The Pediatric Assessment Triangle

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Presentation Overview

- 1. Pediatric developmental stages
- 2. Pediatric anatomical and physiological differences
- 3. The pediatric assessment triangle
- 4. MI Medic card and Broselow tape overview
- 5. Case studies
<table>
<thead>
<tr>
<th>Stages of Development</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensorimotor</strong></td>
<td>(0–2 years)</td>
</tr>
<tr>
<td><strong>Preoperational</strong></td>
<td>(2–6 years)</td>
</tr>
<tr>
<td><strong>Concrete operational</strong></td>
<td>(6–12 years)</td>
</tr>
<tr>
<td><strong>Formal operational</strong></td>
<td>(12 years–adult)</td>
</tr>
</tbody>
</table>
Pediatric Anatomic and Physiological Variances

- **Airway**
  - Tongue is disproportionately larger
  - The airway is narrower and less stable
  - A much higher likelihood for obstruction
  - *Infants breathe mainly through their nose during the first month of life*
Pediatric Anatomic and Physiological Variances

- **Respiratory System**
  - Tidal volume is proportionately smaller while metabolic oxygen demands are almost double than what’s required for an adult.
  - Pediatric patients have a smaller residual capacity, with less oxygen on reserve hypoxia can develop more rapidly.
  - Pediatric patients are diaphragmatic breathers
**Pediatric Anatomic and Physiological Variances**

- **Cardiovascular System**
  - In infants and small children, cardiac output is rate dependent. Therefore, suspect shock with tachycardia.
  - Shock is a late sign in pediatrics. They are able to compensate longer.
  - \( \text{CO} = \text{HR} \times \text{SV} \)
Let’s discuss the meaning behind this equation.
Pediatric Anatomic and Physiological Variances

- **Nervous System**
  - The spinal column is more pliable resulting in excessive spinal mobility.
  - Fontanels remain open after birth, increasing the risk for trauma to the brain.
Pediatric Anatomic and Physiological Variances

- **Abdomen**
  - The organs of the abdomen are much closer together and less protected.
  - The liver and spleen are proportionately larger and more susceptible to injury.
Pediatric Anatomic and Physiological Variances

- **Extremeties**
  - Bone growth is prominent, epiphyseal plates (growth plates) are present.
  - Bones are softer and more porous
Skin and Body Surface Area

- Skin in children is thinner and more elastic.
- Children under 2 have less subcutaneous fat.
- There is a larger body surface area to body mass ratio.
- Increased risk for hypo/hyperthermia
Pediatric Anatomic and Physiological Variances

- **Metabolic**
  - Pediatric patients have limited glycogen and glucose stores
  - Volume loss from vomiting and diarrhea can happen quickly
  - Pediatric patients have a limited capacity to sweat or shiver to regulate body temperature.
The Pediatric Assessment Triangle

**Appearance**
- Abnormal Tone
- ↓ Interactiveness
- ↓ Consolability
- Abnormal Look/Gaze
- Abnormal Speech/Cry

**Work of Breathing**
- Abnormal Sounds
- Abnormal Position
- Retractions
- Flaring
- Apnea/Gasping

**Circulation to Skin**
- Pallor
- Mottling
- Cyanosis
# Normal Pediatric Vital Signs

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Respiratory Rate</th>
<th>Heart Rate</th>
<th>Systolic Blood Pressure</th>
<th>Weight in kilos</th>
<th>Weight in pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn</td>
<td>30 - 50</td>
<td>120 - 160</td>
<td>50 - 70</td>
<td>2 - 3</td>
<td>4.5 - 7</td>
</tr>
<tr>
<td>Infant (1-12 months)</td>
<td>20 - 30</td>
<td>80 - 140</td>
<td>70 - 100</td>
<td>4 - 10</td>
<td>9 - 22</td>
</tr>
<tr>
<td>Toddler (1-3 yrs.)</td>
<td>20 - 30</td>
<td>80 - 130</td>
<td>80 - 110</td>
<td>10 - 14</td>
<td>22 - 31</td>
</tr>
<tr>
<td>Preschooler (3-5 yrs.)</td>
<td>20 - 30</td>
<td>80 - 120</td>
<td>80 - 110</td>
<td>14 - 18</td>
<td>31 - 40</td>
</tr>
<tr>
<td>School Age (6-12 yrs.)</td>
<td>20 - 30</td>
<td>70 - 110</td>
<td>80 - 120</td>
<td>20 - 42</td>
<td>41 - 92</td>
</tr>
<tr>
<td>Adolescent (13+ yrs.)</td>
<td>12 - 20</td>
<td>55 - 105</td>
<td>110 - 120</td>
<td>&gt;50</td>
<td>&gt;110</td>
</tr>
</tbody>
</table>
# Modified Glasgow Coma Scale for Infants and Children

