

**GENERAL GUIDELINES FOR PEDIATRICS**

Pediatric patients, for the purpose of the protocols, defined as age < 12 years, have unique anatomy, physiology, and developmental needs that affect prehospital care as well as hospital care. Because children make up a small percentage of total calls and few pediatric calls are critically ill or injured, it is important to stay attuned to these differences to provide good care. Therefore, **CONTACT BASE** early for guidance when treating pediatric patients with significant complaints, including abnormalities of vital signs. Pediatric emergencies are usually not preceded by chronic disease. If recognition of compromise occurs early, and intervention is swift and effective, the child will often be restored to full health.

The following should be kept in mind during the care of children in the prehospital setting:

- A. Airways are smaller, softer, and easier to obstruct or collapse.
- B. Respiratory reserves are small. A minor insult like improper position, vomiting, or airway narrowing can result in major deficits in ventilation and oxygenation.
- C. Circulatory reserves are also small. The loss of as little as one unit of blood can produce severe shock in an infant. Conversely, it is difficult to fluid overload children. You can be confident that good hands-on circulation assessment will accurately determine fluid needs.
- D. Assessment of the pediatric patient can be accurately done using your knowledge of the anatomy and physiology specific to infants and children.
- E. Listen to the parents' assessment of the patient's problem. They often can detect small changes in their child's condition. This is particularly true if the patient has chronic disease.
- F. The proper equipment is very important when dealing with the pediatric patient. A complete selection of pediatric airway management equipment, IV catheters, cervical collars, and drugs has been mandated by the state. This equipment should be stored separately to minimize confusion.
- G. When following these protocols, the age groups used are:
 1. INFANTS: birth to one year
 2. TODDLERS: one through five years
 3. SCHOOL AGE: six through fourteen years

NORMAL VITAL SIGNS IN THE PEDIATRIC AGE GROUP			
AGE	PULSE Average/minute	RESPIRATIONS breaths/minute	BLOOD PRESSURE systolic in mm Hg
Newborn	150	40-60	60-80
6 mo	140	25-40	65-105
1 yr	135	20-30	70-110
3 yr	110	20-30	76-116
5 yr	100	20-30	80-120
8 yr	90	12-25	86-126
12 yr	80	12-25	95-120



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INFANT AND CHILD RESUSCITATION

Specific Information Needed

- A. Time since the child was last in good health
- B. History of any recent illness or injury
- C. Past medical history

Specific physical findings

- A. General appearance: LOC, muscle tone, color
- B. Airway: obstruction, stridor, drooling, cough
- C. Breathing: respiratory rate, skin color (cyanosis late sign), chest wall symmetry and depth of movement, work of breathing (grunting, nasal flaring, retractions), wheezing.
- D. Circulation: heart rate, peripheral pulses, capillary filling time, skin color, extremity skin temperature.
- E. Level of consciousness, pupil size and reaction to light.
- F. Physical assessment.
- G. Respiratory distress is a critical situation that can be made worse with prolonged scene times.
- H. Any child with or suspected apnea episode should be transported.

Treatment

- A. Airway/Breathing:
 - 1. Manage airway. Effective airway management is by far the most critical aspect of treatment. Bag-mask ventilation may be as good as and in some cases superior to endotracheal intubation for EMS treatment.
 - 2. Administer oxygen via blow-by, non-rebreather mask, or bag-mask ventilation.
 - 3. If apneic, ventilate with a BVM, intubate as indicated, ventilation rate per AHA BLS protocols. Ensure adequate chest rise and fall (tidal volumes), and air entry.

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- 4. Note the drugs that are appropriate for endotracheal administration (naloxone, epinephrine, atropine). (mnemonic: N.E.A. – naloxone, epinephrine, atropine). Endotracheal administration of any medication should be considered LAST RESORT.
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- B. Circulation:
 - 1. Initiate CPR if indicated.

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- 2. Monitor cardiac rhythm.
 - 3. Establish peripheral venous access.
 - 4. If unable to establish a peripheral IV after 1 attempt, establish an intraosseous infusion. If unable to see good peripheral vein, go straight to IO infusion.
 - 5. If any signs of poor perfusion, infuse a 20 cc/kg of normal saline fluid bolus. **CONTACT BASE** if you feel perfusion is compromised on reassessment.

