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**P1—PEDIATRIC**

**PEDIATRIC PATIENT CARE**

Pediatric patient is defined as age 14 or less. Neonate is 0–1 month. These basic treatment concepts should be considered in all pediatric patients.

### SCENE SAFETY
- **BSI**
  - Use universal blood and body fluid precautions at all times

### SYSTEMATIC ASSESSMENT
- **• Management and support of ABCs are a priority**
- **• Identify pre-arrest states**
- **• Assure open and adequate airway**
- **• Place in position of comfort unless condition mandates other position**
- **• Consider spinal motion restriction if history or possibility of traumatic injury exists**
- **• Assess environment to consider possibility of intentional injury or maltreatment**

### DETERMINE PRIMARY IMPRESSION
- **• Apply appropriate field treatment guidelines**
- **• Explain procedures to family and patient as appropriate**
- **• Provide appropriate family support on scene**

### BASE CONTACT
- **• Contact base hospital if any questions arise concerning treatment or if additional medication beyond dosages listed in treatment guidelines is considered**
- **• Use SBAR to communicate with base**

### TRANSPORT
- **• Minimize scene time in pre-arrest patient, critical trauma, shock or respiratory failure**
- **• Transport patient medications or current list of patient medications to the hospital**
- **• Give report to receiving facility using SBAR**

### MONITORING
- **• At a minimum, vital signs and level of consciousness should be re-assessed every 15 minutes and should be assessed after every medication administration or following any major change in the patient’s condition**
- **• For critical patients, more frequent vital signs should be obtained when appropriate**

### DOCUMENT
- **• Document patient assessment and care per policy**
An Apparent Life-Threatening Event (ALTE) is an event that is frightening to the observer (may think the infant has died) and involves some combination of apnea, color change, marked change in muscle tone, choking, or gagging. It usually occurs in infants less than 12 months of age, though any child with symptoms described under 2 years of age may be considered an ALTE.

Most patients have a normal physical exam when assessed by responding personnel. Approximately half of the cases have no known cause, but the remainder of cases have a significant underlying cause such as infection, seizures, tumors, respiratory or airway problems, child abuse, or SIDS.

Because of the high incidence of problems and the normal assessment usually seen, there is potential for significant problems if the child's symptoms are not seriously addressed.

| OBTAIN DETAILED HISTORY | • Obtain history of event, including duration and severity, whether patient awake or asleep at time of episode, and what resuscitative measures were done by the parent or caretaker  
|                         | • Obtain past medical history, including history of chronic diseases, seizure activity, current or recent infections, gastroesophageal reflux, recent trauma, medication history  
|                         | • Obtain history with regard to mixing of formula if applicable  |

| ASSESSMENT | Perform comprehensive exam, including general appearance, skin color, interaction with environment, or evidence of trauma  |

| TREATMENT | Treat identifiable cause if appropriate  |

| TRANSPORT | If treatment/transport is refused by parent or guardian, contact base hospital to consult prior to leaving patient. Document refusal of care.  |
# P3—Pediatric Cardiac Arrest—Initial Care and CPR

