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RESPIRATORY PROTOCOLS

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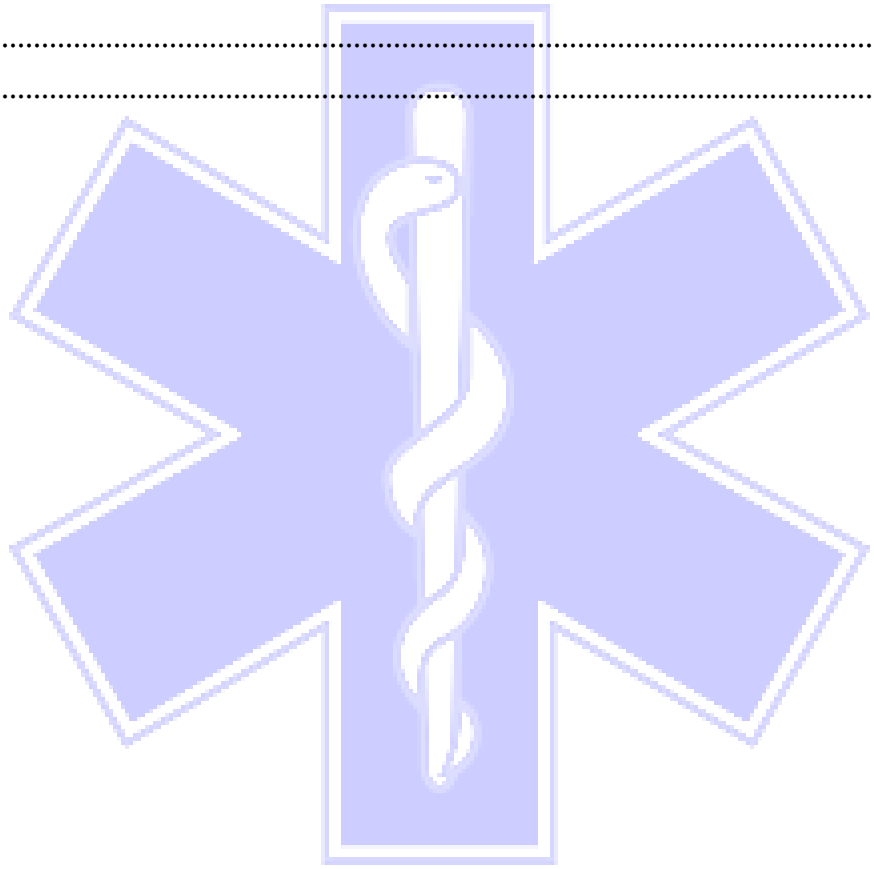

Basic Airway Control

Establishing and maintaining an open airway and assuring adequate ventilation is a treatment priority with all patients. Proper techniques must be used to assure treatment maneuvers do not inadvertently complicate the patient's condition.

Basic Airway Control

1. Assure an open airway by utilizing either the head tilt/chin lift maneuver, the modified jaw thrust maneuver or the tongue-jaw lift maneuver. The head tilt/chin lift maneuver is **NOT** to be used if there is any possibility of cervical spine injury.

2. Expose the chest and visualize for chest rise and movement, simultaneously listen and feel for air movement at the mouth and nose. This procedure will need to be done initially and after correcting an obstruction and securing the airway.

3. If the chest is not rising and air exchange cannot be heard or felt:

    a) Deliver two positive-pressure ventilations. If resistance continues, follow AHA sequences for obstructed airway rescue.
    b) Reassess breathing and check for a carotid pulse.
    c) If spontaneous respirations return and a pulse is present, provide supplemental Oxygen by non-rebreather mask or assist respirations with bag-valve mask (BVM) at 15 L/min.
    d) If the patient remains breathless and a pulse is present, initiate ventilations with a BVM at 15 L/min at a rate of 8-12 breaths per minute.
    e) If the patient remains breathless and a pulse is not present, initiate CPR and institute the appropriate cardiac protocol.

4. If the patient presents with stridor, "noisy breathing" or snoring respirations, render treatment for partial airway obstruction in accordance with AHA guidelines.

    a) Reassess effectiveness of the airway maneuver.
    b) If initially unable to resolve partial airway obstruction, suction the airway and visualize the pharynx for any evidence of foreign objects. Perform a finger sweep if a foreign object can be seen.
    c) If partial airway obstruction persists, treat according to AHA guidelines for resolving a <u>complete</u> airway obstruction.

5. Once the obstruction has been corrected:

    a) Insert an oropharyngeal airway in the unconscious patient (without a gag reflex).

Basic Airway Control

Basic Airway Control {continued}

b) Insert a nasopharyngeal airway in the conscious patient or an unconscious patient with a gag reflex. *Note*: NPA is contraindicated in setting of head/facial trauma or recent skull base surgery

6. Establish the presence and adequacy of breathing by observing the frequency, depth and consistency of respirations. Also, observe the chest wall for any indications of injuries which may contribute to respiratory compromise.

