TAB 8
MEDICAL PROCEDURES,
GUIDELINES
AND EQUIPMENT
TAB 8 GUIDELINE 1
NOTIFICATION TO MEDICAL DIRECTOR

1. Anytime there is deviation from the EMS Guidelines that is not within the guidelines or not within the standard of care for prehospital EMS providers, or any one of the following procedures is performed, then the details of the incident should be forwarded to the Medical Director or his designee IMMEDIATELY. The EMS / Fire officer should be notified of the procedure and then notification to the Medical Director should occur as soon as the unit is put back in service (Medical Director or designee are available 24 hours a day 7 days a week). Notification can be made via the NWOEMS QA Notification form located on the consortium website at [http://www.nwoems.com](http://www.nwoems.com). Email is appropriate for notification, but insure that you utilize at the top of the email “Confidential Peer Review Information Protected by Ohio Revised Code §4765.12” on all emails pertaining to patient information for quality assurance.

2. Complete the Northwest Ohio EMS QA / QI Form and submit to your chief / EMS supervisor for review. Information on that form should be sent to the Medical Director or one of his designee.

3. Procedures requiring Medical Director Notification include:
   a. Any attempted or successful LMA, King Airway or Endotracheal Intubation
   b. Needle Decompression
   c. Needle or Surgical Cricothyrotomy
   d. Intraosseous or Alternative IV use
   e. Esophageal intubation that was not discovered in the field and corrected
   f. Use of automated CPR Chest Compression Device
   g. Medication Assisted Intubation or Rapid Sequence Induction for intubation
   h. Fetal delivery
   i. Any guideline deviation or concern
   j. Anytime another Health Care provider has a concern about the healthcare provided. This should be a phone call to the Medical Director or his designee
NORTHWEST OHIO EMS
QUALITY IMPROVEMENT NOTIFICATION FORM
Confidential for Quality Improvement Only – (not part of medical record)

EMS Agency ________________________________ Date __________________

Incident Run Number ________________________

Against Medical Advice
Patient History and Vital Signs ____________________________

Was Patient Alert and had decisional capacity to make decisions Y ☐ | N ☐
Medical Control Notified Y ☐ | N ☐

Cardiac Arrest
Initial Rhythm ________________________________
Procedures performed (Defibrillation, Intubation, Medication Administration) ___________________

Automated CPR Device Utilized Y ☐ | N ☐
Return of Spontaneous Circulation Y ☐ | N ☐

Intubation or Advanced Airway Placement
Patient History and Vital Signs ____________________________

Number of Intubation attempts _______ Successful Y ☐ | N ☐
Alternative Airway considered and type (King LT / LMA / Needle or Surgical Cric)

Medication Assisted Intubation Y ☐ | N ☐
Patient able to be ventilated Y ☐ | N ☐

IO Insertion
Patient History and Vital Signs ____________________________

IV attempted first and how many times Y ☐ _____ | N ☐
IO Insertion Successful Y ☐ | N ☐

Needle Decompression
Patient History / Vital Signs / Physical Examination ________________________________

Unusual Incident
______________________________________________________________________________
______________________________________________________________________________

NWO EMS ALS – Tab 8 – Medical Procedures, Guidelines and Equipment – Updated 2017_12_01
NORTHWEST OHIO EMS
UNUSUAL OCCURRENCE / INCIDENT REPORT
Confidential for Quality Improvement Only – (not part of medical record)

Person Completing Form: _____________________________________________________
Phone #: ____________________________ E-Mail: ________________________________

Date of Incident: _____________________ Type of Service: BLS: _____________
ALС: _____________

Names and certification numbers of EMS Personnel involved in incident:
________________________________________ _______________________
________________________________________ _______________________
________________________________________ _______________________

Nature of Incident (Check all that apply):
☐ PATIENT INJURY RESULTING FROM THE INCIDENT
☐ MEDICATION ERROR
☐ GUIDELINE VIOLATION
☐ MEDICAL / COMMUNICATION DEVICE FAILURE
☐ MEDICATION THEFT (Notification to DEA for narcotic theft is mandatory)
☐ REPORTABLE MOTOR VEHICLE CRASH
   VEHICLE LICENSE PLATE #:________________________
   PRIMARY GARAGING LOCATION: ______________________
☐ VEHICLE FIRE ☐ VEHICLE THEFT
   VEHICLE LICENSE PLATE #:________________________
   PRIMARY GARAGING LOCATION: ______________________
☐ DELAY IN EMERGENCY DEPARTMENT TRANSFER (Greater than 30minutes)
   FACILITY NAME: ____________________________________________
   ARRIVAL TIME AT FACILITY____________________________
   COMPLETION OF TRANSFER TIME: ________________________
☐ OTHER (EXPLAIN) ____________________________________________________________________
__________________________________________________________________________________
Brief description of incident:

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

SIGNATURE and TITLE

DATE SIGNED

THIS FORM MUST BE FORWARDED TO AN EMS OFFICER OR FIRE / EMS CHIEF WITHIN 24 HOURS
AIRWAY | BREATHING

TAB 8 GUIDELINE 2

PULSE OXIMETER

- The pulse oximeter is an instrument used to ascertain a patient’s arterial oxyhemoglobin saturation (%SpO₂). Measuring the absorption of infrared light passing through the tissue does this.
- Advantages:
  - Early warning system (may alert the paramedic before cardiac monitors).
  - The pulse oximeter will enhance the paramedic’s ability to identify, assess and treat hypoxia for any reason (ie drug overdose).
  - The pulse oximeter will assist in monitoring the effectiveness of other treatments (ie bronchodilators).
  - The pulse oximeter will assist in monitoring O₂ saturation during suctioning and intubation.
  - The pulse oximeter will assist in the assessment of perfusion in patients with orthopedic injuries.
- Ranges:
  - 94% – 100% Ideal Range
  - 90% - 94% Mild to moderate hypoxemia
  - 85% - 90% Severe hypoxemia
  - Below 85% If patient is symptomatic, intubate and ventilate.
- Factors affecting reading:
  - Excessive ambient light, especially sunlight
  - Excessive motion
  - Nail polish – green, black or red
  - Moisture in sensor
  - Improper sensor attachment
  - Poor patient perfusion
  - Venous pulsation
  - Anemia or low hemoglobin
  - Sensor not at heart level
  - Pierced ears (when using ear lobe sensor)
  - Temperature
  - Low battery
TAB 8 GUIDELINE 3
NEBULIZED AEROSOL TREATMENT

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>MANDATORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute respiratory distress with</td>
<td>• Chest pain</td>
<td>• EMT may administer patients own albuterol, or can obtain online medical control to administer albuterol from EMS supply</td>
</tr>
<tr>
<td>• History of COPD</td>
<td>• Allergy to medications</td>
<td></td>
</tr>
<tr>
<td>• Asthma</td>
<td>• Arrhythmias</td>
<td></td>
</tr>
<tr>
<td>• Shortness of breath</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Wheezing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Retractions or accessory muscle use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Tachypnea (respiratory rate &gt; 25 / min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Unable to complete full sentences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fatigue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pulse oximetry reading &lt; 90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Stridor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Croup</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Gather the necessary equipment
- Assemble the nebulizer kit
- Instill the premixed medication into the reservoir well of the nebulizer
- Connect the nebulizer device to oxygen at 6 – 8 liters per minute or adequate flow to produce a steady, visible mist
- Instruct the patient to inhale normally through the mouthpiece of the nebulizer. The patient needs to be a good lip seal around the mouthpiece if not using a mask
  - Use mouthpiece if patient is able to hold nebulizer effectively
  - Use nebulizer mask if patient is unable to hold nebulizer effectively
- The procedure should last approximately ten (10) minutes. Upon nearing the end of the treatment, the condensation will need to be moved down to the bottom of the bowl so it can be drawn up the siphon tube. To do this, shake the chamber or strike the chamber with your fingertip
- Monitor the patient for medication effects. This should include the patient’s assessment of his / her response to the treatment and reassessment of vital signs, ECG and breath sounds
- Document the treatment, dose and route on the patient care report
- Monitor the patient’s pulse rate, oximeter, color and respiratory effort for improvement or deterioration
- Dosing of an aerosol treatment is a single unit dose, reassess treatment response after completion of aerosol and administer a second unit dose if indicated
TAB 8 GUIDELINE 4
CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>POSSIBLE COMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Asthmatic / COPD / CHF / pulmonary edema / Pneumonia / Submersion / Near-drowning / CO poisoning</td>
<td>• Severely depressed level of consciousness or unconsciousness</td>
<td>• Gastric distention</td>
</tr>
<tr>
<td>• Awake and able to follow commands</td>
<td>• Patient is in respiratory arrest / apneic</td>
<td>• Aspiration</td>
</tr>
<tr>
<td>• Is over 12 years old and &gt; 40 kg and is able to fit the CPAP mask</td>
<td>• Inability to maintain airway patency</td>
<td>• Reduced cardiac output / hypotension secondary to reduction in preload / afterload of the heart during CPAP therapy</td>
</tr>
<tr>
<td>• Has the ability to maintain an open airway</td>
<td>• Suspected pneumothorax or has suffered trauma to the chest</td>
<td>• Hypoventilation</td>
</tr>
<tr>
<td>• Demonstrates two or more of the following</td>
<td>• Tracheostomy</td>
<td>• Pulmonary barotrauma</td>
</tr>
<tr>
<td>• Retractions or accessory muscle use</td>
<td>• Actively vomiting or has upper GI bleeding</td>
<td>• Severe anxiety / combativeness due to mask intolerance</td>
</tr>
<tr>
<td>• Tachypnea (respiratory rate &gt; 24 / min)</td>
<td>• Pulse oximetry reading &lt; 92%</td>
<td></td>
</tr>
<tr>
<td>• Inability to speak in full sentences due to dyspnea</td>
<td>• Facial anomalies / facial trauma / recent surgery to the face</td>
<td></td>
</tr>
<tr>
<td>• Bibasilar of diffuse rales or medical history and presenting complaints consistent with cardiogenic pulmonary edema</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• Place the patient in a seated position with legs dependent.
• While one member of the team is setting up the CPAP equipment, the second team member should treat the patient according to established Asthma / COPD / CHF treatment protocols.
• Setting up the system
  • Ensure all necessary equipment is available and assembled.
  • Assemble the patient mask, securing device, tubing and PEEP valve.
  • Connect directly to a 50 psi oxygen source using the quick connect / disconnect valve, listen for leaks.
  • Check device to ensure free of obstruction and verify proper valve setting for intended use. Verify proper valve function.
  • Apply O2 / CO₂ nasal filter line to patient (for end-tidal CO₂ monitoring), attach that to the monitor. Monitor for obstructive capnogram waveform.
  • Place delivery mask over the mouth and nose. Have patient hold the mask and instruct them to breathe slowly and deeply.
  • Secure the mask with provided straps and tighten to desired fit minimizing any air leakage.
  • Evaluate the response in the patient. Reassess breath sounds, oxygen saturation, and general appearance of the patient.
  • Adjust the CPAP pressure valve based on the recommended level and response by the patient.
### Recommended CPAP Pressure Valve Settings

<table>
<thead>
<tr>
<th>Patient Condition</th>
<th>Initial Valve Setting</th>
<th>No Improvement / Patient tolerating mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHF / Pulmonary Edema</td>
<td>10 cm H₂O</td>
<td>10.0 cm H₂O</td>
</tr>
<tr>
<td>COPD / Asthma / Pneumonia</td>
<td>5 cm H₂O</td>
<td>7.5 cm H₂O</td>
</tr>
<tr>
<td>Submersion / Near Drowning</td>
<td>5 cm H₂O</td>
<td>7.5 cm H₂O</td>
</tr>
<tr>
<td>CO Poisoning</td>
<td>5 cm H₂O</td>
<td>7.5 cm H₂O</td>
</tr>
</tbody>
</table>

### Flow Safe II CPAP System

<table>
<thead>
<tr>
<th>Flow (LPM)</th>
<th>CPAP / PEEP (approx. cm H₂O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 – 9</td>
<td>5.0 cm H₂O</td>
</tr>
<tr>
<td>10 – 12</td>
<td>7.5 cm H₂O</td>
</tr>
<tr>
<td>13 – 14</td>
<td>10 cm H₂O</td>
</tr>
<tr>
<td>Flush</td>
<td>13 cm H₂O</td>
</tr>
</tbody>
</table>
TAB 8 GUIDELINE 5
AIRWAY MANAGEMENT

**INDICATIONS**
- Patients in deep coma
- Respiratory arrest or cardiopulmonary arrest
- Patients where complete obstruction of the airway appears imminent

**CONTRAINDICATIONS**
- Patients with an intact gag reflex
- Patients where irritation of the pharynx might cause laryngeal spasm
- Croup or epiglottitis

**MANDATORY**
- Take no longer than 30 seconds per attempt (adult) or 15 seconds (pediatric)
- Other techniques of airway management maybe indicated if there is a suspected injury to the c-spine
- Verify successful endotracheal intubation by auscultation of the chest and end-tidal CO₂ detector

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**SPECIAL CONSIDERATIONS:**
- Supplemental Oxygen
  - Keep SpO₂ > 94%
- Assess ABC’s
  - Respiratory Rate
  - Respiratory Effort
  - Adequacy of Ventilation
  - Pulse Oximetry
- Basic Maneuvers First
  - Open Airway
  - Nasal / Oral Airway Adjunct
  - Bag Valve Mask (BVM)
- Successful
  - Maintain SpO₂ > 94% and EtCO₂ between 35 – 45
- For intubated patients
  - Consider NGT / OGT
- Contact Medical Control

---

**ETT Tube Size / Depth for Pediatrics**
- Estimate tube size (uncuffed tube):
  - ETT = age / 4 + 4
- Cuffed tube on a pediatric patient should be one (1) tube size smaller than the estimated uncuffed tube
- Depth should be 3 x ETT Tube size

**ETT Tube Size / Depth for Adult**

<table>
<thead>
<tr>
<th>Height (inches)</th>
<th>Height (cm)</th>
<th>ETT</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>5’ 0”</td>
<td>60</td>
<td>152</td>
<td>19</td>
</tr>
<tr>
<td>5’ 2”</td>
<td>62</td>
<td>157</td>
<td>20</td>
</tr>
<tr>
<td>5’ 4”</td>
<td>64</td>
<td>163</td>
<td>20</td>
</tr>
<tr>
<td>5’ 6”</td>
<td>66</td>
<td>168</td>
<td>21</td>
</tr>
<tr>
<td>5’ 8”</td>
<td>68</td>
<td>173</td>
<td>21</td>
</tr>
<tr>
<td>5’ 10”</td>
<td>70</td>
<td>178</td>
<td>22</td>
</tr>
<tr>
<td>6’ 0”</td>
<td>72</td>
<td>183</td>
<td>23</td>
</tr>
<tr>
<td>6’ 2”</td>
<td>74</td>
<td>188</td>
<td>23</td>
</tr>
<tr>
<td>6’ 4”</td>
<td>76</td>
<td>193</td>
<td>24</td>
</tr>
</tbody>
</table>
1. Always weigh the risks and benefits of endotracheal intubation in the field against transport. All prehospital endotracheal intubations are considered high risk. If ventilation / oxygenation is adequate, transport may be the best option. The most important airway device and the most difficult to use correctly and effectively is the Bag Valve Mask (not the laryngoscope). Few prehospital airway emergencies cannot be temporized or managed with proper BVM techniques.

2. Blind Insertion Airway Device (BIAD):
   a. King LTS-D Airway Device
   b. Laryngeal Mask Airway (LMA)
   c. I-gel Supraglottic Airway

3. Capnography device MUST be used and checked with each patient movement and documented on the run sheet.

4. Ventilate the adult patient 8 – 10 breaths / minute (pediatric per pediatric tables) with 100% oxygen, and document correct tube placement and depth using numbers on the ET Tube at the lip.

5. Difficult Airway Assessment
   a. **Difficult BVM Ventilation (MOANS):**
      i. Difficult Mask seal due to facial hair, anatomy, blood or secretions / trauma
      ii. Obese or late pregnancy
      iii. Age > 55
      iv. No teeth (roll gauze and place between gums and cheeks to improve seal)
      v. Stiff or increased airway pressures (Asthma, COPD, Obese, Pregnant).
   b. **Difficult BIAD (RODS):**
      i. Restricted mouth opening
      ii. Obstruction / Obese or late pregnancy
      iii. Distorted or disrupted airway
      iv. Stiff or increased airway pressures (Asthma, COPD, Obese, Pregnant);
   c. **Difficult Laryngoscopy (LEMON):**
      i. Look externally for anatomical distortions (small mandible, short neck, large tongue);
      ii. Evaluate 3-3-2 Rule (Mouth open should accommodate 3 patient fingers, mandible to neck junction should accommodate 3 patient fingers, chin-neck junction to thyroid prominence should accommodate 2 patient fingers)
      iii. Mallampati (difficult to assess in the field)
      iv. Obstruction / Obese or late pregnancy
v. Neck mobility
d. Difficult Cricothyrotomy / Surgical Airway (SHORT):
   i. Surgery or distortion of airway
   ii. Hematoma over lying neck
   iii. Obese or late pregnant
   iv. Radiation treatment skin changes
   v. Tumor overlying neck.

6. Trauma
   a. Utilize in-line cervical stabilization during intubation, BIAD or BVM use
   b. During intubation or insertion of BIAD the cervical collar front should be open or removed to facilitate translation of the mandible / mouth opening

7. Complications
   a. Accidental intubation of the esophagus
   b. Insertion of the endotracheal tube too deep into the trachea or right main stem bronchus
   c. Oropharyngeal trauma
   d. Fractured teeth or dentures, damaged gums
   e. Spasm of the vocal cords

8. Tube check procedure
   a. Use this tube check procedure for anyone over age > 5 years
   b. Compress the tube check device, attach to endotracheal tube and release
      i. If air fills the bulb rapidly (< 5 seconds), the tube is probably in the trachea. Confirm clinically, ventilate and secure the tube
      ii. If the air fills slowly (5 – 30 seconds), carefully assess tube placement using direct laryngoscopic visualization, confirm clinically, ventilate and secure the tube

9. May decompress the stomach by insertion of lubricated appropriate sized Nasogastric or Orogastric Tube and attached to suction.
TAB 8 GUIDELINE 6
AIRWAY MANAGEMENT – PRE-INTUBATION CHECKLIST

### Does patient need to be intubated?
- Consider **need** for airway protection, assisted ventilation, improving oxygenation, altering physiological conditions, decreasing work of breathing
- Consider **risks** of intubation – prolonged scene time, risk of failed airway, associated hypotension, positive-pressure ventilation induced decrease in venous return

### Prepare Patient
- Optimize patient position
- Confirm / obtain vascular access
- Patient placed on monitor
- Assess the patient for difficult ventilation with BVM, difficult intubation with BIAD / ET Tube, and difficult surgical airway
- Pre-oxygenation with non-rebreather, CPAP or BVM
- Nasal cannula applied for continued apneic oxygenation
- Place a mark along the patient’s neck as to the location where you will perform a surgical airway

### Prepare Equipment
- BVM with PEEP Valve
- OPA to assist BVM ventilation
- Video laryngoscope operational
- Appropriate size ETT with stylet (rigid for VL), 10 ml syringe for ETT cuff
- Suction
- Endotracheal tube introducer (Gum Bougie)
- EtCO2
- Back up equipment readily available – direct laryngoscope, King LT, OPA / BVM, and surgical airway kit

### Prepare Drugs
- Pre-medication: consider atropine for pediatric patient
- **Induction**: Ketamine and / or Etomidate and / or Fentanyl / Versed
- **Paralysis**: Succinylcholine or Rocuronium
- **Hypotension**: Epinephrine push dose
- **Maintenance**: Fentanyl, Midazolam, Rocuronium or Vecuronium

### Planning

- Plan for failed airway
- Plan for post-intubation hypotension
- Plan for post-intubation sedation
TAB 8 GUIDELINE 7
AIRWAY MANAGEMENT – POST-INTUBATION CHECKLIST

Post-intubation Checklist

- EtCO₂
  Document ________ mmhg
- Secure ETT
  Document ________ ETT depth in cm
- Secure C-collars if indication
- Blood pressure
  Document ________ mmhg
- O₂ saturation
  Document ________%
- Disconnect nasal canula
- Administer analgesia (fentanyl)
- Administer sedation (versed, ketamine)
- Administer vasopressor (epinephrine) for post-intubation hypotension
- Administer paralytic (rocuronium) if indicated
- Assess chest for equal breath sounds and rise / fall; consider mainstem intubation or pneumothorax
- Apply soft restraints

Ventilator Settings

- Place on Hamilton T1 and choose proper mode of ventilation
- Tidal Volume: 6-8 ml/kg ideal body weight (not actual weight)
- FiO₂: initial 100%, wean after 5 min to keep SpO₂ > 92% with FiO₂ goal of 30%
- Rate: Adjust rate or minute ventilation to maintain EtCO₂ 35 – 45
- PEEP: initial 5, increase to maintain SpO₂ > 90%
### TAB 8 GUIDELINE 8

**AIRWAY MANAGEMENT – FAILED AIRWAY (ADULT)**

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>MANDATORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Adult patient age &gt; 16</td>
<td>• Patients with an intact gag reflex</td>
<td>• Use Gum Elastic Bougie, BURP (trachea back, up and to the patient’s right) maneuver on 2nd attempt</td>
</tr>
<tr>
<td>• Patients in deep coma</td>
<td>• Patients where irritation of the pharynx might cause laryngeal spasm</td>
<td>• Consider changing head position</td>
</tr>
<tr>
<td>• Respiratory arrest or cardiopulmonary arrest with failed conventional airway management</td>
<td></td>
<td>• Verify successful endotracheal intubation by auscultation of the chest and end-tidal \ CO\textsubscript{2} detector</td>
</tr>
<tr>
<td>• Patients where complete obstruction of the airway appears imminent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(2) failed attempts by most proficient technician on scene or anatomy inconsistent with intubation attempts.

