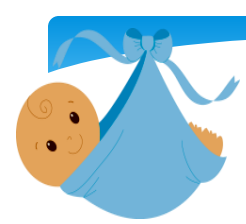
Circulation

1. Heart rate and rhythm
2. Peripheral and central pulses
3. Capillary refill time
4. Skin color and temperature
5. Blood pressure



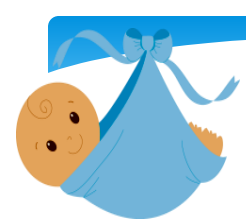
END ORGAN PERFUSION

- | | |
|-------------------------------|-------------------------------|
| – <i>Sensorium</i> | - <i>Brain perfusion</i> |
| – <i>Urine output</i> | - <i>Renal perfusion</i> |
| – <i>Skin color & CRT</i> | - <i>Peripheral perfusion</i> |



Palpation of Central and Distal Pulses





Capillary refill

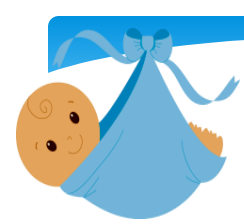




Blood pressure

Definition of Hypotension

<i>Age</i>	<i>Systolic BP (mm Hg)</i>
<i>Term Neonates (0-28 days)</i>	<i>< 60</i>
<i>Infants (1-12 months)</i>	<i>< 70</i>
<i>Children 1-10 yrs</i>	<i>$70 + (age \times 2)$</i>
<i>Children > 10 yrs</i>	<i>< 90</i>
<i>Hypotension with hemorrhage: > 20-25% acute blood loss.</i>	



Signs of circulatory compromise



Capillary refill



Peripheral - central temperature difference skin colour



Level of consciousness



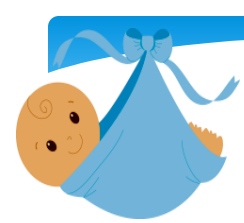
Poor or absent peripheral pulses



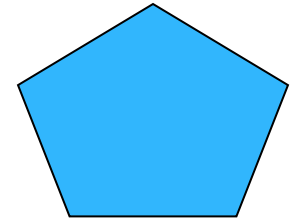
Urine output



Blood pressure



Disability



D

- * Quick evaluation of neurological function
- * Cortical functions

AVPU response scale / GCS score

- * Brain stem function

Pupillary equality, size, and response to light



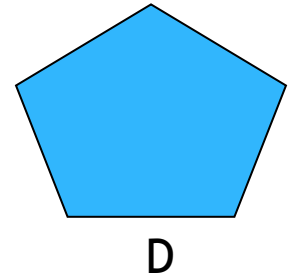
Disability

A - **A**wake

V - responds to **V**erbal stimuli

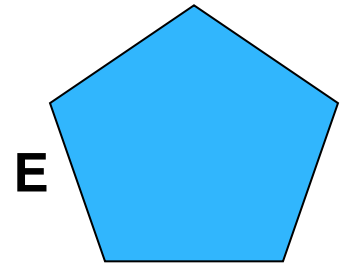
P - responds to **P**ainful stimuli

U - **U**nresponsive





Exposure



E

- * Undress as appropriate, avoid exposure to cold environment
- * Look for deformities / bruises / bleeds
- * Take care of cervical spine in case of injuries
- * Record core temperature and take corrective measures for temperature abnormalities, if detected



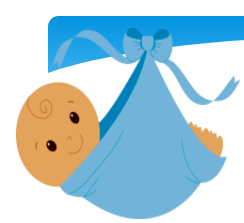
Respiratory Dysfunction By Severity

Respiratory Distress

- Tachypnea
- Tachycardia
- Increased respiratory effort
- Abnormal airway sounds
- Pale cool skin
- Changes in mental status

Respiratory Failure

- (Early) Marked tachypnea, (Late) Bradypnea, Apnea
- Bradycardia
- Increased/decreased/no respiratory effort
- Cyanosis
- Stupor/coma



Respiratory Dysfunction By Type

- * Upper airway obstruction
- * Lower airway obstruction
- * Parenchymal lung disease
- * Disordered control of breathing



Circulatory Dysfunction By Severity

Compensated

- Tachycardia
- Cool pale diaphoretic skin
- Delayed CRT
- Weak peripheral pulses
- Narrow pulse pressure
- Oliguria