7. Supplemental oxygen should be delivered to any patient who exhibits signs of difficulty breathing, sensation of shortness of breath, tachypnea or bradypnea, use of accessory muscles, altered level of consciousness/altered mental status, cyanosis, cardiac symptoms, head injury or any indications of shock.

   a) Supplemental oxygen should be provided by a non-rebreather mask (NRM) at a rate of 15 L/min (assuring reservoir bag is inflated).
   b) If patient is unable to tolerate the NRM, administer oxygen via nasal cannula at a rate of 6 L/min.

8. Bag-valve mask ventilation with supplemental oxygen at 15 L/min should be initiated at the rate of 12/min if respirations are absent, there is evidence of inadequate ventilation, respiratory rate is < 8/min, absent or diminished breath sounds or wounds to the chest wall.

A-EMT/ EMT-I Care

1. If BVM ventilations are being performed, providers may add a PEEP valve at 5-10 cm of H_20 to the BVM when ventilating with OPA/NPA, supraglottic, or endotracheal tube to increase or improve oxygenation.
   ***PEEP valves will only be used in patients with a pulse and those ≥16 years of age.**

Pearls

- Inadequate maintenance of the patient's airway, inappropriate airway maneuvers, using inappropriately sized airway equipment and/or failure to recognize an obstructed airway will complicate the patient's condition.
- Do NOT use the head tilt/chin lift maneuver on a patient with a suspected cervical spine injury.
- Proper facemask seal during artificial ventilations is imperative to assure adequate ventilation.

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Airway Obstruction Procedure

An airway obstruction is life threatening and must be corrected immediately upon discovery.

1. If the patient has an obstructed airway and is still conscious:

    a) Encourage the patient to cough.
    b) Perform 5 abdominal thrusts or chest thrusts if the cough is unsuccessful.
    c) Repeat until the obstruction is relieved or the patient becomes unconscious.
    d) Administer oxygen at 15 L/min if the patient has a partial airway obstruction and is still able to breathe.

2. If the patient is unconscious:

    a) Open the patient's airway and attempt to ventilate.
    b) Reposition the head and reattempt to ventilate if initial attempt is unsuccessful.
    c) Immediately begin CPR.
    d) Perform visualized finger sweep of the patient's mouth and reattempt to ventilate.
    e) Repeat steps (c) and (d) if obstruction persists.
    f) **EMT** & **A-EMT/ EMT-I CARE:** immediately initiate Paramedic Care intercept.
    g) **A-EMT/ EMT-I & Paramedic Care:** attempt direct extraction via laryngoscopy with Magill forceps.
        1. Use the laryngoscope and examine the upper airway for foreign matter and suction as needed.
        2. Remove any foreign objects with forceps and suction.
        3. Re-establish an open airway and attempt to ventilate.
        4. If the obstruction is relieved, continue with airway control, ventilations, assessment, and care.
    h) Continue CPR until obstruction is resolved. Follow appropriate algorithms.

Pearls

- Maintain in-line c-spine stabilization using 2 EMTs in patients with suspected cervical spine injury.

Apneic Oxygenation

Flooding the nasopharynx with oxygen is one of the most effective ways to preoxygenate a patient prior to an elective airway procedure. The same principle applies to a non-elective (emergent airway) up until the point where the airway is occluded with the distal tube cuff. Utilizing apneic oxygenation can allow additional time for airway attempts and help ensure that the first airway attempt is the successful and non-traumatic airway attempt.

Procedure

1. Place a standard nasal cannula (not ETCO2 style) on the patient with the prongs in the nares during the preoxygenation phase prior to intubation/ supraglottic airway placement.
2. Attach the nasal cannula to a secondary oxygen source and turn the oxygen up to 15L/min.
3. Additionally, the patient should be pre-oxygenated prior to airway placement using either a bag valve mask attached to 15L/min via primary oxygen source or a nonrebreather mask (if spontaneous respirations prior to intubation are adequate) at 15L/min.
4. Ensure patient is on a pulse oximeter and cardiac monitor. Just prior to airway placement, remove the primary pre-oxygenation source (BVM or nonrebreather) but leave the nasal cannula in place at 15L/min.
5. Obtain Definitive airway based on *Supraglottic Airway Procedure* or *Advanced Airway Procedure*.
6. Remove nasal cannula only after ETT or supraglottic airway placement is confirmed and secured.
7. Apneic oxygenation is intended to extend the safe apnea time during airway placement before desaturation occurs; it is not a replacement for adequate preoxygenation.