| **Establish Team Leader** | First agency on scene assumes leadership role  
Leadership role can be transferred as additional personnel arrive |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Confirm Arrest</strong></td>
<td>Unresponsive, no breathing or agonal respirations, no pulse</td>
</tr>
</tbody>
</table>
| **Compressions**          | Begin compressions at a rate of 100–120 per minute. Use metronome.  
Compress chest approximately 1/3 of AP diameter of chest:  
• In children (age 1–8)—around 2 inches  
• In infants (under age 1)—around 1 1/2 inches  
Allow full chest recoil (lift heel of hand)  
Change compressors every 2 minutes  
Minimize any interruptions in compressions. If necessary to interrupt, limit to 10 seconds or less.  
Do not stop compressions while defibrillator is charging  
Resume compressions immediately after any shock |
| **AED or Monitor/Defibrillator** | Apply pads while compressions in progress  
Determine rhythm and shock, if indicated  
Follow specific treatment guideline based on rhythm |
| **Basic Airway Management and Ventilation** | Open airway—For 2-person CPR:  
• Provide 2 breaths: 30 compressions for children over age 8  
• Provide 2 breaths: 15 compressions for infants > 1 month & children to age 8  
**Avoid Excessive Ventilation**  
Ventilations should last one second each, enough to cause visible chest rise  
Use 2-person BLS Airway management (one holding mask and one squeezing bag) |
<table>
<thead>
<tr>
<th>P3—PEDIATRIC</th>
<th>CARDIAC ARREST—INITIAL CARE AND CPR</th>
</tr>
</thead>
</table>
| **MEDICATIONS AND DEFIBRILLATION** | • Use length-based tape to determine weight  
• If child is obese and length-based tape used to determine weight, use next highest color to determine appropriate equipment and drug dosing  
• See Pediatric Drug Chart for medication dose and defibrillation energy levels |
| **ADVANCED AIRWAY MANAGEMENT and END-TIDAL CO2 MONITORING** | **For patients 40 kg or greater only:**  
• Placement of advanced airway is not a priority during the first 5 minutes of resuscitation unless no ventilation is occurring with basic maneuvers.  
• Placement of endotracheal tube or King Airway should not interrupt compressions for a period of more than 10 seconds  
• For endotracheal intubation, position and visualize airway prior to cessation of CPR for tube passage.  
• Confirm tube placement and provide ongoing monitoring using end-tidal carbon dioxide monitoring |
| **BLOOD GLUCOSE**             | Treat if indicated. Glucose may be rapidly depleted in pediatric arrest.                                |
| **PREVENT HYPOTHERMIA**       | Move to warm environment and avoid unnecessary exposure  
• Pediatric arrest victims are at risk for hypothermia due to their increased body surface area, exposure and can be exacerbated by rapid administration of IV/IO fluids |
<p>| <strong>TRANSPORT</strong>                 | Consider rapid transport to definitive care                                                              |</p>
<table>
<thead>
<tr>
<th>P4—PEDIATRIC NEONATAL CARE AND RESUSCITATION</th>
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<tbody>
<tr>
<td><strong>WARM PATIENT</strong></td>
</tr>
<tr>
<td><strong>CLEAR AIRWAY</strong></td>
</tr>
<tr>
<td><strong>DRY AND STIMULATE</strong></td>
</tr>
<tr>
<td><strong>EVALUATE RESPIRATIONS, HEART RATE AND COLOR</strong></td>
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<tr>
<td><strong>REASSESS-BEGIN CPR IF INDICATED</strong></td>
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</tbody>
</table>
# P4—Pediatric Neonatal Care and Resuscitation

**If heart rate remains less than 60 despite adequate ventilation and chest compressions:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dosage/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV/IO</td>
<td>TKO. 100–500 ml NS bag (use care to avoid inadvertent fluid administration). Do not delay transport for IV or IO access.</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>1:10,000–0.01 mg/kg IV or IO. Repeat every 3–5 minutes if heart rate remains below 60.</td>
</tr>
<tr>
<td>Consider fluid bolus</td>
<td>10 ml/kg NS IV or IO. May repeat once if needed.</td>
</tr>
<tr>
<td>Consider naloxone</td>
<td>0.1 mg/kg IV or IO if depressed respiratory status despite efforts. Avoid use if long-term use of opioids during pregnancy known or suspected.</td>
</tr>
</tbody>
</table>

**Key Treatment Considerations**

- For uncomplicated deliveries, treatment priorities are to warm, dry, and stimulate the infant.
- Anticipate complex resuscitation if not term gestation, amniotic fluid not clear, if newborn is not breathing or crying or if newborn does not have good muscle tone.
- Use length-based tape for pediatric weight determination. See Pediatric Drug Chart for dose.