Hypotensive

- BP below 5th centile
- Change in mental status

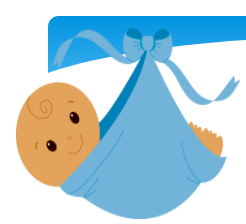


Cardiac Dysfunction By Type

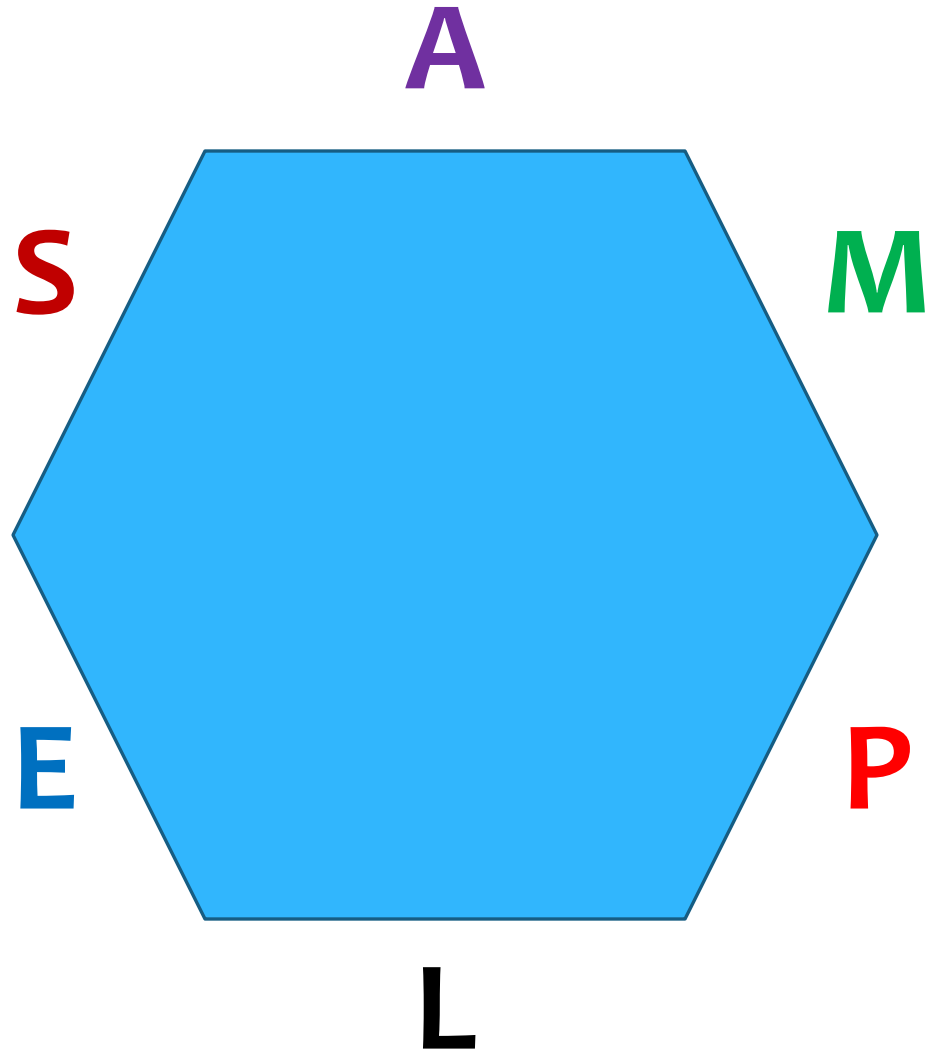
- * Cardiogenic shock
- * Hypovolemic shock
- * Obstructive shock
- * Distributive shock

