

McLean County Area EMS System



Procedure Guidelines

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PREFACE

Emergency Medical Services is the practice of managing and evaluating patients with acute traumatic and medical conditions in the out-of-hospital setting. This practice is at times, performed in chaotic situations and under extreme weather conditions.

These Basic and Advanced Life Support Guidelines have been compiled to lend a standardized approach to commonly encountered patient problems. The intent is to provide guidelines for uniformity and consistency in patient care within the EMS System to ensure the quality of the care.

DEFINITIONS & CONSIDERATIONS

ASSESSMENT

Assessment of patients should be performed as outlined in the McLean County Area EMS System's protocols.

DRUG DOSAGES

Drug dosages in the protocols reflect normal adult dosages. Administration of IV medications should be followed by a 20cc IV fluid bolus when possible.

MILD OR NO SYMPTOMS

Patient presents with no moderate signs/symptoms.

MODERATE SYMPTOMS

Patient not in "pre-arrest" state but shows signs/symptoms, i.e. chest pain, shortness of breath, mild hypotension/compensated shock (subtle alterations in mental status, tachycardia, pale skin, normal BP i.e.>100), mild CHF (crackles on lung exam).

OXYGEN TO MAINTAIN SATURATION>92%

Saturation is determined by pulse oximetry. Pulse oximetry should display a pulse rate equal to the patient's pulse. If the pulse oximeter reading is questionable or not available and the patient exhibits signs of hypoxia (agitation, restlessness, altered level of consciousness, cyanosis) oxygen should be delivered at high flow (10-15 LPM) via mask, otherwise oxygen by nasal cannula at 4-6 LPM is acceptable.

PRE-ARREST STATE

Patient shows signs of severe hypotension/decompensated shock (agitation or restlessness, decreased level of consciousness, loss of peripheral pulses, pale skin, cool skin, diaphoresis, blood pressure<100), acute CHF, or GCS<13.

SBP

Systolic blood pressure.

SHOCK

Signs of inadequate tissue/organ/brain perfusion, i.e., agitation, restlessness, tachycardia, decreased level of consciousness, loss of peripheral pulses.

BOLUS OF IV FLUID TO MAINTAIN SBP 90

If SBP is > 100 IV fluid is infused at KVO rate. If SBP is < 90 administer 250cc boluses of fluid with reassessments of SBP and lung sounds after each bolus. Maximum of 1 liter may be infused without Medical Control consultation.

PATIENT ASSESSMENT

PURPOSE:

To assure that a thorough and rapid survey of the scene and patient is accomplished.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Stethoscope.
3. Sphygmomanometer.
4. Light source.

SCENE SIZE UP

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
 - a. Scene Assessment
 - i. Assure personal safety.
 - ii. Identify possible hazards.
 - i. Location of patient(s).
 - ii. Access to patient(s).
 - iii. Number of patients.
 - iv. Mechanism of injuries.
 - v. Triage as needed.
 - vi. Number of units and what types are needed.
 - b. Initial Assessment.
 - i. Establish cervical spine control. (If indicated)
 - ii. Check for responsiveness and open airway.
 - iii. Check respiratory status.
 - i. Establish that pulses are present; note quality and location of pulses.
 - ii. Check capillary refill (if under 6) and skin color, temperature and texture.
 - iii. Check for MAJOR hemorrhage.
3. Determine patient level of distress.
 - a. If any of the above are compromised, stabilize the patient per MCAEMS Protocols.
 - b. Transport as soon as possible.

PATIENT ASSESSMENT

PROCEDURE:

1. Focused history and physical exam utilizing trauma assessment guidelines.
 - a. Continue stabilization of the spine.
 - b. Reassess ABC's.
 - c. Assess the head.
 - d. Assess the neck for tracheal deviation, distended neck veins.
 - e. Assess the chest – look, assess breath sounds and feel.
 - f. Assess the abdomen.
 - g. Assess the pelvis.
 - h. Assess all the extremities.
 - i. Log roll the patient taking spinal precautions.
 - j. Assess the posterior.
 - k. Assess baseline vitals – stable V.S. q10min; Unstable V.S. q5min.

2. Detailed Physical Examination.
 - a. Inspect for any wounds, contusions or obvious injuries. Palpate for tenderness, instability or crepitation.
 - I. Head
 - a. Scalp.
 - b. Eyes.
 - i. Check pupils for size, equality and reactivity to light.
 - ii. Bruising under the eyes.
 - c. Nose.
 - i. Check for bleeding.
 - ii. Check for drainage of clear fluid (CSF).
 - d. Mouth.
 - i. Check for bleeding.
 - ii. Check for loose teeth.
 - iii. Check for foreign objects.
 - e. Ears.
 - i. Check for fluid or drainage.
 - i. Check for bruising behind ear.
 - II. Neck.
 - a. Symmetry.
 - b. Carotid Pulse.
 - c. Jugular Vein Distention.
 - d. Tracheal Deviation.
 - e. Subcutaneous Air.

PATIENT ASSESSMENT

- III. Chest.
 - a. Symmetry.
 - b. Equal rise and fall.
 - c. Subcutaneous air.
 - d. Auscultate breath sounds.
 - e. Heart tones.
- IV. Abdomen.
 - a. Tenderness.
 - b. Pulsations.
 - c. Masses.
 - d. Rigidity.
- V. Pelvis.
 - a. Stability (flex and compress – NO ROCKING).
- VI. Spine.
- VII. Extremities.
 - a. Distal pulses.
 - b. Color.
 - c. Movement.
 - d. Sensation and peripheral edema.

Trauma ASSESSMENT GUIDELINES:

Assess head and thorax:

D-Deformities
C-Contusion
A-Abrasions
P-Penetrations
P-Paradoxical Motion
B-Burns
T-Tenderness
L-Lacerations
S-Swelling

Assess extremities for:

T-Tenderness
I-Instability
C-Crepitation
P-Pulse
M-Motor
S-Sensation

PATIENT ASSESSMENT

DOCUMENTATION:

1. Scene assessment.
2. Chief complaint, age, sex and weight.
3. Mechanism of injury.
4. Pertinent positive and negative findings of the primary and secondary survey.
5. Glasgow Coma Score.
6. Trauma Score
7. EMT's treatment and if the intervention helped.
8. BSI used.

