

# Pediatric Respiratory Emergencies

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## Respiratory Emergencies

- Common in pediatric patients
- Can easily become life threatening
- Assessment and intervention is crucial

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## Care of the pediatric airway

- Position the airway.
- Position the airway in a neutral sniffing position.
- If spinal injury suspected, use jaw-thrust maneuver to open the airway.



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## Care of the pediatric airway

- Positioning the airway:
  - Place the patient on a firm surface.
  - Fold a small towel under the patient's shoulders and back.
  - Place tape across patient's forehead to limit head rolling.

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## Caring for pediatric patients

- A child's airway differs from an adult's in the following ways:
  - Larger, rounder occiput
  - Larger tongue relative to the mouth
  - Larger epiglottis
  - Less well-developed rings of cartilage in the trachea
  - Narrower, lower airway

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## Respiratory Distress

- Usage of accessory muscles
- Retractions present
- Respiratory rate increases
- Heart rate increases
- Compensation occurs via child's work of breathing

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## Clinical signs of respiratory distress

- Examine the patient visually prior to doing the physical exam
- Allow the patient to remain in the caregiver's lap or presence during the exam
- Touching the patient will agitate him, thus making the distress much worse

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## Clinical signs of respiratory distress

1. Respiratory effort
2. Respiratory rate
3. Chest rise and fall (depth of respirations)
4. Skin color

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## Clinical signs of respiratory distress

1. **Respiratory effort:**  
Accessory muscles  
retractions  
nasal flaring  
head bobbing  
tripod position

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Clinical signs of respiratory distress

2. **Respiratory rate:**

tachypnea-compensatory  
bradypnea-ominous

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Clinical signs of respiratory distress

**Normal Respiratory Rates in Children**

Newborn	30-60
6 mos.	25-40
1-3 yrs	20-30
6 yrs.	18-25
10 yrs.	15-20

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Clinical signs of respiratory distress

3. **Chest rise/fall:**

Check abdominal rise/fall, too  
“paradoxical breathing” –where  
abdomen rises when chest falls

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## Clinical signs of respiratory distress

- **Breath Sounds**
  - Noisy breathing generally indicates partially obstructed and/or swollen airway passages
  - “grunting”: expiratory, caused by partial upper airway closure
  - “stridor”: harsh inspiratory sound, seen in croup
  - “wheezing”: whistling sounds, both inspiratory and expiratory –*asthma and bronchiolitis*

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## Clinical signs of respiratory distress

4. **Skin color:**  
pale, mottled, or cyanotic indicates poor respiratory or cardiovascular status

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## Clinical signs of respiratory distress

5. **Changes in heart rate:**  
Tachycardia common, bradycardia is BAD

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## Signs and Symptoms of Respiratory Emergencies (Summary)

- Nasal flaring
- Grunting respirations
- Use of accessory muscles
- Retractions of rib cage
- Tripod position in older children

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Capillary refill > 5 seconds following release of pressure

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Management goal is to recognize and treat respiratory distress before it can progress into respiratory failure !

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### Assessment

- Upon arrival, observe the child from a distance
  1. General Appearance
  2. Level of consciousness
  3. C-spine precautions

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## Assessment

- Evaluate and treat ABCs
  - Note resp. rate, effort, chest rise, skin color
- Is the airway open?
- Is the airway maintainable without my help?
- Do I need to maintain the airway?
- Is he/she breathing too fast/slow?
- Are the tissues receiving oxygen?
- Is bleeding controlled?
- Is the skin color good?

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## Assessment

- General rule: RR < 20 or > 40 is inadequate, and breathing may need to be assisted.
- Tachypnea = respiratory distress
- Bradypnea = respiratory failure

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## Management

- ALL CHILDREN in respiratory distress will benefit from supplemental oxygen administered by face mask or blow-by
- Keep calm
- Keep warm
- Encourage a position of comfort (if conscious) – parent nearby.

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## Clinical Signs of Respiratory Failure

- Definition: inadequate elimination of carbon dioxide and / or inadequate oxygenation of the blood
- The child no longer has the energy to compensate by increasing his/her ventilatory effort and rate (work of breathing)
- Physical exhaustion ⇒ non-compensation ⇒ hypoxemia and hypercapnea ⇒ respiratory arrest ⇒ cardiac arrest

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## Clinical Signs of Respiratory Failure

1. Decreased work of breathing
2. Cyanosis or mottled skin
3. Decreased respiratory rate
4. Decreased level of consciousness
5. Physical exhaustion

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## Respiratory Management

- Intervention is dictated by the level of consciousness and the work of breathing

### Conscious

- Comfortable position, with family member
- Minimize handling and agitation
- High-flow oxygen

### Unconscious

- Open airway, insert oral airway prior to transport
- Suction < 5 seconds
- High-flow oxygen, ventilate as needed with BVM. Confirm ventilations by Equal chest movement

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## Assessing Ventilation

- Observe chest rise in older children.
- Observe abdominal rise and fall in younger children or infants.
- Skin color indicates amount of oxygen getting to organs.