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§ Pediatric Treatment Guidelines 75
### VENTRICULAR FIBRILLATION PULSELESS VENTRICULAR TACHYCARDIA

#### INITIAL CARE
See Cardiac Arrest—Initial Care and CPR (P3)

#### DEFIBRILLATION
2–4 joules/kg
- Use manual defibrillator if available
- If AED utilized, use pediatric pads if available. Adult pads may be used with usual placement position if pads do not touch. Adult pads may be placed anterior-posterior if usual placement would cause the pads to touch.

#### CPR
For 2 minutes or 5 cycles between rhythm check

#### BVM VENTILATION
For patients 40 kg and over, defer advanced airway unless BLS airway inadequate

#### IO or IV
TKO. Should not delay defibrillation or interrupt CPR.

#### DEFIBRILLATION
4 joules/kg

#### EPINEPHRINE
1:10,000–0.01 mg/kg IV or IO every 3–5 minutes

#### AMIODARONE
5 mg/kg IV or IO

#### TRANSPORT
If Return of Spontaneous Circulation—see guidelines for Shock (P9) if treatment indicated
• Uninterrupted CPR and timely defibrillations are the keys to successful resuscitation. Their performance takes precedence over advanced airway management and administration of medications.
• To minimize CPR interruptions, perform CPR during charging, and immediately resume CPR after shock administered (no pulse or rhythm check).

• Avoid excessive ventilation with BLS airway management, which may cause gastric distention and limit chest expansion. Provide breaths over 1 second, with movement of chest wall as guide for volume needed.
• If advanced airway placed (40 kg and over), perform CPR continuously without pauses for ventilation.

• Confirm placement of advanced airway with end-tidal carbon dioxide measurement. Continuous monitoring with ETCO₂ is mandatory—if values less than 10 mm Hg seen, assess quality of compressions for adequate rate and depth. Rapid rise in ETCO₂ may be the earliest indicator of return of circulation.

• Prepare drugs before rhythm check and administer during CPR.
• Give drugs as soon as possible after rhythm check confirms VF/pulseless VT (before or after shock).
• Follow each drug with 5-10 ml NS flush (minimum). Increase accordingly for patient size (20 ml in adolescents).

☆ Use length-based tape for pediatric weight determination. See Pediatric Drug Chart for medication dose and defibrillation energy levels.

• Transmit “ALL” data to the monitor site identified by your provider agency.
### P6—PEDIATRIC

#### PULSELESS ELECTRICAL ACTIVITY/ASYSTOLE

<table>
<thead>
<tr>
<th>INITIAL CARE</th>
<th>See Cardiac Arrest—Initial Care and CPR (P3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BVM VENTILATION</td>
<td>Defer advanced airway (for patients 40 kg and over) unless BLS airway inadequate</td>
</tr>
<tr>
<td>IV OR IO</td>
<td>TKO</td>
</tr>
<tr>
<td>EPINEPHRINE</td>
<td>1:10,000–0.01 mg/kg IV or IO every 3–5 minutes</td>
</tr>
</tbody>
</table>

**Consider treatable causes—treat if applicable:**

| Consider FLUID BOLUS | 20 ml/kg NS—may repeat X 2 for hypovolemia |
| VENTILATION | Ensure adequate ventilation (8–10 breaths per minute) for hypoxia |
| Consider WARMING MEASURES | For hypothermia |
| Consider NEEDLE THORACOSTOMY | For tension pneumothorax |
| BASE CONTACT | To determine treatment for other identified potentially treatable causes—Hydrogen Ion (Acidosis), Hyperkalemia, Toxins |

*If Return of Spontaneous Circulation—see guidelines for Shock (P9) if treatment indicated*
Key Treatment Considerations

- Uninterrupted CPR is key to successful resuscitation. This takes precedence over advanced airway management and administration of medications.

- If advanced airway placed in patients 40 kg and over, perform CPR continuously without pauses for ventilation.

- Avoid hyperventilation. If intubated, give 8 to 10 ventilations per minute, administered over one second.

- Prepare drugs before rhythm check and administer during CPR.

- Follow each drug with 5-10 ml NS flush (minimum). Increase accordingly for patient size (20 ml in adolescents).

★ Use length-based tape for pediatric weight determination. See Pediatric Drug Chart for dose.