MEDICAL PATIENT ASSESSMENT

PROCEDURE:

Focused History & Physical Examination

1. Determine the "Chief Complaint" of responsive patient.
2. Obtain a "history of present illness" (SAMPLE).
 - a. Signs and Symptoms.
 - b. Allergies.
 - c. Medications.
 - d. Previous illness.
 - e. Last meal or drink.
 - f. Events preceding the illness.
3. Perform rapid assessment as needed.
4. Vital Signs.
 - a. Take vital signs every 10 minutes if stable.
Take vital signs every 5 minutes if not stable.
 - b. Pulse.
 - i. Location.
 - ii. Quality.
 - iii. Rate.
 - iv. Rhythm.
 - c. Respiration's.
 - i. Rate.
 - ii. Quality.
 - iii. Depth.
 - iv. Noises.
 - d. Blood pressure.
5. Glasgow Coma Score.

PATIENT ASSESSMENT

DOCUMENTATION:

1. Scene size-up.
2. Chief complaint, age, sex and weight.
3. History of present illness.
4. Pertinent positive & negative findings of the primary and secondary survey.
5. Past medical history.
6. Medications.
7. Allergies.
8. EMTs treatment and if it helped the patient.
9. BSI used.

REMINDER:

Carotid Pulse	Approx. 60 systolic B/P
Femoral Pulse	Approx. 70 systolic B/P
Radial Pulse	Approx. 80-90 systolic B/P

OXYGEN ADMINISTRATION

PURPOSE:

To assure that patients requiring oxygen receive the appropriate amount, using the correct device.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Oxygen cylinder.
3. Oxygen regulator.
4. Nasal cannula.
5. Pulse oximeter if available.
6. Non-rebreather mask.
7. Bag-value-mask with oxygen reservoir.
8. O₂ tubing.
9. Trach mask.
10. Cup.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Patients that require oxygen.
 - a. Patients that exhibit the sign of hypoxia:
 1. Tachycardia.
 2. Nervousness.
 3. Irritability.
 4. Poor skin signs.
 5. Poor air exchange.
 - b. Any patient that has or could develop respiratory or circulatory compromise.
4. Sources of oxygen.
 - a. Oxygen cylinder.
 1. Color coded.
 2. Labeled oxygen.
 3. Accepts only an oxygen regulator.
 - b. Oxygen regulators.
 1. Required to give oxygen to patients.
 2. Regulates the flow of oxygen to the patient and brings the oxygen pressure down to a usable pressure.
5. Devices to administer oxygen.
 - a. Nasal cannula.
 1. Usually the most tolerated device.
 2. Two prongs direct oxygen into the nasal passages.
 3. Flow at 1-6 liters per minute.

OXYGEN ADMINISTRATION

4. Oxygen percentage delivered at approximately 24-44%.
- b. Non-Rebreather Mask.
 1. Fits like the other masks.
 2. Has valves that keep room air out and allow almost pure oxygen to the patient.
 3. Flow at 10-15 liters per minute – keep the reservoir bag full.
 4. Oxygen percentage delivered is approximately 60-95%.
- c. Bag-Valve-Mask With Reservoir.
 1. Must maintain a seal with mask to deliver effective ventilations.
 2. Can be used on a non-breathing patient or to assist a breathing patient with any respiratory insufficiency.
 3. Flow at 15 Lpm – keep the reservoir bag full.
 4. Oxygen percentage delivered is approximately 100%.
- d. Pulse Oximeter (if available). (See NOTE).
 1. Functions by measuring transmission of red and infrared light through an arterial bed, such as those present in a finger, toe or ear lobe.
 2. Gives a reading of 96% to 100% O₂ saturation in patient with effective respirations. If respirations are compromised, even slightly, O₂ saturation falls.
 3. Provide any patient whose saturation is below 90% with aggressive oxygenation.
- e. CO Monitor
 1. Analyzes wavelengths of light to accurately measure carboxyhemoglobin (SpCO[®]) percent levels in the blood noninvasively and continuously
- f. Trach Mask.
 1. Goes loosely over trach tube.
 2. May use child O₂ mask if proper trach mask not available.
 3. Flow at 8 – 15 Lpm.
- g. Blow by O₂.
 1. Keep away from eyes.
 2. May use end of O₂ hose.
 3. May use appropriate cup.
 4. Flow at 4 – 12 Lpm.

NOTE: Shortcomings in pre-hospital care. In low-flow states, such as hypothermia and late hypovolemia, the device may not sense accurately. The presence of carbon monoxide on the hemoglobin molecule tends to elevate the saturation level falsely. Be careful in using the pulse oximeter in patients with anemia and in some cases of hypovolemia. You may get a normal reading. Give high flow oxygen regardless of oximeter reading.

ASSISTED VENTILATIONS

PURPOSE:

To assure current guidelines and standards are met during treatment of the patient in respiratory arrest or who is hypoventilating.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Oxygen cylinder.
3. Oxygen regulator.
4. Bag-valve mask with oxygen reservoir.
5. Oropharyngeal and/or nasopharyngeal airways.
6. Pulse oximeter (if available).
7. Pocket mask with one-way valve.

RESCUE BREATHING

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Determine unresponsiveness.
4. Establish an open airway.
 - a. Jaw thrust if spinal injury is suspected.
5. Check for breathing.
 - a. Look, listen and feel.
6. IF PATIENT IS NOT BREATHING....
 - a. Insert airway.
 - b. Deliver two (2) slow (1.5-2 seconds) breaths.
 - i. If these breaths are unsuccessful, begin techniques to clear the airway according to current American Heart Association guidelines.
 - ii. Reposition, modified jaw thrust.
 - iii. Abdominal thrusts.
 - iv. Finger sweeps for adults only.
7. Check for a carotid pulse.
 - a. If no pulse, begin CPR.
 - b. If there is a pulse but the patient is not breathing, continue ventilating patient once every five (5) seconds for an adult, (3) three seconds for child and infant.
8. Place on cardiac monitor (if available).

COMBITUBE

ESOPHAGEAL TRACHEAL DOUBLE LUMEN AIRWAY

PURPOSE:

To establish guidelines for management of the airway in the unresponsive patient for whom endotracheal intubation is difficult or not available.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Combitube kit.
3. Suction.
4. Bag-valve-mask.

INDICATIONS:

Cardiac or respiratory arrest. Second line for ALS and ILS if unable to intubate.