Supraglottic Airway Procedures

(EMT, A-EMT/ EMT-I, and Paramedic Care)

A Supraglottic Airway device is an effective airway adjunct when intubation is not available or difficult to perform. Insertion is rapid and easy. It does not require specialized equipment or visualization of the larynx. MEMS currently utilizes The i-gel® as its approved SGA.

i-gel®

- The i-gel® is an airway device designed for emergency or difficult airway management in the apneic or unresponsive patient without a gag reflex.
- It is the primary airway of choice for adult and pediatric cardiac arrest patients.
- It is the back-up airway in cases of an unsuccessful intubation attempt.

Contraindications

- Active gag reflex
- Ingestion of a caustic substance (e.g. gasoline, drain cleaner, etc.).
- Morbid obesity
- Tracheostomy (it will be ineffective).
- Patient less than 30kg (**EMT Care** provider restriction only).
- Known or suspected esophageal disease (*e.g.* esophageal varices).
- Use caution in pregnant females.

i-gel size	Patient size	Patient weight guidance (kg)
3	Small adult	30-60
4	Medium adult	50-90
5	Large adult+	90+

Confirm placement using *Airway Confirmation Procedure* 13.H.1

1. (**Paramedic Care only**) Insert appropriately sized gastric tube if time permits.
   a. Use a 12Fr gastric tube for i-gel® sizes #2- #5
   b. Use a 10Fr gastric tube for i-gel® size #1.5

Critical Thinking

- If unsuccessful in placing a Supraglottic Airway, remove the airway and a **second attempt** with the device following the same insertion procedures may be made. If this attempt is unsuccessful, immediately revert to *Basic Airway Control Procedures*.
- A proficient provider can insert an i-gel® in 5 seconds or less.
- Do NOT administer medications via any Supraglottic Airway Device.
- **Warning:** *To avoid the possibility of the device moving up out of position prior to being secured in place, it is essential that as soon as insertion has been successfully completed, the i-gel® is held in the correct position until being secured.*
- **Warning:** *Do not apply excessive force on the device during insertion.*
- Supraglottic Airways do not prevent the aspiration of gastric contents.

Advanced Airway Control

(A-EMT/ EMT-I & Paramedic Care Only)

Endotracheal intubation is the only way to provide a true definitive airway. However, if endotracheal intubation is difficult or unsuccessful, intubation may be attempted utilizing the "bougie" or consider a supraglottic airway. Basic airway control techniques should always be maintained prior to and during any advanced airway procedure and should always be your primary means of airway control should other methods fail.

Video Laryngoscopy

As an alternative to direct laryngoscopy, video laryngoscopes may be used. You should follow the manufacturer directions specific to the video laryngoscope you are using. Some video laryngoscopes should be used with proprietary stylets in the endotracheal tube as recommended by the manufacturer. Video laryngoscopy is not ideal for situations in which the camera may become obscured such as blood in the pharynx or excessive secretions, recent emesis, or hematemesis or hemoptysis. Many video laryngoscopes are advantageous for intubating while c-spine precautions must be maintained or if an anterior larynx is expected. Whenever using a video laryngoscope as a primary method of intubation, direct laryngoscopy must be also immediately available. Endotracheal tube placement should be confirmed just as with direct laryngoscopy.

Endotracheal tube introducer, AKA "Bougie" procedure

The endotracheal tube introducer, AKA "Bougie" is a useful tool to help facilitate difficult intubation. Unlike a stylet, a bougie is inserted independently of the ET tube and is used as a guide, over which an ET Tube may be placed into the trachea. It is used where a difficult intubation is anticipated, or a poor view of the glottic opening has been confirmed on laryngoscopy.

1. Prepare the endotracheal tube introducer for use: Curve the bougie and ensure the distal tip is formed into a J (coudé) shape.
2. Utilize the laryngoscope as you would do during intubation to obtain the best possible view of the glottic opening. You should always be able to view the tip of the epiglottis and, ideally, the arytenoid cartilages.
3. Advance the Bougie, continually observing its distal tip, with the concavity facing anteriorly.
4. Visualize the tip of the bougie passing posteriorly to the epiglottis and (where possible) anterior to the arytenoid cartilages.
5. Once the tip of the bougie has passed the epiglottis, continue to advance it in the mid-line so that it passes behind the epiglottis but in an anterior direction.
6. As the tip of the bougie enters the glottic opening you may feel "clicks" as it passes over the tracheal rings, or the tip may stop against the wall of the airways. This suggests correct insertion, although this cannot be relied upon to indicate correct positioning.

Advanced Airway Control

(A-EMT/ EMT-I & Paramedic Care Only)

Endotracheal tube introducer, AKA "Bougie" procedure {Continued}

7. Hold the Bougie firmly in place and pass the endotracheal tube over the proximal end of the bougie.
8. As the proximal tip of the bougie is re-exposed, carefully grasp it, assuming control of the bougie.
9. The ET tube should then be carefully advanced along the Bougie and hence through the glottic opening, taking care to avoid movement of the bougie.
10. Once the ET tube is fully in place hold it securely as you slowly withdraw the Bougie.