NO MORE THAN 3 ATTEMPTS TOTAL

---

**LEGEND**

- EMT
- EMT-P
- A-EMT
- MC Order
- EMR

---

**INDICATIONS**

- Adult patient age > 16
- Patients in deep coma
- Respiratory arrest or cardiopulmonary arrest with failed conventional airway management
- Patients where complete obstruction of the airway appears imminent

**CONTRAINDICATIONS**

- Patients with an intact gag reflex
- Patients where irritation of the pharynx might cause laryngeal spasm

**MANDATORY**

- Use Gum Elastic Bougie, BURP (trachea back, up and to the patient’s right) maneuver on 2nd attempt
- Consider changing head position
- Verify successful endotracheal intubation by auscultation of the chest and end-tidal \ CO\textsubscript{2} detector

---

**Flowchart**

1. **Continue BVM**
2. **If SpO\textsubscript{2} drops < 90\% or it becomes difficult to ventilate with BVM Ventilation**
3. **Severe facial trauma or swelling**
4. **Attempt Oropharyngeal or Nasopharyngeal airway placement**
   - **SpO\textsubscript{2} > 92\%**
     - **SpO\textsubscript{2} > 92\% with Ventilation**
       - **SpO\textsubscript{2} > 92\% with BVM Ventilation**
         - **Digital Intubation**
           - **Able to Intubate**
             - **Surgical Cricothyrotomy**
           - **NO**
             - **SpO\textsubscript{2} > 92\% with BVM Ventilation**
               - **YES**
                 - **Continue Ventilation with BVM**
                   - **Contact Medical Control**
         - **NO**
           - **NO**
             - **Blind Insertion Airway Device (If pulseless AND apneic)**
               - **Blind Insertion Airway Device (If apneic)**
                 - **Able to Intubate**
                   - **Digital Intubation**
                     - **Able to Intubate**
                       - **Surgical Cricothyrotomy**
                     - **NO**
                       - **SpO\textsubscript{2} > 92\% with Ventilation**
                         - **YES**
                           - **Continue Ventilation with BVM**
                             - **Contact Medical Control**
             - **YES**
               - **Ventilate to maintain EtCO\textsubscript{2} between 35 – 45 and SpO\textsubscript{2} above 94\%**
                 - **SpO\textsubscript{2} > 92\% with BVM Ventilation**
                   - **YES**
                     - **Continue Ventilation with BVM**
                       - **Contact Medical Control**
                   - **NO**
                     - **SpO\textsubscript{2} > 92\% with BVM Ventilation**
                       - **YES**
                         - **Continue Ventilation with BVM**
                           - **Contact Medical Control**
               - **NO**
                 - **SpO\textsubscript{2} < 90\%**
                   - **NO**
                     - **SpO\textsubscript{2} > 92\% with Ventilation**
                       - **YES**
                         - **Continue Ventilation with BVM**
                           - **Contact Medical Control**
K
AIRWAY MANAGEMENT – FAILED AIRWAY (PEDIATRIC)

INDICATIONS
- Pediatric patient age < 16
- Patients in deep coma
- Respiratory arrest or cardiopulmonary arrest with failed conventional airway management
- Patients where complete obstruction of the airway appears imminent

CONTRAINDICATIONS
- Patients with an intact gag reflex
- Patients where irritation of the pharynx might cause laryngeal spasm

MANDATORY
- Use Gum Elastic Bougie, BURP (trachea back, up and to the patient’s right) maneuver on 2nd attempt
- Consider changing head position
- Verify successful endotracheal intubation by auscultation of the chest and end-tidal CO₂ detector

(2) failed attempts by most proficient technician on scene or anatomy inconsistent with intubation attempts.
NO MORE THAN 3 ATTEMPTS TOTAL

Continue BVM

YES

SpO₂ > 92% with BVM Ventilation

NO

Severe facial trauma or swelling

NO

YES

If SpO₂ drops < 90% or it becomes difficult to ventilate with BVM Ventilation

Attempt Oropharyngeal or Nasopharyngeal airway placement

Improved

YES

SpO₂ > 92%

NO

Blind Insertion Airway Device (If pulseless AND apneic)

NO

Blind Insertion Airway Device (If apneic)

YES

SpO₂ > 92% with Ventilation

NO

Continue Ventilation with BVM

YES

Contact Medical Control

For Age > 8
Surgical Cricothyrotomy

For Age < 8
Needle Cricothyrotomy

Ventilate to maintain EtCO₂ between 35 – 45 and SpO₂ above 94%
TAB 8 GUIDELINE 10
INTUBATION – DIGITAL

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINdications</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
</table>
| - Patients in deep coma  
- Respiratory arrest or cardiopulmonary arrest  
- Patients where complete obstruction of the airway appears imminent | - Patients with an intact gag reflex  
- Patients where irritation of the pharynx might cause laryngeal spasm  
- Croup or epiglottitis | - Inability to locate airway structures  
- Accidental intubation of the esophagus.  
- Insertion of the endotracheal tube too deep into the trachea or right mainstem bronchus.  
- Oropharyngeal trauma.  
- Spasm of the vocal cords. |

- Prepare, position and oxygenate the patient with 100% oxygen.  
- Select proper ET tube. Insert stylet and bend tube into a “J” shape.  
- Have team member stabilize the patient’s head and neck in an in-line (neutral) position. Place a bite block or oral airway between the patient’s molars to help protect your fingers.  
- Limit each intubation attempt to 30 seconds (for adult) and 15 seconds (for pediatrics) with BVM between attempts.  
- Insert your left middle and index fingers into the patient’s mouth. By alternating fingers, “walk” your hand down the midline while simultaneously tugging gently forward on the tongue. This lifts the epiglottis up and away from the glottic opening, within reach of your probing fingers.  
- Palpate the arytenoid cartilage posterior to the glottis and the epiglottis anteriorly with your middle finger. Press the epiglottis forward, and insert the endotracheal tube into the mouth, anterior to your fingers.  
- Advance the tube, pushing it gently with your right hand. Use your left index finger to keep the tip of the ETT against your middle finger. This will direct the tip to the epiglottis.  
- Use your middle and index fingers to direct the tip of the ETT between the epiglottis (in front) and your fingers (behind). Then with your right hand advance the ETT through the cords while simultaneously maneuvering it forward with your left index and middle fingers. This will prevent it from slipping posteriorly into the esophagus.  
- Hold the tube in place with your hand to prevent its displacement. Check ET tube placement with colorimetry EtCO₂ Detector.  
- Inflate the cuff with 3 – 10 ml of air.  
- Auscultate for bilaterally equal breath sounds and absence of sounds over the epigastrium. If unsure of tube placement, remove tube and ventilate patient with BVM.  
- Attach End tidal CO₂ filter-line to monitor and confirm capnographic waveform and capnometric value. Continue monitoring throughout patient treatment and transport.  
- Document ETT size, time, result (success) and placement location (centimeter marks at the patient’s teeth or lips) on the patient care report (PCR). Document all devices used to confirm initial tube placement. Document positive / negative breath sounds before and after each movement of the patient.
TAB 8 GUIDELINE 11
INTUBATION – ENDOTrACHEAL (ADULT / PEDIATRIC)

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Patients in deep coma</td>
<td>• Patients with an intact gag reflex</td>
<td>• Accidental intubation of the esophagus</td>
</tr>
<tr>
<td>• Respiratory arrest or cardiopulmonary arrest</td>
<td>• Patients where irritation of the pharynx might cause laryngeal spasm</td>
<td>• Insertion of the endotracheal tube too deep into the trachea or right mainstem bronchus.</td>
</tr>
<tr>
<td>• Patients where complete obstruction of the airway appears imminent</td>
<td>• Croup or epiglottitis</td>
<td>• Oropharyngeal trauma.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fractured teeth or dentures.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Spasm of the vocal cords.</td>
</tr>
</tbody>
</table>

- Prepare, position, and oxygenate the patient with 100% oxygen.
- Select proper ET tube (stylet, if used).
- Have suction unit available for airway suctioning.
- Limit each intubation attempt to 30 seconds (for adult) and 15 seconds (for pediatrics) with BVM between attempts.
- Visualize ET tube pass through vocal cords.
- Check ET tube placement with colorimetry EtCO₂ Detector.
- Inflate the cuff with 3 – 10 ml of air (may not apply to pediatric non-cuffed tubes); secure ET tube with Thomas Tube holder or other device.
- Auscultate for bilaterally equal breath sounds and absence of sounds over the epigastrium. If unsure of tube placement, remove tube and ventilate patient with BVM.
- Consider using Flex guide (adult patients) or KING airway if ET intubation efforts are unsuccessful.
  - Note: KING sizes 3 / 4 / 5 may prohibit use in pediatric patients.
- Attach End tidal CO₂ filter-line to monitor and confirm capnographic waveform and capnometric value. Continue monitoring throughout patient treatment and transport.
- Document ETT size, time, result (success) and placement location (centimeter marks at the patient’s teeth or lips) on the patient care report (PCR). Document all devices used to confirm initial tube placement. Document positive/negative breath sounds before and after each movement of the patient.

Trauma Patient Intubation (Orotracheal Intubation with C-Spine Control)
- After basic manual and adjunctive airway maneuvers, have your partner maintain in-line stabilization while kneeling at the patient’s side, facing his head. This is done by placing both hands over the patient’s ears with the little, ring, and middle fingers under the occiput, the index fingers anterior to the ears, and the thumbs on the face over the maxillary sinuses.
- Apply slight pressure in the caudal direction (toward the feet) to support and immobilize the head.
- Proceed gently with orotracheal intubation, remembering the need to minimize movement of the cervical spine.
### TAB 8 GUIDELINE 12
### INTUBATION – MEDICATION ASSISTED

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>MANDATORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Severe head injury</td>
<td>• Patients with an intact gag reflex and maintaining their own airway</td>
<td>• Take no longer than 30 seconds per attempt (adult) or 15 seconds (pediatric)</td>
</tr>
<tr>
<td>• Trauma patient where oral-tracheal or nasotracheal intubation cannot be easily performed with active reflexes or gag</td>
<td>• High risk airways including extremely anterior, large neck, poor neck extension</td>
<td>• Other techniques of airway management maybe indicated if there is a suspected injury to the c-spine</td>
</tr>
<tr>
<td>• Combative patients with altered mental status</td>
<td>• Unstable scene environment (when equipment or space would prevent optimum attempts)</td>
<td>• Verify successful endotracheal intubation by auscultation of the chest and end-tidal CO₂ detector</td>
</tr>
<tr>
<td>• Impending respiratory failure requiring intubation</td>
<td>• Equipment and having functioning suction available</td>
<td></td>
</tr>
</tbody>
</table>

### Preparation
- Back up LMA or King LT airway as well as flex guide Bougie should be available. Consider King Vision if available.
- Place patient in sniffing position and elevate head if possible (non-traumatic).
- Have assistant take c-spine stabilization from anterior position. Front of c-collar may be opened to allow mandible movement.

### Preoxygenate
- Administer oxygen @ 15 lmp via non-rebreather mask or CPAP if spontaneously breathing and via BVM assistance with supplemental oxygen if apneic or hypoventilating.

### Premedication
- **Atropine**: 0.02 mg / kg IVP (max 1 mg, minimum 0.1 mg) for pediatric patients
- **Consider push-dose epinephrine**: (5 – 20 mcg) for concern of hypotension

### Pharmacy
- **Ketamine**: 3 mg / kg slow IVP
  - OR – **Etomidate**: 0.3 mg / kg IVP slowly over 60 seconds
  - OR – **Fentanyl**: 3 mcg / kg IVP and **Versed**: 0.3 mg / kg IVP

### Paralyze (If Necessary)
- **Succinylcholine**: 1.5 mg / kg IV / IO
  - DO NOT administer to Dialysis Patients with unknown potassium levels / Chronic Bed Ridden / Crush Injury (> 4 hours entrapped)

### Place
- Use apneic oxygenation with nasal cannula set @ 15 L
- Place endotracheal tube under direct visualization or Bougie
- May use BURP maneuver (Back, Up, Right, Posterior movement of cricoid) to assist in accessing airway
- Ventilate with BVM and oxygen

### Proof of Placement (Pass the tube)
- Apply capnography or colorimetry CO₂ detector
- Check for Frost (mist), Feel of compliance, Chest rise and fall
- Listen for lung sounds over epigastrium and lateral posterior lung fields

### Post Intubation Care
- Secure ET Tube and immobilize head and / or use c-collar with towel rolls
- Capnography device MUST be used and checked with each patient movement and documented on the run sheet.
- Ventilate the patient every 6 seconds with 100% oxygen, and document correct tube placement and depth using numbers on the ET Tube at the lip
- **Post Intubation Sedation / Pain management for all intubated patients:**
  - All patients that have received a paralytic agent MUST receive pain control and sedation
  - Perform Richland Agitation Sedation Scale [Goal (0) to (-2)]
  - Midazolam 0.1 mg / kg (max 10 mg for initial post intubation dose then 1 – 5 mg for adult, max 5 mg for pediatric) IV / IO every 5 – 15 minutes for sedation
  - Fentanyl 1 mcg / kg IV / IO every 15 – 30 minutes for sedation / pain of tube placement
  - **CONSIDER** Vecuronium 0.1 mg / kg IV / IO (maximum 10 mg) – or – Rocuronium 1 mg / kg IV / IO (maximum 100 mg). May repeat dose for severe agitation

### INDICATIONS
- EMS ALS – Tab 8 – Medical Procedures, Guidelines and Equipment – Updated 2017_12_01

### CONTRAINDICATIONS
- Equipment and having functioning suction available
- Delayed Sequence Intubation
  - For patients not tolerating pre-oxygenation or high risk for difficult intubation
  - Ketamine 0.5-1 mg/kg IV / IO
  - Continue BVM / CPAP / BiPap to facilitate oxygenation
  - Confirm adequate airway visualization before intubation attempt

### MANDATORY
- Quick Med Reference
  - **Child** (Est 30 kg)
    - Etomidate 9 mg IVP
    - Ketamine 90 mg IVP
    - Succinylcholine 45 mg IVP
  - **Small Adult** (Est. 60 kg)
    - Etomidate 18 mg IVP
    - Ketamine 180 mg IVP
    - Succinylcholine 90 mg IVP
  - **Medium Adult** (Est. 80 kg)
    - Etomidate 24 mg IVP
    - Ketamine 240 mg IVP
    - Succinylcholine 120 mg IVP
  - **Large Adult** (Est. 100 kg)
    - Etomidate 30 mg IVP
    - Ketamine 300 mg IVP
    - Succinylcholine 150 mg IVP
SPECIAL CONSIDERATIONS:

1. Paramedics and Nurses credentialed with Medication Assisted Intubation (MAI) guideline must meet standard of care as described by the Ohio Board of Emergency Medical Services. Paramedics and nurses must perform a minimum of (1) successful, live or human patient simulation (HPS) per quarter to maintain competency in MAI.

2. Purpose of medication assisted intubation is to ensure a successful first pass intubation attempt. This is extremely important for patients that are already hypoxic or with traumatic brain injuries. When choosing which sedation and paralytic medication to give the practitioner should consider the patients past medical history, current physical limitations, heart rate, blood pressure and oxygen saturation. All patients MUST be properly sedated before proceeding with the paralytic agent. At times this MIGHT require multiple sedation medications.

3. Complications
   a. Apnea
   b. Bruxism or jaw stiffness
      i. If bruxism occurs, administer an additional dose of Etomidate (0.3 mg / kg up to 20 mg) IV or IO over 15 – 20 seconds immediately, or if credentialed to administer paralytic agent then administer the paralytic agent
   c. Fasciculation
   d. Hypotension

4. Do not administer succinylcholine to these type patients:
   a. With hyperkalemia (dialysis patients)
   b. Chronic bed ridden patients
   c. Crush injuries

5. Delayed Sequence Intubation is used for the patient not tolerating oxygenation or during the LEMON Law evaluation is deemed a high risk patient. Given ketamine 0.5 – 1 mg / kg as a pretreatment. Oxygenate the patient well and then continue with the medication assisted intubation process.

6. May decompress the stomach by insertion of lubricated appropriate sized Nasogastric or Orogastric Tube and attached to suction.

7. ALL PATIENTS THAT HAVE RECEIVED PARALYTICS MUST HAVE SOME FORM OF SEDATION.

8. All use of MAI | RSI procedures requires notification to the Medical Director or designee as soon as practical once patient care duties are completed.
TAB 8 GUIDELINE 13
INTUBATION – NASOTRACHEAL

**INDICATIONS**
- Imminent respiratory arrest where oral intubation cannot be accomplished.
- Rigidity or hypoxia from seizures (e.g. “clenched teeth”).
- Trauma to the oral cavity prohibiting oral intubation.
- Patients with severe respiratory distress and depressed gag reflex.

**CONTRAINDICATIONS**
- Non-breathing or near apneic patient.
- Known or likely fracture/instability of mid-face secondary to trauma.
- Patients with basilar skull fracture.
- Relative contraindications:
  - Blood clotting abnormalities
  - Nasal polyps

**COMPLICATIONS**
- Accidental intubation of esophagus
- Insertion of endotracheal tube too deep into the trachea or right mainstem bronchus.
- Oropharyngeal trauma; laryngopharyngeal trauma.
- Fractured teeth or dentures.
- Spasm of the vocal cords.

- Prepare, position and oxygenate the patient with 100% oxygen.
- Select proper ET tube (~1mm less than for oral intubation).
- Lubricate ET tube generously with water-soluble lubricant (Lidocaine Jelly).
- Pass the ET tube through the largest nostril with the beveled edge against the nasal septum and perpendicular to the facial plate.
- Use forward and lateral back and forth motion to advance the tube into the oropharynx. **Never force the tube.**
- Listen for air movement through the tube. Apply firm, gentle cricoid pressure and advance the tube quickly past the vocal cords during inspiration. Look/feel for bulging and anterior displacement of the laryngeal prominence.
- Listen over the opening of the ET tube to detect air flow with ventilatory effort.
- Check ET tube placement with colorimetry EtCO2 Detector.
- Inflate the cuff with 3 – 10 ml of air; secure ET tube.
- Auscultate for bilaterally equal breath sounds and absence of sounds over the epigastrium. If unsure of tube placement, remove tube and ventilate patient with BVM.
- Attach End tidal CO2 filter-line to monitor and confirm capnographic waveform and capnometric value. Continue monitoring throughout patient treatment and transport.
- Document ETT size, time, result (success) and placement location on the patient care report (PCR). Document all device used to confirm initial tube placement. Document positive/negative breath sounds before and after each movement of the patient.

**SPECIAL CONSIDERATIONS:**
1. **Orotracheal intubation** is the preferred choice
2. Procedure requires patient have spontaneous breathing
3. Contraindicated in anatomically disrupted or distorted airways, increased intracranial pressure, severe facial trauma, basilar skull fracture, head injury
4. Not a rapid procedure and exposes patient to risk of desaturation
TAB 8 GUIDELINE 14
INTUBATION – KING LTS-D AIRWAY

1. The King LTS-D is a “dual lumen” airway designed for use as a primary or back up airway in the event intubation is not authorized or not successful. The King LTS-D is the preferred advanced airway for the EMT and approved for all scopes of practices.

2. Indications
   a. EMT’s may utilize the King LTS-D for the unconscious, apneic or near apneic patient or in cases when CPR is initiated.
   b. The King LTS-D may be used initially or after beginning CPR with Bag Valve Mask ventilations.

3. Contraindications
   a. Responsive patients with an intact gag reflex
   b. Patients with known esophageal injury / disease
   c. Patients who have ingested caustic substances

<table>
<thead>
<tr>
<th>Size</th>
<th>2</th>
<th>2.5</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Criteria</td>
<td>35 – 45 inches (90 – 115 cm) Or 12 – 25 Kg</td>
<td>41 – 51 inches (105 – 130 cm) Or 25 – 35 Kg</td>
<td>4 – 5 feet (122 – 155 cm)</td>
<td>5 – 6 feet (155 – 180 cm)</td>
<td>&gt; 6 feet (&gt; 180 cm)</td>
</tr>
<tr>
<td>Connector Color</td>
<td>Green</td>
<td>Orange</td>
<td>Yellow</td>
<td>Red</td>
<td>Purple</td>
</tr>
<tr>
<td>Cuff Pressure</td>
<td>60 cm H2O</td>
<td>60 cm H2O</td>
<td>60 cm H2O</td>
<td>60 cm H2O</td>
<td>60 cm H2O</td>
</tr>
<tr>
<td>KLTD Cuff Volume</td>
<td>25 – 35 mL</td>
<td>30 – 40 mL</td>
<td>45 – 60 mL</td>
<td>60 – 80 mL</td>
<td>70 – 90 mL</td>
</tr>
</tbody>
</table>

4. Procedure
   a. Assess for absence of gag reflex, hypoventilation or apnea and visible foreign body in the airway
   b. Size of device is based on height of the patient with a size four being the most widely used size for patients 5 – 6 feet in height.
   c. Lubricate only the posterior surface of the King LTS-D to avoid blockage of the aperture or aspiration of the lubricant.
   d. Place King LTS-D per next page flow sheet.
• **STEP 1** - Position the patient in sniffing position (if cervical spine injury not suspected). Hold the King LTS-D at the connector with dominant hand. With non-dominant hand, hold mouth open and apply chin lift after grasping the lower jaw.

• **STEP 2** - Introduce the King LTS-D airway rotated laterally 45 – 90 degrees such that the blue orientation line is touching the corner of the mouth. Introduce the tip into the mouth and under the base of the tongue rotating tube to the midline.

• **STEP 3** - Advance tube until base of connector is aligned with the teeth or gums. Never force the tube into position.

• **STEP 4** - Attach BVM while gently ventilating, slowly withdraw tube until ventilation is easy and free flowing with visual chest rise and fall.

• **STEP 5** - Inflate cuff according to size
  - Size 2 25 – 35 ml
  - Size 2.5 30 – 40 ml
  - Size 3 45 – 60 ml
  - Size 4 60 – 80 ml
  - Size 5 70 – 90 ml

• **STEP 6** - Ventilate the patient every 6 seconds with 100% oxygen, and document correct tube placement and depth of insertion.

• **STEP 7** - Capnography device **MUST** be used and checked with each patient movement and documented on the run sheet.

• **STEP 8** - Secure the King LTS-D to the patient using tape / Thomas Tube Holder or any other acceptable means.

• **STEP 9** - May decompress the stomach by insertion of lubricated appropriate sized Nasogastric or Orogastric Tube and attached to suction.
5. **SPECIAL CONSIDERATIONS:**
   
a. Does not protect the airway from the effects of regurgitation and aspiration
   
b. High airway pressures may divert gas either to the stomach or to the atmosphere
   
c. Intubation of the trachea cannot be ruled out as a potential complication of the insertion of the KING LTS-D
   
d. It can and should be used with capnography and up to an 18 F nasogastric tube can be placed through the Gastric Access Lumen to decompress the stomach.
TAB 8 GUIDELINE 15
INTUBATION – LARYNGEAL MASK AIRWAY

1. Indications
   a. EMT’s may utilize the LMA for the unconscious, apneic or near apneic patient or in cases when CPR is initiated.
   b. The LMA may be used initially or after beginning CPR with Bag Valve Mask ventilations.

2. Contraindications
   a. Responsive patients with an intact gag reflex
   b. Patients with known esophageal injury / disease
   c. Patients who have ingested caustic substances

3. Guideline
   a. Assess for absence of gag reflex, hypoventilation or apnea and visible foreign body in the airway
   b. Select correct size of airway

<table>
<thead>
<tr>
<th>Mask Size</th>
<th>Patient Selection Guidelines</th>
<th>Maximum Cuff Inflation Volume</th>
<th>Maximum ETT ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Infants / Children 10 – 20 kg</td>
<td>up to 10 ml</td>
<td>4.5 mm Uncuffed</td>
</tr>
<tr>
<td>2½</td>
<td>Children 20 – 30 kg</td>
<td>up to 14 ml</td>
<td>5.0 mm Uncuffed</td>
</tr>
<tr>
<td>3</td>
<td>Children 30 – 50 kg</td>
<td>up to 20 ml</td>
<td>6.0 mm Cuffed</td>
</tr>
<tr>
<td>4</td>
<td>Adults 50 – 70 kg</td>
<td>up to 30 ml</td>
<td>6.0 mm Cuffed</td>
</tr>
<tr>
<td>5</td>
<td>Adults 70 – 100 kg</td>
<td>up to 40 ml</td>
<td>7.0 mm Cuffed</td>
</tr>
</tbody>
</table>

c. Place LMA per next page flow sheet.

d. Capnography device MUST be used and checked with each patient movement and documented on the run sheet.

e. Ventilate the patient every 6 seconds with 100% oxygen, and document correct tube placement and depth of insertion.