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## Nasopharyngeal Airways (1 of 2)

- Determine the appropriately sized airway.
- Place the airway next to the face to make certain length is correct.
- Position the airway.
- Lubricate the airway.



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## Nasopharyngeal Airways (2 of 2)

- Insert the tip into the right naris.
- Carefully move the tip forward until the flange rests against the outside of the nostril.
- Reassess the airway.



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## Oxygen Delivery Devices (1 of 2)

- Nonrebreathing mask at 10 to 12 L/min provides 90% oxygen concentration.
- Blow-by technique at 6 L/min provides 21% oxygen concentration.
- Nasal cannula at 4 to 6 L/min provides 24% to 44% oxygen concentration.



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## Oxygen Delivery Devices (2 of 2)

- Simple face mask at 6 to 10 L/min provides 30% to 60% oxygen concentration.
- BVM device at 10 to 15 L/min provides 90% oxygen concentration.



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## BVM Devices

- Equipment must be the right size.
- Ventilate at the proper rate and volume.
- May be used by one or two rescuers.

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## Transport

- Make certain that the appropriate equipment is used for pediatric patients
- Provide oxygen to all patients
- Reassess the child's respiratory status continuously to make certain that it remains stable or is improving.
- Observe chest rise, heart rate, skin color continuously

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## Pediatric Upper Airway Emergencies

### 1. Croup

- Viral infection which causes swelling (edema) in vocal cords, trachea, and tissue below the glottis
- Partial airway obstruction
- Common, especially in winter months
- Follows a history of cold symptoms
- 6 months to 3 year age group

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## Pediatric Upper Airway Emergencies

### 1. Croup

- Harsh, barking cough—especially at night
- Inspiratory stridor
- Nasal flaring
- Low-grade fever

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## Pediatric Upper Airway Emergencies

### 1. Croup

- Assess ABCs
- Obtain respiratory history
- Emotional support. Place in comfortable, upright position
- O2 per facemask
- Do not examine the throat

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## Pediatric Upper Airway Emergencies

### 2. Epiglottitis

- Acute, potentially life-threatening bacterial infection
- Swelling of the epiglottis
- Commonly seen in 3-6 year age groups
- Can easily lead to complete airway obstruction

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## Pediatric Upper Airway Emergencies

### 2. Epiglottitis

- Sudden onset of symptoms
- High fever, sore throat, dyspnea
- Difficulty swallowing
- Drooling
- Inspiratory stridor
- Other signs of respiratory distress or failure

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## Pediatric Upper Airway Emergencies

### 2. Epiglottitis

- Emotional support. Place in comfortable, upright position
- Avoid examination of throat and agitating the patient
- Administer oxygen (humidified)
- Priority transport, consider ALS
- BVM, prn. Don't field intubate

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## Pediatric Upper Airway Emergencies

### 3) Foreign-body Aspiration

- Most common problem in 1-3 yr. olds
- Small toys, balloons, buttons, hot dogs, grapes
- Don't chew their food well

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## Pediatric Upper Airway Emergencies

### 3) Foreign-body Aspiration

- Suspect in children with history of sudden respiratory distress associated with gagging, coughing, stridor, or wheezing
- Will rapidly progress into respiratory arrest, then into cardiac arrest

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## Pediatric Upper Airway Emergencies

### 3) Foreign-body Aspiration

- Management:
  - AHA FBAO Guidelines

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## Pediatric Lower Airway Emergencies

### 1. Bronchiolitis

- Children < 2 yrs., especially in the winter
- Cold symptoms > mild fever > bronchioles swell > heavy secretions > resp. distress
- Similar to asthma, but asthma rarely occurs in the first year of life

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## Pediatric Lower Airway Emergencies

### 1. Bronchiolitis

- Tachypnea, retractions, wheezing, grunting > resp. distress > resp. failure

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## Pediatric Lower Airway Emergencies

### 1. Bronchiolitis

- Management:
  - ABCs
  - Respiratory history, exam
  - Position for comfort, avoid agitation
  - Hi-flow oxygen
  - If failure, BVM, priority transport

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## Pediatric Lower Airway Emergencies

### 2) ASTHMA

- Narrowing of airways, causing airway obstruction
- Smooth muscles of airway constrict > Inflammation > mucus formation
- Most common in 3 to 13 year olds
- Symtoms can be gradual or acute