CONTRAINDICATIONS:

1. Patients < than 5 feet tall or > 7 feet.
2. Under 16 years of age
3. Patients with intact gag reflex.
4. Patients with known esophageal disease.
5. Patients with known or suspected caustic substance ingestion.
6. Patients with known or suspected foreign body obstruction.
7. Burn Injuries
8. Latex allergy

NOTE:

Do not force the Combitube. If the tube does not advance easily, redirect it or withdraw and reinsert. When facial trauma has resulted in sharp, broken teeth or dentures remove dentures and exercise extreme caution when passing the Combitube into the mouth to prevent cuff from tearing. The Combitube® small adult (SA) can be used in those patients who are between 4-5 feet but over the age of 16

PROCEDURE:

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary equipment and supplies.
3. Assess patient to assure that insertion of Combitube is indicated.
4. Begin artificial respiration or CPR, incorporating usual precautions to verify and open airway.
5. Prior to insertion, test cuff integrity by inflating each cuff with the prescribed volume of air. Inflate proximal pharyngeal cuff (Blue Pilot Balloon) with 100ml of air. Inflate the distal white esophageal cuff (White Pilot Balloon) with 15ml of air.

COMBITUBE

ESOPHAGEAL TRACHEAL DOUBLE LUMEN AIRWAY

6. Lubricate the tube with water-soluble lubricant to facilitate insertion.\
7. Attach the 90° elbow to the non ventilated tube to deflect gastric contents
8. In the supine patient, lift the tongue and jaw upward with one hand.
9. With the other hand, hold the Combitube so that it curves in the same direction as the natural curvature of the pharynx. Maintain a mid-line position of the Combitube. Insert the tip into the mouth, advance in a downward curved movement until the teeth, or alveolar ridges lie between the two printed bands.
10. Inflate #1 Blue pilot balloon with 100ml of air using the 140ml blue colored coded syringe supplied. The large latex cuff will fill and may cause the Combitube to move slightly from the patient's mouth. This is to be expected.
11. Inflate #2 White pilot balloon with 15ml of air using the 20ml syringe supplied.
12. Begin ventilation through the longer blue connecting tube labeled No. 1.
 1. If auscultation of breath sounds is positive and auscultation of gastric insufflation negative, continue ventilation. (If possible, confirm by observing chest expansion.) Under this condition, the second connecting tube may be used for the removal of gastric fluids with the suction catheter provided in the kit.
13. If auscultation of breath sounds is negative, and gastric sounds are negative, the Combitube may have been advanced too far into the pharynx. Deflate the No. 1 pilot balloon/cuff, move the Combitube approximately 2-3 cm out of the patient's mouth. Re-inflate the No. 1 positive and auscultation of gastric sounds is negative, continue ventilation.
14. If auscultation of breath sounds is negative and gastric sounds are positive, immediately begin ventilation through the shorter clear connecting tube labeled No. 2. Confirm tracheal ventilation by auscultation of breath sounds and absence of gastric noise.

DOCUMENTATION:

1. Who attempted/performed procedure.
2. Number of attempts vs. successful.
3. BSI and equipment used.
4. Indications for procedure.
5. Breath sounds post procedure.
6. Time of procedure.
7. Oxygen flow.
8. Any complications or undesired side effects.

King Airway

PURPOSE:

To establish guidelines for management of the airway in the unresponsive patient for whom endotracheal intubation is difficult or not available.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Combitube kit.
3. Suction.
4. Bag-valve-mask.

Indications:

Cardiac or respiratory arrest, and second line airway for ALS and ILS if unable to intubate.

CONTRAINDICATIONS:

1. Patients who are conscious or who have an intact gag reflex
2. Under 16 years of age
3. Patients with intact gag reflex.
4. Patients with known esophageal disease.
5. Patients with known or suspected caustic substance ingestion.
6. Patients with known or suspected foreign body obstruction.
7. Burn Injuries

PROCEDURE:

1. Pre-Oxygenate the patient.
2. Select the appropriate sized tube based on patient's height.
3. Rest cuff for proper inflation and possible leakage.
4. Lubricate the distal beveled tip and posterior aspect of the tube. Avoid lubrication of areas near the ventilatory openings.
5. Place the patient's head in the neutral or sniffing position.
6. With the dominant hand, hold the King Airway, and with the non-dominant hand hold the mouth and apply chin lift.
7. With the airway rotated 45° - 90° laterally such that the blue orientation line is touching the corner of the mouth, insert the tip of the airway into the mouth and advance past the base of the tongue.
8. As the tube passes under the tongue, rotate the tube back to midline with the blue orientation line facing the patient's chin.
9. Without exerting excessive force, advance the tube until the base of the connector is aligned with the teeth or gums.

King Airway

10. Inflate the cuffs based on the following
 - A. Size 3 = 50ml (Yellow)
 - B. Size 4 = 70ml (Red)
 - C. Size 5 = 80ml (Purple)
11. Attach the Bag Valve Mask to the tube and gently ventilate the patient. While ventilating, simultaneously withdraw the King Airway until ventilation is easy and free-flowing. When easy ventilation is achieved, discontinue withdrawal of the King Airway.
12. Auscultate for bilaterally equal breath sounds and absence of sounds over the epigastrium. This should be repeated frequently and after movement or manipulation.
13. Confirm tube placement using an end-tidal CO₂, or an esophageal device.
14. Secure the tube.
15. Document the tube size, time, results (success), and placement location by the centimeter marks either at the patient's teeth or lips on the patient care report. Document all devices used to confirm initial tube placement. Also document positive or negative breath sounds before and after each movement of the patient.

ENDOTRACHEAL AND NASOTRACHEAL INTUBATION

PURPOSE:

To establish guidelines for endotracheal and nasotracheal intubation of the patient with airway compromise by ILS and ALS personal.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Endotracheal tubes of assorted sizes.
3. Stylet – adult and pediatric.
4. Laryngoscope handle and assorted blades with functional bulbs and battery.
5. 10cc syringe.
6. Lubricant.
7. Tube securing device
8. Suction capable of clearing large volumes or large pieces of emesis.
9. Stethoscope.
10. 2% Lidocaine gel
11. Neosynphrine nasal spray.
12. CETACAINE spray.