4. An air leak is caused by an improperly placed LMA airway, a mask with too little or too much air in the cuff, an LMA cuff that has folded back on itself, and / or too small and LMA device for size of the patient. Check the position of the LMA cuff and reinsert or replace, as necessary. Do not simply add more air to the cuff, as adding air may increase tension of the cuff, pushing it away from the laryngeal opening.
• Tightly deflate the cuff so that it forms a smooth "spoon shape". Lubricate the posterior surface of the mask with water-soluble lubricant

• With the head extended and neck flexed, carefully flatten the LMA airway tip against the hard palate

• Gently maintain cranial pressure with the non-dominant hand while removing the index finger

• Hold the LMA airway like a pen, with the index finger placed at the junction of the cuff and the tube

• Use the index finger to push cranially, maintaining pressure on the tube with the finger. Note position of the wrist. Advance the mask until definite resistance is felt at the base of the hypopharynx

• Without holding the tube, inflate the cuff with just enough air to obtain a seal (to a pressure of approximately 60 cm H₂O). Never overinflate the cuff
# TAB 8 GUIDELINE 16

## ENDOTRACHEAL TUBE INTRODUCER

(GUM ELASTIC BOUGIE)

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
</table>
| • Difficult intubation with a restricted view of the glottic opening (vocal cords).  
  • Short, thick neck  
  • Pregnancy  
  • Laryngeal edema  
  • Anatomical variation  
  • C-spine immobilization  
  • Tumors above the glottis opening | • Pediatric patient less than age 14  
  • Use of ET tube < 6.0 mm | • Soft tissue damage or bronchial rupture may occur:  
  • During blind intubation  
  • Positioning past the carina  
  • If undue pressure is applied  
  • If ET tube is passed over introducer without the use of a laryngoscope  
  • Single-use device. Do not attempt to clean or sterilize |

- Perform laryngoscopy, obtaining the best possible view; should always be able to view the tip of the epiglottis and ideally the arytenoids cartilages
- Advance the bougie, continually observing the distal tip, with the concavity (J tip) facing anterior.
- Visualize the tip of the bougie passing posterior to the epiglottis.
- Once the tip of the bougie has passed into the epiglottis, continue to advance midline so it passes behind the epiglottis in an anterior direction.
- As the tip enters the glottic opening (passes through the vocal cords) you will feel a “click” as it passes over the tracheal rings, or the tip may experience a “hold up” if it is against the wall of the airway. If you feel a “hold up”, gently withdraw the bougie about 5 cm.
- Hold the bougie firmly in place and MAINTAIN LARYNGOSCOPY. Instruct your colleague to pass the ET tube over the proximal end of the bougie. As the proximal tip is re-exposed the colleague should carefully grasp it, assuming control of the bougie and passing control of the ET tube to the intubator.
- Once the ET tube is fully in place, hold it securely as your colleague carefully withdraws the bougie.
TAB 8 GUIDELINE 17

KING VISION VIDEO LARYNGOSCOPY

1. The King Vision Video Laryngoscope is a portable, battery operated, rigid, digital video laryngoscope system that incorporates an integrated reusable display with disposable blades designed to visualize the airway while aiding in the placement of airway devices.
   a. The King Vision is designed for indirect laryngoscopy, difficult endotracheal intubations as well as routine intubations.
   b. The King Vision accommodates minimum mouth openings of 13mm for the standard blade and 18mm for the channeled blade making it effective for the majority of adult patient populations

2. Indications
   a. Patient with cervical spine immobilization precaution
   b. Concern prior to intubation that the patient may be a difficult intubation
   c. Poor visualization of vocal cords using normal intubation means

3. Contraindications
   a. Inability to open the mouth
   b. Inability to clear mouth of blood / vomitus with suctioning

4. Preparing the King Vision Video Laryngoscope (the Display and Blade combination) for use
   a. The KING Vision Display is intended to have minimal direct patient contact during normal use.
   b. Select the channeled blade to be used.
      i. The size #3 (Adult) Channeled blade is designed to be used with standard ETT sizes 6.0 to 8.0.
   c. Install the Display into the Blade (only goes together one way). Listen for a “click” to signify that the Display is fully engaged with the Blade
      i. Note that the front and back of the parts are color-coded to facilitate proper orientation.
   d. Lubricate the ETT, using a water soluble lubricant, then placing it into the guiding channel of the Channeled Blade with the ETT distal tip aligned with the end of the channel. Take care to avoid covering the imaging element of the blade with lubricant.
      i. No introducing stylet is needed.
      ii. Note that the ETT tip should not be evident on the screen when loaded properly.
iii. Alternatively, the ETT can be inserted into the channel after the blade has been inserted into the mouth and the vocal cords have been visualized.

2. Powering On
   a. Press the power button on the back of the King Vision Display.
   b. The King Vision Display should turn “ON” immediately and Display shows a moving image.
   c. Confirm the imaging of the King Vision is working properly.
   d. If the LED Battery indicator light in the upper left hand corner of the King Vision Display is FLASHING RED, the battery life remaining is Limited and the batteries should be replaced as soon as possible.

3. Insertion of King Vision Blade into the Mouth
   a. Open the patient’s mouth using standard scissor technique. If patient has dentures, remove prior to placing blade.
   b. In the presence of excessive secretions/blood, suction the patient’s airway prior to introducing the Blade into the mouth.
   c. Insert the blade into the mouth following the midline. Take care to avoid pushing the tongue toward the larynx.
   d. As the Blade is advanced into the oropharynx, use an anterior approach toward the base of the tongue. Watch for the epiglottis and direct the Blade tip towards the vallecula to facilitate visualization of the glottis on the Display’s video screen. The King Vision Blade tip can be placed in the vallecula like a Macintosh blade or can be used to lift the epiglottis like a Miller blade. For best results, center the vocal cords in the middle of the Display’s video screen.
   e. If unable to visualize the full vocal cords, gentle lift upwards on the blade
   f. If the lens becomes obstructed (e.g., blood/secretions), remove the Blade from the patient’s mouth and clear the lens.
   g. Avoid putting pressure on the teeth with the King Vision Video Laryngoscope.

4. ETT Insertion
   a. After you can see the vocal cords in the center of the King Vision Display, advance the ETT slowly and watch for the cuff to pass through the vocal cords.
      i. Minor manipulation of blade may be needed to align the ETT tip with the vocal cords.
   b. User Tips for ETT Advancement into the Trachea
The most common issue associated with ETT placement with any video laryngoscope is that the blade tip has been advanced too far; there may be a good close-up image of the vocal cords, but the ETT cannot be advanced because the blade/camera is obstructing ETT passage. To address this:

1. Place the Blade tip in the vallecula or,
2. If too close to the vocal cords, withdraw the Blade slightly and gently lift in an anterior direction prior to attempting to advance the ETT

5. Blade Removal
   a. Stabilize / hold the ETT laterally and remove the King Vision Video Laryngoscope from the mouth by rotating the handle toward the patient’s chest. As the blade exits the mouth, the ETT should easily separate from the flexible lateral opening of the channel.
   b. Turn off Display by pressing and holding the POWER button.

6. Separation and Disposal of the King Vision Parts after use
   a. After the procedure is complete, separate the King Vision Display from the Blade. Dispose of the Blade and clean/disinfect the Display.
   b. **NOTE: Do not dispose of the King Vision Display**

7. Cleaning and Disinfecting of the Reusable King Vision Display
   a. The King Vision Display is designed for easy cleaning and disinfection. The surfaces of the Display are specifically designed to allow proper cleaning without the need for any specialized equipment or supplies
   b. **Do not submerge the KING Vision Display in any liquid as this can damage the Display.**
   c. If the Display is visibly soiled or contamination is suspected, follow the cleaning steps outlined below:
      i. To prevent liquid from entering the King Vision Display, orient the device with the video screen above the battery compartment (upright/vertical orientation).
      ii. Prepare a mild soap/disinfecting solution. Clean the entire outer surface of the Display with the cleaning solution. A cotton swab may be used to clean the crevices of the purple sealing gasket and the ON/OFF button. Take care to avoid getting fluid inside the opening at the bottom of the battery compartment where the electrical connection is located.
iii. Remove the battery cover and clean the outer edge on either side of the battery compartment with a cotton swab, taking care to avoid the batteries and their contacts. Clean the battery cover.

iv. After cleaning, remove any residue with a damp wipe or gauze.

v. Use a dry wipe/gauze to remove water or allow the device to air dry.

vi. Replace battery cover.

vii. Store the King Vision Display in the supplied storage case or other similar pouch, bag or tray to protect from the environment until it is used again.
### GUIDELINE 18
### TRANSPORT VENTILATION DEVICES

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Respiratory arrest</td>
<td>• Patients with spontaneous respiration and not tolerating timed ventilation.</td>
<td>• Pneumothorax</td>
</tr>
<tr>
<td>• Cardiac arrest</td>
<td>• Patients not in need of ventilator assistance.</td>
<td>• Tube dislodgement</td>
</tr>
<tr>
<td>• Patients with a tracheotomy tube in need of ventilator assistance</td>
<td>• Not for use with pediatric patients or patients &lt; 40 kg unless able to by manufacturer specifications.</td>
<td>• Inability to ventilate</td>
</tr>
<tr>
<td>• Any intubated patient whom an adequate tidal volume and rate can be obtained</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**This procedure will be performed by paramedics only**

- Place in supine position with neck in a neutral position, c-spine control if indicated.

- Prepare Vent
  - Attach oxygen source gas line to quick connect on oxygen outlet.
  - When used with portable oxygen cylinder, ensure that the cylinder has adequate volume to power the ventilator and ensure that the valve is completely open.
  - Attach ventilator circuit with non-rebreather valve to the patient valve assembly by means of corrugated tubing.
  - Attach pulse oximetry unit to the patient and document initial reading.
  - Set tidal volume equal to 6 – 8 ml/kg of patient’s ideal body weight or at the patient’s current setting if patient is already on a ventilator. Note for patient’s with severe obstructive disease a higher tidal volume and lower rate is desired to maximize expiratory time.
  - Set breaths per minute (BPM) to desire position.
    - Use setting that the patient is already at if patient is already on a ventilator, otherwise use settings 12 – 20 BPM.
    - Hyperventilation may be achieved by increasing tidal volume and rate.
  - Ensure that the gas flow is detected as ventilator cycles.
  - Occlude the outlet to check for proper function of high-pressure alarms.

- Attach ventilation circuit to the ET Tube with appropriate ETCO2 monitoring device attached.
  - Attach capnography (end tidal CO2 monitor)
  - Assess lung sounds and adequate rise and fall of the chest. After assessment, may adjust tidal volume up to 10 ml/kg (of ideal body weight) for adequate ventilations
  - Once accurate EtCO2 readings are established, adjust respiratory rate from 8 – 20 BPM to achieve goal ETCO2 reading between 35 – 45 mmHg
  - Dial peep initially at 5 mmHg, may increase to 10 mmHg for patient’s with decreased compliance, CHF, and ARDS in order to maintain adequate gas exchange
  - As soon as possible switch to permanent O2 source to conserve portable cylinder
  - Continue to assess patient and ventilator settings for adequate ventilations during transport
  - Auscultate for bilateral breath sounds and observe for symmetrical and adequate chest rise.
  - Document ventilator use, settings and patient’s response on run report.
- Cleaning
  - If a disposable patient circuit is used (recommended).
  - Discard the circuit after every use.
  - Visible external contamination may be wiped off using a clean cloth soaked in detergent solution or in isopropyl alcohol.
  - If reusable non-rebreathing valve and circuit are used.
  - Clean after every use.
  - Detach corrugated hose from valve assembly.
  - Unscrew the valve inlet side from the outlet side and remove the diaphragm.
  - Wash with soap and water.

**Checklist – Suspected Extubation**

- [ ] Check Pulse
- [ ] Ventilate patient with bag valve device and high flow oxygen
- [ ] Check chest rise / fall and lung compliance
- [ ] Check EtCO₂
- [ ] If absent EtCO₂ and chest rise / fall, remove ETT
- [ ] Reestablish airway
  - [ ] Reintubate if conditions permit
  - [ ] Otherwise place King LT airway
- [ ] Chest rise?
  - [ ] If absent, use BVM and oral airway
- [ ] If unable to promptly (< 30 seconds) resolve problems, ventilate patient with bag valve device and high flow oxygen. Re-evaluate the patient and auscultate chest for air movement
- [ ] If unable to ventilate and oxygenate, consider surgical airway

**Checklist – Hypoxia / Desaturation**

- [ ] Confirm endotracheal tube placement and depth
- [ ] Check Oxygen supply
- [ ] Check SpO₂ probe. If necessary attach secondary or replacement SpO₂ probe if available
- [ ] Hand ventilate with BVM and portable O₂
- [ ] Check oxygen circuit integrity (connections, kinks, holes)
- Check EtCO\textsubscript{2} waveform
- Check Chest rise / fall and lung compliance
- Suction endotracheal tube
- Increase tidal volume (watch PIPs) if on the low side
- Increase FiO\textsubscript{2}
- Sedate and paralyze (if credentialed) for ventilator/spontaneous respiration asynchrony as appropriate
- Albuterol unit dose in-line nebulized treatment prn
- Duoneb unit dose in-line nebulized treatment prn
- Use of Positive End Expiratory Pressure (PEEP)
  - PEEP will be added in an attempt to achieve an SpO\textsubscript{2} of greater than 95%
  - PEEP will be added in increments not to exceed 10 cm
  - The use of greater than 10 cm of PEEP will require a physician’s order
  - Use of PEEP requires continuous observation and response to signs of reduced cardiac output
- Assess chest – decompress if suspected pneumothorax

---

**Checklist – High Pressure Alarm**

In the event of any suspected failure by the audible alarm alert, cessation of chest rise or air exchange and / or decrease in SaO\textsubscript{2}, perform the following:

- Immediately auscultate the chest for positive bilateral air exchange and assess lung compliance
- Check ET tube for correct placement, blockage, kinks and / or pilot balloon inflation
- Check patient valve for foreign material or obstruction
- Check green breath indicator on delivery valve for position function
- Check oxygen source and regulator
- Check hose and supply line assemblies
- Assess ETT depth – adjust as indicated
- Suction ETT
- Check and confirm tidal volume is 6 – 8 ml/kg
- Confirm patient’s weight
- Signs of awareness?
- Consider additional sedation / analgesia
- Consider additional paralytics ONLY if ETT placement is confirmed

- Assess for pneumothorax, decompress as indicated
- Assess for bronchospasm
- Insert Orogastric tube
- If unable to promptly (< 30 seconds) resolve problems, disconnect the ventilator and ventilate patient with bag valve device and high flow oxygen. Re-evaluate the patient and auscultate chest for air movement

**Checklist – Low Pressure Alarm**

- Assess ETT depth – adjust as indicated
- Check circuit integrity and connections
- EtCO₂ waveform – if absent refer to suspected extubation checklist
- Check tidal volume is 6 – 8 ml/kg
- Confirm patient’s weight
- If unable to promptly (< 30 seconds) resolve problems, disconnect the ventilator and ventilate patient with bag valve device and high flow oxygen. Re-evaluate the patient and auscultate chest for air movement
- Consider replacing ETT over endotracheal tube introducer

**Rising peak inspiratory pressures**

- Re-confirm tube placement
- Assess for kink in ETT
- Assess for pneumothorax and decompress if needed
- Assess need for sedation/analgesia and possibly paralysis (if credentialed)
- Suction ETT
- Ensure tidal volume appropriate for patient

**Checklist – Hypercapnea (ETCO₂ > 45 mmHg)**

- Re-confirm tube placement
- Increase respiratory rate
- Increase tidal volume
- Suction ETT
- Bronchospasm – Assess waveform
  - Administer albuterol unit dose in-line nebulized treatment prn
  - Duoneb unit dose in-line nebulized treatment prn

<table>
<thead>
<tr>
<th>Checklist – Hypocapnea (ETCO₂ &lt; 35 mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Re-confirm tube placement</td>
</tr>
<tr>
<td>- Assess and treat perfusion status: may be due to inadequate perfusion</td>
</tr>
<tr>
<td>- Decrease respiratory rate</td>
</tr>
<tr>
<td>- Decrease tidal volume</td>
</tr>
<tr>
<td>- Consider sedation/analgesia and possibly paralysis (if credentialed) to control respiratory rate</td>
</tr>
</tbody>
</table>
TAB 8 GUIDELINE 19
CAPNOGRAPHY

1. End tidal carbon dioxide is the measurement of the % carbon dioxide in the airway. Capnography provides a numeric reading (% CO\textsubscript{2} present) as well as graphic display (waveform). ETCO\textsubscript{2} is very useful in the patient with an advanced airway in place in helping to determine the adequacy of ventilation and perfusion. In order for there to be a measurable carbon dioxide level there must be cardiac output as well as lungs that are being ventilated and perfused.

2. Indications
   a. Confirmation of proper placement for endotracheal tube, King LT, laryngeal mask airway, surgical cricothyrotomy
   b. Acute dyspnea
   c. Assisted ventilations

3. Interpreting Capnography
   a. Normal range for EtCO\textsubscript{2} is 35 – 45 mmHg
   b. There are 4 phases of the waveform that require analysis.
      i. The flat A – B baseline segment (Respiratory Baseline) represents the beginning of exhalation of CO\textsubscript{2} – free gas that is contained in dead space from the conduction airways (trachea, bronchi). This value normally is zero.
      ii. The B – C segment (Expiratory Upstroke), a sharp rise, represents exhalation of a mixture of dead space gases and alveolar gases.
      iii. The C – D segment represents the alveolar plateau, characterized by exhalation of mostly alveolar gas. Point D is the end-tidal (EtCO\textsubscript{2}) value that is recorded and displayed by the monitor, (peak concentration of CO\textsubscript{2} occurring at the end of expiration).
      iv. The D – E segment (Inspiratory Down stroke), a sharp fall, reflects the inhalation of gases that are CO\textsubscript{2} – free (room air or supplemental oxygen). Alterations of the normal capnograph or EtCO\textsubscript{2} values are the result of changes in metabolism, circulation, ventilation, or equipment function.
4. When no CO$_2$ is detected, 3 factors must be quickly evaluated for cause:
   a. Loss of airway – improper tube placement, improper ventilation
   b. Circulatory collapse – Massive PE, cardiac arrest, low cardiac output
   c. Equipment malfunction – disconnected or malfunctioning bag-valve or ventilator

5. Procedure:
   a. Open tubing connector door and connect ETCO$_2$ filter line tubing by turning clockwise
      i. Tubing should be connected to monitor before being connected to the patient’s airway.
   b. Verify ETCO$_2$ display is on.
   c. Connect filter line to patient airway.

6. SPECIAL CONSIDERATIONS:
   a. CO$_2$ monitoring initiates as soon as the filter line is connected. Display will auto scale to appropriate value parameters.
   b. CO$_2$ alarms are preset:
      i. High alarm – 70 mm Hg.
      ii. Low alarm – 5 mm Hg.
   c. The apnea alarm will sound and “Alarm Apnea” will be displayed on the screen when no valid breath has been detected for 30 seconds. The ETCO$_2$ monitor is intended only as an adjunct in patient assessment and is not to be used as a diagnostic apnea monitor. An apnea message and alarm will display only if a valid breath has not been detected for 30 seconds. Monitoring should be used with clinical signs and symptoms.
   d. Carefully route the patient tubing (filter line) to reduce the possibility of entanglement or strangulation.

   End-tidal CO$_2$ monitoring is appropriate for adult and pediatric patients.
TAB 8 GUIDELINE 20
NEEDLE CRICOTHYROTOMY

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
</table>
| • Management of an obstructed airway when standard airway procedures cannot be accomplished or have failed
• May be performed on patients of any age
• Unable to intubate by another route
• Cervical spine injuries
• Maxilla facial trauma
• Laryngeal trauma / edema | • Patient able to maintain own airway
• Able to perform alternative airway management including endotracheal intubation / BVM / B IAD / Digital Intubation / Retrograde Intubation | • Post procedure bleeding
• Cellulitis of neck
• Subcutaneous emphysema
• Voice change
• Feeling of lump in throat
• Persistent stoma
• Obstructive problems
• Misplacement of the airway |

This procedure will be performed by paramedics only

- Place in supine position with neck in a neutral position, c-spine control if indicated
- Use aspect technique, as time and conditions will allow
- Have suction supplies available and ready
- Palpate the thyroid notch, cricothyroid interval and sterna notch for orientation
- Secure larynx laterally between thumb and forefinger
- Relocate the cricothyroid membrane
- Using the syringe attached to a short 10 – 14 gauge catheter-over-needle device if needed, insert the needle through the cricothyroid membrane at a 45 – 60 degree angle towards feet
- Confirm entry of needle in trachea by aspirating air through the syringe
- If air is present, change the angle of insertion to 60 degrees
- Advance the catheter to the level of the hub
- Carefully remove the needle and syringe
- Secure the cannula to the patient
- Attach the cannula to a 15 mm adapter (2.5 – 3.0 pediatric ET tube adapter)
- Attach a BVM to the airway adapter and begin oxygenation
- Make certain ample time is used not only for inspiration but expiration
- If unable to obtain an adequate airway, resume basic airway management and transport the patient as soon as possible
SPECIAL CONSIDERATIONS:

1. This procedure buys TIME only. It is not a definitive airway. It will provide OXYGENATION only, not appropriate VENTILATION. The paramedic considering a cricothyrotomy must make a careful airway assessment focused on:
   a. Determining the patient’s ability to maintain his / her own airway without further interventions
   b. Need for non-surgical intubation, such as obstructed airway procedures, manual airway maneuvers, oral or nasal airways with positive pressure ventilation or medication administration
   c. This decision will be affected by:
      i. Extrication time, transport time, distance to transport hospital, paramedic’s personal airway skills and on-line MEDICAL CONTROL.