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## Pediatric Lower Airway Emergencies

### 2) ASTHMA

- Air is trapped in alveoli >exhalation is difficult
- As attack worsens, respiratory rate and effort increase
- Symptoms of SOB, tachypnea, tachycardia, wheezing (especially expiratory)
- Anxiety will make the condition worse
- Respiratory distress > Respiratory failure

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## Pediatric Lower Airway Emergencies

### 2) ASTHMA

- Management:
  - Comfortable position (tripod)
  - emotional support
  - “breathing coach” to control rate
  - High-flow oxygen
  - Obtain nebs and administer as directed

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## Pediatric Lower Airway Emergencies

### 2) ASTHMA

- Management:
  - Priority transport
  - If BVM, then 1:4 ventilations to allow for adequate air evacuation from the obstructed lungs (one second inspiration, four second expiration)

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## Emergency Care

- Provide supplemental oxygen in the most comfortable manner.
- Place child in position of comfort.
  - This may be in caregiver’s lap.
- If patient is in respiratory failure, begin assisted ventilation immediately.
  - Continue to provide supplemental oxygen.

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### Common Pediatric Problems

- Seizures
- Altered Mental Status
- Poisoning
- Fever
- Shock
- Near Drowning
- SIDS

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### Seizures

- Seizures also called convulsions or “fits”
- Result from abnormal electrical discharges from the brain
- Usually result in:
  - Abnormal movements, and
  - Altered level of consciousness

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## Seizures

- Presentation is quite variable:
  - May be only subtle changes, especially in infants, such as:
    - Eyelid fluttering
    - Lip-smacking
    - Sucking movements
  - May manifest as momentary losses of attention
  - May be localized rhythmic movement of a hand or foot, without loss of consciousness

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## Seizures

- Most commonly, the seizure is generalized, often called a “grand mal” seizure, with:
  - Shaking and/or stiffening of all extremities
  - Loss of consciousness
  - Incontinence, and (most importantly)
  - Respiratory impairment

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## Seizures

- Usually self-limited:
  - Most often brief (< a few minutes)
  - Patient is usually lethargic and sleepy in the “post-ictal” state when EMS arrives
- May be prolonged (> 15 minutes):
  - This constitutes a medical emergency
  - Support of airway and breathing is often required

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## Seizures

### Causes:

- Fever
- Infections
- Poisoning
- Hypoglycemia
- Trauma
- ↓ oxygen delivery to brain
- No identified cause (epilepsy)

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## Seizures

### Treatment

- Assure airway patency
- Position patient on side if no possibility of C-spine trauma
- Be prepared to suction
- Provide oxygen, BVM ventilation PRN
- Consider ALS assistance, if available, for resp. compromise or prolonged seizure
- Transport even if post-ictal

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## COMMON PEDIATRIC

### PROBLEMS:

### ALTERED MENTAL STATUS

- Multiple causes:
  - Hypoglycemia
  - Poisoning
  - Post-seizure
  - Infection
  - Head trauma
  - Hypoxia
  - Shock

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## ALTERED MENTAL STATUS: EMERGENCY MEDICAL CARE

- Assure patency of airway
- Monitor closely and be prepared to assist ventilation
- Be prepared to suction secretions/vomit
- Rapid transport

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## COMMON PEDIATRIC PROBLEMS: POISONINGS

- Common reason for pediatric ambulance calls:
  - Infant and toddler “exploration”
  - Adolescent suicide attempts or “gestures”
- Identify suspected container via careful history at the scene
- Bring container to hospital, if possible



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## POISONINGS: EMERGENCY MEDICAL CARE

- Responsive patient:
  - Contact medical control
  - Provide oxygen
  - Transport
  - Continue close monitoring, the patient may become unresponsive
  - Be prepared to suction vomit

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**POISONINGS:  
EMERGENCY MEDICAL  
CARE (Cont'd)**

- Unresponsive patient:
  - Assure airway patency
  - Provide oxygen
  - Be prepared to ventilate
  - Be prepared to suction secretions and/or vomitus
  - Rule out trauma as cause
  - Contact medical control
  - Rapid transport

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**COMMON PEDIATRIC  
PROBLEMS:  
FEVER**

- Common reason for pediatric ambulance call
- Many causes:
  - Rarely life-threatening
  - When rash present, potentially serious
  - Meningitis is most serious cause
- Emergency medical care
  - Transport
  - Be alert for seizures

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**Emergency Care**

- Provide supplemental oxygen in the most comfortable manner.
- Place child in position of comfort.
  - This may be in caregiver's lap.
- If patient is in respiratory failure, begin assisted ventilation immediately.
  - Continue to provide supplemental oxygen.

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