PROCEDURE:

ENDOTRACHEAL INTUBATION

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary supplies and equipment.
3. Attach appropriate blade to handle, lock handle and blade into place and assure that the bulb is functioning.
4. If using a stylet, insert stylet into the tube and conform to desire configuration.
5. Assure that end of stylet is recessed at least one half inch from the tube opening to prevent trauma during intubation.
6. Perform Sellick maneuver (application of mild pressure to the cricoid ring to partially occlude the esophagus) to reduce the risk of vomiting and subsequent aspiration.
7. Pre-oxygenate patient.
8. Position patient for intubation:
 - a. **NON-TRAUMATIZED PATIENT:**
Place patients head into the “sniffing” position (place a small towel under the occiput to lift head slightly without hyperextension).
 - b. **POTENTIALLY TRAUMATIZED PATIENT:**
Have a second rescuer stabilize the neck in neutral position from below during the entire process of intubation.

ENDOTRACHEAL AND NASOTRACHEAL INTUBATION

9. With the left hand, carefully insert blade into the right side of the patient's mouth, following the natural curvature of the tongue. The blade should gradually be brought into the midline of the mouth so that the tongue is displaced to the left. This will allow better visualization of landmarks. Visualize the hard palate and uvula as the oral cavity is "tracked through". A common mistake is to insert the full length of the laryngoscope blade beyond the epiglottis, making it difficult to visualize the cords.
10. On arrival at the posterior pharynx, lift the tip of the blade. The tip of the epiglottis should be visible. With the tip of the blade (Miller), lift the epiglottis to visualize the vocal cords. If using the curved blade (Macintosh), the blade tip is inserted into the vallecula and then lifted higher to visualize the cords.
11. Lift the handle forward and anteriorly and avoid using the teeth as fulcrum.
12. Visualize the vocal cords. With the right hand, insert the endotracheal tube between the vocal cords until the cuff just disappears from sight.
13. Remove the laryngoscope and inflate the endotracheal tube cuff with the manufacturers recommended amount of air.
14. Ventilate the patient and assess the patient for correct placement of endotracheal tube in the trachea:
 - a. While auscultating first the right side of the chest, then the left side and then the epigastric are:
 1. If lung sounds are present and equal to auscultate, the endotracheal tube cuff may be inflated with the recommended amount of air as directed by the manufacturer.
 2. If lung sounds are more prominent in the right lung field, the endotracheal tube may have passed into the right mainstem bronchus. Deflate the endotracheal tube cuff. Pull the endotracheal tube back gradually, auscultating until the lung sounds have equalized in both lung fields and reinflate the endotracheal tube cuff.
 - b. If lung sounds are not present or sounds are more prominent in the epigastric area, the endotracheal tube has passed into the esophagus and the procedure must be repeated.
 - c. Place secondary confirmation device which is mandatory on any patient.
 - d. Other methods to help verify endotracheal tube placement
 1. Visualization of endotracheal tube passing through vocal cords.

ENDOTRACHEAL AND NASOTRACHEAL INTUBATION

2. Condensation observed on inside of endotracheal tube on patient exhalation.
3. Chest rise.
4. Loud breath sounds at suprasternal notch.
- e. **INADVERTENT ESOPHAGEAL INTUBATION IS A LETHAL COMPLICATION.** Continuously reassess the patient to ensure proper endotracheal placement. **REASSESS TUBE POSITION EVERY TIME THE PATIENT IS MOVED.**
15. Secure the endotracheal tube in place.
16. Monitor the patient for potential complications.

PROCEDURE: NASOTRACHEAL INTUBATION

An alternative airway for the unresponsive patient experiencing spontaneous breathing and/or teeth clenching who has a sensitive gag reflex or cannot be orally intubated. This procedure should be used with caution in the head injured patients because of the possibility of a basilar skull fracture. This procedure is contraindicated in the presence of trauma to the mid-facial region (nose, maxilla or zygomatic region).

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary supplies and equipment. Select a tube size, which is one full size smaller than that used for oral intubation.
3. Pre-form the distal end of the endotracheal tube. This may be accomplished with either of the following methods.
 - a. Tie the endotracheal tube into a simple knot and leave in this position until ready to intubate.
 - b. Use a directional tip endotracheal tube if available.
 - c. Place the tip of the endotracheal tube inside the B.V.M. "adapter" to create a circle.
4. Suction the oropharyngeal area.
5. Inspect both nares and determine easiest route of passage (usually the right nare). Spray both nares with 2 sprays of neosynphrine nasal spray.
6. Lubricate the endotracheal tube with a water soluble jelly. Lubricate the nares with lubricant applied to the opening of the nasal passage.
7. Insert the endotracheal tube into the nostril with the bevel toward the midline, so the turbinate is not injured while inserting the endotracheal tube.
8. Guide the endotracheal tube with gentle pressure down into the palate and direct it toward the larynx.

ENDOTRACHEAL AND NASTRACHEAL INTUBATION

9. The rescuer should now direct attention to listening and/or feeling for air movement through the endotracheal tube. The rescuer may place his/her ear against the proximal end of the endotracheal tube. As the distal end of the endotracheal tube get closer to the laryngeal opening, the sound of air movement should become increasing louder.
10. Continue to gently guide the endotracheal tube toward the glottis unless air movement ceases, at which time the rescuer should withdraw the tube slightly, reposition the head if needed (ONLY IF NO TRAUMA INVOLVED) and resume the process. The tube should be passed through the vocal cords during an inspiration by the patient.
11. Ventilate the patient and assess patient for correct placement of endotracheal tube in the trachea:
 - a. While auscultating first the right side of the chest, then the left side and then the epigastric area:
 1. If lung sounds are present and equal to auscultation, the endotracheal tube cuff may be inflated with the recommended amount of air as directed by the manufacturer.
 2. If lung sounds are more prominent in the right lung field, the endotracheal tube may have passed into the right mainstem bronchus. Deflate the endotracheal tube cuff. Pull the endotracheal tube back gradually, auscultating until the lung sounds have equalized in both lung fields and reinflate the endotracheal tube cuff.
 - b. If lung sounds are not present or sounds are more prominent in the epigastric area, the endotracheal tube has passed into the esophagus and the procedure must be repeated.
 - c. Place secondary confirmation which is mandatory on any patient with a pulse.
 - d. Other methods to help verify endotracheal tube placement:
 1. Visualization of endotracheal tube placement:
 2. Condensation observed on inside of endotracheal tube on patient exhalation.
 3. Chest rise.
 4. Loud breath sound at suprasternal notch.
 - e. **INADVERTENT ESOPHAGEAL INTUBATION IS A LETHAL COMPLICATION.** Continuously reassess the patient to ensure proper tube position. **REASSESS TUBE POSITIONING EVERY TIME THE PATIENT IS MOVED.**
12. Secure the endotracheal tube in place.
13. Monitor the patient for potential complications.