2. Key points
   a. Use needle cricothyrotomy as a bridge to more invasive surgical airways
   b. If placement is required due to foreign body obstruction, removal attempts should continue after performing needle cric procedure
   c. Use procedure early to prevent ongoing hypoxia if foreign body is not easily removed
## TAB 8 GUIDELINE 21
### SURGICAL CRICOXYROTOMY

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
</table>
| - Management of an obstructed airway when standard airway procedures cannot be accomplished or have failed  
- Unable to intubate by another route  
- Cervical spine injuries  
- Maxilla facial trauma  
- Laryngeal trauma / edema  | - Patient able to maintain own airway  
- Able to perform alternative airway management including endotracheal intubation / BVM / B IAD / Digital Intubation / Retrograde Intubation  
- Pediatric patient less than age 8  | - Post procedure bleeding  
- Asphyxia  
- Aspiration  
- Creation of a false passage into tissue  
- Subglottic stenosis / edema  
- Laryngeal stenosis  
- Hemorrhage  
- Laceration of the esophagus or trachea  
- Mediastinal emphysema  
- Vocal cord paralysis |

**This procedure will be performed by paramedics only**

- Place in supine position with neck in a neutral position, c-spine control if indicated
- Use aspect technique, as time and conditions will allow.
- Have suction supplies available and ready.
- Palpate the thyroid notch, cricothyroid interval and sterna notch for orientation.
- Stabilize the thyroid cartilage with the non-dominant hand.
- Using a #11 blade scalpel, make a vertical incision through the skin over the lower half of the cricothyroid membrane, approximately 1 – ½ inches in length. This should expose the cricothyroid membrane.
- Carefully incise through the membrane, up to 1 cm in length.
- Using the handle of a second capped scalpel, insert it into the incision and rotate it 90 degrees to open the incision into the airway, or hemostats may be used to widen the opening. Can then place a gum elastic bougie into the hole to ensure patency.
- Insert a cuffed 6.0 endotracheal tube (or smaller for pediatrics) through the cricothyroid membrane incision. Direct the tube distally into the trachea until the cuff just passes the tracheal incision.
- Inflating the cuff approximately 8 – 10 ml and ventilate the patient, auscultating the chest.
- Secure the ET Tube to prevent dislodging with rolled gauze tie.
- Attach to 100% oxygen by BVM and confirm with capnography.
- Ventilate the patient every 6 seconds with 100% oxygen, and document correct tube placement and depth of insertion.
## TAB 8 GUIDELINE 22
### TRACHEOSTOMY TUBE CARE

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Management of an obstructed</td>
<td>• Patient able to maintain airway via</td>
<td>• Post procedure bleeding</td>
</tr>
<tr>
<td>tracheostomy airway</td>
<td>tracheostomy tube</td>
<td>• Asphyxia</td>
</tr>
<tr>
<td>• Secretions in tracheostomy tube</td>
<td></td>
<td>• Aspiration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creation of a false passage into tissue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hemorrhage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Laceration of the esophagus or trachea</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mediastinal emphysema</td>
</tr>
</tbody>
</table>

- **Clearing an Obstructed Tracheostomy Tube**
  - Position patient. Ensure that the outer opening of the tube is clear.
  - Check that the tube is in the proper location. The wings or flange should be against the neck, and the obturator should not be in place.
  - If a fenestrated tube (holes for upward flow of air to the upper airway) is in place, remove the decannulation plug.
  - If a double lumen tube is in place, remove the inner cannula to clear secretions.
  - If none of the above maneuvers work, suction the tube with a suction catheter.

- **Suctioning a Tracheostomy Tube (may be performed by EMT / Advanced EMT / Paramedic / Nurses)**
  - Choose a suction catheter small enough to pass through the tube.
  - Prepare suction unit for use and attach suction catheter.
  - Give oxygen (over tracheostomy tube) with a mask, and then loosen secretions by placing 1 – 2 mL of normal saline into the tube with a syringe.
  - Insert the suction catheter approximately 2 inches (5 cm) into the tube. If the patient begins to cough, the catheter is through the tube and into the trachea, and the depth of insertion is too deep. Do not use suction while inserting the catheter, and never force the catheter.
  - Cover the suction port (hole) and suction for 3-5 seconds, while slowly removing the catheter. Never suction for longer than 10 seconds. Always monitor heart rate and coloring during this procedure. Stop suctioning immediately if the heart rate drops significantly or the patient’s coloring worsens.
  - If the obstruction is removed, and the patient can breathe on his/her own, do not suction further. If additional suctioning is needed, apply oxygen (by blow-by or direct ventilation) and repeat steps as necessary.
  - Always provide supplemental oxygen after suctioning by using the blow-by method or with manual ventilations.
• Replacing a Tracheostomy Tube (may be performed by Advanced EMT / Paramedic / Nurses)
  • Insert a tracheostomy tube of the same size and model whenever possible. If this is not available, use a
    smaller tube or an endotracheal tube of the same outer diameter as the tracheostomy tube.
  • If the tube uses an insertion obturator, place this in the tube. If the tube has an inner and outer cannula, use
    the outer cannula and obturator for insertion.
  • Moisten or lubricate the tip of the tube (and obturator) with water, sterile saline, or a water-soluble lubricant.
  • Gently insert the tube with an arching motion (follow the curvature of the tube) posteriorly and then
    downward. Slight traction on the skin above or below the stoma may help.
  • Once the tube is in place, remove the obturator, attach the bag-mask device, and attempt to ventilate. If the
    tube uses an inner cannula, insert to allow mechanical ventilation with a bag-valve device.
  • Check for proper placement by watching for bilateral chest rise, listening for equal breath sounds, and
    observing the patient. Signs of improper placement include lack of chest rise, unusual resistance to assisted
    ventilation, air in the surrounding tissues, and lack of patient improvement.
  • If the tube cannot be inserted, withdraw the tube, administer oxygen, and ventilate as needed.
  • Use a smaller-size tracheostomy tube for the second attempt. If still unsuccessful with a smaller
    tracheostomy tube, insert an endotracheal tube through the stoma. Check the length of the original
    tracheostomy tube, note the markings on the endotracheal tube, and advance it to the same depth as the
    original tube. Do not advance the tube too far, or it may go into the right main stem bronchus.
  • If still unsuccessful, use a suction catheter as a guide. Insert a small sterile suction catheter through the
    tracheostomy tube. Without applying suction, insert the suction catheter into the stoma. Slide the
    tracheostomy tube along the suction catheter and into the stoma, until it is in the proper position. Remove
    the suction catheter. Assess ventilation through the tracheostomy tube.
  • If still unsuccessful, consider orotracheal intubation or transport the patient with ventilation through the
    stoma using a pediatric mask, or through a bag-mask device over the nose and mouth while covering the
    stoma with a sterile gauze.
  • After proper placement, cut the ends of the tracheostomy ties or tape diagonally (allows for easy insertion),
    pass through eyelets (openings) on the flanges, and tie around the patient’s neck, so that only a little finger
    can pass between the ties and the neck.

SPECIAL CONSIDERATIONS:
1. There are several types of tracheostomy tubes, and they come in many sizes and lengths, cuffed
   and uncuffed versions. The size is written on the wings or flanges of the tube. The inner and outer
   diameters are often on the wings as well. All tracheostomy tubes have a standard outer opening or
   hub outside the neck so a bag-mask device can be attached. For some tubes, an adapter may be
   needed to make this connection.
1. Indications
   a. Intubated patient showing signs of agitation or pain during transport
   b. All patients that received or are on a paralytic agent

2. Contraindications
   a. Airway compromise
   b. Hypotension

3. Guideline
   a. Ensure that the patient is properly intubated and that oxygen is attached
      i. All patients “MUST” be on capnography if intubated
      ii. Agitation is one of the first signs for hypoxia
   b. Richmond Agitation-Sedation Scale
      i. Validated agitation-sedation scale from age 2 months and older
      ii. Goal is for RASS between (0) to (-2)

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 4</td>
<td>Combative</td>
<td>Overtly combative or violent; immediate danger to staff</td>
</tr>
<tr>
<td>+ 3</td>
<td>Very agitated</td>
<td>Pulls on or removes tube(s) or catheter(s) or has aggressive behavior toward staff</td>
</tr>
<tr>
<td>+ 2</td>
<td>Agitated</td>
<td>Frequent nonpurposeful movement or patient–ventilator dyssynchrony</td>
</tr>
<tr>
<td>+ 1</td>
<td>Restless</td>
<td>Anxious or apprehensive but movements not aggressive or vigorous</td>
</tr>
<tr>
<td>0</td>
<td>Alert and Calm</td>
<td>Spontaneously pays attention to caregiver</td>
</tr>
<tr>
<td>- 1</td>
<td>Drowsy</td>
<td>Not fully alert, but has sustained (more than 10 seconds) awakening, with eye contact, to voice</td>
</tr>
<tr>
<td>- 2</td>
<td>Light Sedation</td>
<td>Briefly (less than 10 seconds) awakens with eye contact to voice</td>
</tr>
<tr>
<td>- 3</td>
<td>Moderate Sedation</td>
<td>Any movement (but no eye contact) to voice</td>
</tr>
<tr>
<td>- 4</td>
<td>Deep Sedation</td>
<td>No response to voice, but any movement to physical stimulation</td>
</tr>
<tr>
<td>- 5</td>
<td>Unarousable</td>
<td>No response to voice or physical stimulation</td>
</tr>
</tbody>
</table>

4. Considerations
   a. Administration of sedation and pain control for intubated patients with initial RASS of (-2) to (-5) will at the discretion of the medical crew members
5. Medication
   b. Adult
      i. Sedation
         1. Ketamine 1 – 4 mg / Kg slow IV or 6 – 12 mg / Kg IM every 5 minutes as needed
         2. Midazolam 1 – 5 mg IV / IM / IO / IN every 5 – 15 minutes as needed
      ii. Pain Control
         1. Fentanyl 1 mcg / kg every 15 – 30 minutes as needed
         2. Ketamine 1 – 4 mg / Kg slow IV or 6 – 12 mg / Kg IM every 5 minutes as needed
   c. Pediatric
      i. Sedation
         1. Ketamine 1 mg / Kg slow IV or 4 – 5 mg / Kg IM every 5 minutes as needed
         2. Midazolam 0.1 mg / kg (max 5 mg) IV / IM / IO / IN every 5 – 15 minutes as needed
      ii. Pain Control
         1. Fentanyl 1 mcg / kg every 15 – 30 minutes as needed
         2. Ketamine 1 mg / Kg slow IV or 4 – 5 mg / Kg IM every 5 minutes as needed
**TAB 8 GUIDELINE 24**

**NEEDLE (PLEURAL) DECOMPRESSION**

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Signs and symptoms of tension pneumothorax</td>
<td>• Puncture of the lung</td>
</tr>
<tr>
<td>• Acute dyspnea (severe)</td>
<td>• Hemorrhage from puncture of the blood vessels</td>
</tr>
<tr>
<td>• Unilaterally absent or severely diminished breath sounds on affected side</td>
<td>• Severe pain if the patient is conscious</td>
</tr>
<tr>
<td>• Subcutaneous emphysema</td>
<td><strong>PRECAUTIONS</strong></td>
</tr>
<tr>
<td>• Signs and symptoms of shock without other apparent causes</td>
<td>• When making the puncture, DO NOT PENETRATE any further than the pleura. Too deep of an insertion may result in penetration of the lung</td>
</tr>
<tr>
<td>• Hypotension (SBP &lt; 90 mmHg)</td>
<td>• The puncture must be made close to the top of the rib so to avoid major nerves and vessels in that area</td>
</tr>
<tr>
<td>• Tachycardia</td>
<td></td>
</tr>
<tr>
<td>• Mediastinal shift with tracheal deviation (late sign)</td>
<td></td>
</tr>
<tr>
<td>• Jugular vein distention (JVD)</td>
<td></td>
</tr>
</tbody>
</table>

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**This procedure will be performed by credentialed Advanced EMT / paramedics / nurses only.**

- PPE (gloves, eye protection, etc.)
- Assess the patient for signs and symptoms of a tension pneumothorax:
  - Acute dyspnea (severe).
  - Unilaterally absent or severely diminished breath sounds on affected side.
  - Subcutaneous emphysema.
  - Signs and symptoms of shock without other apparent causes.
    - Hypotension (and usually Tachycardia) is required for “Tension Pneumothorax”.
    - Mediastinal shift with tracheal deviation (late sign).
    - Jugular vein distention (JVD).
  - Auscultate breath sounds.
  - Administer oxygen at 15 LPM by non-rebreather mask or by BVM.
  - Identify the 4th or 5th intercostal space anterior-axillary line on the affected side.
    - Alternative site includes the second intercostal space on the anterior chest at the midclavicular line on the same side as the injury.
  - Cleanse site with alcohol / betadine or chlorhexadine prep.
  - Place patient in position of comfort, usually upright (only if no c-spine injury).
  - Insert needle (preferable 14 ga x 5.25 in for adult and 18 ga x 2 in for pediatric) into the skin between:
    - Lateral approach (preferred) - 4th and 5th rib (going above the rib).
    - Anterior approach – 2nd and 3rd rib (going above the rib).
    - Puncture the parietal pleura.
      - If using a syringe, have it attached to the needle and gentle aspirate as you are advancing the needle through the skin. A “gush” of air or blood into the syringe indicates placement.
    - Advance the IV catheter and remove the needle.
    - Secure the catheter in place.
    - Reassess the patient’s vital signs, lung sounds and respiratory efforts.
TAB 8 GUIDELINE 25
CHEST TUBE MONITORING

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
</table>
| • Inter-facility transfers requiring monitoring of a pre-established, patent chest tube. | • None, when the chest tube is indicated and must be monitored. | • Pneumothorax  
• Tube dislodgement  
• Inability to ventilate |

This procedure will be performed by paramedics and nurses only

• Monitoring:
  • Monitor the patient’s vital signs (Sp02 and ET02 if available) and breath sounds over affected lung area.
  • Assess for increasing respiratory distress and/or chest pain.
  • Observe the following:
    • Chest tube dressing for leakage.
    • If necessary, remove dressing and inspect tube at the entrance of the thorax for loose sutures and tube displacement.
    • Patency of the tube (kinks, dependent loops or clots).
      • Water level in the water seal should fluctuate with breathing, rising with inspiration and falling with expiration. If patient is on mechanical ventilation, this pattern is reversed because of the positive pressure.
      • Fluctuations stop when the lung is fully re-expanded, or when tube is kinked.
    • Drainage system, which should be upright and below the level of the tube insertion.
  • Chest tubes should only be clamped (toothless clamps) under specific circumstances:
    • To assess for air leaks.
    • To rapidly empty or change collection bottle or chamber.
    • To change disposable systems. Have the new system ready to be connected before clamping the tube.
  • Position the patient to permit optimal drainage (do not remove LSB/Immobilization equipment on trauma patients):
    • Semi-Fowler’s position to evacuate air (pneumothorax).
    • High Fowler’s position to drain fluid (hemothorax).
  • Assure tube connection between chest and drainage tubes are intact, taped well and secured in multiple locations.
    • Water seal vent must be without occlusion.
    • Suction control chamber vent must be without occlusion when suction is used.
    • Suction should be 15 – 30 cm H20 and intermittent.
  • Coil excess tubing on mattress next to patient and secure to gurney, assure there is a dependent loop.
  • Adjust tubing to hang in a straight line from the top of the mattress to the drainage chamber.
**Chest Tube Inadvertently Pulled (Partial or Complete):**
- Identify if leak in system exists. (If proximal tube port is not outside pleural cavity, tube is still functional).
- If a leak exists, gently remove tube completely and rapidly close surgical site with direct pressure and occlusive dressing.
- Notify Medical Control and consider diversion to closer facility.

**Air Leak:**
- In patients receiving mechanical ventilation with PEEP, if continuous bubbling is seen in water-seal bottle/chamber, a possible leak exists between the patient and water seal.
  - Locate leak.
  - Tighten loose connection between patient and water seal.
  - Leak is corrected when constant bubbling is stopped.
- Bubbling continues, indicating that the air leak has not been corrected.
  - Cross-clamp chest tube at the dressing site. If bubbling stops, air leak is inside the patient’s thorax (lung) or at the chest tube insertion site.
  - Unclamp tube and notify medical control immediately. **Leaving the chest tube clamped may cause a tension pneumothorax.**
  - Reinforce chest dressing.
- The bubbling continues, indicating that the leak is not in the patient’s chest or at the insertion site.
  - Gradually move clamps down drainage tubing away from the patient and toward the suction-controlled chamber, moving one clamp at a time.
  - When bubbling stops, leak is in the section of tubing or connection distal to the clamp.
  - Replace tubing or secure connection and release clamp.
- Bubbling continues, indicating that the leak is not in the tubing.
  - Check the drainage system for leak.
  - Change the drainage system if indicated.

**Tension Pneumothorax Develops:**
- If severe respiratory distress or chest pain develops:
  - Determine that the chest tubes are not clamped, kinked or occluded.
  - Correct problem if found.
  - Do not “milk” the chest tube if a clot is found without first clamping the tube proximal of clot.
- Absence of breath sounds on affected side:
  - Notify medical control immediately
- Hyper-resonance on affected side, mediastinal shift to unaffected side, tracheal shift to unaffected side, hypotension or tachycardia is present:
  - Contact Medical Control and consider **chest decompression** on the affected side.
• Water Seal (if water bottle system is used)
  • Water-seal bottle is broken.
    • Insert distal end of water-seal tube into sterile solution so that tip is 2 cm below surface.
    • If no sterile solution is available, double clamp chest tube while preparing new bottle.
    • Replace bottle and release clamps.
  • Water-seal tube is no longer submerged in sterile fluid:
    • Add sterile solution to water-seal bottle until distal tip is 2 cm below surface.
    • Set water-seal bottle upright so that tip is submerged.

SPECIAL CONSIDERATIONS:

1. If unable to determine location of equipment leak or malfunction, clamp tube, disconnect device at proximal connection and replace with Heimlich Valve. Unclamp tube, reassess patient.

2. Consider placement of Heimlich Valve in series between patient and Pleura-Vac/Atrium type device as a safety mechanism.
INDICATIONS
- Patient requiring acute IV hydration / medication
- Significant trauma or mechanism, emergency or potentially emergent medical condition
- Alternative venous access should only be used in life-threatening situations and unable to obtain traditional venous access

CONTRAINDICATIONS
- Fracture of the bone selected for IO infusion
- Excessive tissue at insertion site with the absence of anatomical landmarks
- Previous significant orthopedic procedures (IO within 24 hours, prosthesis)
- Infection at the site selected for insertion

MANDATORY
- All “alternative venous access” must have IV fluid running to maintain patency.
- EZ-IO Needle Types
  - Blue – EZ-IO (40 kg and over)
  - Pink - EZ-IO PD (3 – 39 kg)
  - Yellow EZ-IO LD (excessive tissue)

LEGEND
- EMR
- EMT
- A-EMT
- EMT-P
- MC Order

Approved IO Insertion Sites
- Proximal tibia – 2 cm below the patella
- Distal tibia – 3 cm above medical malleolus
- Proximal humerus – 1 cm above surgical neck with arm in “sling position”
SPECIAL CONSIDERATIONS:

1. Always clamp lines when open to environment
2. Maintain aseptic technique during procedure at all times
3. **Proper sites for intraosseous insertion:**
   a. **Adult Humeral head insertion:** Expose the shoulder and adduct the humerus (place the patient’s arm against the patient’s body) resting the elbow on the stretcher or ground and the forearm resting on the abdomen. With the patient in this position you may immediately note the humeral head on the anterior-superior aspect of the upper arm or anterior-lateral aspect of the shoulder. Palpate and identify the mid-shaft humerus and continue palpating toward the humeral head. As you near the shoulder you will note a small protrusion. This is the base of the greater tubercle insertion site.
   b. **Adult Distal Tibial insertion:** The insertion site is approximately two finger widths proximal to the medial malleolus and midline along the tibia.
   c. **Adult Proximal Tibial insertion:** There are 3 anatomical landmarks that must be identified. The first landmark is the patella or kneecap. To locate it, feel the front surface of the leg just below the femur. The second landmark is approximately 2 finger widths below the patella, this is the tibial tuberosity, a round oval elevation or bump on the front surface of the tibia. The third and final landmark is 1 finger width medial of the tibial tuberosity. Insertion should take place on the flat broad portion of the tibia.
d. Pediatric Distal Femur insertion: The insertion site is two fingers above the superior pole of the patella in an extended leg. The position should be slightly lateral of midline so that the vascular bundle is missed.

e. Pediatric Proximal Tibial insertion: If the tibial tuberosity cannot be palpated, the insertion site is two finger widths below the patella and then medial along the flat aspect of the tibia. If the tibial tuberosity can be palpated, the insertion site is one finger width below the tuberosity and then medial along the flat aspect of the tibia.

f. Pediatric Distal Tibial insertion: The insertion site is approximately one finger width (patients < 12 kg) and one to two finger widths (patients between 12 and 39 kg) proximal to the medial malleolus and midline along the tibia.

4. EZ-IO Product System

a. Clinical Indications:
   i. EZ-IO is indicated for “acute patients” in whom 1 – 2 peripheral (or external jugular) IV attempts have been unsuccessful OR in whom no potential IV sites are obvious on initial examination. “Acute patients” who:
      1. Have limited or no vascular access;
      2. Previously required central venous access for infusion due to difficult vascular access;
      3. Have an immediate need for drugs or fluids;
      4. Require multiple IV sticks to obtain vascular access for medication or fluid administration;
      5. Require intubation or sedation;
      6. Need access in emergencies including cardiac or respiratory arrest

b. Contraindications:
   i. Not intended for conscious, non-life threatening patients.
   ii. Select alternate insertion site if:
      1. Infection at the area of insertion
      2. Known or suspected fracture of bone selected for IO insertion
      3. Excessive tissue and/or absence of adequate anatomical landmarks
      4. Previous significant orthopedic procedures (IO within 24 hours in the same extremity, prosthetic limb or joint)

c. Considerations:
i. Due to the anatomy of the IO space you will note flow rates to be slower than those achieved with IV catheters
   1. Ensure the administration of a 10mL rapid bolus (flush) with a syringe.
   2. Use a pressure infusion bag for continuous infusions.

d. Precautions:
   i. The EZ-IO AD, LD and PD are not intended for prophylactic use.
   ii. If the bony cortex has been penetrated during a failed insertion attempt, further attempts should not be made on the same extremity.

e. Potential Complications:
   i. Localized bleeding and infiltration of fluid and drugs into surrounding tissues, including possible compartment syndrome.
   ii. Bone fracture in small newborns or patients with osteoporosis or congenital bone disease.
   iii. Fat embolus.

5. Procedure for EZ-IO placement
   a. Cleanse the site with alcohol or betadine
   b. While holding the EZ-IO driver in one hand, stabilize the bone and skin around the insertion site with the opposite hand and position the driver at the insertion site with the needle set perpendicular to the bone surface.
   c. Select the appropriate needle set and securely seat on the driver
      i. PD (3-39Kg) – 15mm
      ii. AD (40Kg and greater) – 25mm
      iii. LD (Excessive Tissue) – 45mm
   d. Power the needle set through the skin at the insertion site until you feel resistance. Check to ensure that at least 5 mm of the catheter is visible as indicated by the proximal depth indicator. (If < 5 mm of the catheter is visible, the patient has excessive soft tissue over the insertion site and the needle will not reach the bone’s cortex and other options for vascular access should be considered).
e. Penetrate the bone cortex by squeezing the driver trigger and applying firm, steady pressure then release the drive trigger when the needle flange touches the skin or when a sudden “give” is felt upon entry into the marrow.

f. Stabilize the catheter hub and remove the driver from the needle set by gently pulling straight up on the driver and lifting away.

g. Remove the stylet from the catheter, while grasping the hub firmly with one hand, rotate the stylet counterclockwise (unscrew the stylet from the catheter). Pull the stylet out of the catheter and consider placing it into the empty cartridge for disposal. Do not attempt to recap the stylet.

h. Confirm proper IO positioning, the catheter should be standing straight up at a 90 degree angle and is firmly seated in the bone.

i. Attach the EZ connect tubing to the IO and aspirate to assure you are in the marrow, then flush the IO with 2 – 3 ml (maximum of 1 mg / kg) Lidocaine with 7 - 8 ml of normal saline to ease the somatic pain associated with the infusion and allow for acceptable flow rates, watch for signs of infiltration.

j. Initiate the infusion, a pressure infuser may be necessary to maintain acceptable flow rates.

k. Apply EZ-Stabilizer (if available) or secure with Secure in position with tape and a bulky dressing. Maintain surveillance of the site for signs of infiltration. Avoid taping completely around the limb.

l. Monitor extremity distal to site for changes in circulation (pulse, capillary refill).