- Transmit “ALL” data to the monitor site identified by your provider agency.
### P7—PEDIATRIC SYMPTOMATIC BRADYCARDIA

- **90%** of pediatric bradycardias are related to respiratory depression and respond to support of ventilation
- Only unstable, severe bradycardia causing cardiorespiratory compromise will require further treatment
- Signs of severe cardiorespiratory compromise are poor perfusion, delayed capillary refill, hypotension, respiratory difficulty, altered level of consciousness

| **OXYGEN** | **BLS:** High flow initially  
**ALS:** Titrate to **SpO₂** of at least 94% |
| **CARDIAC MONITOR** | |
| **IV or IO** | TKO. Use IO only if patient unstable and requires medication. Use 100–500 ml NS bag. |
| **Consider CPR** | If heart rate remains less than 60 with poor perfusion despite oxygenation and ventilation, perform CPR |
| **EPINEPHRINE** | 1:10,000–0.01 mg/kg IV or IO. Repeat every 3–5 minutes. |

**SAFETY WARNING:**
Atropine should be considered only after adequate oxygenation/ventilation has been ensured

| **Consider ATROPINE** | 0.02 mg/kg IV, IO (0.1 mg minimum dose). Maximum single dose 0.5 mg. If continued heart rate less than 60, repeat 0.02 mg/kg IV or IO |

**Key Treatment Considerations**

- Use length-based tape for pediatric weight determination. [See Pediatric Drug Chart for dose.](#)
Sinus tachycardia is by far the most common pediatric rhythm disturbance

UNSTABLE SINUS TACHYCARDIA (narrow QRS less than or equal to 0.09)
- ‘P’ waves present/normal, variable R-R interval with constant P-R interval
- Unstable sinus tachycardia is usually associated with shock and may be pre-arrest

UNSTABLE SUPRAVENTRICULAR TACHYCARDIA (SVT) (narrow QRS less or equal to 0.09)
- ‘P’ waves absent/abnormal, heart rate not variable
- History generally vague, non-specific and/or history of abrupt heart rate changes
- Infants’ rate usually greater than 220 bpm, Children (ages 1–8) rate usually greater than 180 bpm

UNSTABLE—POSSIBLE VENTRICULAR TACHYCARDIA—(Wide QRS greater than 0.09 sec)
- In some cases, wide QRS can represent supraventricular rhythm

### INITIAL THERAPY—ALL TACHYCARDIA RHYTHMS

<table>
<thead>
<tr>
<th>OXYGEN</th>
<th>BLS: Low flow unless ALOC/respiratory distress/shock. ALS: Titrate to SpO₂ of at least 94%. Be prepared to support ventilation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHECK PULSE and PERFUSION</td>
<td>Determine stability:</td>
</tr>
<tr>
<td></td>
<td>• Stable—Normal perfusion: Palpable pulses, normal LOC, normal capillary refill, and normal BP for age</td>
</tr>
<tr>
<td></td>
<td>• Unstable—Poor perfusion: ALOC, abnormal pulses, delayed cap. refill, difficult/unable to palpate BP. If unstable, transport early and treat as below.</td>
</tr>
<tr>
<td>CARDIAC MONITOR</td>
<td>Run strip to evaluate QRS Duration</td>
</tr>
<tr>
<td>IV or IO</td>
<td>TKO. Use 100–500 ml bag NS</td>
</tr>
<tr>
<td>FLUID BOLUS</td>
<td>20 ml/kg NS if hypovolemia suspected. May repeat X1</td>
</tr>
</tbody>
</table>
# P8–PEDIATRIC TACHYCARDIA