ENDOTRACHEAL AND NASOTRACHEAL INTUBATION

COMPLICATIONS:

LARYNGEAL SPASM

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary equipment, use 2% Lidocaine gel to lubricate the end of the ET tube.
3. Monitor the patient for LARYNGEAL SPASM:
 - a. A reaction characterized by a spasm and closing of the vocal cords. Spasm can occur as a result of anaphylaxis, smoke inhalation, intubation attempts or introduction of a foreign body into the laryngeal space.
 - b. Most common after repeated nasal attempts.
4. Visualize and suction the lower airway to remove any possible obstruction.
5. Using the bag-valve-mask, ventilate the patient with 100% oxygen for several ventilations and re-attempt the intubation.
6. Swollen airways may require intubation with a tube size slightly smaller than usual.
7. If intubation attempts are unsuccessful and laryngeal spasm continues and if Medical Control permits, cricothyrotomy with a pertrach may be performed.

PNEUMOTHORAX

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary equipment.
3. Monitor patient for PNEUMOTHORAX:
 - a. Air trapped within the pleural space. PNEUMOTHORAX may occur during intubation if a stylet is used and protrudes from the distal end of the endotracheal tube. This may lacerate the trachea or larynx.
 - b. Pneumothorax will be characterized by diminished or absent lung sounds on the affected side.
4. Auscultate lung fields beginning with the right side. Diminished sound only on the left side may indicate placement in the right mainstem bronchus.
5. Administer 100% oxygen and continue to assess patient for development of tension pneumothorax. Tension pneumothorax is characterized by deviation of the trachea away from the affected side, distended neck veins, further signs of respiratory compromise and shock (SBP<90).

ENDOTRACHEAL AND NASOTRACHEAL INTUBATION

6. Occurrence of pneumothorax may be minimized by proper placement of the stylet in the endotracheal tube prior to intubation. When using a stylet, ensure that it does not protrude through the end of the endotracheal tube.

COMMENT:

This is not a frequent complication of orotracheal intubation. As such perforation of trachea is more likely to cause PNEUMOMEDIASTINUM, which is impossible to diagnose without an x-ray.

ENDOTRACHEAL AND NASOTRACHEAL INTUBATION ASPIRATION

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary equipment.
3. Monitor the patient for aspiration:
 - a. Introduction of foreign matter into lower airways and lungs.
 - b. Can occur when the unconscious patient is unable to protect the airway and foreign matter such as vomitus and/or blood enter the airways.
4. Have suction available and ready any time a patient's respirations are being assisted and during the intubation procedure. Suctioning may be required prior to attempting placement of the endotracheal tube to better visualize the vocal cords.
5. The Sellick maneuver (application of mild pressure to the cricoid ring to partially occlude the esophagus), used during the intubation procedure, will reduce the risk of vomiting and subsequent aspiration.

TRAUMA TO ORAL/NASAL PHARYNGEAL CAVITY

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary equipment.
3. Monitor the patient for potential TRAUMA TO ORAL/NASAL PHARYNGEAL CAVITY:
 - a. Can occur during intubation if endotracheal tube is inserted in a rough manner, if too large of a laryngoscope blade is used or if it is used in a rough manner, if endotracheal tube is inserted blindly too far through the vocal cords or if a non-lubricated endotracheal tube is inserted into a dry oral or nasal cavity.
 - b. Trauma to the oral or nasopharyngeal areas may present with minimal to moderate bleeding.

ENDOTRACHEAL AND NASOTRACHEAL INTUBATION

4. The potential for trauma may be minimized by lubricating the distal portion of the endotracheal tube prior to insertion, gently placing the laryngoscope blade into the oral cavity and inserting the endotracheal tube gently, just past the cords.
5. If trauma occurs, suctioning around and/or through the endotracheal tube may be indicated.

ESOPHAGEAL INTUBATION

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary equipment.
3. Immediately following placement of the endotracheal tube, assess the patient for:
 - a. Incorrect placement of the endotracheal tube into the esophagus.
 - b. During auscultation, sounds will be most prominent in the epigastric area, ventilations may be more difficult, the abdomen may become distended and vomitus may be present in the endotracheal tube.
4. Suction should be available and ready in case of vomiting.
5. The patient should be ventilated with the bag-valve-mask and 100% oxygen for several ventilations prior to attempting intubation again.
6. Opportunities for esophageal intubation may be minimized by visualizing the vocal cords prior to and while inserting the endotracheal tube and utilizing the Sellick maneuver and/or a stylet if the cords appear too anterior to visualize.

RIGHT MAINSTEM BRONCHUS INTUBATION

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary equipment.
3. Monitor the patient for possible INTUBATION OF RIGHT MAINSTEM BRONCHUS:
 - a. Can occur when the endotracheal tube is placed too far after passing the vocal cords. The tube will pass into the right mainstem bronchus and during auscultation, breath sounds will be more prominent in the right lung fields.
4. During intubation, pass the endotracheal tube just past the vocal cords, auscultate both lung fields and if sounds are equal bilaterally, inflate the cuff of the endotracheal tube.

ENDOTRACHEAL AND NASOTRACHEAL INTUBATION

5. If during auscultation, lung sounds are more prominent in the right lung fields, gently and slowly pull the un-inflated endotracheal tube towards the rescuer while auscultating and ventilating until the lung sounds are equal on both sides.
6. Verify that no signs and symptoms of a tension pneumothorax is present.
7. Inflate the cuff with the amount of air recommended by the manufacturer.
8. The first advanced provider has two attempts at intubation. IF unsuccessful and another advanced provider is available one additional attempt may be made to a max total of three attempts per patient.
9. If unsuccessful at intubation after three attempts a Combitube is to be put in place to secure the airway.

DOCUMENTATION:

1. Who attempted/performed procedure.
2. Number of attempts vs. successful.
3. BSI and equipment used.
4. Site of and indications for procedure.
5. Breath sounds, gastric sounds and at least one other method of endotracheal tube placement confirmation post procedure.
6. Endotracheal tube size.
7. Time of procedure.
8. Oxygen flow.
9. Any complications or undesired side effects.