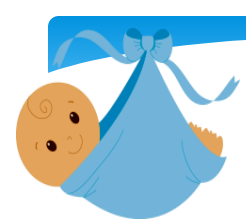
Secondary Assessment





Secondary Assessment





Signs & Symptoms

Allergies

Medications

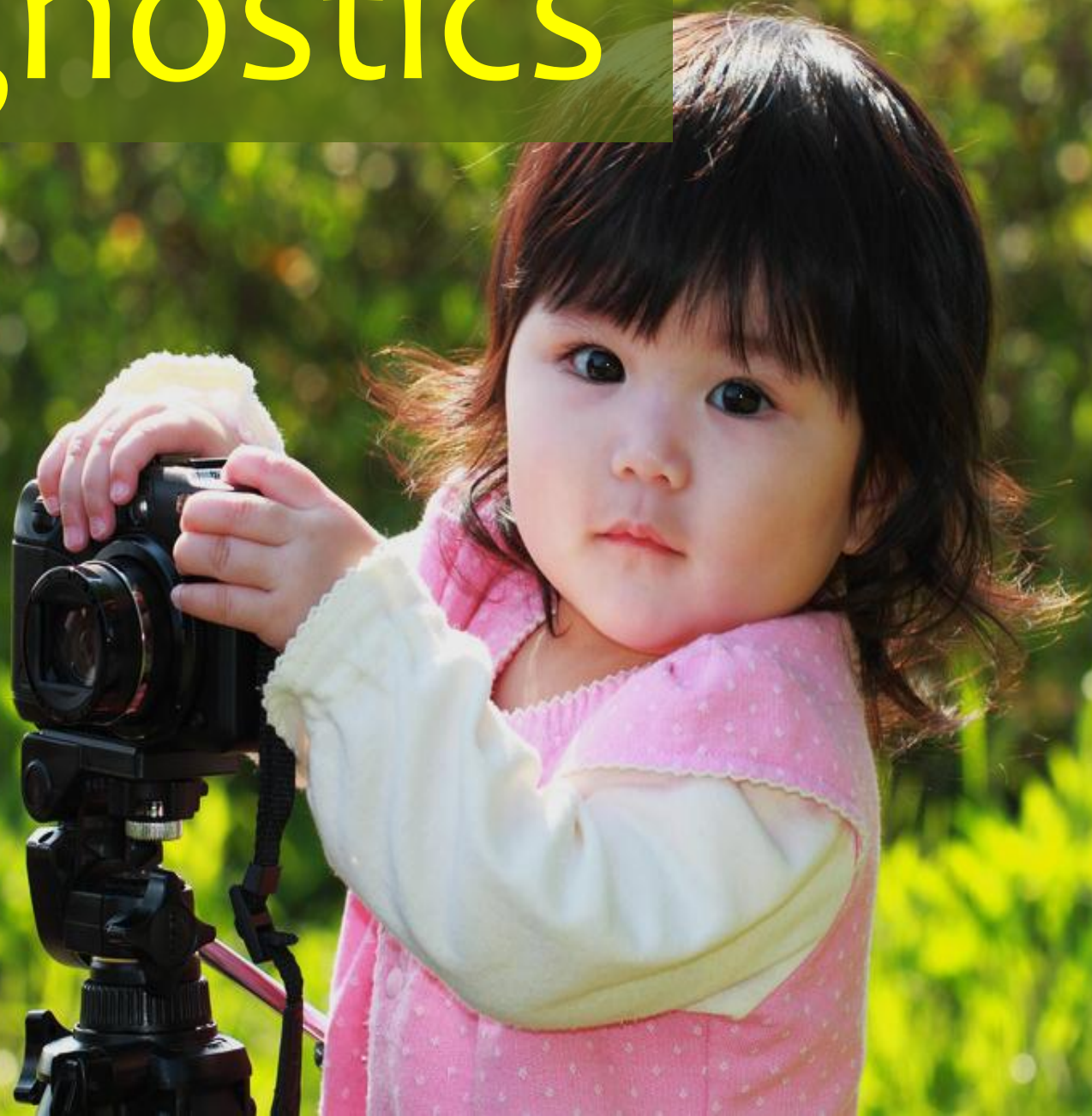
Past Medical History

Last Meal

Events

SAMPLE

Diagnostics





Diagnostic Assessments to assess Respiratory & Circulatory problems

ABG

VBG

CBG

Hemoglobin

Lactate

**Central Venous
Pressure
Monitoring**

**Invasive Arterial
Pressure
Monitoring**

**Chest
Xray**

ECG

Echocardiogram

PEFR

**Central Venous
O₂ saturation**

Take Home Message





To Summarize...

- * Approach - **E - I - I** approach
- * Evaluation -

Initial Impression

A-B-C

Primary Assessment

A-B-C-D-E

Secondary Assessment

S-A-M-P-L-E

At any point → life-threatening problem → life saving interventions

Evaluate and manage first , diagnose later



A Way Ahead



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YOU

March
of
Dimes

The
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