Pearls

- The Bougie should never be allowed to move up and down during the procedure.

Airway Control in the Trauma Patient

Any type of airway manipulation may be dangerous during airway control of the suspected spinal injury patient. Maintain in-line stabilization while attempting airway control. Consider utilizing a supraglottic airway or video laryngoscopy *in lieu of traditional intubation.*

1. A minimum of two (2) trained rescuers is needed to assure special attention to spinal precautions.
2. One rescuer will apply manual in-line stabilization by placing the rescuers hands about the patient's ears with the little fingers under the occipital skull and the thumbs on the face over the maxillary sinuses.
3. The rescuer performing airway placement should be at the head.
4. Maintain the patient's head in a neutral position during intubation or insertion of a supraglottic airway, taking care to prevent cervical manipulation.

Prohibited Advanced Airway Procedures

Attempting difficult, unfamiliar, and rarely performed procedures may pose a danger to the patients they are being performed on. Certain procedures that are used in the hospital setting are **not approved** for prehospital personnel in the Memorial EMS System. These include:

- Nasotracheal Intubation
- Percutaneous Transtracheal Ventilation
- Cricothyrotomy/Surgical Airway

Pearls

- If intubation attempts fail (2 attempts), switch to a supraglottic airway or revert to basic airway control.
- There should always be waveform capnography present if the tube is in the proper position.

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Advanced Airway Control

(Paramedic Care Only)

Medication Assisted Intubation

Rare situations occur where the respiratory distress patient is so exhausted from the efforts of breathing that their ability to continue any respiratory effort has a very limited future. In such situations, patients (typically those with diagnosed respiratory and circulatory diseases) may identify that they have been intubated before and that they are not going to be able to continue the work of breathing.

Paramedic Care

1. Bag valve mask, OPA/NPA, supraglottic airway and intubation equipment including bougie must be readied. Until all equipment is readied, patient's respirations can be assisted with BVM and 100% Oxygen.
2. Apply **Waveform Capnography**
3. Provide **Apneic Oxygenation** at 15 LPM via nasal cannula.
4. **Ketamine:** 2mg/ kg IV/IO IBW over 2 minutes (dosing based on Ideal Body Weight)

   The formula for calculating IBW is:
   Men= 50 kg + 2.3 kg for every inch over 5 foot tall.
   Women= 45.5 kg + 2.3 kg for every inch over 5 foot tall.

5. **Hurricane Spray:** 1-2 sprays in posterior pharynx. May repeat once in 30 seconds.
6. **Utilize all available airway adjuncts including the Bougie**
7. **Obtain Definitive Airway** based on Supraglottic *Airway Procedure* or *Advanced Airway Procedure*.
   1. If the intervention takes greater than 20 seconds, stop and ventilate the patient before the second (final) attempt.
8. **Fentanyl:** 1 mcg/kg (Maximum 100 mcg single dose) slow IV/IO for comfort **after** airway is placed and confirmed using *Airway Confirmation Procedure* 13.H.1
9. If patient has a history of renal failure the dose should be reduced by half.
   Contact Medical Control for re-dosing of Ketamine and/or Fentanyl
10. Medication assisted intubation will be reviewed through the CQI process. EMS paperwork should include EKG and capnography tracings.

Failed Airway

If unable to maintain SPO2≥ 90%, regardless of patient positioning, the most proficient scene provider should re-assess ability to increase SPO2≥ 90% with all available, complaint appropriate adjuncts up to and including *Medication Assisted Intubation*. If SPO2 remains <90% revert to NPA with BVM (regardless of contraindications), immediate transport and hospital notification.

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Orogastric (OG) Tube Insertion Procedure

(Transport Paramedic Care Only)

Indications

Indication for orogastric (OG) tube placement in the Memorial EMS System is:

- Gastric decompression of an adult cardiac arrest patient after endotracheal intubation has been performed and placement verified; OR with use of a supraglottic airway.

Contraindications

- Known esophageal varices
- Esophageal stricture
- Esophageal or stomach cancer
- Esophagectomy or partial gastrectomy
- Gastric bypass surgery
- Penetrating neck trauma

OG Insertion Procedure

1. Estimate the length of the tube needed to reach the stomach by measuring the tube from the corner of the mouth to the earlobe and down to the xiphoid process. Mark the length with tape.
2. Lubricate the Salem sump tube (18F) with a water-soluble lubricant (*e.g.* K Y Jelly).
3. Insert the tube through the oropharynx or through the gastric access lumen on the supraglottic airway until the marked depth is reached.
4. If the tube coils in the posterior pharynx, direct laryngoscopy can be utilized to place the tube in the esophagus.
5. Verify placement (see *OG Placement Verification*).