6. EZ-IO Removal (Procedure)
   a. Stabilize the extremity.
   b. Attach luer-lock syringe.
   c. Continuously rotate clockwise while slowly and gently applying traction to catheter. Do not rock or bend the catheter during removal.
   d. Once removed immediately place catheter in appropriate sharps container.
   e. Dress site as appropriate.
7. FASTResponder Sternal Intraosseous Device
   
a. The FASTResponder Sternal Intraosseous Device is intended for intraosseous infusion as an alternative to intravenous access to facilitate emergency resuscitation through the use of drugs and fluid.

b. Indications for Use:
   
i. Device is indicated for use in establishing a sternal intraosseous access route in adult and adolescent patients (12 years of age and older), requiring vascular administration of drugs or fluids to facilitate emergency resuscitation.

   ii. Not intended to be left in site for more than 24 hours.

c. Designated Insertion Site
   
i. Manubrium.

d. Contraindications
   
i. None

e. Precautions
   
i. Designed to penetrate 6 mm into the manubrium. Qualified professionals should determine any appropriate or necessary exceptions, either inclusions or exclusions to the criterion “for patients 12 years and older.

   ii. Proximal tip of Infusion Tube contains metal.

   iii. The function of the device may be affected by:

     1. Compromised skin over the insertion site such as trauma, infection or burns.

     2. Fracture of the sternum or vascular injury which may compromise the integrity of the manubrium or its vascularization.

     3. Midline sternotomy scars

   iv. Warnings

     1. Safety in patients with very severe osteoporosis has not been proven.

     2. Reuse of FASTResponder™ is not recommended due to the potential for cross contamination, which may lead to serious injury or death.

     3. Do not insert finger(s) in the open end of the device due to the potential of needle stick.
f. Device

![Device Diagram]

- Adhesive Liner (A)
- Locking Pin (B)
- Target Foot (C)
- Infusion Tube (D)
- Strain Relief Hook (E)
- Protective Dome (F)

g. Insertion Procedure

i. Expose the sternum and clean infusion site. NOTE: Maintain aseptic technique throughout the procedure.

ii. Remove the Adhesive Liner (A) with the Locking Pin (B).

iii. Align the Target Foot (C) notch with the patient’s sternal / manubrial notch, over the midline, and perpendicular to the manubrium.

iv. Push the FASTResponder down completely to deploy the Infusion Tube (D).

v. Withdraw the FASTResponder™ straight back while holding down the Target Foot (C). Support comes out with the Infusion Tube (D). Discard the FASTResponder™ following contaminated sharps protocols.
vi. Connect the IV line directly to the luer, and clip the Strain Relief Hook (E) to the Target Foot (C). Confirm placement by aspiration, flush with 5mL saline bolus to clear.

vii. Remove the liner from the Protective Dome (F) and apply the Dome (F) over the Target Foot (C) infusion site.

h. Removal Procedure
   i. Remove Protective Dome (F).
   ii. Turn off the source of fluid and disconnect.
   iii. Pull on Infusion Tube (D) to remove from the patient. (NOTE: Pull using one continuous motion (do not start/stop) until removed. Use the tube to pull-on, not the luer connection. It is normal for the tubing to stretch).
   iv. Peel off the Target Foot (C) and dress the site per standard protocol.
   v. Discard Infusion Tube (D) and Target Foot (C) following contaminated sharps protocol.

i. NOTES
   i. If fluid does not flow, even after flushing, or if extravasation occurs, infusion should be discontinued and an alternate method of vascular access should be used (i.e., humeral or tibial IO access with EZ-IO).
   ii. Fluids or drugs may be administered as boluses from a syringe, or from fluid sources using gravity drip, pressure cuffs or syringe / stopcock pumping method. Fluids have been infused into sternums at 30 ml/ min by gravity drip and 120 ml/ min by pressurized source.
   iii. CPR should be paused for the brief time required for FASTResponder insertion. This brief pause will not impact patient outcome


9. Alternative Venous Access
   a. This procedure will be performed by paramedics / nurses only
b. Alternative venous access should only be used in life-threatening situations

c. Peripherally Inserted IV Access Devices (PICC line)
   i. Located in patient’s antecubital area
   ii. May have 1-2 pigtails (if two pigtails are noted – access blue port)
   iii. Procedure
      1. Infection control / Remove blue cap – if permanent / nonremovable cap exists – just clean with alcohol swab.
      2. Attach 10 ml syringe with saline to Leur lock device or nonremovable cap and Flush line with 10 ml saline – if resistance is met, reposition patient’s arm and try again – if continued resistance is met, abort attempts to access device.
      3. Attach IV solution with tubing to Leur lock device or nonremovable cap and regulate desired IV rate.
      4. Tape tubing down to avoid disconnection with patient movement.
      5. Stop procedure at any time redness, swelling, extravasation of fluid, or resistance of using device is met.

d. Implanted port (Port-a-Cath)
   i. Located on patient’s anterior chest between clavicle and breast
   ii. Metal round device may be palpated for location
   iii. Procedure
      1. Locate device via palpation.
      2. Infection control / Cleanse site with Betadine.
      3. Attach 10 ml with saline to Huber needle.
      4. Secure device with one hand, with second hand, access device using Huber needle – needle should be perpendicular to patient’s skin – slight resistance may be felt when accessing device, apply pressure, slight “pop” will be achieved, insert needle until resistance is meet (hits posterior surface of device).
      5. Flush device with 10 ml Normal Saline.
      6. Attach IV tubing to device and regulate desired IV flow rate.
      7. Support Huber needle with 2 x 2’s or 4 x 4’s and apply dressing to site
      8. Stop procedure at any time redness, swelling, extravasation of fluid, or resistance of using device is met.
e. Tunneled catheters (Broviac or Hickman)
   i. Located in patient’s anterior chest
   ii. Single pigtail device hanging from patient’s chest
   iii. Cap usually nonremovable
   iv. Procedure
      1. Infection control / Cleanse cap with alcohol.
      2. Flush device with 10 ml Normal Saline.
      3. Attach IV tubing and solution to port and adjust to desired IV flow rate.
      5. Stop procedure at any time redness, swelling, extravasation of fluid, or resistance of using device is met.

f. Hemodialysis A-V catheters (Quinton catheter)
   i. Double pig-tailed device (blue and brown/red ports)
   ii. Normally located in patient’s neck or groin
   iii. Access blue port only
   iv. Procedure
      1. Infection control / Remove blue port cap / Cleanse cap with alcohol
      2. Flush device with 10 ml Normal Saline.
      3. Attach IV solution and tubing to port and adjust to desired flow rate
      4. Secure IV tubing using tape.
      5. Stop procedure at any time redness, swelling, extravasation of fluid, or resistance of using device is met.

g. Non-tunneled catheters (Central line)
   i. Normally located on anterior chest between clavicle and patient’s breast
   ii. Normally contains 3 pig tails
   iii. Blue port is the recommended port to access
   iv. Procedure
      1. Infection control / Remove blue port cap / Cleanse cap with alcohol.
      2. Flush device with 10 ml Normal Saline.
      3. Attach IV tubing with solution to port and adjust to desired flow rate.
      4. Secure tubing with tape.
      5. May try other port if resistance is encountered with blue port
6. Stop procedure at any time redness, swelling, extravasation of fluid, or resistance of using device is met.

7. Secure tubing with tape.
# TAB 8 GUIDELINE 27
## MAINTENANCE OF BLOOD AND BLOOD TRANSFUSION MONITORING

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Active bleeding</td>
<td>• Type and Cross Matched Packed Red Blood Cells and administration orders should</td>
</tr>
<tr>
<td>• Symptomatic anemia</td>
<td>be obtained from referring facility prior to departure.</td>
</tr>
<tr>
<td>• Hypotension</td>
<td>• The referring physician should inform the patient or responsible party of the</td>
</tr>
<tr>
<td>• Traumatic injuries with acute blood loss</td>
<td>indications and risks and benefits of blood transfusion. Permission for the</td>
</tr>
<tr>
<td></td>
<td>transfusion should be documented in the transfer record.</td>
</tr>
</tbody>
</table>

- Assure that the patient is wearing an ID bracelet with his / her name and hospital ID number from the referring hospital. Confirm the patient’s name and ID number on the bracelet match those on the unit of blood, and verify the patient’s identity and matching numbers with two providers.

- Blood transfusions are administered through a blood filter and through a primary infusion of Normal Saline.

- Obtain a complete set of vital signs.

- Vital signs are monitored 5 minutes after the start of each unit of blood and at least every 15 minutes thereafter unless needed more often as dictated by the clinical situation.

- **Nurses may initiate blood products with check from another health care provider.** Paramedics may monitor and maintain pre-established blood or blood products infusions during inter-facility transfer.

- Once the last bag of blood has infused, nurses and paramedics will:
  - Provide continuous cardiac monitoring.
  - Provide oxygen therapy.
  - Confirm flow rate and settings.
  - Confirm flow rate settings on IV pump with the transferring physician's written or verbal order.

- Document blood unit number, vitals (including temperature), and any signs and symptoms of allergic reaction accordingly on the transport record.

- Once the last bag of blood has infused, nurses and paramedics will:
  - Spike a bag of Normal Saline.
  - Infuse the bag of normal Saline at KVO or a rate that will maintain patient's hemodynamic status.
  - Document time of re-spiking of the bag, and amount of Saline that infused into the patient.

- Upon arrival at the receiving facility give used blood bag to receiving facility staff.

- The following documentation shall be provided for each bag of blood administered:
  - Beginning Time
  - Ending Time
  - Lot number, and the patient band number
Identification and Management of Complications:

- Contact Medical Control for consultation.

Hemolytic Transfusion Reaction

- Signs and Symptoms: facial flushing, hyperventilation, tachycardia, hives, chest pain, wheezing, fever chills, cyanosis, dark urine, sense of impending doom.
- Management
  - Stop transfusion, change all tubing, infuse normal saline, collect blood bags for lab analysis.
  - Maintain normovolemia with normal saline
  - Consider Lasix 0.5 - 1 mg / Kg IV / IO.
  - If hypotensive consider Levophed at 5 – 20 mcg / min or Dopamine at 2 – 20 mcg / kg / min.

Febrile Non-hemolytic Transfusion Reaction

- Signs and symptoms: headache, fever, chills.
- Management:
  - Stop transfusion, change all tubing, infuse normal saline, collect blood bags for lab analysis.
  - Benadryl 25-50 mg IV.
  - Acetaminophen 325 mg po.

Anaphylactic Reaction

- Signs and Symptoms: hives, hypotension, tachycardia, itching, wheezing.
- Management:
  - Stop transfusion, change all tubing, if hypotensive bolus normal saline at 10 - 20 mL / Kg IV, collect blood bags for lab.
  - Epinephrine (1:1000) 0.3 – 0.5 mg IM in adults and 0.01 mg / Kg (max 0.5 mg) IM in pediatrics for mild allergic reactions.
  - Epinephrine (1:10,000) 0.3 – 0.5 mg IV if the allergic reaction is severe and the patient is hypotensive.
  - Benadryl 25 – 50 mg IV.
  - Consider intubation for signs of upper airway obstruction.

Circulatory Overload

- Signs and symptoms: dyspnea, orthopnea, hypertension, CHF.
- Management:
  - Stop transfusion.
  - Elevate patient into a sitting position.
  - Consider Nitroglycerin IV 40 – 100 mcg / min for SBP > 100 mmHg
  - Consider Lasix 0.5 – 1 mg / kg IV.
The ResQGARD is a device that improves hemodynamics in spontaneously breathing patients. This device regulates pressures within the thorax which:

- Doubles the blood flow to the heart
- Increases the blood flow to the brain by 50%
- Doubles the systolic blood pressure
- Increases survival rates
- Increases the likelihood of successful defibrillation

### INDICATIONS

- Spontaneously breathing patients (> 1 year or 25 pounds) with hypotension (< 100 mmHg [adults]; < 90 mmHg [children])
- Secondary causes:
  - Hypovolemia
  - Internal hemorrhage
  - External hemorrhage
  - Dehydration
  - Trauma-related hypovolemia
  - Abdominal trauma (blunt or penetrating)
  - Extremity trauma (blunt or penetrating)
- Hypotension
- Dialysis
- Sepsis
- Orthostatic intolerance
- Medication reaction

### CONTRAINDICATIONS

- Patients under one (1) year of age or 25 pounds
- Blunt or penetrating chest trauma
- Patients with flail chest
- Patients with ongoing uncontrolled blood loss
- Situations with life-threatening active bleeding are not under control, the ResQGARD may accelerate bleeding.
- Relative contraindication. Blood loss of unknown rate
- Chest pain
- Congestive Heart Failure
- Dilated cardiomyopathy
- Aortic stenosis
- Shortness of breath, respiratory insufficiency
- Pulmonary hypertension

- Connect the ResQGARD to the facemask.
- Explain to the patient that they will feel some slight resistance when inhaling. This means that the device is working and helping to improve blood flow.
- Hold the mask over the nose and mouth maintaining a tight facemask seal.
- A ResQStrap can be used to hold the ResQGARD in place.
- Breathe @ 10–16/min.
- Inhale slowly (over 2–3 seconds) and deeply; exhale normally.
- If supplemental oxygen is desired, connect the oxygen tubing to the port and deliver up to 15 lpm.
- Monitor
  - Serial blood pressures every 5 minutes, pulse oximetry and continued patient assessment are necessary for evaluating ResQGARD effectiveness.
  - If respiratory distress develops with use, immediately discontinue.
  - Complaint of nausea and / or vomiting, the device should only be used with the mouthpiece or facemask w/o strap to allow for easy removal and prevention of aspiration.
- Documentation
  - When the ResQPOD is used it shall be documented in the narrative of the patient care report.
SCENE REHABILITATION: GENERAL

Universal Patient Care

INITIAL PROCESS
- Patients logged into General Rehabilitation Documentation
- VS Assessed / Recorded (If HR > 110 then obtain Temp)
- Patients assessed for signs / symptoms

Significant Injury
Cardiac Complaint: Signs / Symptoms
Respiratory Complaint: Serious Signs / Symptoms
Respiratory Rate < 8 or > 40
Diastolic Blood Pressure < 80

YES → Go to Appropriate Protocol

Heat Stress
Active Cooling Measures
Forearm immersion, cool shirts, cool mist fans, etc for 10 – 20 minutes

Rehydration Techniques
12 – 32 oz Oral Fluid over 20 minutes. Oral rehydration may occur along with Active Cooling Measures

NO → Heat or Cold Stress

Heat Stress
YES → Active Cooling Measures
NO → Cold Stress

Cold Stress
Active Warming Measures
Dry patient, place in warm area. Hot packs to axilla and / or groin

Rehydration Techniques
12 – 32 oz Oral Fluid over 20 minutes. Oral rehydration may occur along with Active Warming Measures

YES

YES

NO

NO

Reassess individual and Vital Signs after 20 minutes
in General Rehabilitation Section

VITAL SIGNS CAVEATS

BLOOD PRESSURE:
Prone to inaccuracy on scenes. Must be interpreted in context.
Individuals at special events may have elevated blood pressure due to physical exertion and is not typically pathologic.
Individuals with SBP > 160 mmHg or DBP > 100 mmHg may need extended rehabilitation. However this does not necessarily prevent them from returning to the event.

TEMPERATURE:
Individuals may have increased temperature during rehabilitation.

HR ≥ 110 BPM → YES

Temp ≥ 100.6 → YES

Temp ≥ 100.6 → YES

HR ≥ 110 BPM → YES

Discharge Individual from General Rehabilitation Section

Extend Rehabilitation Time Until VS Improve.
Consider Transport

Extend Rehabilitation Time Until VS Improve.
Consider Transport

Extend Rehabilitation Time Until VS Improve.
Consider Transport
SPECIAL CONSIDERATIONS:

1. This guideline should be utilized for evaluating patrons of certain special events that may or may not otherwise meet the definition of a patient.

2. Paramedic on-scene has full authority in deciding when individuals meet the definition of a patient and / or require further treatment or transport.

3. Regarding documentation under this guideline, individuals who are evaluated only at the rehabilitation center require a narrative-based patient log entry under one PCR for all of these individuals. However, if a patient receives ALS care more than over-the-counter medications and/or is transported to an emergency department, the patient requires a separate run number and full PCR like any other patient.

4. People taking anti-histamines, blood pressure medication, diuretics or stimulants are at increased risk for cold and heat stress.

5. Establish rehab location such that it provides shelter, privacy and freedom from smoke or other
TAB 8 GUIDELINE 30

SCENE REHABILITATION: RESPONDER

Universal Patient Care

INITIAL PROCESS
- Personnel logged into Responder Rehabilitation Section
- VS Assessed / Recorded
- Pulse Oximetry and SpCO (if available)
- Personnel assessed for signs / symptoms

20 Minute Rest Period
Firefighters should consume at least 8 oz of fluid between SCBA change-out

Pulse Rate > 85 % NFPA Age Predicted Maximum
- YES →
  - SBP ≥ 160
  - or-
  - DBP ≥ 100
  - NO

Respirations < 8 or > 40
- YES →
  - Pulse Oximetry < 92 %
  - or-
  - SpCO > 10 %
  - NO

Temperature ≥ 100.6
- YES →

Discharge Responder from Rehabilitation Section
Reports for Reassignment

NO

— YES →

Mandatory Rest Period
Rehydration is Most Important
Re-evaluate in 10 minutes

IV Access
Fluid Bolus Up to 2000 mL
Until Pulse Rate ≤ 110 or Less and SBP ≥ 100

No improvement after 30 minutes of additional rehabilitation consider Transport

Contact Medical Control
Transport to appropriate facility

Injury / Illness / Complaint should be treated using appropriate treatment protocol beyond need for oral or IV hydration

REMOVE:
- PPE
- Body Armor
- Chemical Suits
- SCBA
- Turnout Gear
- Other equipment as indicated

CONTINUE:
Heat and Cold Stress treatment Techniques from General Rehab Protocol

NFPA Age Predicted 85% Maximum Heart Rate

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Maximum Heart Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 - 25</td>
<td>170</td>
</tr>
<tr>
<td>26 – 30</td>
<td>165</td>
</tr>
<tr>
<td>31 – 35</td>
<td>160</td>
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<tr>
<td>36 – 40</td>
<td>155</td>
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<tr>
<td>41 – 45</td>
<td>152</td>
</tr>
<tr>
<td>46 – 50</td>
<td>148</td>
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<tr>
<td>51 – 55</td>
<td>140</td>
</tr>
<tr>
<td>55 – 60</td>
<td>136</td>
</tr>
<tr>
<td>61 – 65</td>
<td>132</td>
</tr>
</tbody>
</table>
SPECIAL CONSIDERATIONS:

1. This guideline is to be utilized for public safety responders, usually firefighters, on the scene of an incident.

2. Rehabilitation officer has full authority in deciding when responders may return to duty.

3. Utilize this guideline in conjunction with the rehab steps and guidance in the General Rehabilitation Guideline.

4. May be utilized with adult responders on fire, law enforcement, rescue, EMS and training scenes.

5. Responders taking anti-histamines, blood pressure medication, diuretics or stimulants are at increased risk for cold and heat stress.

6. Rehabilitation Section is an integral function within the Incident Management System.

7. Establish section such that it provides shelter, privacy and freedom from smoke or other hazards.
CARDIAC | ACLS
TAB 8 GUIDELINE 31
CARDIAC MONITORING

Rapid diagnosis of cardiac arrhythmias is essential for treatment and improving patient outcomes. Pre-hospital cardiac monitoring may facilitate early activation of STEMI centers as well as treatment of other life threatening illnesses through appropriate primary triage and referral.

This procedure can be performed by an EMT in the presence of an Advanced EMT or Paramedic. EMTs are not allowed to interpret any cardiac monitor or EKG.

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>EXCLUSION CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults with complaints of non-traumatic, heart-related symptoms.</td>
<td>Patient for whom the acquisition of the pre-hospital cardiac monitoring will cause significant time delay or other circumstance that is not in the best interest of patient care at that time.</td>
</tr>
<tr>
<td>Person who accesses the emergency medical system with suspected acute coronary syndrome.</td>
<td>Patient who refuses to allow cardiac monitoring to be obtained.</td>
</tr>
<tr>
<td>Person who accesses the emergency medical system that is requested by a physician to acquire a cardiac monitoring.</td>
<td>Any other circumstance that is not in the best interest of the patient.</td>
</tr>
<tr>
<td>Patient with previous cardiac history and all medical patients over the age of 40 with the following risk factors:</td>
<td></td>
</tr>
<tr>
<td>o Smoker</td>
<td></td>
</tr>
<tr>
<td>o Hypertension</td>
<td></td>
</tr>
<tr>
<td>o Obesity / Sedentary</td>
<td></td>
</tr>
<tr>
<td>o Diabetes</td>
<td></td>
</tr>
<tr>
<td>o Family history</td>
<td></td>
</tr>
<tr>
<td>o Elevated cholesterol</td>
<td></td>
</tr>
</tbody>
</table>

- Cardiac monitor interpretive findings should be reported to on-line MEDICAL CONTROL during the patient assessment and sent via cell phone (transmission) if possible
- Towels should be used as needed to protect the modesty of your patient.
- Cardiac Monitoring Procedure
  - Prep skin as time and patient condition allows
  - Attach Limb Leads as described below
  - Primary leads will be limb leads I, II, & III (white / black / red). If there is a (4 or 5) lead cardiac monitor, then attach those leads accordingly
  - Application & Recording should be done liberally during patient care
  - Record before and after any medication administration
- Use the strip for notes as needed
- Include a reasonable sample of the available cardiac monitor strips with the EMS report

- Limb leads (4)
  - Left anterior axillary line
    - left anterior shoulder
  - Right anterior axillary line
    - right anterior shoulder
  - Left anterior superior iliac crest
    - Left hip / lower abdomen
  - Right anterior superior iliac crest
    - right hip / lower abdomen
TAB 8 GUIDELINE 32

12 LEAD EKG PROCEDURE

Rapid diagnosis of an acute myocardial infarction is essential for treatment and improving patient outcomes. Pre-hospital EKG’s may facilitate early activation of STEMI centers through appropriate primary triage and referral.

This procedure can be performed by an EMT in the presence of an Advanced EMT or Paramedic, or if the EMT will be transmitting the EKG to online medical control and as long as it does not delay patient transport. EMTs are not allowed to interpret any cardiac monitor or EKG.

