PEDIATRIC RESPIRATORY DISTRESS OR FAILURE

Support Airway

- Ensure adequate airway
  - Provide proper positioning as indicated (head-tilt-chin lift or modified jaw thrust); if child is responsive, allow them to find a comfortable position; use airway adjuncts as appropriate
  - Suction as needed
  - Use foreign body airway obstruction clearing techniques as indicated
  - Consider advanced airway if clinically indicated; consult with advanced airway specialist such as an anesthesiologist or otolaryngologist for difficult airway, if available
- Consider pharmacologic management as appropriate

↓

Support Breathing

- Assess ventilation rate, depth, rhythm and effort; auscultate breath sounds
- Establish pulse oximetry; provide humidified supplemental oxygen to maintain O_2 saturation 94% to 99%
- Establish capnography in intubated patients and, if available, in nonintubated patients
- Assist ventilation as needed (BVM, noninvasive or invasive)
- Perform needle decompression and/or tube thoracostomy, if needed
- Consider pharmacologic management as appropriate

↓

Support Circulation

- Assess central and peripheral pulses and perfusion
- Monitor blood pressure and heart rate
- Establish cardiac monitoring
- Establish IV/IO access as appropriate*
- Consider fluid resuscitation and pharmacologic management as appropriate

IDENTIFY AND TREAT SPECIFIC TYPE OF RESPIRATORY PROBLEM (In addition to general care above)

Partial Upper Airway Obstruction	Lower Airway Obstruction	Lung Tissue Disease	Neurological and Metabolic Disorders of Ventilation
▪ **Croup:** Consider **nebulized epinephrine, corticosteroids, heliox** ▪ **Anaphylaxis:** Consider **epinephrine, albuterol, corticosteroids, antihistamines;** if hypotensive, initiate **fluid resuscitation** (20 mL/kg crystalloid fluid bolus rapidly; repeat as needed) ▪ **Foreign body aspiration:** Provide **patient positioning** and **ventilatory support;** arrange for specialty consultation, if available	▪ **Bronchiolitis:** Provide **suctioning** and **supportive care;** consider a trial of **nebulized epinephrine** or **albuterol;** if no response discontinue. If response, consider continued bronchodilator therapy. If previously diagnosed with asthma, consider asthma management. ▪ **Asthma (bronchospasm):** Administer **albuterol** with or without **ipratropium;** consider **corticosteroids, magnesium sulfate, epinephrine, terbutaline**	▪ **Pneumonia/pneumonitis:** Administer **antibiotics** as indicated; assess for type of pneumonia to guide antibiotic therapy; initiate **bronchodilator** treatment as needed ▪ **Pulmonary edema (cardiogenic):** Consider **inotrope, inodilator and/or vasoactive agent** therapies as needed; consider **diuretics;** provide **ventilatory support with PEEP** as needed (noninvasive and invasive) ▪ **Pulmonary edema (noncardiogenic):** Manage oxygenation and ventilation according to protocols for PARDS; correct hypoxemia with **ventilation strategies** and **PEEP;** consider permissive hypercapnia, as indicated	▪ **Disordered control of respiration (increased ICP):** Ensure adequate CPP (head midline, pharmacologic therapy for ICP, avoid hypotension, aggressively treat fever) ▪ **Toxin/poisoning/ overdosage:** Contact poison control center; administer **antidotes** (e.g., **naloxone**) ▪ **Neuromuscular disease:** Provide **suctioning** and **ventilatory support** (noninvasive and invasive) as needed ▪ **Metabolic disorders:** Consider reversal of metabolic derangements

*To avoid agitating the patient, may opt to defer vascular access in spontaneously ventilating patients who do not require IV therapy or who are not exhibiting signs of deterioration.

PEDIATRIC RESPIRATORY DISTRESS OR FAILURE

Differentiating Severity of Respiratory Compromise

Stage	Description	Signs and Symptoms	
Respiratory distress	Earliest stage of respiratory compromise; patient maintains adequate oxygenation and ventilation via compensatory mechanisms; can progress to respiratory failure	▪ Tachypnea ▪ Increased work of breathing (accessory muscle use, nasal flaring) ▪ Varying degrees of airway obstruction (as evidenced by stridor, drooling, wheezing) ▪ Abnormal breath sounds ▪ Grunting	▪ Tachycardia ▪ Irritability or anxiety ▪ Assuming position of comfort (e.g., tripod positioning) ▪ Pallor ▪ Cyanosis which resolves with supplemental oxygen
Respiratory failure	Patient unable to maintain adequate oxygenation (hypoxic) or ventilation (hypercapneic) to meet metabolic demands; usually requires ventilatory support; will lead to respiratory arrest if not quickly addressed	▪ Slowed respiratory rate (may initially be very rapid) ▪ Poor or absent air movement ▪ Diminished breath sounds ▪ Lack of chest movement ▪ Low oxygen saturation or low PaO_2 ▪ High $ETCO_2$ or high PCO_2	▪ Bradycardia ▪ Altered mental status (e.g., lethargy, somnolence), including loss of consciousness ▪ Central cyanosis (may not resolve with supplemental oxygen) ▪ Pallor ▪ Hypotension
Respiratory arrest	Complete cessation of breathing effort; leads to cardiac arrest after a very short time	▪ Absent breath sounds ▪ Lack of chest movement ▪ Bradycardia	▪ Hypotension ▪ Loss of consciousness ▪ Cyanosis

