

# M03: Pediatrics - Respiratory Emergencies (superseded 2023-10-24)

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Updated: March 19, 2024

Reviewed: March 01, 2021

## Introduction

*This practice guideline contains changes related to COVID-19.*

Respiratory conditions in children can be categorized into upper airway obstructions, lower airway obstructions, lower airway restrictive pathology, and disordered control of breathing.

Upper airway obstructions occur when there is an increased work of breathing due to an obstruction above the thorax. This can consist of a foreign body, tissue swelling, subglottic stenosis from previous intubation trauma, and the development of a tumour. Lower airway obstructions, by contrast, result from obstructive problems below the thorax: foreign bodies, and bronchial swelling or constriction.

Restrictions in the lower airways are a result of "stiffening" of lung tissue, caused by increased fluid accumulation from pulmonary edema, toxic exposure, allergic reactions, infiltration, and inflammation. Abdominal structures can also push on lung tissue, creating a restrictive condition.

Dysfunction within the respiratory center of the brain is responsible for the development of disordered breathing. These are more properly neurological problems with respiratory effects, and can include problems such as increased intracranial pressure, neuromuscular disease, and some poisonings and overdoses.

## Essentials

- Upper airway obstruction can be an uncomfortable call to attend as many patients may look ill or unwell, but require purely comfort levels for treatment.
  - See [→ B04: Croup and Epiglottitis](#) for additional information on the management of upper airway obstructions
- Lower airway obstruction results in an inability for the patient to get air out of the chest. This is usually due to excessive swelling or bronchospasm.
- Lower airway restrictive pathologies consist of numerous conditions that result in decreasing lung compliance or stiffening of the lung. The general management of these conditions concern correcting oxygenation and ventilation utilizing an escalation pathway of increasing FiO<sub>2</sub> via nasal cannula, face mask, heated HiFlow nasal cannula (2 L/min to a max of 60 L/min), NIV therapy, then intubation. Bronchospasm can be treated with a B<sub>2</sub> agonist.
- Disordered Control of Breathing are a series of conditions affecting the respiratory control center in the brain or neuromuscular diseases.

## General Information

- Continuous salbutamol can decrease serum potassium.
- Ventilating the lower airway restrictive disease patient may require high peak inspired pressure of up to 32 cmH<sub>2</sub>O and high PEEP of up to 10-15 cmH<sub>2</sub>O. Diligent monitoring for the development of a pneumothorax is required.
- Succinylcholine should be avoided in the patient with neuromuscular disease due to the possibility of triggering hyperkalemia or malignant hyperthermia.

## Interventions

### First Responder

- Prevent heat loss but do not overheat the patient
- Provide supplemental oxygen as required
  - [→ A07: Oxygen Administration](#)

- Manual airway maneuvers as required
  - → [B01: Airway Management](#)
  - Most pediatric airways can be effectively managed with proper positioning and an OPA/NPA (as per license level) and BVM without any requirements for further airway interventions. The gold standard for airway management is a self-maintained airway. Bag-valve mask is the preferred technique for airway management in pediatric respiratory emergencies and is reasonable compared with advanced airway interventions (endotracheal intubation or supraglottic airway).

#### Emergency Medical Responder – All FR interventions, plus:

- Provide supplemental oxygen to maintain SpO<sub>2</sub> ≥ 94%
  - → [A07: Oxygen Administration](#)
  - For bronchospasm, reactive airway disease, and asthma:
    - [Salbutamol](#)
    - ☐ ☐ **EMR: Requires completion of scope expansion education.**
- Convey with notification
- Consider intercept with additional resources

#### Primary Care Paramedic – All FR and EMR interventions, plus:

- Consider vascular access and fluid administration (in patients ≥ 12 years of age)
  - → [D03: Vascular Access](#)
- Consider supraglottic airway to maintain airway patency; an iGel with a viral filter pre-connected before insertion must be utilized
  - → [PR08: Supraglottic Airway](#)
- For bronchospasm, reactive airway disease, and asthma:
  - [Salbutamol](#) via MDI
  - Consider intramuscular [EPINEPHrine](#); epinephrine via intramuscular injection should be considered for a patient with SpO<sub>2</sub> < 90% and moderate to severe symptoms of asthma that are unresolved with the use of salbutamol administered by MDIs
  - See → [B03: Asthma and Bronchospasm](#) for additional information
- For croup and epiglottitis
  - Croup: consider nebulized [EPINEPHrine](#) (NOT for epiglottitis)
  - See → [B04: Croup and Epiglottitis](#) for additional information

#### Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Consider addition of [ipratropium](#) to supplement salbutamol
- Consider [magnesium sulfate](#) for significant and protracted bronchospasm
- Consider intraosseous cannulation if peripheral access is unavailable
  - → [PR12: Intraosseous Cannulation](#)
- Consider procedural sedation to facilitate airway management. Where SGAs and/or bag-valve mask ventilation fail to provide adequate oxygenation, tracheal intubation may be permissible in cases where paramedics are otherwise unable to obtain and maintain a patent airway. To be clear, this is for actual or immediately impending failure of airway patency unable to be managed by any other means other than intubation. **Clinical consultation required prior to attempting intubation.**
  - → [PR17: Procedural Sedation](#)
- Consider intubation in patients whose airways cannot be managed through less invasive means
  - → [PR18: Anesthesia Induction](#)
- Decompress suspected tension pneumothorax
  - Out-of-hospital needle thoracentesis should be considered AGMP. Although this is a low occurrence procedure, it does potentially expose the paramedic to an increased risk of exposure. If this procedure is needed, crews are directed to proceed with airborne PPE including face-shield, EHFR/N95 mask, gown, and gloves.
  - → [PR21: Needle Thoracentesis](#)

#### Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Mechanical ventilation (NIV and invasive)
- Chest tube maintenance
- Osmotic agents
- 3% Saline
- Infusion medication
- Antibiotic therapy
- Steroid therapy
- Nonselective adenosine receptor antagonist and phosphodiesterase inhibitor

## Evidence Based Practice

Pediatric Wheeze/Bronchospasm

### Supportive

- [Anticholinergic](#)
- [Beta Agonist-MDI](#)
- [Beta Agonist-Nebulized](#)
- [Beta Agonist-Parenteral](#)
- [Epinephrine-Nebulized](#)
- [Epinephrine-Parenteral](#)
- [Hypertonic Saline-Nebulized](#)
- [Oxymetry Monitoring](#)
- [Steroids-Parenteral](#)
- [High flow nasal canula](#)
- [Ketamine](#)

### Neutral

- [Magnesium Sulfate-IV](#)
- [Magnesium Sulfate-nebulized](#)
- [Oxygen-Humidified](#)
- [PEEP](#)
- [Steroids-Inhaled](#)
- [Steroids-Oral](#)
- [NiPPV](#)
- [ETCO2](#)
- [Temperature Monitoring](#)

### Against

Pediatric Stridor

### Supportive

- [Epinephrine-Nebulized](#)
- [Oxygen-Humidified](#)
- [Steroids-Oral](#)

### Neutral

### Against