USE OF THE FLEX-GUIDE™ ET TUBE INTRODUCER (BOUGIE)

This device can be used when there is difficulty visualizing a patient's vocal cords due to the patient's anatomy, edema, or a need to limit neck motion. It is best to use this device early in your intubation attempt. Prolonged scene times related to multiple intubation attempts should be avoided.

CONTRAINDICATIONS:

Nasal intubation

Patient needs an ET tube smaller than 6.0

TECHNIQUE:

Standard orotracheal intubation preparation and procedures should be used.

When the laryngoscope blade is in place and exposing some or all of the laryngeal opening, advance the ET Tube Introducer, tip up, into the trachea until the black line on the introducer is at the patient's lips. Frequently, you will feel the introducer bounce

ENDOTRACHEAL AND NASOTRACHEAL INTUBATION

along the tracheal rings as it is advanced. This is a good indication you are in the trachea.

Lubricate an appropriately sized ET tube (minimum of 6.0mm) and pass it over the introducer and into the trachea. If resistance is felt, rotate the ET tube 90 degrees counterclockwise. This allows the bevel of the ET tube to spread the arytenoids so that minimum force is used.

If resistance is still felt, back up the ET tube slightly and try again.

Advance the ET tube to an appropriate depth and remove the introducer

DIGITAL INTUBATION

PURPOSE:

To establish guidelines for digital intubation of the patient with airway compromise.

NOTE:

Inserting an ET tube blindly through the patient's mouth with this technique should only be attempted after attempts at VISUALIZED intubation have failed.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Endotracheal tubes of assorted sizes.
3. Stylet – adult and pediatric.
4. Laryngoscope handle and assorted blades with functional bulbs and battery.
5. 10cc syringe.
6. Lubricant.
7. Tape or “endo-lock” type device.
8. Suction capable of clearing large volumes or large pieces of emesis.
9. Stethoscope.
10. 2% Lidocaine gel.
11. AFRIN spray
12. Cetacaine spray.

PROCEDURE: DIGITAL INTUBATION

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary supplies and equipment.
3. A stylet must be used. Insert stylet into the tube and conform to desired configuration a curved “hockey stick” shape. Assure that end of stylet is recessed at least one half inch from the tube opening to prevent trauma during intubation.
4. Hyperventilate and pre-oxygenate patient.
5. Position patient for intubation:
 - a. NON-TRAUMATIZED PATIENT:
Place patient's head into the “sniffing” position during insertion. (Place a small towel under occiput to lift head slightly without hyperextension).
 - b. POTENTIALLY TRAUMATIZED PATIENT:
Have a second rescuer stabilize the neck in neutral position from below during the entire process of intubation.

DIGITAL INTUBATION

6. Insert two fingers into the patient's mouth, reaching for the epiglottis. The two first fingers are held together and advanced until they are fully inserted into the patient's mouth and oropharynx, so that the tips of the first two fingers can feel the epiglottis and are just beyond it. Flex the fingers a little way; so that the tip can be felt to slightly elevate the epiglottis and stop.
7. Without allowing ANY movement of the inserted fingers, insert the bent endotracheal tube into the patient's mouth, guiding its bent distal tip between the first two fingers. These should only be parted enough to let the tube pass between them while still touching them.
8. Continue to advance the tube between the two fingers until its bent distal tip can be felt at the ends of the fingertips. When the fingertips are slightly flexed, elevating the epiglottis, the very space between the fingertips points directly into the opening of the vocal cords. With the hand holding the proximal end, push the endotracheal tube in a caudal direction while using the fingertips if necessary to "walk" the distal tip into the trachea.
9. With the tube inserted into the trachea, grasp it securely with the still-inserted fingers and withdraw the stylet with the other. While continuing to guide it with the inserted fingers, advance the tube fully to the proper depth with the other hand.
10. Inflate the endotracheal tube cuff with the manufacturers recommended amount of air.
11. Ventilate the patient and assess the patient for correct placement of endotracheal tube in the trachea:
 - a. While auscultating first the right side of the chest, then the left side and then the epigastric area:
 1. If lung sounds are present and equal to auscultation the endotracheal tube cuff may be inflated with the recommended amount of air as directed by the manufacturer.
 2. If lung sounds are more prominent in the right lung field, the endotracheal tube may have passed into the right mainstem bronchus. Deflate the endotracheal tube cuff. Pull the endotracheal tube back gradually, auscultating until the lung sounds have equalized in both lung fields and re-inflate the endotracheal tube cuff.
 - b. If lung sounds are not present or sounds are more prominent in the epigastric area, the endotracheal tube has passed into the esophagus and the procedure must be repeated.
 - c. Place a secondary conformation device to help detect placement. Use of secondary conformation device is mandatory on any patient.

DIGITAL INTUBATION

- d. Other methods to help verify endotracheal tube placement.
 1. Visualization of endotracheal tube passing through vocal cords.
 2. Condensation observed on inside of endotracheal tube on patient exhalation.
 3. Chest rise.
 4. Loud breath sounds at suprasternal notch.
 - e. **UNRECOGNIZED ESOPHAGEAL INTUBATION IS A LETHAL COMPLICATION.** Continuously reassess the patient to ensure proper endotracheal placement. **REASSESS TUBE POSITION EVERY TIME THE PATIENT IS MOVED.**
12. Secure the endotracheal tube in place.
 13. Monitor the patient for potential complications.

DOCUMENTATION:

1. Who attempted/performed procedure.
2. Number of attempts vs. successful.
3. BSI and equipment used.
4. Site of and indications for procedure.
5. Breath sounds, gastric sounds and at least one other method of endotracheal tube placement confirmation post procedure.
6. Endotracheal tube size.
7. Time of procedure.
8. Oxygen flow.
9. Any complications or undesired side effects.

REMOVAL OF FOREIGN OBJECT

WITH MAGILL FORCEPS

PURPOSE:

To establish guidelines for the removal of foreign objects in the unresponsive patient for whom abdominal thrusts or chest thrusts have been ineffective.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Resuscitation equipment.
 - a. Bag-valve-mask.
 - b. Oropharyngeal airways.
 - c. Endotracheal tubes, 10cc syringe, tape or "endolock".
 - d. Laryngoscope, blades with functioning bulbs and water soluble lubricant.
 - e. Oxygen.
 - f. Suction unit.
 - g. Stethoscope.

