

**COUNTY OF SACRAMENTO
EMERGENCY MEDICAL SERVICES AGENCY**



Program Document: **Pediatric Airway Management**

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Signature on File

EMS Medical Director

Signature on File

EMS Administrator

Purpose:

- A. To establish a pediatric airway management skills guideline when managing a pediatric airway.

Authority:

- A. California Health and Safety Code, Division 2.5
- B. California Code of Regulations, Title 22, Division 9

Indications:

- A. Respiratory failure.
- B. Adjunct to indicated medical treatments.

NOTE: Respiratory failure is characterized by inadequate ventilation, insufficient oxygenation, or both. Anticipate respiratory failure if any of the following signs are present:

1. An increased respiratory rate, particularly with signs of distress (e.g., increased respiratory effort including nasal flaring, retractions, seesaw breathing, or grunting).
2. An inadequate respiratory rate, effort, or chest excursion (e.g., diminished breath sounds or gasping), especially if the mental status is depressed.
3. Cyanosis with abnormal breathing despite supplementary oxygen.

Airway Options:

- A. Newborn (≥ 2 kg) – 8 years (up to and including the **ORANGE** length on Handtevy or Broselow length-based tapes if age is unknown):

1. BLS airway.
 2. Supraglottic airway **(AEMT/Paramedic ONLY)**.
- B. Age $\geq$ 8 years (or meets/exceeds the **GREEN** length on Handtevy or Broselow length-based tapes if age is unknown):
1. BLS airway.
 2. Supraglottic airway **(AEMT/Paramedic ONLY)**.
 3. Endotracheal Intubation **(Paramedic Only)**.

Procedure:

BLS:

- A. BLS airway management comes down to optimal positioning, which can be improved by emphasizing the following:
1. Proper positioning
 - a. Chin lift or jaw thrust maneuver.
 - b. Padding/roll under the shoulder to produce a sniffing position.
 - c. Alignment of the external auditory canal with the sternal notch.
 2. Use of OPA or NPA when possible and appropriate.
- B. Additional Considerations
1. Infants and young children have large occiputs compared to adults. This major difference causes more flexion of the neck when the patient is supine. Also, children have larger tongues, which can cause airway obstruction. Extra care must be taken to achieve adequate positioning and relief of tongue obstruction with airway adjuncts.
 2. If skilled rescuers are available, a 2-person technique may provide more effective bag-mask ventilation than a single-person technique. A 2-person technique may be required to provide effective bag-mask ventilation when there is significant airway obstruction, poor lung compliance, or difficulty in creating a tight seal between the mask and the face. One rescuer uses both hands to open the airway and maintain a tight mask-to-face seal while the other compresses the ventilation bag. Both rescuers should observe the chest to ensure chest rise. Because the 2-person technique may be more effective, be careful to avoid delivering too high a tidal volume that may contribute to excessive ventilation.
 3. Gastric inflation can be minimized by using lower inspiratory pressures, which is done by delivering breaths slowly and providing smaller tidal volumes.

Procedure:

ALS:

- A. When BLS airway management cannot maintain adequate ventilation or oxygenation.
- B. Supraglottic airway insertion may be considered in newborns (≥ 2 kg) – 8 years (up to and including the **ORANGE** length on Handtevy or Broselow length-based tapes if age is unknown).
- C. Endotracheal intubation may be considered in age ≥ 8 years (or meets/exceeds the **GREEN** length on Handtevy or Broselow length-based tapes in age is unknown).
- D. Pediatric Endotracheal Intubation Considerations (≥ 8 years of age):
 - 1. Endotracheal intubation in children requires special training because the pediatric airway anatomy differs from that of the adult. The likelihood of successful endotracheal tube placement with minimal complications is related to the length of training, supervised experience in the field, and adequate ongoing experience.
 - 2. In preparation for intubation, confirm that tubes with an internal diameter (ID) 0.5 mm smaller and 0.5 mm larger than the estimated size are available. During intubation, if the endotracheal tube meets resistance, place a tube 0.5 mm smaller instead.
 - 3. ET size can be estimated by using the formula: Cuffed endotracheal tube ID (mm) = $3.5 + (\text{age}/4)$.
 - 4. Continuous waveform end-tidal CO₂ (ETCO₂) monitoring is required.
 - 5. Two attempts at an advanced airway may be made, and then the Paramedic shall reassess the adequacy of BLS airway interventions. If BLS airway interventions are insufficient, a third advanced airway attempt will be made by a different (non-intern) Paramedic if available, or a supraglottic airway device shall be used. A supraglottic airway device shall be used on the fourth advanced airway attempt if no contraindications exist.
 - 6. Inadequate oxygenation and ventilation with an iGel device on the 4th attempt will constitute a failed airway and trigger diversion and a FAILED AIRWAY PRE-ALERT to the closest ED for airway management.
- E. If an intubated patient's condition deteriorates, consider the following possibilities (mnemonic DOPE):
 - 1. **D**isplacement of the tube
 - 2. **O**bstruction of the tube
 - 3. **P**neumothorax
 - 4. **E**quipment failure

Cross Reference:

PD# 8829 – Noninvasive Ventilation (NIV)
PD# 8830 – Supraglottic Airway i-Gel®
PD# 9009 – Neonate Resuscitation
PD# 9006 – Cardiac Arrest