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>EXCLUSION CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults with complaints of non-traumatic, heart-related symptoms.</td>
<td>Patient for whom the acquisition of the pre-hospital EKG will cause significant time delay or other circumstance that is not in the best interest of patient care at that time.</td>
</tr>
<tr>
<td>Person who accesses the emergency medical system with suspected acute coronary syndrome.</td>
<td>Patient who refuses to allow an EKG to be obtained.</td>
</tr>
<tr>
<td>Person who accesses the emergency medical system that is requested by a physician to acquire a 12 Lead EKG.</td>
<td>Any other circumstance that is not in the best interest of the patient.</td>
</tr>
<tr>
<td>Patient with previous cardiac history and all medical patients over the age of 40 with the following risk factors:</td>
<td>A copy of the 12 lead EKG will be hand delivered to the receiving hospital and should have the patient’s name appearing on the 12 lead EKG. A second copy of the 12 lead EKG shall be attached to the run report for appropriate documentation.</td>
</tr>
<tr>
<td>o Smoker</td>
<td></td>
</tr>
<tr>
<td>o Hypertension</td>
<td></td>
</tr>
<tr>
<td>o Obesity / Sedentary</td>
<td></td>
</tr>
<tr>
<td>o Diabetes</td>
<td></td>
</tr>
<tr>
<td>o Family history</td>
<td></td>
</tr>
<tr>
<td>o Elevated cholesterol</td>
<td></td>
</tr>
</tbody>
</table>

1. 12 lead interpretive findings should be reported to on-line MEDICAL CONTROL during the patient assessment and sent via cell phone (transmission) if possible
2. Towels should be used as needed to protect the modesty of your patient. In the female patient, the chest leads must be positioned under the breasts
3. When time allows, acquire a 2nd 12 lead EKG during transport AFTER the administration of Nitroglycerin, Lidocaine, Fentanyl or any other medication (if the patient is having an ACS event)
4. 12 Lead EKG Procedure
   a. If feasible, the 12 Lead EKG should be acquired in supine position, if unable to do so then obtain in a sitting or semi-sitting position. Many of your cardiac patients will be orthopneic and unable to tolerate the supine position
b. Prep skin as time and patient condition allows

c. Attach Limb and precordial leads accordingly to standard ECG placements as described:

5. If defibrillation, synchronized cardioversion or pacing is necessary, quickly remove the necessary precordial leads to allow for quick combo patch placement and proceed with the appropriate guideline or place leads below such pads

- Limb leads (4)
  - Left anterior axillary line
    - left anterior shoulder
  - Right anterior axillary line
    - right anterior shoulder
  - Left anterior superior iliac crest
    - Left hip / lower abdomen
  - Right anterior superior iliac crest
    - right hip / lower abdomen

- Precordial leads (6)
  - V1 fourth intercostal space just to the right of the sternum
  - V2 fourth intercostal space just to the left of the sternum
  - V3 in between V2 and V4
  - V4 fifth intercostal space mid-clavicular line
  - V5 anterior axillary line level with V4
  - V6 mid axillary line level with V4 and V5
  - V4R fifth intercostals space in right mid-clavicular line

a. Instruct the patient to remain still during the 12 Lead acquisition for 10 seconds
a. EKG Lead Interpretation

<table>
<thead>
<tr>
<th>I (Lateral)</th>
<th>aVR</th>
<th>V1 (Septal)</th>
<th>V4 (Anterior)</th>
</tr>
</thead>
<tbody>
<tr>
<td>II (Inferior)</td>
<td>aVL (Lateral)</td>
<td>V2 (Septal)</td>
<td>V5 (Lateral)</td>
</tr>
<tr>
<td>III (Inferior)</td>
<td>aVF (Inferior)</td>
<td>V3 (Anterior)</td>
<td>V6 (Lateral)</td>
</tr>
</tbody>
</table>

b. Document 12 lead intervention, time and results in the patient care report

c. Serial 12 Lead EKG should be acquired every 5 – 10 minutes or with a change in the patient’s condition

d. Write on the 12 lead what position it was acquired in and attach a copy of the 12 Lead EKG to the run sheet

2. Right Sided EKG Procedure

a. Indications of a RV wall infarction may include:
   
i. ST elevation in the inferior leads, II, III, and aVF
   
ii. ST elevation that is greatest in lead III is especially significant
   
iii. ST elevation in V1 (considered to be the only precordial lead that faces the RV on the standard 12-lead ECG)
   
iv. Other findings may include: right bundle branch block, second- and third-degree atrioventricular blocks, ST segment elevation in lead V2 50% greater than the magnitude of ST segment depression in lead aVF
   
v. Hypotension and clear lung fields

- Limb leads (4)
  
  o Left anterior axillary line
    
    ▪ left anterior shoulder
  
  o Right anterior axillary line
    
    ▪ right anterior shoulder
  
  o Left anterior superior iliac crest
    
    ▪ left hip
  
  o Right anterior superior iliac crest
    
    ▪ right hip
• Precordial leads (6)
  o V1R fourth intercostal space just to the left of the sternum
  o V2R fourth intercostal space just to the right of the sternum
  o V3R in between V2R and V4R
  o V4R fifth intercostals space in right mid-clavicular line
  o V5R anterior axillary line level with V4R
  o V6R right mid axillary line level with V4R and V5R

3. Posterior EKG Procedure
   a. Indications of a posterior wall infarction may include:
      i. Changes in V1 – V3 on the standard 12-lead ECG predominantly, which include:
         1. Horizontal ST depression
         2. A tall, upright T wave
         3. A tall, wide R wave
         4. R/S wave ratio greater than 1
         5. Inferior or lateral wall MI (especially if accompanied by ST depression or prominent R waves in leads V1-V3)
   b. Label the Posterior EKG
      i. Note “Posterior EKG” in the machine, if able
      ii. Handwrite “Posterior EKG” on the 12 Lead EKG printout if not already part of the electronic printout
      iii. Re-label V4 – V6 on the printout to V7 – V9
• Limb leads (4)
  o Left anterior axillary line
    ▪ left anterior shoulder
  o Right anterior axillary line
    ▪ right anterior shoulder
  o Left anterior superior iliac crest
    ▪ left hip
  o Right anterior superior iliac crest
    ▪ right hip
• Place three additional EKG electrodes as follow:
  o TIP: start at V9 (the last electrode) and work forward
  o V9 – left spinal border, same horizontal line as V4 – 5
  o V8 – midscapular line, same horizontal line as V7 and V9
  o V7 – posterior axillary line, same horizontal line as V6
• Place ECG lead cables as follows (using a standard 12-lead machine):
  o Locate lead cables V1 – V6. Connect lead cables to electrodes as follow:
  o Lead cable V6 connects to electrode V9
  o Lead cable V5 connects to electrode V8
  o Lead cable V4 connects to electrode V7
  o Lead cables V1 – V3 are connected the same way as when obtaining a standard EKG
**TAB 8 GUIDELINE 33**

**AUTOMATED EXTERNAL DEFIBRILLATOR**

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>IMMEDIATELY AFTER THE A.E.D. BECOMES AVAILABLE</th>
</tr>
</thead>
</table>
| - Pulseless and apneic patient not meeting D.O.A. or D.N.R. criteria.  
- Consider the use of child pads or attenuator for victims < 8 years of age or < 55 pounds. | - If patient is found in water, remove from water and dry patient thoroughly.  
- Do not use an AED in an explosive atmosphere or extremely wet atmosphere.  
- If a medication patch is found, remove patch and wipe clean before applying defibrillation pads.  
- Do not place defibrillation pads directly over patient’s implanted defibrillator or pacemaker. | (for any patient meeting the above “Indications”), it shall be attached to the patient and if appropriate defibrillation delivered as outlined below. This must happen within the first 2 minutes of the A.E.D.’s arrival. |

**AED Maintenance**

- Defibrillation cables should be inspected for damage and / or wear.  
- Defibrillation pads should be routinely inspected to assure that they are within their expiration and are not open.  
- Assure that batteries are charged and spares are available.

- Turn A.E.D. power on.  
- Expose patient’s chest and apply defibrillator pads to ensure good contact either anterior-posterior or anterior-lateral position.  
- Anterior-lateral position:  
  - White cable - Angle between the sternum and right clavicle.  
  - Red cable - Over the lower left ribcage (axillary area).  
- Plug cables into AED.  
- Stop CPR and clear the patient.  
- Press the analyze button.  
  - If advised by the defibrillator, charge defibrillator, assure patient is clear and push button to deliver shock.  
  - If a “No Shock” message is received at any time during analysis, assess for a pulse.  
    - No pulse - perform C.P.R. for two minutes before analyzing rhythm again.  
    - Pulse present - check breathing.  
- Immediately resume CPR and then assess pulse.  
  - No pulse - continue C.P.R. for two minutes using supplemental oxygen and airway adjunct.  
  - If pulse present and patient is not breathing, secure airway and ventilate with B.V.M. & supplemental oxygen.  
  - If pulse & adequate spontaneous respirations are present, place patient in recovery position & place on oxygen 15 LPM via complex mask.  
- After two (2) minutes of C.P.R., push analyze button.  
  - If advised by AED, charge AED, assure patient is clear and push button to deliver shock.  
- Do not deliver more than six (6) attempts at defibrillation unless directed to by medical control.  
- Remember to continue B.L.S. treatment if rhythm is not converted.  
- An AED is okay to utilize on a metal roof as long as the provider is not in direct contact with the patient.
**TAB 8 GUIDELINE 34**

**CARDIAC DEFIBRILATION**

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>Maintenance of cardiac defibrillator</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pulseless and apneic patient not meeting D.O.A. or D.N.R. criteria.</td>
<td>• If patient is found in water, remove from water and dry patient thoroughly.</td>
<td>• Defibrillation cables should be inspected for damage and/or wear.</td>
</tr>
<tr>
<td>• Consider the use of child pads or attenuator for victims &lt; 8 years of age</td>
<td>• Do not use a cardiac defibrillator in an area explosive atmosphere or extremely</td>
<td>• Defibrillation pads should be routinely inspected to assure that they are within</td>
</tr>
<tr>
<td>or &lt; 55 pounds.</td>
<td>wet atmosphere.</td>
<td>their expiration and are not open.</td>
</tr>
<tr>
<td></td>
<td>• If a medication patch is found, remove patch and wipe clean before applying</td>
<td>• Assure that batteries are charged and spares are available.</td>
</tr>
<tr>
<td></td>
<td>defibrillation pads.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Do not place defibrillation pads directly over patient’s implanted defibrillator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or pacemaker.</td>
<td></td>
</tr>
</tbody>
</table>

**Maintenance of cardiac defibrillator**

- Defibrillation cables should be inspected for damage and/or wear.
- Defibrillation pads should be routinely inspected to assure that they are within their expiration and are not open.
- Assure that batteries are charged and spares are available.

**INDICATIONS**

- Pulseless and apneic patient not meeting D.O.A. or D.N.R. criteria.
- Consider the use of child pads or attenuator for victims < 8 years of age or < 55 pounds.

**CONTRAINDICATIONS**

- If patient is found in water, remove from water and dry patient thoroughly.
- Do not use a cardiac defibrillator in an area explosive atmosphere or extremely wet atmosphere.
- If a medication patch is found, remove patch and wipe clean before applying defibrillation pads.
- Do not place defibrillation pads directly over patient’s implanted defibrillator or pacemaker.

**Maintenance of cardiac defibrillator**

- Defibrillation cables should be inspected for damage and/or wear.
- Defibrillation pads should be routinely inspected to assure that they are within their expiration and are not open.
- Assure that batteries are charged and spares are available.

- Plug cables into EKG Monitor, expose patient’s chest and apply defibrillator pads to ensure good contact either anterior-posterior or anterior-lateral position.
- Anterior-lateral position.
  - White cable - Angle between the sternum and right clavicle.
  - Red cable - Over the lower left ribcage (axillary area).
- Stop CPR and clear the patient.
- Recognize EKG findings as ventricular fibrillation or pulseless ventricular tachycardia.
- Charge the device to Manufacturer’s Specifications or as follows:
  - Phillips Biphasic – defibrillate at set energy of 150 J for each subsequent shock.
  - Monophasic units – defibrillate at 360 J for each shock.
  - Physio-control Biphasic – defibrillate at a sequence of 200 J, then 300 J, then 360 J.
  - Zoll Biphasic – defibrillate at a sequence of 120 J, then 150 J, then 200 J.
- Visually check that no one is in contact with the patient and announce CLEAR.
- Press the SHOCK button and deliver the shock.
- Immediately resume CPR and then assess pulse.
  - No pulse - continue C.P.R. for two minutes using supplemental oxygen and airway adjunct.
  - If pulse present and patient is not breathing, secure airway and ventilate with B.V.M. & supplemental oxygen.
  - If pulse & adequate spontaneous respirations are present, place patient in recovery position & place on oxygen 15 LPM via complex mask.
  - Remember to continue B.L.S. treatment if rhythm is not converted.
### SYNCHRONIZED CARDIOVERSION

#### INDICATIONS
- Unstable patient with a tachydysrhythmia that have a pulse.
- Consider the use of pediatric pads or attenuator for victims < 8 years of age or < 55 pounds.

#### CONTRAINDICATIONS
- Pulseless patient.
- If patient is found in water, remove from water and dry patient thoroughly.
- Do not use a cardiac defibrillator in an explosive atmosphere or extremely wet atmosphere.
- If a medication patch is found, remove patch and wipe clean before applying defibrillation pads.
- Do not place defibrillation pads directly over patient’s implanted defibrillator or pacemaker.

#### Maintenance of cardiac defibrillator
- Defibrillation cables should be inspected for damage and / or wear.
- Defibrillation pads should be routinely inspected to assure that they are within their expiration and are not open.
- Assure that batteries are charged and spares are available.

#### Procedure
- Plug cables into EKG Monitor, expose patient’s chest and apply defibrillator pads to ensure good contact either anterior-posterior or anterior-lateral position.
- Anterior-lateral position:
  - White cable - Angle between the sternum and right Clavicle.
  - Red cable - Over the lower left ribcage (axillary area).
- Ensure that appropriate sedation and analgesics have been given to the patient.
- Push the SYNC button, observe the EKG rhythm and confirm that the triangle sense marker appears near the middle of each QRS complex.
- If the sense markers do not appear or they are displayed in the wrong location adjust the EKG size or select another lead.
- The location of the sense marker may vary slightly with each QRS complex.
- Energy delivered for synchronized cardioversion should occur per current AHA guidelines or at 100 joules.
- Make sure that everyone is clear of the patient and then Push the CHARGE button.
- After confirming that the monitor is still in SYNC mode, ensure that everyone is clear from the patient by saying CLEAR, push and hold the SHOCK button until it discharges.
- Reassess the patient and the cardiac rhythm, repeat steps as necessary.
## TRANSCUTANEOUS PACING

### INDICATIONS
- Patients with symptomatic bradycardia after no response to atropine.
- Patients in 2nd or 3rd degree heart block and are symptomatic or primary treatment if unable to start an IV.

### CONTRAINDICATIONS
- Pulseless patient.
- Hypothermic patient
- Pediatric bradycardia

### Maintenance of cardiac pacer
- Defibrillation cables should be inspected for damage and/or wear.
- Defibrillation pads should be routinely inspected to assure that they are within their expiration and not open.
- Assure that batteries are charged and spares are available.

### PROCEDURE
- Plug cables into EKG Monitor, expose patient’s chest and apply defibrillator pads to ensure good contact either anterior-posterior or anterior-lateral position.
- Anterior-lateral position:
  - White cable - Angle between the sternum and right Clavicle.
  - Red cable - Over the lower left ribcage (axillary area).
- Ensure that appropriate sedation and analgesics have been given to the patient.
- Push the PACER button
- Push the RATE Button
  - Set the rate at 80 beats per minute, or higher if the patient’s intrinsic rate is above 80.
- Push the CURRENT button
  - Increase the milliamps until you reach electrical and mechanical capture and then increase by an additional 5–10 milliamps (assess the carotid and femoral pulses to confirm mechanical capture).
  - This procedure can also be performed by going to maximum joules and slowly decreasing the joules until you no longer capture and then increasing until capture is obtained.
TAB 8 GUIDELINE 37
RESQCP SYSTEM

1. Purpose
   a. This document provides suggested specifications for the use of the ResQCPR System™, which is composed of the ResQPOD ITD® 16 and the ResQPUMP® ACD-CPR Device.
   b. The ResQPOD ITD 16 is an impedance threshold device (ITD) that regulates airflow into the lungs during CPR to enhance the negative pressure (i.e., vacuum) in the chest, allowing more blood to be pulled back to the heart, and lowering intracranial pressure (ICP).
   c. The ResQPUMP ACD-CPR Device is used to perform active compression decompression CPR (ACD-CPR), which is intended to promote complete and active chest wall recoil to further enhance the vacuum. Used together, these devices increase blood flow to the brain and vital organs, and improve the likelihood of survival.

2. Indications
   a. The ResQCPR System is intended for use as a CPR adjunct to improve the likelihood of survival in adult patients with non-traumatic cardiac arrest

3. Contraindications
   a. Do not use the ResQPUMP if the patient’s chest is not large enough for the ResQPUMP suction cup to provide adequate compressions/decompressions during use
   b. ResQPUMP should not be used in patients who have had a recent sternotomy (within 6 months)
   c. Pregnant women
   d. Children under the age of 16

4. Precautions
   a. Improper use of the ResQCPR System could cause serious injury to the patient and ineffective chest compressions/decompressions. The ResQCPR System should only be used by personnel who have been trained in its use.
   b. Safety and effectiveness of the ResQCPR System in the setting of traumatic injury (wounds resulting from sudden physical injury) have not been established.
   c. Improper positioning of the ResQPUMP suction cup may result in possible injury to the rib cage and/or internal organs, and may also result in suboptimal circulation during ACD-CPR.
   d. Moisture, gels, or other lubricating materials on the patient’s chest should be removed before applying the ResQPUMP. Failure to do so may result in sliding of the suction cup
on the chest, ineffective chest compressions/decompressions, and possible injury to the rib
cage or internal organs.

5. Performing CPR using the CPR System
   a. Before beginning CPR with the ResQCPR System assess patient for signs of circulation
      (e.g., consciousness, breathing, coughing, movement, pulse).
   b. If no signs of life are present, begin performing CPR with the ResQCPR System as soon
      as possible, but do not delay manual chest compressions while preparing the ResQCPR
      devices.
   c. Place ResQPUMP ACD-CPR Device:
      i. Position the suction cup in the middle of the sternum between the nipples (mid-
nipple line). Make sure that the edge of the suction cup does not extend below the
      xiphoid process, as this could result in inadequate suction and/or rib injury.
      ii. Turn on metronome and begin performing compressions:
         1. Perform chest compressions at the recommended compression to ventilation
            ratio. Use a 50% duty cycle, spending equal time compressing and lifting.
            Avoid interruptions.
         2. Compression:
            a. Compress with elbows locked and shoulders directly over the
               sternum. Bend at the waist, using the entire upper body and large
               thigh muscles to compress and lift.
            b. Compress at a rate of 80/min using the metronome (push button) as
               a guide (compress on one tone, lift on the other tone).
            c. Compress to recommended depth (e.g. 2” or 5 cm). Observe the
               force required to achieve that depth, as it will vary according to how
               compliant the chest is. The tip of the red arrow indicates the force
               being applied. Once the amount of force required is known, use that
               target as a guide for continued compressions. The approximate
               amount of force required to compress the chest 5 cm is as follows:
               i. 30 kg: soft/supple chest
               ii. 40 kg: chest of average compliance
               iii. 50 kg: stiff/rigid chest
            d. Use the force gauge to monitor forces and rescuer fatigue.
      3. Decompression:
a. To fully achieve the benefits of ACD-CPR, actively pull up until the tip of the red arrow on the force gauge registers ≈ 10 kg. It is not necessary to lift with more than 10 kg of force.

b. Lift using the upper body and large thigh muscles, and bend at the waist. If the suction cup dislodges, then pull up slightly less.

d. Attach the ResQPOD ITD 16 to the facemask as soon as chest compressions begin; use a 2-handed technique to maintain a tight facemask seal and airway position.

e. After 30 compressions, pause and use one hand to administer two ventilations over one second duration each until the chest rises.

f. Continue to provide a 30:2 compressions to ventilation ratio until a pulse returns or an advanced airway is placed. Rotate ACD-CPR duties every two minutes (or more often) to avoid fatigue.

g. Once an advanced airway (e.g. ET tube, supraglottic airway) is placed:
   i. Confirm tube placement and secure with commercial tube restraint.
   ii. Move the ResQPOD to the airway and turn on the timing assist lights.
   iii. Provide asynchronous ventilations; ventilate once over one second until chest rise is seen, each time light flashes (10/min).
   iv. Perform continuous chest compressions at 80/min. Do not pause compressions for ventilations.

h. If ROSC occurs, discontinue ResQCPR including ResQPOD and support ventilations as indicated
   i. If the patient re-arrests, resume use of both devices immediately

6. Cleaning
   a. ResQPump should be cleaned after every use. The silicone rubber cushion cup attracts dust and suction may be difficult to obtain. Store the ResQPump in a case to keep it clean
   b. To clean the handle, wipe it with a damp cloth and mild detergent. Never immerse the handle in water or autoclave to clean
   c. To clean the suction cup. Wash the suction cup with a mild detergent and rinse with tap water
   d. The handle and cup may be chemically disinfection after washing using bleach solution (1 part 5% liquid household bleach and 9 parts water) or Cavicide. Wipe the handle with a dampened cloth (do not immerse or rinse) to remove chemical residue. The cup may be rinsed with water afterwards
SPECIAL CONSIDERATIONS:

1. Signs and symptoms of improved cerebral blood flow (e.g. eye opening, gagging, spontaneous breathing, and limb or body movement) have been reported in patients without a pulse but who are undergoing ResQCPR. If these occur, check quickly to see if a pulse has returned. If the patient remains in cardiac arrest, continue ResQCPR and contact your medical control authority for guidance on managing these signs and symptoms in an arrested patient.
### TAB 8 GUIDELINE 38

#### RESQPOD

The ResQPOD is an Impedance Threshold Device (ITD) that improves hemodynamics in spontaneously breathing patients. This device regulates pressures within the thorax which:
- Doubles the blood flow to the heart
- Increases the blood flow to the brain by 50%
- Doubles the systolic blood pressure
- Increases survival rates
- Increases the likelihood of successful defibrillation

#### INDICATIONS
- The ResQPOD device should be used on all patients in cardiopulmonary arrest if it is available and not otherwise contraindicated
- Use in any age > 1 year

#### CONTRAINDICATIONS
- Not to be used on patients with spontaneous circulation. It should be removed from the respiratory circuit once spontaneous circulation is achieved
- Flail chest
- Pediatrics < 1 year of age

---

- Use with a BVM and oral or nasal airway
  - Attach the ResQPOD to the mask
  - Ventilate after each light blink (10 / min)
  - Maintain an airtight seal
- For an intubated patient or use with LMA or King LTS-D
  - Confirm tube placement; secure with commercial tube restraint.
  - Connect ResQPOD directly to ET, King airway or LMA.
  - Connect adapter to ventilation port of ResQPOD.
  - Connect EtCO₂ filter line to adapter; filter line attached to monitor (LP12).
  - Connect ventilation source (bag-valve device or ATV).
  - Do not give medications through the ResQPOD. Instill through ET only.
- Perform continuous chest compressions and ventilations as outlined in the current AHA guidelines. Avoid unnecessary delays or interruptions in chest compressions.
- Turn on ResQPOD timing assist lights. Ventilate asynchronously at timing light flash rate.
- Remove secretions from ResQPOD by shaking or blowing out with the ventilation source.
- **Upon return of spontaneous circulation (ROSC), and EtCO₂ > 40 mm Hg, remove the ResQPOD from the ventilation circuit.**
  - In the event that spontaneous circulation is lost, re-attach the ResQPOD to the advanced airway and utilize as outlined above.
  - Carefully monitor placement of the advanced airway after movement of the patient, placement of the ResQPOD, and/or removal of the ResQPOD.
- Document the ResQPOD procedure and results in the patient care report (PCR).
TAB 8 GUIDELINE 39
AUTOMATED CHEST COMPRESSION DEVICE:
LUCAS 2 CHEST COMPRESSION SYSTEM

1. Indications
   a. Use on adult patients who have acute circulatory arrest defined as absence of spontaneous breathing and pulse, and loss of consciousness.
   b. Patients not meeting the D.O.A. or D.N.R criteria.