PROCEDURE:

1. Put on gloves and full-face protection (mask and goggles or full face shield).
2. Assemble all necessary supplies and equipment.
3. Determine that patient has completely obstructed airway:
 - a. Patient is apneic, aspiration was witnessed or is highly suspected.
 - b. One (1) sequence of A-B-C's, followed by abdominal thrusts and finger sweep (unsuccessful).
4. Position patient:
 - a. **NON-TRAUMATIZED PATIENT:** Place patients head into "sniffing" position. Place a small towel under the occiput to lift head slightly without hyperextension of the neck.
 - b. **POTENTIALLY TRAUMATIZED PATIENT:** Have a second rescuer stabilize the neck in a neutral position from below during the entire process and until the cervical spine is immobilized.
5. With the left hand, carefully insert blade into the right side of the patient's mouth, following the natural curvature of the tongue. The blade should gradually be brought into the midline of the mouth so that the tongue is displaced to the left. This will allow better visualization of landmarks. Visualize the hard palate and uvula as the oral cavity's is "tracked through". A common mistake is to insert the full length of the laryngoscope blade beyond the epiglottis, making it difficult to visualize the cords.

REMOVAL OF FOREIGN OBJECT **WITH MAGILL FORCEPS**

6. On arrival at the posterior pharynx, lift the tip of the blade. The tip of the epiglottis should be visible. With the tip of the blade (Miller), lift the epiglottis to visualize the vocal cords. If using the curved blade (MacIntosh), the blade tip is inserted into the vallecula and then lifted higher to visualize the cords.
7. Lift the handle forward and anteriorly to **avoid using the teeth as a fulcrum.**
8. When the obstruction is visualized, use the Magill forceps in your right hand to grasp the material and gently remove it from the lower airway. (If the obstruction is too distal in the lower airway, cricothyrotomy may have to be immediately performed).
9. Suction any small particles or liquid from the posterior airways.
10. If the patient is apneic, intubate the trachea and ventilate with 100% oxygen.
11. Continuously re-assess the patient's condition and endotracheal tube placement.

DOCUMENTATION:

1. Results of initial assessment and indications for procedure.
2. Any difficulty with procedure.
3. Equipment used and oxygen flow used post procedure.
4. Time of procedure.
5. Respiratory status of patient.
6. BSI used.

CARE OF THE PATIENT **WITH A TRACHEOSTOMY TUBE**

PURPOSE:

To establish guidelines for management of the patient with a tracheostomy tube. Care actions may include removal of dried secretions from the stoma and surrounding skin and suctioning through the tracheostomy.

EQUIPMENT:

1. Disposable gloves, sterile glove and full-face protection (mask and goggles or full-face shield.)
2. Sterile 4X4's.
3. Sterile saline or sterile water.
4. Oxygen.
5. Tracheostomy mask.
6. Suction catheters of various sizes depending on the size of the tracheostomy tube (sizes 10, 12, 14 & 16 will accommodate most pediatric and adult patients).
7. Properly operating suction unit.

PROCEDURE: SUCTIONING THROUGH THE TRACHEOSTOMY TUBE

1. Monitor patient for necessity of SUCTIONING THROUGH THE TRACHEOSTOMY TUBE:
 - a. Mucous may be visibly present in the airway. The patient may also display bubbly, noisy breathing or coughing. The cough, although noisy, is ineffectual because the glottis is bypassed by the tracheostomy.
2. Put on glove and full-face protection (mask and goggles or full-face shield).
3. Pre-oxygenate the patient.
4. Turn suction on and attach suction catheter without removing catheter from package.
5. Open bottle of sterile water or sterile saline.
6. Put sterile glove on one hand and use hand to insert catheter, with suction off, into the tracheostomy tube.
7. Begin with withdrawing the catheter using a rotary motion and intermittent suction.
 - a. Suction no longer than fifteen (15) seconds.
8. Clear suction catheter and suction tubing by inserting catheter into sterile water or saline with suction on.
9. Oxygenate the patient again.
10. Repeat procedure once if necessary. Suctioning more than twice at one time may induce hypoxia.

CARE OF PATIENT **WITH A TRACHEOSTOMY TUBE**

PROCEDURE: REMOVAL OF DRIED SECRETIONS FROM TRACHEOSTOMY

1. Put on gloves, full-face protection, and suction patient as above if necessary.
2. Monitor patient for need for REMOVAL OF DRIED SECRETIONS FROM TRACHEOSTOMY:
 - a. Thick mucous build up in and around the tracheostomy tube may form a crust build up and/or mucous plug.
3. Remove soiled dressings if necessary. If soiled dressings are removed, change gloves prior to applying clean dressings.
4. Use saline soaked 4X4's to cleanse around the stoma site.
5. Do not remove ties used to secure tracheostomy tube in place.

DOCUMENTATION:

1. Who performed procedure.
2. BSI and equipment used.
3. Indications for procedure.
4. Time of procedure.
5. Any complications or side effects.
6. Were desired effects attained.

UNCUFFED TRACHEOSTOMY TUBES

Patients with Un-cuffed Tracheostomy Tubes

More and more patients are having surgical tracheostomies done as a treatment for sleep apnea. These patients are unable to maintain their airway when they sleep due to the short thick anatomy of their upper airways. The Tracheostomy tubes for these patients have no cuff so that the patients are still able to talk when they are awake. If they suffer a cardiac or respiratory arrest, their airway must be managed differently because of air leaks caused by the lack of a cuff.

Because there is no cuff on these Tracheostomy tubes, ventilation with a BVM is ineffective because instead of sending all of the ventilation air into the lungs, some of it escapes through the upper airway. In other words, **an un-cuffed airway in a dyspneic or apneic patient is not secure.**

If you encounter a dyspneic or apneic patient with a Tracheostomy tube follow these steps:

1. Assess the patient's airway for a "pilot balloon". (This looks just like the balloon on an ET tube and serves the same purpose.) If there is a pilot balloon, make sure the balloon is inflated. The balloon is inflated with 5 ml of air just like an ET tube balloon. Once the pilot balloon is inflated, the airway is secure and the patient can be ventilated with a BVM to check placement and ventilation continued.
2. If there is no pilot balloon or on the right side of the flange it says "no cuff", This is an un-cuffed tube. For patients not on a ventilator this would be the norm. If you are unsure if the trach is cuffed or not, try to ventilate the patient. If the trach is un-cuffed:
 - A. the patient's color will not improve with ventilation, there will be poor rise and fall of the chest and breath sounds will be poor
 - B. there will be an expulsion of air through the lips with bagging (like the sound a horse makes through his lips)
 - C. you will see air bubbles forming around the lips
3. Call Medical Control and explain the situation. Prepare to replace the Tracheostomy tube with an endotracheal tube.
4. Select an ET tube size based on the size of the Tracheostomy tube. The trach tube size is on the left side of the flange.
 - A. Lubricate the tube with water-soluble lubricant.
 - B. Remove the tracheostomy tube