<table>
<thead>
<tr>
<th></th>
<th>Child</th>
<th>Infant</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye opening</strong></td>
<td>Spontaneous</td>
<td>Spontaneous</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>To speech</td>
<td>To speech</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>To pain only</td>
<td>To pain only</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>No response</td>
<td>1</td>
</tr>
<tr>
<td><strong>Best verbal response</strong></td>
<td>Oriented, appropriate</td>
<td>Coos and babbles</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Confused</td>
<td>Irritable cries</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Inappropriate words</td>
<td>Cries to pain</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Incomprehensible sounds</td>
<td>Moans to pain</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>No response</td>
<td>1</td>
</tr>
<tr>
<td><strong>Best motor response</strong></td>
<td>Obey commands</td>
<td>Moves spontaneously and</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Localizes painful stimulus</td>
<td>purposefully</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Withdraws in response to pain</td>
<td>Withdraws to touch</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Flexion in response to pain</td>
<td>Withdraws to response in pain</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Extension in response to pain</td>
<td>Abnormal flexion posture to pain</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>Abnormal extension posture to pain</td>
<td>1</td>
</tr>
</tbody>
</table>

*If patient is intubated, unconscious, or preverbal, the most important part of this scale is motor response. Motor response should be carefully evaluated.*
Pediatric Patient Assessment

- Airway and breathing
- Circulation
- Transition phase
- Focused history
- Secondary assessment
- Reassessment
What’s Challenging About Pediatric Patients?

- Communication barriers depending on age
- They can become unstable very quickly
- We don’t frequently treat pediatric patients
This is an emergency system that groups the child by length in an emergency.

In an non-emergent situation you can also use the Broselow card based on the weight of the child.

Do you know where your Broselow tape is located?

https://www.youtube.com/watch?v=powngrRPrEA
## Purple

<table>
<thead>
<tr>
<th>Dose mg</th>
<th>Infusion:</th>
<th>Volume Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mg</td>
<td>105 mL</td>
<td>1 mg</td>
</tr>
<tr>
<td>2 mg</td>
<td>210 mL</td>
<td>2 mg</td>
</tr>
<tr>
<td>5 mg</td>
<td>105 mL</td>
<td>5 mg</td>
</tr>
<tr>
<td>160 mg</td>
<td>43 mL/HR</td>
<td>160 mg-PE</td>
</tr>
<tr>
<td>160 mg-PE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Infusion:
- Pursuant to JCAHO's National Patient Safety Goal 3b - "Rule of 6" for infusions should be converted to standardized concentrations.

### Fluids

<table>
<thead>
<tr>
<th>FLUIDS</th>
<th>FLUIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.25 g</td>
<td>1 mg</td>
</tr>
<tr>
<td>0.1 mg</td>
<td>0.13 mg</td>
</tr>
<tr>
<td>0.5 mg</td>
<td>0.5 mg</td>
</tr>
<tr>
<td>10 g</td>
<td>13 g</td>
</tr>
<tr>
<td>10 mg</td>
<td>13 g</td>
</tr>
</tbody>
</table>

### Infusion

- Pursuant to JCAHO's National Patient Safety Goal 3b - "Rule of 6" for infusions should be converted to standardized concentrations.