2. Application
   a. Push ON | OFF on the User Control Panel for 1 second to power up LUCAS in the bag and start the self-test. Green LED adjacent to the ADJUST key illuminates when LUCAS is ready for use.
   b. Assemble the LUCAS device
      i. Remove the LUCAS Back Plate from the Carrying Bag.
      ii. Stop manual CPR.
      iii. Make sure that you support the patient’s head. Carefully put the LUCAS Back Plate under the patient, immediately below the arm pits.
      iv. Start manual CPR again.
      v. Hold the handles on the support legs to remove the LUCAS Upper Part from the bag. Pull the release rings once to make sure that the claw locks are open. Let go of the release rings.
      vi. Attach the support leg that is nearest to you to the Back Plate.
      vii. Stop manual CPR.
      viii. Attach the other support leg to the Back Plate, so that the two support legs lock against the Back Plate. Listen for CLICK.
      ix. Pull up once to make sure that the parts are correctly attached.
   c. Make appropriate adjustments to ensure that the lower edge of the suction cup is positioned immediately above the end of the sternum.
i. With the LUCAS in the ADJUST mode, adjust the height of the Suction Cup to set the Start Position. Perform this by pushing the Suction Cup down with TWO fingers under the pressure pad touches the patient’s chest without compressing the chest.

ii. Push PAUSE to lock the Start Position. Remove your fingers from the Suction Cup.

iii. Check for proper position. If not, push ADJUST, pull up the Suction Cup to readjust the central and height position for a new Start Position. Push PAUSE.

d. Push ACTIVE (continuous) or ACTIVE (30:2) to start the compressions.

e. Check that the device is working as it should regarding frequency and compression.

f. Apply the LUCAS Stabilization Strap if the LUCAS device is applied to the patient and performing compressions under the supervision of one person.

  g. Applying defibrillation pads

  i. Self-adhesive electrodes should be used during defibrillation as to make it easier to work with the LUCAS.

  ii. Position the defibrillator electrodes and wires so they are not under the suction cup.

  iii. Defibrillation can be performed when LUCAS is applied to the patient.

  iv. Switch off LUCAS before ECG analysis and during defibrillation. MAKE THE INTERRUPTIONS as short as possible.

  v. Verify position of suction cup after defibrillation, re-adjust if necessary

  vi. Resume compressions.

h. Securing patient to LUCAS and transport patient per manufacture specifications.

  i. Stop LUCAS device with spontaneous return of circulation.
j. In case of mechanical malfunction of the Lucas 2 the EMS responder will resort back to manual CPR for patient care

3. Decontamination
   a. Lucas 2 should be cleaned according to manufacturer’s specifications
   b. Check Lucas 2 for damage prior to repackaging and returning to service
TAB 8 GUIDELINE 40
AUTOMATED CHEST COMPRESSION DEVICE: ZOLL AUTOPULSE

1. Indications
   a. Use on adult patients who have acute circulatory arrest defined as absence of spontaneous breathing and pulse, and loss of consciousness.
   b. Patients not meeting the D.O.A. or D.N.R criteria.

2. Contraindications
   a. Patients under the age of 18 (unless adult appearing in size)
   b. **Patient weight maximum is 300 pounds, Minimum is 90 pounds**
   c. Traumatic cardiac arrest

3. Precautions
   a. Always minimize any interruptions to compressions when using the AutoPulse
   b. Deployment of AutoPulse should not postpone initiation of manual compressions
   c. Do not place or position the patient on the AutoPulse in either a face down orientation or on the patient’s side
   d. Do not place any straps or restraints (or otherwise constrain) the LifeBand during active operation
   e. Do not use the AutoPulse platform along to carry a patient. Reeve Sleeve / MegaMover Litter / Smithcot Stretcher / backboard should be used to move the patient.

4. Application
   a. Turn the AutoPulse on (switch at top middle of board above the patients head), ensure that the battery is securely latched before moving the AutoPulse or initiating chest compressions.
      i. If a fault/user advisory is displayed, check installation of the band clip into the drive shaft slot. **DO NOT STOP MANUAL COMPRESSIONS**
   b. Place the patient in a seated upright position.
   c. Remove all clothing from torso front and back.
   d. Place the AutoPulse platform behind the patient’s back while still in a seated upright position. Yellow arrow should be pointed up.
   e. Lay the AutoPulse and patient down to the ground ensuring that the head aligns onto yellow line and the shoulders are at the black line on the platform. This ensures that the patient is
correctly aligned on the AutoPulse platform and that the LifeBand Load-distributing Band (LBD) will be correctly positioned.

f. Connect Chest / LifeBand across the chest of the patient.
   i. Do not twist bands and maintain bands at 90 degrees to platform.

g. Lift the chest band straight up to ensure it is free of twists

h. Press the “Green” button once to start sizing cycle. Do not touch the patient while the AutoPulse platform is analyzing the patient’s size.
   i. Press the “Green” button a second time to start compression cycle.

j. Check for femoral pulses with compressions every 2 minutes.

k. Secure the patient to the AutoPulse platform with attached straps.

l. Prior to realigning the patient, to assess for pulses, upon ROSC, to pause or stop operation, press STOP “Orange” button.

m. In case of mechanical malfunction of the AutoPulse the EMS responder will resort back to manual CPR for patient care.

5. Complications
   a. Care should be used when moving patients with a large abdomen (shifting of excess flesh may cause the LifeBand to move or break)
   b. If disruption or malfunctions of LifeBand occurs resume manual CPR.

6. Decontamination
   a. AutoPulse should be cleaned according to manufacturer’s specifications
   b. Never reuse the LifeBand (these are single use only)
   c. Check AutoPulse for damage prior to restocking and returning to service

7. Removal of LifeBand
   a. Place AutoPulse face down.
   b. Lift hinged skirts, pinch 4 locked tabs and remove cover plate.
   c. Grasp band with the thumb and index finger of both hands. Push in the middle fingers and pull up the band to remove clip from the shaft.

8. Installation of new LifeBand
   a. Match arrow on the cover plate with arrow on platform.
   b. Insert head end of band clip into slot.
   c. Press tail end of band clip into guide plate slot and feel for click.
   d. Rotate shaft in either direction to verify band clip is seated in slot.
   e. Snap cover plate in place and flip down hinged skirts.
MEDICAL
TAB 8 GUIDELINE 41
BLOOD GLUCOSE MONITORING

1. Indications
   a. The blood glucose meter is the device used for determining the patient’s blood glucose level and giving a plasma value in milligrams per deciliter. Blood for testing may be either capillary or venous.
   b. It should be noted, venous and capillary values may differ by 10%.
   c. If the blood glucose meter malfunctions for any reason, this should not hinder patient care.

2. Procedure
   a. Explain procedure to the patient.
   b. Prep area with alcohol wipes and let dry.
      i. This should be performed on the edges of the finger tips (not directly on the pad of the finger).
   c. Turn on the blood glucose meter and follow directions for placing test strip in the meter.
   d. Obtain either capillary or venous sample preferably a capillary and put on test strip.
   e. Glucose reading will take approximately 10 – 30 seconds.
   f. Document reading on run form.
TAB 8 GUIDELINE 42
MEDICATION ADMINISTRATION –
INFLUENZA VACCINATION

1. To reduce incidence of morbidity and mortality of influenza disease, departmental Paramedics will implement this Guideline for seasonal influenza vaccination for EMS or Fire Personnel per Ohio Law 4765.391.

2. **This procedure will be performed by Medical Director approved paramedics only** and have had the Influenza Vaccination Training for Paramedics.

3. **Medication**
   a. Give any of the follow products depending upon which is available and if age appropriate
   b. *Use of product names are intended to help users delineate specific product indications and are not intended to be an endorsement of any particular product.
   c. Medication administered via IM route

<table>
<thead>
<tr>
<th>Product*</th>
<th>Dose</th>
<th>Route</th>
<th>Age Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afluria, trivalent (IIV3)</td>
<td>0.5 mL</td>
<td>IM</td>
<td>Can be given to persons &gt; 9 years</td>
</tr>
<tr>
<td>Fluarix, trivalent (IIV3) or quadrivalent (IIV4)</td>
<td>0.5 mL</td>
<td>IM</td>
<td>Can be given to persons &gt; 9 years</td>
</tr>
<tr>
<td>Flucelvax, cell culture inactivated influenza vaccine, trivalent (ccIIV3)</td>
<td>0.5 mL</td>
<td>IM</td>
<td>18 years and older</td>
</tr>
<tr>
<td>FluLaval, trivalent (IIV3) or quadrivalent (IIV4)</td>
<td>0.5 mL</td>
<td>IM</td>
<td>Can be given to persons &gt; 9 years</td>
</tr>
<tr>
<td>Fluvirin, trivalent (IIV3)</td>
<td>0.5 mL</td>
<td>IM</td>
<td>Can be given to persons &gt; 9 years</td>
</tr>
<tr>
<td>Fluzone, trivalent (IIV3) or quadrivalent (IIV4)</td>
<td>0.5 mL</td>
<td>IM</td>
<td>Can be given to persons &gt; 9 years</td>
</tr>
<tr>
<td>Vaccine</td>
<td>Dosage</td>
<td>Route</td>
<td>Age Group</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------</td>
<td>-------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Fluzone ID, trivalent (IIV3)</td>
<td>0.1 mL</td>
<td>ID</td>
<td>18 through 64 years of age</td>
</tr>
<tr>
<td>Fluzone High-Dose, trivalent (IIV3)</td>
<td>0.5 mL</td>
<td>IM</td>
<td>65 years and older</td>
</tr>
<tr>
<td>Flublok, recombinant influenza vaccine, trivalent (RIV3)</td>
<td>0.5 mL</td>
<td>IM</td>
<td>18 through 49 years</td>
</tr>
</tbody>
</table>

4. Documentation
   
   a. All immunizations will be documented following NWO EMS Influenza Vaccine Administration Record
   
   b. Any adverse reactions will be documented per State / Federal Law along with Vaccine Adverse Event Reporting System (VAERS)
Algorithm for Evaluation of an Egg Allergy

Preceding Influenza Vaccination Year

Can the person eat lightly cooked egg (e.g., scrambled egg) without reactions?

- Yes → Give vaccine per usual guideline.
- No →

After eating eggs or egg-containing foods, does the person experience ONLY hives?

- Yes → Give Inactivated Influenza Vaccine (IIV) and observe for reaction for at least 30 minutes after vaccination.
  OR
  Give Recombinant Influenza Vaccine (RIV) if patient is 18 through 49 years old.
- No →

Does the person experience other symptoms such as
- Cardiovascular changes (e.g., hypotension)?
- Respiratory distress (e.g., wheezing)?
- Gastrointestinal (e.g., nausea/vomiting)?
- Reaction requiring epinephrine?
- Reaction requiring emergency medical attention?

- Yes → Give RIV if patient is 18 through 49 years old
  OR
  IIV should be administered by a health care provider with experience in the recognition and management of severe...
TAB 8 GUIDELINE 43
MEDICATION ADMINISTRATION –
INHALATION MUCOSAL ATOMIZATION DEVICE (MAD)

1. Indications
   a. Used for atomizing topical solutions across the nasopharyngeal and oropharyngeal mucous membranes.
   b. For use when administering the following medications.
      i. Fentanyl for pain.
      ii. Midazolam (Versed) for seizures or sedation.
      iii. Naloxone (Narcan) for opiate overdoses.
      iv. Glucagon for hypoglycemia.

2. Procedure
   a. Aspirate the proper volume of highly concentrated medication required to treat the patient (an extra 0.1 ml of medication should be drawn up to account for the dead space within the atomizer at the end of the procedure).
   b. Twist off / remove the syringe from the needle / needleless device.
   c. Attach the atomizer tip via Luer locking mechanism - it twists into place. Slip Luer is also effective as long as the tip is firmly seated on the syringe tip.
   d. Using your free hand to hold the crown of the head stable, place the tip of the atomizer snugly against the nostril aiming slightly up and inward (towards the top of the opposite ear).
   e. Briskly compress the syringe plunger to deliver half of the medication into the nostril.
   f. Move the device over to the opposite nostril and administer the remaining medication into that nostril.

Re-use the MAD on the same patient as needed, and then discard.
**TAB 8 GUIDELINE 44**

**MEDICATION ADMINISTRATION – INTRAMUSCULAR (IM)**

Intramuscular (IM) injections in the prehospital setting are relatively uncommon. IM injections are administered into the muscle tissue and require adequate perfusion for absorption. This method has a predictable rate of absorption, but its onset of action is considerably slower than IV.

### INDICATIONS
- When the rate of absorption needs to be slower and/or prolonged in action.
- When other administration routes are unsuccessful or unavailable.

### CONTRAINDICATIONS
- Severe bleeding disorders (i.e., hemophilia) or recent thrombolytic therapy.
- States of severe hypoperfusion or shock. When rapid absorption and action of a medication is required (i.e., when IV is preferred).

---

- Prepare equipment.
- Check label, date, and appearance of medication.
- Locate appropriate injection site:
  - Posterior Deltoid
    - Identify the bony portion of the shoulder where the clavicle and scapula meet [the acromioclavicular joint (AC)].
    - Measure 3 to 4 fingers-width down the arm from AC joint.
    - Slide 1 to 2 fingers-width posteriorly on the arm.
  - Anterior Thigh
    - Using a circular motion from selected site outward, cleanse the site with alcohol wipe.
    - With one hand, stretch or flatten the skin overlying the selected site. This will allow for smoother entry of the needle.
    - In the other hand, hold syringe like a dart and quickly thrust the needle into the tissue and muscle at a 90-degree angle.
    - Aspirate syringe to ensure that inadvertent venous administration is avoided.
      - If blood is aspirated into the syringe, withdraw the syringe and needle and dispose of properly.
      - Do not administer any medication mixed with blood.
      - Begin again at a different site.
    - If no blood is aspirated, slowly inject medication.
    - After all medication is injected, quickly withdraw syringe and dispose of in an approved container.
    - Gently massage over the injection site to increase absorption and medication distribution.
    - Apply firm pressure and place band-aid over site.
SPECIAL CONSIDERATIONS:

1. Approved injection sites: Posterior Deltoid or Anterior Thigh
2. Appropriate equipment (needle size and length).
3. 5/8 to 1” needle length for deltoid administration.
4. 22 – 25 gauge needle for aqueous medications.
5. 3 ml syringe
6. Deltoid injections: 2 mL or less (for medication amounts greater than 2 mL, split between both deltoids).
TAB 8 GUIDELINE 45
MEDICATION ADMINISTRATION – IV PUMP USAGE

1. Overview
   a. To set guidelines for the use of the intravenous pump for medication administration and controlled fluid administration.
   b. All EMS crew members will be required to complete annual competency training on this equipment.

2. Indications
   a. Patient has a pre-established IV with medication administration or controlled fluid administration.
   b. IV is established in the field with the need for controlled drip medication administration or controlled fluid administration.
   c. Pediatric patient requires controlled medication administration or controlled fluid administration.

3. Procedure for use
   a. Assure that the IV line established is patent.
   b. Assure that you have the proper pump tubing that goes with the specific brand of the pump.
   c. Assure drip chamber is half full and tubing is primed and completely bled through without any air bubbles.
   d. Verify proper drip rate per guideline or physician order.
   e. Power on IV pump and insert pump tubing per manufacturer recommendations.
   f. Set drip rate and start drip.
   g. Recheck and verify drip rate is correct.
   h. Monitor patient for adverse reactions.
   i. If adverse reactions are noted STOP THE DRIP, treat adverse reactions per Allergic Reaction Guideline; contact MEDICAL CONTROL.

4. Cleaning
   a. Pumps that are company owned are to be cleaned in accordance with the weekly decontamination procedures.
TAB 8 GUIDELINE 46
MEDICATION ADMINISTRATION –
NERVE AGENT | ORGANOPHOSPHATE

1. A first responder, EMT, Advanced EMT, or Paramedic, may administer drugs or dangerous drugs contained within a nerve agent antidote auto-injector kit, including a MARK I kit, in response to suspected or known exposure to a nerve or organophosphate agent provided the first responder or EMT is under physician medical direction and has received appropriate training regarding the administration of such drugs within the nerve agent antidote auto-injector kit, per EMS Scope of Practice, State of Ohio.

2. **DuoDote is indicated for the treatment of poisoning by organophosphorous nerve agents as well as organophosphorous insecticides.** DuoDote should only be administered to patients experiencing symptoms of organophosphate poisoning in a situation where exposure is known or suspected. DuoDote should be administered as soon as symptoms of organophosphate poisoning appears:

<table>
<thead>
<tr>
<th>Mild Symptoms</th>
<th>Severe symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Blurred vision</td>
<td>● Strange or confused behavior</td>
</tr>
<tr>
<td>● Excessive, unexplained teary eyes</td>
<td>● Severe difficulty breathing or copious secretions from lungs / airway</td>
</tr>
<tr>
<td>● Excessive, unexplained runny noise</td>
<td>● Severe muscular twitching and general weakness</td>
</tr>
<tr>
<td>● Increased salivation such as sudden drooling</td>
<td>● Involuntary urination and defecion</td>
</tr>
<tr>
<td>● Chest tightness or difficulty breathing</td>
<td>● Convulsions</td>
</tr>
<tr>
<td>● Tremors throughout the body or muscular twitching</td>
<td>● Unconsciousness</td>
</tr>
<tr>
<td>● Nausea and/or vomiting</td>
<td></td>
</tr>
<tr>
<td>● Unexplained wheezing, coughing or increased airway secretions</td>
<td></td>
</tr>
<tr>
<td>● Acute onset of stomach cramps</td>
<td></td>
</tr>
<tr>
<td>● Tachycardia or bradycardia</td>
<td></td>
</tr>
</tbody>
</table>

3. Procedure - DuoDote application
   a. Tear open plastic pouch at any of the notches
b. Place the DuoDote Auto-Injector in your dominant hand, firmly grasp the center of the DuoDote Auto Injector with the Green Tip pointing down

c. With your other hand, pull off the gray safety release. The DuoDote Auto-Injector is now ready to be administered

d. The injection site is the mid-outer thigh area. The DuoDote Auto-Injector can inject through clothing, however, make sure pockets at the injection site are empty

e. Swing and firmly push the Green Tip straight down (90-degree angle) against the mid-outer thigh. Continue to firmly push until you feel the DuoDote Auto-Injector trigger

   i. **After the auto-injector triggers, hold the DuoDote Auto-Injector firmly in place against the injection site for approximately 10 seconds**

f. Remove the DuoDote Auto-Injector from the thigh and look at the Green Tip. If the needle is visible, the drug has been administered. If the needle is not visible, check to be sure the Gray safety release has been removed, and then repeat the above steps beginning with step D, but push harder in Step E

g. After the drug has been administered, push the needle against a hard surface to bend the needle back against the DuoDote Auto-Injector

   i. Put the used DuoDote back into the plastic pouch, if available. Leave used DuoDote with the patient to allow other medical personnel to see the number of DuoDote Auto-Injector (s) administered

h. Immediately move yourself and the patient away from the contaminated areas and seek definitive medical care for the patient
TAB 8 GUIDELINE 47
NARCOTIC MEDICATION DOSE EQUIVALENT

1. The purpose of this guideline is to give alternative medication for whenever a time arises and appropriate pain medication is not available and the paramedic has to rely on back-up pain medications in treating the acute pain of prehospital patients.

2. Preparation for acute pain IV narcotics include:
   a. Fentanyl Citrate
   b. Morphine Sulfate
   c. Hydromorphone Hydrochloride

3. Fentanyl Citrate is the mainstay of pain medication for the PPS | Mercy EMS Guideline. If this medication is not available, the 2nd option will be morphine sulfate followed by hydromorphone hydrochloride as the last choice.

4. Dose equivalent chart

<table>
<thead>
<tr>
<th>Fentanyl</th>
<th>Morphine</th>
<th>Hydromorphone</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Dose 1 mcg / kg</td>
<td>• Dose 0.1 mg / kg</td>
<td>• Dose 0.015 mg / kg</td>
</tr>
<tr>
<td>• 100 mcg</td>
<td>• 10 mg</td>
<td>• 1 mg</td>
</tr>
</tbody>
</table>
TAB 8 GUIDELINE 48
NASOGASTRIC | OROGASTRIC TUBE PLACEMENT

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• To alleviate gastric distension which is inhibiting effective ventilation in an intubated patient.</td>
<td>• Nasogastric Tube Placement - Obvious skull fracture or severe head / facial injuries with suspected skull fracture • Known esophageal varices or who have had caustic substance ingestion</td>
<td>• Proper size Gastric Tubes (12 – 18 French) • Lubricant • 30 or 60 ml syringe • Suction unit</td>
</tr>
</tbody>
</table>

- Assemble equipment
- Nasogastric Tube Insertion
  - Measure tube length from nose to tip of earlobe and then to xiphoid process.
  - Select nostril.
  - Lubricate end of tube (6 – 8 inches).
  - Position head in slightly flexed position (if no spinal precautions).
  - Gently insert and advance toward posterior nasopharynx and into stomach.
- Oropharyngeal Tube Insertion
  - Measure tube length from teeth to tip of earlobe and then to xiphoid process.
  - While lifting up on jaw, gently insert and advance the tube to the posterior oropharynx and direct towards the feet and into the stomach
- Confirm location by:
  - Aspirating gastric contents
  - Placing stethoscope over epigastrium and auscultate while inserting 30 – 60 ml of air into the tube.
  - Secure tube in place with tape.
  - If necessary attach the tube to intermittent suction.
  - Mark and document tube size and depth.
TAB 8 GUIDELINE 49
RERAINT GUIDELINE

At times it is necessary to physically restrain individuals who are incompetent to refuse treatment or transport. The intent of physical restraint is to protect the patient, emergency responders and the public from dangerous actions of individuals.