OG Placement Verification

1. Using a 60mL catheter tip syringe, instill 30mL of air into tube and auscultate over epigastrium for air sounds.
2. Aspirate for gastric contents and assess for cloudy, green, tan, brown, bloody or off-white color contents consistent with gastric contents.
3. Secure tube with tape.

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Orogastric (OG) Tube Insertion Procedure
(Transport Paramedic Care Only)

Gastric Decompression

Once placement of the Salem sump tube has been verified, begin gastric decompression in one of the following manners:

1. Attach the tube to portable suction (and suction intermittently as needed).
2. Attach the tube to the onboard suction (and suction intermittently as needed).
3. Attach the tube to continual low suction (approximately 60 mmHg) using the onboard suction.
4. If suction is not readily available, connect the 60mL syringe to the tube while keeping the (blue) air vent patent. This will allow the sump function of the tube to work until suction can be applied and will also prevent gastric contents from leaking from the tube.

Pearls

- If you cannot place the OG tube quickly (no more than 2 attempts), forego the procedure – do not delay transport.
- The **blue** air vent must remain patent to ensure proper sump function and to prevent damage to the gastric lining during suctioning.

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Respiratory Distress Protocol

Correct management of the patient in respiratory distress is dependent on identifying the etiology of the distress and recognizing the degree of the patient's distress. Signs and symptoms of respiratory distress will include:

- Shortness of breath
- Difficulty speaking
- Altered mental status
- Diaphoresis
- Use of accessory muscles
- Retractions
- Respiratory rate less than 8 or greater than 24

If the etiology is questionable or your assessment does not provide a clear etiology, Consult Medical Control for direction in patient care.

Asthma/COPD/Pneumonia

In addition to general signs & symptoms of respiratory distress, patients may present with inspiratory & expiratory wheezing and/or "tight" lung sounds with decreased air movement.

EMR Care

EMR Care should be focused on assessing the situation and initiating routine patient care to treat for shock.

1. Render initial care in accordance with the *Routine Patient Care Protocol*.
2. **Oxygen**: If respiratory distress is noted, 15 LPM via NRM or if unable to tolerate the mask, 6 LPM via nasal cannula.
    a. If no obvious respiratory distress is noted, apply a pulse ox. If ≥ 94% and no signs/ symptoms of respiratory distress, no Oxygen is required. If ≤94% apply nasal cannula at 2-6 LPM or 15 LPM via NRM as needed to raise pulse ox to ≥94%.
3. May suggest and assist patient with home prescribed inhalers.
4. Be prepared to support with **BVM** if necessary.

EMT Care

EMT Care should be directed at conducting a thorough patient assessment, initiating routine patient care to treat for shock and preparing the patient for or providing transport.

1. EMT Care includes all components of *EMR Care.*
2. **DuoNeb:** Albuterol (Proventil) 2.5mg + Ipratropium bromide (Atrovent) 0.5mg via nebulizer via nebulizer. May repeat the Duoneb x2 after completion of the first if needed for continued symptomatic relief.
3. Apply **Waveform Capnography** (if equipped).

Respiratory Distress Protocol

Asthma/COPD/Pneumonia {Continued}

EMT Care (cont.)

4. **Initiate a Paramedic Care intercept** if needed and transport as soon as possible.
5. Contact receiving hospital as soon as possible or Medical Control if necessary.

A-EMT/ EMT-I Care

A-EMT/ EMT-I Care should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, and preparing for or providing patient transport.

1. A-EMT/ EMT-I Care includes all components of *EMT* Care.
2. Obtain peripheral IV access.
3. **In-line nebulizer** may be utilized if patient is unresponsive or in respiratory arrest.
4. **Epinephrine 1:1000**: 0.5mg IM if the patient is suffering status asthmaticus. **Epinephrine administration should be the priority in these critical patients.**
   - Special consideration should be given to administering Epinephrine if the patient is > 40 years old, has an irregular heart rate, has a heart rate > 150 bpm or has a significant history of heart disease. **Consult Medical Control prior to administration if the patient meets any of these criteria.**
5. For ongoing respiratory distress, the provider may initiate **CPAP** (see CPAP protocol)

Paramedic Care

Paramedic Care should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, and preparing for or providing patient transport.

1. Paramedic Care includes all components of A-EMT/ EMT-I Care.
2. **Methylprednisolone** (Solu-Medrol): 125 mg IV.
3. In patients with persistent respiratory distress, consider **Magnesium Sulfate:** 2gm in 100ml D5W IV over 10-15 minutes.

Pearls

CPAP (Continuous Positive Airway Pressure) can be applied by **A-EMT/ EMT-I/Paramedic Care** to achieve PEEP (Peak End Expiratory Pressure) for patients presenting with signs & symptoms of respiratory distress. The patient must be alert and able to adequately ventilate spontaneously for CPAP to be initiated.