- C. Medications:

1. Stabilizing the airway and supporting respiration are the mainstays of treatment. Specific treatment should be focused on the etiology of the arrest.
2. Arrhythmias are treated as noted in Arrhythmia Algorithms.
3. Hypoglycemia is common in younger children. If the child has altered mental status, either administer dextrose (1-8 years should receive 2 ml/kg of a 25% solution IV; <1 year should receive 5 ml/kg of 10% solution) or rule out hypoglycemia with a bedside blood sugar check. Hypoglycemia in pediatrics is commonly defined as a blood sugar <40.

Specific Precautions

- A. The most successful pediatric resuscitations occur before a full cardiopulmonary arrest. Assess pediatric patients carefully and assist with airway, breathing, and circulatory problems before the arrest occurs, to improve the outcome in pediatric patients.
- B. Pediatric arrests are most likely to be primary respiratory events. The rescuer's primary attention must be directed to securing the airway and providing good ventilation before specific treatment of cardiac rhythm. Any cardiac rhythm can spontaneously convert to sinus rhythm in a well-ventilated child.
- C. Oxygen and epinephrine are the mainstays of pediatric resuscitations. Atropine and sodium bicarbonate are not first line drugs in pediatrics.
- D. Cardiopulmonary arrest from trauma is treated with airway management, rapid transport, CPR and fluid administration en route.
- E. Recommendations for obstructed airway are abdominal thrusts over the age of one year. Infants less than one year old should be treated with back blows and chest thrusts. Early laryngoscopy should be used in an attempt to visualize and remove upper airway obstructions.
- F. If a child 1 year of age or older is in cardiac arrest, an AED may be used, preferably one with pediatric capabilities.
- G. Use of a length-based emergency tape (LBET) such as the Broselow™ tape is highly accurate and allows for rapid drug and fluid doses and correct equipment size and use. LBET use should be routine for any pediatric emergency.



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POSSIBLE SUDDEN INFANT DEATH SYNDROME (SIDS)

Specific Information Needed

- A. History: position in which the child was found, condition of the bed, last time the child was seen well, seizure activity, trauma, possibility of ingestion
- B. Associated symptoms: history of fever, respiratory symptoms, infection, vomiting, diarrhea, other signs of infections
- C. Past medical history: prematurity, chronic illness

Specific physical findings

- A. ABCs
- B. Neurologic: level of consciousness, responsiveness, muscle activity and tone
- C. Skin: signs of trauma
- D. Dependent lividity or early rigor mortis.
- E. Body temperature.

Treatment

- A. Initiate or continue resuscitation based on field pronouncement protocol.
- B. Use appropriate airway adjuncts as indicated.
- C. Ventilate with 100% oxygen; suction as needed.
- D. Support cardiac output as indicated by:
 - 1. CPR
 - 2. External chest compressions
 - 3. Establish venous access.

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- 4. Pediatric ALS as indicated
 - 5. Monitor cardiac rhythm
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- E. **CONTACT BASE** for field pronouncement if appropriate.
- F. Support the parents and siblings.

Special Considerations

- A. Activate appropriate support for the family if the patient is pronounced dead in the field. Police, County Social Services, and the SIDS support line should be contacted.
- B. Automatic External Defibrillator (AED) should be used in patients >1 year old.
- C. Avoid premature assessments.
- D. The cause of SIDS is unknown. Cases occur between one month and one year of age. All cases are mandatory coroner cases.
- E. Consider possible NAT (non-accidental trauma, child abuse) and pass on any concerns to receiving facility personnel.
- F. For family support and community education, family members may welcome the following contact information:

The Colorado SIDS Program, 6825 East Tennessee Ave., Suite 300, Denver, CO 80224
Local#: 303-320-7771 or toll-free#: 1-888-285-7437; Web: <http://www.coloradosids.org>



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PEDIATRIC DEHYDRATION

Specific Information Needed

- A. History: onset and progression of symptoms, frequency of vomiting and diarrhea, urine output, oral intake, recent trauma, possible drug ingestion
- B. Past medical history