<table>
<thead>
<tr>
<th>Soft restraints</th>
<th>Chemical restraint</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Kling or cravats</td>
<td>• Haldol 5 mg IM, may repeat once in 5 – 10 minutes</td>
</tr>
<tr>
<td>• Commercial soft restraints</td>
<td>• Benadryl 25 – 50 mg IV / IM if dystonic (stiff neck or jaw) or dyskinesia (apprehension or skin sensation) develops.</td>
</tr>
<tr>
<td>• Nylon wrist restraints</td>
<td>• May consider 2 mg Versed slow IVP every 2 – 3 minutes until patient becomes sedated (maximum dosage of Versed is 10 mg)</td>
</tr>
<tr>
<td>• Cloth (i.e. sheets or bath blankets)</td>
<td>• Versed 5 mg each nostril can be given via Nasal-Mucosal Atomizer Device if an IV access is not available.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hand restraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Leather restraints</td>
</tr>
<tr>
<td>• Handcuffs or wrist chains</td>
</tr>
<tr>
<td>• Cable ties</td>
</tr>
<tr>
<td>• Leg shackles</td>
</tr>
<tr>
<td>• Hobble restraints</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spitting masks</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Non-rebreather mask</td>
</tr>
<tr>
<td>• Spit Net</td>
</tr>
<tr>
<td>• Surgical Mask</td>
</tr>
</tbody>
</table>

1. Patients restrained by law enforcement devices must be transported accompanied by a law enforcement officer in the patient compartment who is capable of removing the devices. However, when rescuers have utilized restraints in accordance with Restraint Guideline, the law enforcement agent may follow behind the ambulance during transport, if there are no safety concerns and the arrangement is agreeable to both EMS and Law Enforcement personnel on scene.

2. Procedure
   a. Offer the patient a final chance to cooperate.
   b. Approach the patient swiftly from all sides at once.
   c. The EMTs should maintain communication with the patient.
   d. Place the patient in a supine position on a backboard and secure all extremities to the backboard.
i. One arm up and one arm down will reduce the patient’s ability to struggle.

ii. Secure the legs to the corners of the board, or crisscross their legs.

iii. Continue to monitor the patient for signs and symptoms of hypoxia. Be prepared to release the restraints as necessary. Document your findings on the EMS run sheet.


v. Monitor and document the neurovascular status of restrained extremities every 15 minutes. Adjust the device as necessary.

vi. For patients that are spitting
   1. Ensure that the patient is not hypoxic, if so then place on Non-rebreather mask at 15 L O2.
   2. Patients that are competent, but are continuously spitting on EMS personnel, Surgical mask or spitting net can be used.
   3. DO NOT place rolled up towel / gauze into a patient’s mouth.

vii. Notify on-line MEDICAL CONTROL of the patient’s status and the possible need for security.

SPECIAL CONSIDERATIONS:

1. If a restraint is applied by law enforcement, the officer should accompany the patient to the hospital in the squad.

2. Personnel should not use the following restraint techniques
   a. Choke holds
   b. Hog ties
   c. Restraints used in the prone position
   d. Restraint by sitting on the patient’s torso
   e. Restraint by sandwiching between the backboard
   f. Any restraint by any method that would interfere with breathing
### AVULSED TOOTH REIMPLANTATION

#### INDICATIONS
- Only reimplant permanent teeth
- Best chance of success is when reimplantation occurs less than 5 minutes from injury (can go up to 15 minutes)

#### CONTRAINDICATIONS
- Do not reimplant if the alveolar bone / gingiva are missing or if the root is fractured
- Do not reimplant if the patient is immunosuppressed or reports having cardiac issues that require antibiotics prior to procedures
- Do not reimplant if the patient requires spinal immobilization

#### SPECIAL CONSIDERATIONS:
- Hold the tooth by the crown
- Quickly rinse the tooth with saline before reimplantation, but DO NOT BRUSH off or clean tooth of tissue
- Rinse and suction the clot from the socket
- Reimplant tooth firmly into socket with digital pressure

- If patient is not a candidate for reimplantation, place tooth in interim storage media (Save-A-Tooth solution, low fat milk, patient’s saliva or normal saline)
TAB 8 GUIDELINE 51
CHEST SEAL

There are multiple commercial grade chest seal occlusive dressings designed to treat open chest wounds, a life-threatening situation that could lead to tension pneumothorax and cardiac arrest. The majority of these devices have an adhesive dressing that allows for the ability to reseal, making for an ideal venting. These devices include a large coverage area and usually have an absorbent pad to help keep the wound clean.

1. Indications
   a. Open pneumothorax

2. Procedure
   a. Open package and remove the chest seal.
   b. Clean and dry the area around the chest wound.
   c. Grip tabs and remove the clear liner.
   d. Place dressing, adhesive side down, centered around the wound.
   e. Press dressing firmly to ensure adhesion.
   f. One or both tabs can be used to facilitate placement, or lifting / removal of dressing.
   g. Remove dressing using standard dressing removal techniques.
**TAB 8 GUIDELINE 52**

**HELMET REMOVAL**

<table>
<thead>
<tr>
<th>Removal of helmet</th>
<th>Leave helmet in place</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Inability to access, assess and maintain airway and breathing</td>
<td>• Helmet fits well with little or no movement of head in helmet</td>
</tr>
<tr>
<td>• Improperly fitted helmet allowing for excessive head movement within helmet</td>
<td>• No impending airway or breathing problems</td>
</tr>
<tr>
<td>• Proper c-spine alignment and immobilization cannot be achieved</td>
<td>• Removal may cause further injury or harm</td>
</tr>
<tr>
<td>• Cardiac arrest</td>
<td>• Proper c-spine alignment and immobilization can be achieved with helmet in place</td>
</tr>
<tr>
<td>• EMTs are trained in technique</td>
<td>• There is no interference with the ability to assess and reassess airway and breathing</td>
</tr>
</tbody>
</table>

1. Sport (football, ice hockey, field hockey, fencing, baseball)
   a. **Key points**
      i. Typically, open anteriorly
      ii. Easier to access airway
      iii. If shoulder pads are used in conjunction with helmet and helmet is removed, then shoulder pads need to be removed simultaneously for proper c-spine alignment
   b. All are equipped to have facemask removed separate from helmet. In most cases, removal of facemask is all that is needed, as the alignment of c-spine can be obtained with the shoulder pads and helmet in place
      i. Remove facemask by cutting snubber straps that hold it in place to access airway
   c. Helmet Removal
      i. If helmet must be removed due to unusual circumstances, at least 4 people are needed
      ii. Shoulder pads need to be removed simultaneously. When shoulder pads are involved, use forearms to stabilize helmet and place hands at base of neck grasping the shoulder area
      iii. While maintaining manual c-spine, Helmet’s inside face pads may be loosened by using a tongue blade to unsnap them with a twisting motion. Then cut the shoulder pads laces and straps and all shirts / jerseys from end of sleeve to center to allow for quick removal
      iv. Lift patient flat up for removal of equipment. Helmet should be grasped and tilted slightly to remove - DO NOT SPREAD SIDES OF BACK EDGE OF HELMET, WILL IMPINGE UPON NECK
v. At same lift, pull of shoulder pads and clothing
vi. Lower patient down and apply c-collar

2. Motorcycle / Bike / Skateboard
   a. **Key points**
      i. When full-faced, airway is harder to access and maintain
      ii. Face shield may be removed for airway access
   b. Helmet Removal
      i. Take eyeglasses off before attempting removal of helmet
      ii. One EMT stabilizes the helmet by placing hands on each side of the helmet with fingers on mandible to prevent movement
      iii. Second EMT removes any straps by cutting them, then places one hand on the mandible at the angle of the jaw and the other hand posteriorly at the occipital region
      iv. The EMT holding the helmet pulls the sides of the helmet outwards away from the head and gently slips the helmet halfway off and stops
      v. The EMT maintaining stabilization of the neck repositions hold by sliding the posterior hand superiorly to secure the head from falling back after complete helmet removal
      vi. Helmet is then completely removed
      vii. Place c-collar accordingly
# TAB 8 GUIDELINE 53

## PELVIC BINDER

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>MANDATORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used in the initial treatment to stabilize a pelvic injury and possible pelvic fractures</td>
<td>Patient too small to obtain the 6 inch gap needed for closure</td>
<td>Assess and Document pulse, sensation, and motor function before and after placement of pelvic binder</td>
</tr>
</tbody>
</table>

### Initial Assessment
- Perform standard trauma or comprehensive secondary survey to determine if there is a possibility of a pelvic injury and possible pelvic fractures. This may include, but is not limited to:
  - Assess for abrasions and contusions around the pelvic area
  - Assess for superficial hematoma above inguinal ligament, scrotum, and thigh
  - Assess limb length discrepancy and deformity
  - Assess pelvic stability by bimanual compression of the iliac wings
  - Examinations of the rectal and vaginal areas for bleeding

### Procedure
- Wrap the fabric belt around the supine patient
- Fit pelvic binder around the pelvis so that the top of the pelvic binder is at the level of the greater trochanters or iliac crest (ideally the belt should cover the buttocks)
- Then cut excess belt in front leaving a 6 – 8 inch gap of exposed pelvis
- Apply pulley system / power unit to each side of the belt and slowly draw tension until snug
  - This provides simultaneous circumferential compression of the pelvic region
  - In male patients make certain genitalia are elevated out of groin area
- Monitor vital signs
- Document time and date device is applied in space provided

### Special considerations
- If an obese patient requires, two belts may be affixed together using one power unit as an extender and the other as the pulley
- Monitor pulse and blood pressure in accordance with your organizational protocols
- Healthcare providers should release tension every 12 hours to check for skin integrity and provide wound care as necessary
- Pelvic Binders should be replaced when soiled or after every 24 hours of use
- Place Foley catheter prior to application as needed
- Children under 50 lbs (23 Kg) may be too small to obtain the 6 inch gap needed for closure

### CONTRAINDICATIONS
- Patient too small to obtain the 6 inch gap needed for closure

### MANDATORY
- Assess and Document pulse, sensation, and motor function before and after placement of pelvic binder

**INDICATIONS**
- Used in the initial treatment to stabilize a pelvic injury and possible pelvic fractures
- Adult and Pediatric trauma patients

**CONTRAINDICATIONS**
- Patient too small to obtain the 6 inch gap needed for closure

**MANDATORY**
- Assess and Document pulse, sensation, and motor function before and after placement of pelvic binder

<table>
<thead>
<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>MANDATORY</th>
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<tbody>
<tr>
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- Assess and Document pulse, sensation, and motor function before and after placement of pelvic binder

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**INDICATIONS**
- Used in the initial treatment to stabilize a pelvic injury and possible pelvic fractures
- Adult and Pediatric trauma patients

**CONTRAINDICATIONS**
- Patient too small to obtain the 6 inch gap needed for closure

**MANDATORY**
- Assess and Document pulse, sensation, and motor function before and after placement of pelvic binder
TAB 8 GUIDELINE 54
SELECTIVE SPINAL IMMOBILIZATION

INDICATIONS
- Suspicion of spinal/neurological injury
- Provider decision to utilize the Spinal Immobilization Clearance protocol

CONTRAINdications
- Neurologic problems
- Spinal tenderness
- Altered mental status
- Intoxication
- Distracting injuries

MANDATORY
- Must be able to communicate with patient (NO LANGUAGE BARRIER)
- Patient must have mental capacity and decision making capacity to be able to use guideline

LEGEND
- EMT
- EMT-P
- A-EMT
- EMR
- MC Order

High-Risk Characteristics / Mechanism
- Age > 65
- Axial load/diving injuries
- Sudden acceleration/deceleration, lateral bending forces to neck/torso
- Violent impact to head, neck, torso, pelvis
- Numbness, tingling, paresthesia

Unreliable Patient Interaction
- Language Barriers: inability to communicate
- Lack of cooperation during exam
- Evidence of drug/alcohol intoxication
- Painful distracting injury such as long-bone fracture

Motor/Sensory Exam
- Wrist/hand extension bilaterally
- Foot plantar flexion bilaterally
- Foot dorsiflexion bilaterally
- Gross sensation in all extremities
- Check for paresthesia

Any patient that can self extricate from a vehicle with complaint of neck pain can be placed in rigid c-collar, and let them get out of vehicle themselves and ambulate to the stretcher

Consider based upon Mechanism of Injury (MOI)

Patient able to ambulate

Long board immobilization is not required

While performing selective spinal immobilization, maintain inline spinal immobilization

Patient > 65 or < 2 with Significant mechanism

Unable to reliably communicate with EMS provider to perform exam

Neuro Exam: Any focal weakness, numbness, paresthesia

Spinal Exam: Point tenderness to spinal process, midline pain with axial load or midline pain with ROM

Altered Mental Status
Any alteration in patient?

Intoxication: Any evidence?

Distracting Injury (serious): Any painful injury that might distract the patient from the pain of a c-spine injury?

Selective Spinal Immobilization Required

Spinal Immobilization Not Required
SELECTIVE SPINAL IMMOBILIZATION:

1. Patients with mechanism of injury with the potential for causing spine injury shall have a spine injury clinical assessment performed. The purpose of spinal immobilization (spinal motion restriction) should reduce patient discomfort and protect patients from additional harm. Spinal immobilization that increases pain should be avoided.

2. Selective spinal immobilization can include either cervical immobilization, or thoracic / lumbar / sacral (TLS) immobilization or cervical and TLS immobilization depending on complaint of pain, degree of injury.
   a. All altered patients should have full spinal immobilization.
   b. When in doubt always place a cervical collar on patient and at minimum maintain inline stabilization with patient on stretcher.

3. High risk injuries / Significant Mechanism of Injury (MOI)
   a. Always consider in all patients the use of c-collar and if necessary backboard
   b. Significant mechanism (consider immobilization)
      i. Fall from elevation ≥ 3 feet / 5 stairs
      ii. Axial load to head, e.g. diving
      iii. MVC high speed [> 45 mph (100km/hr)], rollover, ejection
      iv. Motorized recreational vehicles (motorcycle / 4-wheelers)
      v. Bicycle struck or collision
      vi. Pedestrian hit by high speed vehicle
      vii. Assault with significant head, neck or back trauma

4. Low risk characteristics / mechanisms
   a. These low-risk factors allow for safe omission of spinal immobilization in patients with GCS = 15
   b. Characteristics
      i. Simple rear-end collision
      ii. Ambulatory on scene at any time
      iii. No neck pain on scene
      iv. No midline cervical tenderness

5. Patients may remain on the extrication device if the crew deems it safer for the patient considering stability, time and patient comfort. This decision will be at the discretion of the crew.
6. Penetrating trauma patients to the head, chest, abdomen or extremities do not require spinal immobilization. Consider for patients with cervical penetration with concern of neurologic findings.

7. Patient with only cervical immobilization without TLS spine injury, elevate the head of the stretcher to 30 degrees while maintaining cervical spinal motion restriction.

SPECIAL CONSIDERATIONS:

1. The elderly may have altered perception of pain and therefore may not report the same intensity of symptoms as younger patients. Therefore, extra caution is in order when assessing elderly patients.

2. Keep in mind that patients who are immobilized properly on a long immobilization device with cervical immobilization will not be able to reliably protect their airways in the event they vomit. Therefore, it is imperative that a working suction device be handy to clear vomit from the patient's upper airway.

3. The mere smell of alcohol does not mean that the patient is intoxicated. However, if there is any question about whether or not the patient is intoxicated, then the patient should be treated as if he has a spine injury, at least until he is "calm, cooperative, sober, and alert enough to give a reliable exam."

4. Exercise caution when applying spinal immobilization to patients with difficulty breathing and position appropriately.
   a. Patients with acute or chronic difficulty breathing: spinal immobilization is known to reduce respiratory function as much as 20%.
   b. Respiratory compromise is experienced most by geriatric and pediatric patients secured to a long backboard.

5. Combative patients: avoid methods or interactions that provoke increased spinal motion or agitation.

INTRAFACILITY TRANSFERS:

1. Maintain rigid c-collar if necessary.

2. Patients originally taken off of backboards do not require to be placed back on a backboard to transport the patient.
   a. High risk spinal injury patients should have inline immobilization at all times.
   b. Use of slide board should be considered to help transfer of patient to reduce any twisting of the spine.
3. Patients found to be on backboards can be slide off the backboard onto the EMS Cot / Helicopter liter for transport maintaining inline stabilization.

SPECIFIC TECHNIQUES

1. Cervical spinal immobilization
   a. Following procedure is to be used to properly immobilize the patient when injury to the cervical spine is considered
   b. Cervical collars should be placed on patient prior to patient movement, if possible
   c. The cervical spine must be maintained in a neutral position at all times by direct manual and/or mechanical means. DO NOT APPLY TRACTION AT ANY TIME.
   d. The following devices are approved mechanical adjuncts for cervical spine immobilization:
      i. Kendrick Extrication Device (KED), XP1, or equivalent
      ii. Cervical Immobilization Device (CID)
      iii. Rigid cervical collar properly fitted
      iv. If no collar can be made to fit patient, towel, blanket rolls, head block or similar device may be used to support neutral head alignment
   e. If back board is used, straps must also be placed across the patient's chest, pelvis, and legs to secure their body to the long immobilizer. CAUTION: It is DANGEROUS to secure the head if the BODY is allowed to move on the long board. This will subject the neck to unacceptable torque and bending.
   f. Lateral neck supports such as towel rolls, Head bed, or equivalent must be applied and the patient's head and taped across the forehead and collar.
   g. The cervical collar may be removed if interfering with airway management or airway placement, or if causing extreme patient distress.

2. Emergency patient removal
   a. Indicated when scene poses an imminent or potential life threatening danger to patient and / or rescuers
   b. Remove the patient from danger while best attempt is made to maintain spinal precautions
   c. Rapid extrication is indicated when patient condition is unstable (ie airway or breathing compromise, shock, unconsciousness, no pulse, or need for immediate intervention)

3. Self-Extrication procedure
   a. Patients, who are stable, alert and without neurological deficits may be allowed to self-extricate to the ambulance cot after placement of a cervical collar
   b. Limit movement of the spine during the process
4. Thoracic and lumbar spinal immobilization

   a. **Following procedure is to be used to properly immobilize the patient when injury to the thoracic and lumbar spine is considered and the patient condition prevents self-extrication**

   b. The spine must be maintained in a neutral position at all times by direct manual and/or mechanical means.
      i. Rescuers should place the patient in a stable, neutral position where space is created to place backboard or other long extrication device in position near the patient
      ii. Move the patient to supine position on the long extrication device

   c. As soon as practical, the patient will be carefully placed on a long immobilizer. The following such devices are approved:
      i. Scoop stretcher
      ii. Long spine board (wood or equivalent radiolucent material)
      iii. Stokes litter (high angle rescue only)
      iv. Full body vacuum splint

   d. The patient must be securely fastened to the long immobilizer with straps across the chest, pelvis, and legs to prevent any torque or twisting of any part of the spine. Airway secretions and vomitus are to be cleared using suction devices. If necessary, the patient to be log rolled together with the immobilization equipment for the purpose of airway maintenance.

   e. The extrication device is used to move the patient to the ambulance / air medical stretcher
TAB 8 GUIDELINE 55
SPLINTING

1. Indications:
   a. Immobilization of an extremity for transport, either due to suspected fracture, sprain, or injury.
   b. Immobilization of an extremity for transport to secure medically necessary devices (i.e., intravenous catheters).

2. General Splinting Procedure:
   a. Assess and document pulses, sensation, and motor function prior to placement of the splint. If no pulses are present and a fracture is suspected, consider reduction of the fracture prior to placement of the splint.
   b. Remove all clothing from the extremity.
   c. Select a site to secure the splint both proximal and distal to the area of suspected injury, or the area where the medical device will be placed.
   d. Do not secure the splint directly over the injury or device.
   e. Place the splint and secure with Velcro, straps, tape, or bandage material depending on the splint manufacturer and design.
   f. Document pulses, sensation, and motor function after placement of the splint. If there has been deterioration in any of these 3 parameters, remove the splint and reassess.
   g. Document the time, type of splint, and the pre and post assessment of pulse, sensation, and motor function in the patient care report (PCR).

3. Types of splints
   a. Traction Splinting
      i. Traction splints are used to immobilize suspected femur fractures.
      ii. Guidelines set forth by the equipment manufacturer should be followed when applying the device.
   b. Hare Traction Splint (Application Procedure):
      i. Assess neurovascular function.
      ii. Place the ankle device over the ankle.
      iii. Place the proximal end of the traction splint on the posterior side of the affected extremity, being careful to avoid placing too much pressure on genitalia or open wounds. Make certain the splint extends proximal to the suspected fracture. If the
splint will not extend in such a manner, reassess possible involvement of the pelvis.

iv. Extend the distal end of the splint at least 6 inches beyond the foot.

v. Attach the ankle device to the traction crank.

vi. Twist until moderate resistance is met.

vii. Reassess alignment, pulses, sensation, and motor function. If there has been deterioration in any of these 3 parameters, release traction and reassess.

viii. Document the time, type of splint, and the pre and post assessment of pulse, sensation, and motor function in the patient care report (PCR).

c. Sager Traction Splint (Application Procedure)

i. Assess neurovascular function.

ii. Position the splint – Place the splint between the patient’s legs and apply the thigh strap snugly against the injured limb, seating the cushion against the patient’s perineum. Extend the inner shaft of the splint to place the pulley wheel just beyond the patient’s heel. When positioning the splint, the pulley wheel should be facing the injured limb.

iii. Set the splint – Apply the ankle harness firmly around the ankle above the medial and lateral malleolus. Pull the control tabs on the ankle harness to shorten the ankle sling, pulling it up against the sole of the foot. You are now ready to administer dynamic traction. Extend the splint shaft to achieve the amount of desired traction, while observing the amount registered on the traction scale. Check the thigh strap, re-tighten to retain snug fit.

iv. Secure the splint – Slip the largest leg cravat under the hollow behind the knee and see-saw it up to the upper thigh. Follow with the shortest cravat under the knee and see-saw down under the lower leg. Place the remaining cravat under the knee and then secure all three cravats binding the leg and splint together. Wrap the figure-8 strap snugly around the ankles and over the feet.

v. Reassess alignment, pulses, sensation, and motor function. If there has been deterioration in any of these 3 parameters, release traction and reassess.

vi. Document the time, type of splint, and the pre and post assessment of pulse, sensation, and motor function in the patient care report (PCR).
1. **Indications**
   
a. Uncontrolled extremity bleeding not responsive to direct pressure

b. Extremity bleeding in Tactical or Unsafe environment

**Utilization of the Friction Adaptor Buckle**

When using two hands to apply the C-A-T or if the Self-Adhering Band becomes exceptionally dirty, use the Friction Adaptor Buckle to lock the band in place.
### APPENDIX

#### TAB 8 GUIDELINE 57

#### WEIGHT CHART: POUNDS TO KILOGRAMS

#### (1 - 250) Pounds to Kilograms (0.5 - 113)

<table>
<thead>
<tr>
<th>Pound</th>
<th>Kg</th>
<th>Pound</th>
<th>Kg</th>
<th>Pound</th>
<th>Kg</th>
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<th>Kg</th>
<th>Pound</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>51</td>
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