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Respiratory Distress Protocol

Flash Pulmonary Edema

In addition to general signs & symptoms of respiratory distress, patients may present with rales (or "crackles"), pedal edema, distended neck veins (JVD), orthopnea and tripod positioning. Commonly associated with CHF exacerbation.

EMR Care

EMR Care should be focused on assessing the situation and initiating routine patient care to treat for shock.

1. Render initial care in accordance with the *Routine Patient Care Protocol*.
2. **Oxygen**: If respiratory distress is noted, 15 LPM via NRM or if unable to tolerate the mask, 6 LPM via nasal cannula.
    a. If no obvious respiratory distress is noted, apply a pulse ox. If $\geq$ 94% and no signs/ symptoms of respiratory distress, no Oxygen is required. If $\leq$94% apply nasal cannula at 2-6 LPM or 15 LPM via NRM as needed to raise pulse ox to $\geq$94%.
3. Be prepared to support with a **BVM** if necessary.

EMT Care

EMT Care should be directed at conducting a thorough patient assessment, initiating routine patient care to treat for shock and preparing the patient for or providing transport.

1. EMT Care includes all components of *EMR Care*.
2. Be prepared to support the patient' respirations with BVM if necessary.
3. Apply **Waveform Capnography** (if equipped)
4. Initiate **Paramedic Care** intercept and transport as soon as possible.
5. Obtain **12-Lead EKG** and transmit to receiving hospital if capabilities exist and time permits.

A-EMT/ EMT-I Care

A-EMT/ EMT-I Care should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, and preparing for or providing patient transport.

1. A-EMT/ EMT-I Care includes all components of *EMT Care*.
2. Render initial care in accordance with the *Routine Patient Care Protocol*.
3. For ongoing respiratory distress, the provider may initiate **CPAP** (see CPAP protocol)
4. Obtain peripheral **IV access**.

Respiratory Distress Protocol

Flash Pulmonary Edema

A-EMT/ EMT-I Care {Continued}

5. **Nitroglycerin (NTG)**: 0.4mg SL. May repeat every ***3-5 minutes*** to a total of 3 doses (if systolic BP remains > 110mmHg).
6. Contact receiving hospital as soon as possible. *Communicate early in the transmission if your patient is on CPAP so the appropriate equipment is ready upon patient arrival*.

Paramedic Care

Paramedic Care should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, and preparing for or providing patient transport.

1. Paramedic Care includes all components of *A-EMT/ EMT-I Care*.
2. Always monitor for and be prepared to address respiratory failure.

Critical Thinking Elements

- **Constant reassessment of the respiratory distress patient is imperative to assure that the patient has adequate ventilation and oxygenation. Closely monitor the patient's response to treatment rendered.**
- **Patients in respiratory distress should be transported in an upright position to assist their respiratory effort.**
- **Do not delay CPAP application for administration of Nitroglycerin (*i.e.* you do not need to wait until all three (3) doses of NTG SL have been administered before applying CPAP).**
- **CPAP has its greatest effect when used without interruptions. CPAP should not be removed to administer NTG, a provider may coordinate those interruptions when CPAP must be transferred from portable to onboard O2 tanks.**
- **If wheezing is present and if ETCO2 waveform (if available) supports concurrent bronchospasm, refer to BRONCHOSPASM/ASTHMA/COPD Protocol.**

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Airway Confirmation Procedure

(EMT, A-EMT/ EMT-I, Paramedic Care)

Consistency in airway placement **confirmation** methods and the **documentation** of such is a priority in our EMS System. The following are provider-level specific requirements to confirm Supraglottic Airway and Endotracheal Tube placement. All SGA's and ETT's placed or attempted will be reviewed via the MEMS CQI Process. Failure to document in this manner will be actionable by the EMS System.

EMT Care

A "confirmed airway" at the EMT Care level is defined as established bilateral breath sounds/ absent epigastric noises when BVM ventilations are performed and one of the following:

- Continuous waveform capnography (if equipped).
- + Colormetric device color change purple to gold (eg "Easycap").
- Chest rise and fall.
- Condensation/fogging in the tube.
- Clinical improvement (e.g. skin color, VS, level of responsiveness).

These findings should be **reassessed and documented** following any major move of the patient, including but not limited to:

- Placing patient on a backboard or CPR device.
- Loading patient in an ambulance/ transferring care to higher level.
- Unloading the patient at the hospital/ transferring care to E.D. staff.