"Key" Potential Assessment Findings by Respiratory Problem Type

Assessment	Partial Upper Airway Obstruction	Lower Airway Obstruction	Lung Tissue Disease	Neurologic and Metabolic Disorders of Ventilation
Airway	▪ Stridor (inspiratory; may be expiratory) ▪ Trouble swallowing, drooling/difficulty managing secretions ▪ Voice (or cry) changes (e.g., hoarseness, muffled) ▪ Unmaintainable airway (late) ▪ Sudden-onset signs of airway obstruction and respiratory compromise (foreign body aspiration)	▪ Unmaintainable airway (late)	▪ Unmaintainable airway (late)	▪ Unmaintainable airway due to altered mental status ▪ Impaired swallowing, drooling (neuromuscular diseases) ▪ Ineffective airway clearance
Breathing: respiratory rate	▪ Tachypnea ▪ Bradypnea or apnea (late)	▪ Tachypnea ▪ Bradypnea or apnea (late)	▪ Tachypnea ▪ Bradypnea or apnea (late)	▪ Tachypnea, bradypnea or apnea ▪ Irregular breathing pattern (e.g., Cheyne-Stokes breathing)
Breathing: work of breathing	▪ Retractions ▪ Nasal flaring	▪ Retractions ▪ Nasal flaring	▪ Retractions ▪ Nasal flaring	▪ Normal, increased or irregular
Breathing: air movement	▪ Decreased	▪ Decreased ▪ Prolonged exhalation	▪ Decreased	▪ Variable
Breathing: abnormal sounds	▪ Stridor (inspiratory; may be expiratory)	▪ Wheezing ▪ Grunting ▪ Rhonchi (bronchiolitis) ▪ Crackles	▪ Grunting ▪ Decreased breath sounds (pneumonia) ▪ Localized crackles (pneumonia) ▪ Generalized crackles and wheezes (pulmonary edema)	▪ None
Other	▪ Barking or brassy cough (croup)	▪ Unable to talk in full sentences ▪ Wet, "junky" cough (bronchiolitis)	▪ Shallow respirations ▪ Cough	▪ Ineffective cough (neuromuscular diseases) ▪ Cushing's triad (abnormal breathing, hypertension and bradycardia; associated with increased ICP)
Circulation	▪ Tachycardia ▪ Pallor, cyanosis	▪ Tachycardia (bradycardia with hypoxia and respiratory failure) ▪ Pulsus paradoxus ▪ Pallor, cyanosis	▪ Tachycardia ▪ Pallor, cyanosis (late)	▪ Tachycardia ▪ Hypertension ▪ Bradycardia ▪ Cyanosis (apnea)
Disability	▪ Restless, anxious, irritable, unable to get comfortable ▪ Assuming a position of comfort (e.g., tripod positioning) ▪ Agitation, somnolence or unconsciousness (late)	▪ Restless, anxious ▪ Reluctance to lie flat ▪ Agitation, somnolence or unconsciousness (late)	▪ Restless, anxious ▪ Agitation, somnolence or unconsciousness (late)	▪ Altered mental status (CNS conditions, toxins, metabolic conditions) ▪ Pupillary changes (CNS conditions, toxins) ▪ Global muscle weakness, hypotonia in infants (neuromuscular diseases) ▪ Posturing (CNS conditions)
Exposure	▪ Skin reactions (rashes) ▪ Increased or decreased temperature ▪ Toxic appearance ▪ Swelling (anaphylaxis, infection or abscess)	▪ Increased or decreased temperature	▪ Increased or decreased skin temperature	▪ Signs of trauma, bleeding, needle marks (injection), increased or decreased temperature ▪ Chest wall deformity, kyphoscoliosis, thin or atrophied extremities, contractures (neuromuscular diseases)
Secondary assessment	▪ Hypoxemia in severe obstruction (croup) ▪ Radiograph may show steeple sign (croup) or "thumb sign" (epiglottitis)	▪ Hypoxemia ▪ Chest radiograph may show hyperinflation or air trapping (both sides in asthma/ bronchiolitis; one side with foreign body aspiration) ▪ Chest radiograph may show object in foreign body aspiration ▪ Rapid flu testing, respiratory viral studies positive	▪ Hypoxemia ▪ Chest radiography: airspace opacity, lobar consolidation or interstitial opacities	▪ Acute or chronic metabolic alkalosis or acidosis