Document Specific physical findings

- A. General appearance: LOC, muscle tone, color
- B. ABCs and vital signs
- C. Skin: warmth of distal extremities, color, skin turgor, capillary fill time (should be less than 2 seconds), pulses
- D. Mucous membranes: wetness of mouth, presence of tears
- E. Musculoskeletal: evaluate for trauma
- F. The signs of dehydration are:
 - 1. EARLY - tachycardia and tachypnea for age, decreased LOC, capillary filling time longer than two seconds, cool skin, mucous membranes dry, sunken eyes and fontanelle;
 - 2. LATE - loss of skin turgor, diminished pulses, and shock

Treatment

- A. Use appropriate airway adjuncts as indicated.
- B. Administer oxygen
- C. Breathing: ventilation as indicated
- D. Circulation:
 - 1. Establish pulse rate and capillary refill time

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- 2. Establish peripheral venous access.
 - 3. Consider fluid bolus of normal saline 20cc/kg.
 - 4. Do not delay transport for IV attempts.
 - 5. The patient with simple dehydration is not a candidate for intraosseous infusion, **CONTACT BASE** for approval of IO if shock is present.

Specific Precautions

- A. Assessment of dehydration is primarily by physical exam. Vital signs may be abnormal, but they are nonspecific.
- B. Determination of tachycardia or hypotension is based on age.
- C. Monitor carefully for signs of decreased tissue perfusion (shock). Early (compensated) shock is present if capillary fill time is greater than 2 seconds, and there are poor pulses, muscle tone and color, and/or are normotensive. Decompensated shock is present if systolic BP is <normal for age, have a decreased mental status and/or have weak or absent central pulses.



6040
PEDIATRIC RESPIRATORY DISTRESS

Specific Information Needed

- A. History: sudden or gradual onset of symptoms, cough, fever, sore throat, hoarseness
- B. History of potential foreign body aspiration or trauma
- C. Past medical history
- D. Current medication use

Specific Objective Findings

- A. Airway: look for respiratory distress during inspiration, listen for abnormal breathing sounds such as stridor, cough (croup-like?), and wheezing, feel for air movement, crepitation, and tracheal deviation (late finding).
- B. Breathing: respiratory rate and effort, chest wall movement/adequacy of tidal volume, color, use of accessory muscles, retractions, nasal flaring, head bobbing, or grunting
- C. Respiratory sounds by auscultation of chest: wheezing, rales, decreased (unilateral?), prolonged inspiratory (croup) or expiratory (wheezing) phases.
- D. Mental status: AVPU
- E. General appearance: leaning forward or drooling (suggests upper airway obstruction), skin color and temperature, muscle tone.

Treatment

- A. Administer high-flow oxygen by blow-by or non-rebreather mask.
- B. As long as the child is adequately ventilating and has adequate mentation, avoid agitating the patient. Keep the patient in his position of comfort.
- C. If the child is not ventilating adequately, assist with a BVM.
- D. If the patient is wheezing and has a metered dose inhaler (MDI), initiate MDI protocol. EMT's must contact base.

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- E. In the rare case that the child cannot be ventilated with a BVM device:
 - 1. Reposition airway. Consider oral airway if patient unconscious.
 - 2. If still unable to ventilate, visualize the airway with a laryngoscope. Remove any foreign object with Magill forceps.
 - 3. If nothing is seen, orally intubate the patient.
- F. Consider intubation only if unable to provide ventilatory support with a BVM and oral airway.
- G. Assess and consider treatment for the following problems if respiratory distress is severe and the patient does not respond to proper positioning and administration of high flow oxygen.

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- 1. Croup or epiglottitis:
 - a. Allow patient to remain in position of comfort if alert.
 - b. Consider administering nebulized racemic epinephrine 0.5 ml or L-epinephrine, 5 mg (5.0 ml of a 1:1000 solution) (under 10 kg use 0.5 ml/kg of a 1:1000 solution) via nebulizer if croup is likely and there is respiratory distress.
- 2. Asthma:

- a. Administer albuterol sulfate, one unit dose bottle by nebulizer. Consider adding ipratropium (0.5 mg/2.5ml) for patients over 2 years of age.
 - b. Use continuous nebulization of albuterol sulfate for respiratory distress.
 - c. Consider epinephrine 0.01 mg/kg (0.01 ml/kg of a 1:1000 solution), SQ/IM.
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H. If diagnosis is unclear, transport patient with 100% oxygen, reassess frequently and be prepared to manage the patient's airway.