A-EMT/ EMT-I and Paramedic Care

A "confirmed airway" at the A-EMT/ EMT-I and Paramedic Care level is defined as established bilateral breath sounds/ absent epigastric noises when BVM ventilations are performed and **continuous waveform capnography**. These must be performed and documented at the A-EMT/ EMT-I and Paramedic Care level. Further supporting documentation may include any of the following:

- Visualization of tube passing chords (ETT only).
- + Colormetric device color change purple to gold (eg "Easycap").
- Chest rise and fall.
- Condensation/fogging in the tube.
- Clinical improvement (eg skin color, level of responsiveness).

These findings should be **reassessed and documented** following any major move of the patient, including but not limited to:

- Placing patient on a backboard or CPR device.
- Loading patient in an ambulance/ transferring care to higher level.
- Unloading the patient at the hospital/ transferring care to E.D. staff.

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Capnography Procedure

(EMT, A-EMT/ EMT-I, Paramedic Care)

Capnography, specifically waveform capnography, provides assessment of the quality of respiratory efforts as well as patency of airway adjuncts. Capnography can identify changes much sooner than waiting for signs and symptoms in a patient who is not able to communicate those changes. **Capnography is the most reliable and easily assessable tool for verification of airway patency and effects of respiratory support.**
All patients with advanced airways and/or complaining of respiratory distress should monitored based on their qualitative (waveform) and quantitative capnography. Additional complains such as sepsis, and trauma would also benefit from capnography.

Treatment and Interventions

1. Assemble all equipment prior to utilization.
    a. If required by unit model, zero the unit.
2. Apply ETCO2 adapter.
    a. If utilizing for monitoring of conscious patient, nasal cannula can be applied.
    b. If utilizing with ETT/ supraglottic airway, placement location in circuit should be based on manufacturer recommendations.
3. Resume ventilations (continue spontaneous respirations).
4. Observe monitor for numeric value and waveform.
    a. Obtain documentation strip prior to and after each patient move.
    b. If absent or low numeric value and/or absent or inappropriate waveform
        i. Immediately verify placement of advanced airway via
            - Colormetric device
            - Direct laryngoscopy
        ii. Assess circulation for possible cause of low/ absent/ inappropriate readings.
        iii. Assess ETCO2 device for appropriate setup/contamination with moisture or bodily fluids
5. Unless directed otherwise by specific treatment protocol, seek to maintain ETCO2 range of **35-45 mmHg**.
    a. A sudden decrease in ETCO2 in any situation could signal a change in patient condition. Immediately assess patient and begin resuscitation as indicated.
    b. A sudden increase in ETCO2 during cardiac arrest may indicate ROSC. Assess the patient.

Critical Thinking Elements

- **Failure to place and document capnography on patients with airways in place is deemed both UNSAFE and ACTIONABLE by the EMS System.**
- **Know your equipment. Providers must know the difference between no value detected and no signal detected.**
- **Reasons for no value detected must be immediately assessed and include:**
    - **Loss of airway, apnea, obstruction**
    - **Circulatory collapse, cardiac arrest**
    - **Equipment failure: BVM or oxygen**
- **Providers should sync their cardiac monitor so that all available data is attached to the PCR.**

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CPAP Procedure

(A-EMT/ EMT-I and Paramedic Care only)

CPAP (Continuous Positive Airway Pressure) can be applied by A-EMT/ EMT-I/ Paramedic Care providers to achieve PEEP (Peak End Expiratory Pressure) for patients presenting with signs & symptoms of respiratory distress. The patient must be alert and able to adequately ventilate spontaneously for CPAP to be initiated.

Indications for CPAP

CHF/ Pulmonary Edema
Asthma
COPD
Pneumonia
Near Drowning

Contraindications for CPAP

Systolic BP of < 100mmHg
Severe cardiorespiratory instability and impending arrest
Respiratory or cardiac arrest
Upper airway abnormalities or trauma
Penetrating chest trauma
Compromised thoracic organs
Persistent nausea and vomiting
Gastric distention
Obtunded patient/ questionable ability to protect own airway.

CPAP Application

1. Assess vital signs.
2. If the systolic BP is < 100mmHg, **Contact Medical Control** prior to initiating.
3. Set up the circuit and mask as per the manufacturers' instructions and connect to a normal oxygen regulator. Apply to the patient.
4. The CPAP device pressure settings are now adjustable based upon O2 flow rates.
5. Begin **CPAP** for all above indicated patients at **5cmH_2O** which is 8-9 LPM O2 flow.
6. The provider may titrate the pressure by increasing 2.5cmH_2O every 5 minutes to a maximum of **10cmH_2O** which is 13-14 LPM O2 flow (if continued respiratory distress/hypoxemia).
7. Consider inline nebulizer treatment as indicated per Respiratory Distress Protocol.
8. Treat continuously while enroute to the receiving facility.
9. Obtain and record vital signs every 5 minutes.

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CPAP Application (Cont.)

