Sierra – Sacramento Valley EMS Agency Program Policy			
Airway & Ventilation Management			
	Effective: 06/01/2022	Next Review: 01/2025	**1102**
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PURPOSE:

To establish standards for airway and ventilation management by EMS personnel.

AUTHORITY:

A. California Health and Safety Code § 1797.220 and 1798.

B. California Code of Regulations, Title 22, Division 9.

POLICY:

A. A patent upper airway is a critical component of effective ventilation. The more open an airway is, the lower the ventilation pressure and volume required for effective ventilation. Airway occlusion is worsened by flexion of the head and opening of the mouth. Thus, any maneuver used to open the airway should correct these issues.

B. BLS airway adjuncts (NPA/OPA) should be utilized on every patient receiving bag valve mask (BVM) ventilation, unless contraindications for their use are present.

C. Excessive ventilation of patients may result in adverse hemodynamic effects and/or decreased cerebral blood flow, and should be avoided.

D. EMS personnel must weigh the benefits of an advanced airway against the adverse effects of interrupting chest compressions to place the device in cardiac arrest patients. If BVM ventilation is adequate, EMS personnel may defer placement of an advanced airway device until the patient fails to respond to initial CPR and defibrillation or until return of spontaneous circulation is achieved. King or i-gel airway devices are preferred for cardiac arrest patients when attempts at orotracheal intubation are likely to interrupt continuous chest compressions.

E. Correct placement of an advanced airway device must be confirmed with physical assessment in addition to end-tidal CO_2 ($EtCO_2$) monitoring using waveform capnography ($PetCO_2$) or a colorimetric CO_2 detector. $PetCO_2$ is the preferred method of $EtCO_2$ monitoring, and shall be utilized on all patients with an advanced airway when available. Colorimetric CO_2 detectors initially utilized by BLS providers shall be replaced by $PetCO_2$ as soon as possible after arrival of ALS personnel.

F. ALS/LALS personnel must confirm patency of an advanced airway device placed by an EMT, and assume responsibility for the airway once they establish patient care.

G. Advanced airway device location and patency must be immediately verified any time there is an airway concern, when there is a movement of the patient, or when patient care is transferred to other prehospital or hospital personnel.

H. If the advanced airway device is determined to no longer be patent, appropriate measures must be immediately taken to establish a patent airway. This may include removal of the advanced airway device and utilization of BLS airway measures until an advanced airway can be re-established.

PROCEDURE:

A. Ventilation Management:

1. BVM ventilation should be performed by two rescuers whenever possible, one to hold the mask seal with two hands and the other to squeeze the BVM device at the appropriate rate. In addition to using an OPA or NPA, a jaw-thrust maneuver should be used while holding the mask seal.

2. Deliver ventilations slowly, over 1 - 2 seconds. Use as low of a tidal volume as needed to achieve normal chest rise and fall.

3. An appropriate ventilation rate is the fewest ventilations per minute that maintain SpO2 and $EtCO_2$ within normal ranges.

4. A Positive End Expiratory Pressure (PEEP) valve may be utilized in combination with a bag-valve ventilation device under the following conditions:

   - The patient does not have any of the following contraindications:
     - Suspected pneumothorax.
     - Suspected head injury or increased intracranial pressure.
     - Hypovolemic shock.
   - If an advanced airway device is not in place, BVM ventilations must be performed by two rescuers to maintain PEEP effectiveness.
   - PEEP shall be maintained at 5 cmH2O.

5. An Impedance Threshold Device (ITD) may be utilized in combination with a bag-valve ventilation device for patients under the following conditions:

   - Adult non-traumatic cardiac arrest.
   - If an advanced airway device is not in place, BVM ventilations must be performed by two rescuers to maintain ITD effectiveness.

B. Advanced Airway Device Utilization/Management:

1. The following procedures should be utilized when placing an advanced airway device, as patient condition and circumstances permit:

    - If possible, pre-oxygenate with high flow oxygen via non-rebreather mask (NRM) or BVM as appropriate for three minutes.
    - Apply high flow oxygen (10 - 15 L/min) via nasal cannula (NC) in addition to NRM or BVM to augment pre-oxygenation.
    - Position patient in a semi-recumbent or reverse trendelenburg position if possible.
    - Continue utilizing passive oxygenation via NC during intubation attempts.
    - Perform jaw thrust to maintain pharyngeal patency and apply airway device.

2. Orotracheal Intubation Criteria:

    - Indication: Adult patients in need of advanced airway protection and/or unable to be adequately ventilated with a BVM.
    - No more than two total intubation attempts are allowed per patient. Each attempt should last no longer than 30 seconds. Ventilate with 100% oxygen for a minimum of one minute prior to each attempt. An intubation attempt is defined as the introduction of the endotracheal (ET) tube past the teeth.
    - Consider utilizing an ET tube introducer for patients with a difficult airway (e.g., suspected spinal injuries, supraglottic or laryngeal edema present, epiglottis can be visualized but vocal cords cannot, etc.).
    - If orotracheal intubation is unsuccessful, a supraglottic (i-gel) airway device shall be utilized if an advanced airway remains necessary.

3. Supraglottic (i-gel) Airway Device Criteria:

    - Indications:
        - Adult patients in need of advanced airway protection and/or unable to be adequately ventilated with a BVM, when orotracheal intubation is unavailable or unsuccessful.
        - Adult patients in need of rapid advanced airway control when orotracheal intubation is anticipated to be difficult or likely to interrupt continuous chest compressions.
        - Paramedic/AEMT personnel only:
            - Pediatric patients (≤14 years old) in need of airway protection or unable to be adequately ventilated with a BVM.
    - Contraindications:
        - Intact gag reflex.
        - Caustic ingestion.
        - Unresolved complete airway obstruction.

- Trismus or limited ability to open the mouth and insert the device (relative).
- Oral trauma (relative).
- Distorted anatomy that prohibits proper device placement (relative).

4. Advanced Airway Device Placement Confirmation:

   - While ventilating, auscultate both lung fields for breath sounds and confirm chest rise. Listen over the left upper quadrant of the abdomen for absence of air in the stomach.
   - Attach an $EtCO_2$ monitoring device, which must remain in place until arrival at the hospital or cessation of resuscitation efforts.
   - All methods and devices used to confirm advanced airway device placement must be documented on the patient care report.

5. If a patient with an advanced airway in place regains consciousness, do not remove the advanced airway. Use restraints as necessary and consider sedation with Midazolam 5 mg IV/IO OR 10 mg IM/IN for adult patients. Contact the base hospital for midazolam dosing consultation on pediatric patients if necessary.