Specific Precautions

- A. Children with croup, epiglottitis, or laryngeal edema usually have respiratory arrest due to exhaustion. Most children can still be ventilated with a BVM.
 - B. Children with severe asthma may not exhibit wheezing. The patients will have prolonged expiratory phases and may appear listless, agitated, or unresponsive.
 - C. Respiratory distress is a critical situation that can be made worse with prolonged scene times.
 - D. Cyanosis is a late sign in pediatric hypoxia. Provide 100% oxygen for any child in distress.
 - E. Consider the differential assessment for each finding:
 1. Stridor: foreign body, croup, epiglottitis or other bacterial upper airway infection, larynx trauma, etc
 2. Wheezing: foreign body, asthma, bronchiolitis, hydrocarbon exposure, etc
 3. Respiratory distress: pneumothorax, foreign body, pneumonia, shock, CHF, etc
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- F. Any child with a witnessed or suspected apnea episode should be transported.
- G. Intubation of the infant is most easily accomplished with an infant-sized straight laryngoscope blade.
- H. Do not intubate unless you can visualize the ETT going through the cords. If you are unable to intubate the trachea quickly, withdraw, re-oxygenate with BVM, and try again. No harm will result to the child if you keep the patient well oxygenated and don't traumatize the airway with intubation attempts. Transporting while using BVM only is acceptable and may be preferable in many circumstances.



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PEDIATRIC SEIZURES

Specific Information Needed

- A. History: preceding activity level, onset and duration of seizure, description of seizure activity, fever, color change, recent illness, head trauma, possibility of ingestion, cardiac symptoms.
- B. Past history: previous seizures, current medications, chronic illness

Specific Objective Findings

- A. Airway: look for respiratory distress, listen for abnormal breathing sounds, feel for air movement, crepitus.
- B. Breathing: respiratory rate and effort, chest wall movement (adequacy of tidal volume), use of accessory muscles, retractions.
- C. Circulation: heart rate, pulse, capillary filling time, skin color, blood pressure
- D. Neurologic: mental status, muscle tone, focal findings, post-ictal period, incontinence. Note improvement or deterioration in mental status with time.
- E. Musculoskeletal: note any associated injuries.

Treatment

- A. Airway: Maintain patent airway by BLS maneuvers. Suction as needed. Administer high concentration oxygen.
- B. Breathing: Assist ventilation as needed. (rarely necessary)
- C. If child is in status epilepticus:

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1. Attempt peripheral venous access x1. If successful, administer diazepam 0.3 mg/kg, IV/IO bolus, slowly, over 2 minutes OR 0.5 mg/kg rectally up to a maximum of 10 mg OR administer diazepam, 0.5 mg/kg rectally, not to exceed 10 mg.
2. If unable to start peripheral IV:
 - a. for ages 8 and under, administer diazepam, 0.5 mg/kg rectally, not to exceed 10 mg.

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- b. for ages 9 and above, administer midazolam 0.1 mg/kg IM, not to exceed 10 mg.
2. Determine blood glucose level and draw appropriate blood tubes if possible.

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3. If hypoglycemic, give dextrose (1-8 years should receive 2 ml/kg of a 25% solution IV; <1 year should receive 5 ml/kg of 10% solution).
 4. If seizures continue, **CONTACT BASE.**
- D. If the child has stopped seizing and is postictal, transport while continuing to monitor vital signs and neurological condition. Continue to provide supplemental oxygen.

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- E. If child is febrile initiate passive cooling measures.

Specific Precautions

- A. Febrile seizures occur in normal children between 6 months and 6 years. Such seizures are usually short, lasting less than 5 minutes, generalized, and usually do not require anti-seizure drug therapy.
- B. Do not force anything between the teeth.
- C. Consider hypoglycemia as a cause for non-traumatic seizure.
- D. Breath-holding spells in toddlers can resemble seizures, but are not a true seizure.
- E. Most airways of seizing children can be managed with BLS measures. Intubation is only necessary if there is prolonged apnea from diazepam or from the seizure activity itself.