10. In cases of continued deterioration, severe anxiety, or life-threatening complications:
    a) **Stop** the CPAP treatment.
    b) Initiate appropriate EMT & Paramedic Care support per protocol.
    c) On arrival at the receiving hospital, immediately communicate any adverse reactions to emergency department staff.

Flow vs Pressure

Lightweight & Portable	80 grams nominal (less mask & harness) 90 mm X 53 mm X 65 mm (unit only)
Flow (LPM)	**CPAP/PEEP (approx. cm H_2O)**
6	2.0 - 3.0
10	6.0 - 7.0
12	8.0 - 9.0
15	11.0 - 12.0
8 - 9	5.0
10 - 12	7.5
13 - 14	10.0
Flush	13.0 (Max.)

Pearls:

- **CPAP can be a very beneficial adjunct in treating patients with respiratory distress.**
- **MEMS approved CPAP devices currently deliver approx. 70% FiO2.**
- **CPAP increases intrathoracic pressures.**
  - **As CPAP pressure increases *expect* the systolic BP to drop.**
  - **Monitor closely and use with caution in patients with SBP<110mmHg.**
- **Do not titrate CPAP pressure above 10cmH2O.**

Adult Tracheostomy

EMR Care

First Responder Care should be focused on ensuring a patent airway.

1. Render initial care in accordance with the *Routine Adult Care Protocol*.
2. **Oxygen:** 15 L/min via tracheostomy collar.
3. Assess work of breathing.
4. Assess for abnormal airway sounds.
5. Place patient in a position of comfort.
6. If the tracheostomy tube is obstructed with secretions **direct the caregiver to:**
   a. Suction with an appropriately sized whistle-tip catheter.
   b. Repeat suction after removing inner cannula of tracheostomy tube.
   c. Change the tracheostomy tube.
7. If the airway continues to be obstructed or if ventilatory effort is inadequate, **ventilate with 100% oxygen** by attaching a BVM to the tracheostomy tube.
8. If the tracheostomy tube is still not patent, ventilate in standard fashion while covering the stoma.
   a. The balloon on the trach must be deflated prior to attempting ventilation.
9. Initiate Paramedic Care intercept as soon as possible.
10. Take patient's tracheotomy care bag with the patient.

EMT Care

EMT Care should be directed at conducting a thorough patient assessment and ensuring that the patient has a patent airway.

1. EMT Care includes all components of *EMR Care*.
2. EMT level and above caregivers may suction with a whistle-tip catheter. Pass the suction device, if unable to pass suction concern for obstruction vs false passage.
3. If BVM ventilations, then **apply in-line capnography** (if equipped).
4. Initiate transport ASAP

Memorial EMS
Decatur Memorial EMS
Springfield Memorial EMS

Adult Tracheostomy

A-EMT/ EMT-I and Paramedic Care

A-EMT/ EMT-I/ Paramedic Care should be directed at continuing or establishing care, conducting a thorough patient assessment, and ensuring a patent airway.

1. Care includes all components of *EMT Care*.
2. If unable to pass suction, remove the inner cannula and visually inspect for evidence of obstruction, attempt ventilation w/o the inner cannula in place.
    a. If breathing is inadequate and a spare tracheostomy is available, attempt to reposition/replace tracheostomy tube. DO NOT PERFORM IF TRACHEOSTOMY STOMA IS LESS THAN TWO WEEKS OLD.
        i. Insert bougie through tracheostomy tube and advance to Carina (approx. 10cm).
        ii. Deflate balloon.
        iii. Remove tracheostomy tube over bougie while ensuring that bougie remains in the stoma and trachea to serve as a guide.
        iv. Feed the new tracheostomy tube over bougie and into the stoma. Inflate balloon.
        v. Remove the bougie.
        vi. Secure tracheostomy tube in place.
    b. If spare tracheostomy tube is unavailable, follow the above procedure for tracheostomy tube replacement using an ET tube the same size as the tracheostomy or 0.5 size smaller (e.g., for a 6.0 Shiley tracheostomy, use a 6.0 or 5.5 cuffed ET tube) Be sure not to force the ET tube and remain mindful of how deep you are inserting the tube (do not advance to the point where it would only ventilate into Right Mainstem).
        i. If the size of tracheostomy tube is unknown, use a 6.0 ET tube.
    c. If unsuccessful, orally intubate the patient (unless known Laryngectomy).
    d. **Contact Medical Control.**

Critical Thinking Elements

- Know the difference between a tracheostomy and a laryngectomy.
    a. Tracheostomy patient airways connect all the way to the mouth.
    b. Laryngectomy patient airways terminate at the stoma at base of neck.
- Oral attempts at intubation of a laryngectomy patient will always result in esophageal intubation because the upper portion of the airway has been surgically removed.
- Important to obtain history as to why the patient has a tracheostomy - if for head/neck cancer beware of likely abnormal anatomy making attempts at oral intubation very difficult if not impossible.