## UNSTABLE SUPRAVENTRICULAR TACHYCARDIA (NARROW QRS LESS OR EQUAL TO 0.09)

<table>
<thead>
<tr>
<th>VAGAL MANEUVERS</th>
<th>Consider if will not result in treatment delays. ICE PACK to face of infant/child.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE CONTACT</td>
<td></td>
</tr>
<tr>
<td>ADENOSINE</td>
<td>0.1 mg/kg rapid IV push followed by 10–20 ml NS flush (maximum dose 6 mg). If not converted, 0.2 mg/kg rapid IV push followed by 10–20 ml NS flush (maximum dose 12 mg)</td>
</tr>
<tr>
<td>SYNCHRONIZED CARDIOVERSION</td>
<td>If unable to obtain IV access, prepare for Synchronized Cardioversion. Do NOT delay cardioversion to obtain IV or IO access or sedation.</td>
</tr>
<tr>
<td>Consider SEDATION</td>
<td>Consider MIDAZOLAM 0.1 mg/kg IV or IO, titrated in 1 mg maximum increments (maximum dose 5 mg)</td>
</tr>
<tr>
<td>SYNCHRONIZED CARDIOVERSION</td>
<td>0.5–1 joule/kg. If not effective, repeat at 2 joules/kg.</td>
</tr>
</tbody>
</table>

## UNSTABLE—POSSIBLE VENTRICULAR TACHYCARDIA (WIDE QRS GREATER THAN 0.09 SEC)

| BASE CONTACT    |  |
| SYNCHRONIZED CARDIOVERSION | Prepare for CARDIOVERSION while attempting IV/IO access, but do not unduly delay care for IV access or medications |
| Consider SEDATION | If IV/IO access has been obtained, consider MIDAZOLAM 0.1 mg/kg IV or IO, titrated in 1 mg maximum increments (maximum dose 5 mg) |
| SYNCHRONIZED CARDIOVERSION | 0.5–1 joule/kg. If not effective, repeat at 2 joules/kg. |

## KEY TREATMENT CONSIDERATIONS

- Early transport appropriate in unstable patients.
- Use length-based tape for pediatric weight determination. See Pediatric Drug Chart for dose.
**P9—PEDIATRIC**

**SHOCK**

- Altered level of consciousness; cool, clammy, mottled skin; capillary refill greater than 2 seconds; tachycardia; blood pressure less than 70 systolic

- Listless infant or child with poor skin turgor, dry mucous membranes, history of fever may indicate sepsis, meningitis

<table>
<thead>
<tr>
<th>OXYGEN</th>
<th><strong>BLS/ALS:</strong> High flow. Be prepared to support ventilations as needed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREVENT HYPOTHERMIA</td>
<td>Move to warm environment. Avoid unnecessary exposure.</td>
</tr>
<tr>
<td>CARDIAC MONITOR</td>
<td></td>
</tr>
<tr>
<td>EARLY TRANSPORT</td>
<td>CODE 3</td>
</tr>
<tr>
<td>IV or IO</td>
<td></td>
</tr>
<tr>
<td>FLUID BOLUS</td>
<td>20 ml/kg NS—may repeat X2</td>
</tr>
<tr>
<td>BLOOD GLUCOSE</td>
<td>Check and treat if indicated</td>
</tr>
</tbody>
</table>

*Related guidelines: Altered level of consciousness (G2), Tachycardia (P8)*
P9–PEDIATRIC SHOCK

Key Treatment Considerations

Successful pediatric resuscitation relies on early identification of the pre-arrest state

- Normal blood pressure, delayed capillary refill, diminished peripheral pulses and tachycardia indicates compensated shock in children

- Hypotension and delayed capillary refill > 4 seconds indicates impending circulatory failure

- Systolic blood pressure in children may not drop until the patient is 25–30% volume depleted. This may occur through dehydration, blood loss or an increase in vascular capacity (e.g. anaphylaxis)

- Decompensated shock (Hypotension with > 5 seconds capillary refill) may present as PEA in children

- Sinus tachycardia is the most common cardiac rhythm encountered

- Supraventricular tachycardia should be suspected if heart rate greater than 180 in children (ages 1–8) or greater than 220 in infants

- Hypoglycemia may be found in pediatric shock, especially in infants

- Pediatric shock victims are at risk for hypothermia due to their increased body surface area, exposure and rapid administration of IV/IO fluids

★ Use length-based tape for pediatric weight determination. See Pediatric Drug Chart for dose