## Yellow

### Seizure

<table>
<thead>
<tr>
<th>SEIZURE</th>
<th>FLUIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3 mg</td>
<td>260 mL</td>
</tr>
<tr>
<td>2.6 mg</td>
<td>130 mL</td>
</tr>
<tr>
<td>6.5 mg</td>
<td></td>
</tr>
<tr>
<td>260 mL</td>
<td></td>
</tr>
<tr>
<td>200 mg</td>
<td></td>
</tr>
<tr>
<td>48 mL/HR</td>
<td></td>
</tr>
</tbody>
</table>

### Overdose

<table>
<thead>
<tr>
<th>OVERDOS</th>
<th>FLUIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5 g</td>
<td>260 mL</td>
</tr>
<tr>
<td>1.3 mg</td>
<td>130 mL</td>
</tr>
<tr>
<td>0.13 mg</td>
<td></td>
</tr>
<tr>
<td>0.5 mg</td>
<td></td>
</tr>
<tr>
<td>13 g</td>
<td></td>
</tr>
</tbody>
</table>

### ICP

- 13 g

### Equipment

- O₂ Mask
- Pediatric NR
- ETCO₂
- Pediatric
- 6 French
- Urinary Catheter
- 8-10 French
- 10 French
- Chest Tube
- 16-20 French
- 1 Straight
- NG Tube
- 8-10 French
- Child
- Vascular Access
- 20-24Ga
- 60 mm
- Intravenous
- 15Ga
- 18 French
- BP Cuff
- Child
- May not be included in Organizer System(s).

- 4.5 Uncuffed
- 13.5 cm
- 6 French
- *ETCO₂
- 10 French
- *Urinary Catheter
- 20-24 French
- *Chest Tube
- 10 French
- NG Tube
- 10 French
- Child
- Vascular Access
- 18-22Ga
- Intravenous
- 15Ga
- BP Cuff
- Child

* Nasopharyngeal Airway
* LMA
MI-MEDIC Dosing and Intervention Cards

- Can be used in conjunction with your Broselow tape.
- When no Broselow tape is available can be used based on the age or weight of the patient
- This is an exceptional resource.
- Do you have MI-Medic cards in your rigs and ED’s?
MI-MEDIC Instructions

Determine the appropriate card to be used based on the following order:
1. Select the card that matches the patient’s weight when known. (Be sure not to confuse pounds and kilograms)
2. Use approved, length-based pediatric resuscitation tape to determine the correct card when weight is unknown.
3. Use the patient’s age to determine the correct card when resuscitation tape is not available, estimating age when unknown.
4. If pediatric patient exceeds length-based tape use Black (Adult) card.

Pediatric Patients (≤14 years old)
1. Select the desired medication or intervention.
2. Assure the medication concentration on-hand is the same as specified on the MI-MEDIC.
3. Administer volume of medication listed at the far right of the card, including dilution amount if necessary.

Adult Patients (>14 years old) – Black Cards
1. Select desired medication or intervention.
2. Assure the medication concentration on-hand is the same as specified on the MI-MEDIC.
3. Administer volume of medication listed at the far right of the card, including dilution amount if necessary.

☑ Some medications should be diluted as described on the card.
☑ Confirm medication dose and volume to be delivered with colleague when possible.
☑ Contact Medical Control for questions or concerns.

Note: Protocols are dynamic and may change based on current science. EMS personnel must be familiar with the most current set of approved protocols which take precedence over the information included in the MI-MEDIC.

FREE TUTORIALS AND CE’S AVAILABLE ON THE MI-MEDIC AT: AmericanCME.com
https://www.michigan.gov/documents/mdhhs/MI-MEDIC_2.0_597134_7.pdf
You are called to the scene of a 3 y.o. patient that is demonstrating DIB and decreased level of consciousness.

Initial assessment reveals cyanosis of the lips. The child is lethargic and cannot keep his eyes open.

Apply what you’ve learned. Let’s walk through this together.
You are called to the scene of a 2 y.o. patient in cardiac arrest. CPR is in progress.

Apply what we’ve learned. Let’s walk through this together.
Any Questions?