UNCUFFED TRACHEOSTOMY TUBES

- C. Insert the ET tube. (remember it only needs to be placed a short distance to reach the carina compared to oral intubation). Right main stem bronchus intubation is very easy to do with this technique.
 - D. Confirm placement by listening to breath sounds on both sides and over the stomach.
 - E. Secure the tube with cloth or pink tape. (Silk tape will slip due to the secretions). Secure the tube first, then wrap the tape around the patient's head and back around the tube.
 - F. Recheck tube placement. **DO NOT CUT THE ET TUBE OFF SHORT.**
 - G. Ventilate with BVM
5. If unable to insert the ET tube into the stoma, intubate the patient using the standard oral technique, cover the stoma site with sterile gauze to prevent air escaping the stoma site and ventilate with BVM.

AUTOMATIC VENTILATOR

Criteria:

1. ALS providers only
2. Apnea
3. Patient is intubated
4. At least 8 years old or 45 kg (90 pounds)

Exclusions:

1. Respiratory Distress
2. Breathing
3. Unable to intubate
4. Untreated tension pneumothorax

Note:

Should a mechanical problem develop or the patient appears to be ventilated improperly, (i.e. adverse change in pulse ox, lung sounds, rise and fall of chest wall, etc.), disconnect the unit immediately and ventilate the patient by other means.

Procedure:

1. Intubate patient (if not already done)
 - A. Verify tube placement
 - B. Verify presence of equal lung sounds
 - a. If equal lung sounds are not present:
 - a. Visualize tube placement
 - b. Consider tension pneumothorax or hemothorax and treat accordingly
2. Attach the ventilator to gas source. Assure ample supply of oxygen.
3. Attach patient valve outlets to ventilator.
4. Set breaths per minute (BPM)
 - A. Average adult=12-20 BPM
 - B. Average child=20 BPM
5. Set tidal volume (Vt), titrate to rise and fall of chest
 - A. Average adult=600-800 ml
 - B. Average child=400-600 ml
 - C. Do not exceed 800 ml
6. Set inspiratory time, adult or child
7. Verify ventilator is delivering oxygen adequately (look, listen, and feel at end of vent tubing)
8. Attach ventilator tubing to patient ET tube
9. Verify patient ventilatory status
 - A. Rise and fall of chest
 - B. Equal, bilateral breath sounds
 - C. Pulse oximetry
 - D. CO2 color change
 - E. Update vital signs

PERCUTANEOUS TRANSTRACHEAL VENTILATION (PTTV)

PURPOSE: To establish guidelines in the use of a PTTV.

EQUIPMENT:

1. Gloves and face protection.
2. Over-the-needle IV catheters a size 12g or 14g.
3. Two 10 – 30 ml syringes (one must fit into an IV cannula).
4. A standard universal oxygen connecting tube (low pressure gas supply tubing).
5. A #6, #7 or #8 (cuffed) endotracheal tubes.
6. A plastic “Y” or “T” of a size that will allow for connection to a universal oxygen connecting tube’s end and a #6, #7 or #8 endotracheal tubes when the 15/22mm adaptor is removed from its proximal end. (A “Y” with a standard low pressure oxygen nipple at each of its open ends is manufactured).
7. Two short plastic connecting tubes.
8. A suction catheter with a hard plastic whistle-stop opening.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment. This should be done in advance. Start by cutting the low pressure universal oxygen supply tubing into two pieces about 12 to 15 inches from one end. Then remove the hard plastic whistle-stop from the catheter end (or if it is in-line, cut the catheter so that, one inch of the catheter remains on each side of the whistle stop). With the plastic connecting tubes (if needed) connect each cut end of the oxygen supply tubing to one side of the whistle stop so that the whistle stop is in-line in the reconnected oxygen supply tubing. Next connect the end of the oxygen supply tubing (that has the whistle stop near it) over one side of the “Y” or “T”. Then remove the 115/22ml adapter from the proximal end of the #6, #7 or #8 endotracheal tube and connect it to the distal end or the “Y” or “T”. The finished assembly should match the drawing. To make sure that each connection is secure and without leaks, and to make sure that nothing in the assembly has restricted the flow of oxygen, connect one end to the low pressure nipple and oxygen source and check that a proper flow occurs out of the tip of the endotracheal tube when the whistle stop and the open port on the “Y” or “T” is covered with our fingers. After it has been checked, this assembly together with the needles (each in its own puncture proof container) and the 2 syringes can be packaged and sterilized

PERCUTANEOUS TRANSTRACHEAL VENTILATION (PTTV)

4. The oxygen supply tubing is attached to the normal supplemental oxygen nipple of a portable regulator or wall source which has been set at 15 liters per minute and the endotracheal tube at the distal end of the assembly is inserted into the barrel of the 10-30 ml syringe attached to the IV cannula inserted into the patient's trachea. Then the cuff of the endotracheal tube is inflated to provide a seal.
5. Attaching the barrel of a 10ml syringe to the catheter which has been inserted into the trachea provides a secure way to hold the catheter to prevent its kinking and when used with the ET tube produces an easy and reliable connection without the need to manipulate the catheter.
6. The endotracheal tube (with its cuff not yet inflated) will easily slide into the syringe's barrel and a secure mechanical connection and a seal result when the endotracheal tube cuff is inflated.
7. A suction catheter which has a hard plastic whistle-stop inserted in its proximal end, which when removed from the catheter allows for a firm direct connection to the end of the oxygen supply tubing and a perfect tight fit into the hub of the IV catheter as seen in the picture.
8. If the whistle-stop can be obtained and used there will be no need for the "Y" or "T". The endotracheal tube and the syringe barrel is eliminated, making pre-assembly and the use of the unit much simpler.
9. Once the unit has been properly connected to the 15 Lpm oxygen flow and to the patient, oxygen will flow out of the whistle-stop hole and the open branch of the "Y" or "T".
10. When the EMT simultaneously occludes both of these openings, a closed tubing system is produced between the oxygen source and the needle or catheter inserted into the patient's trachea. The oxygen's pressures will cause it to flow through the catheter and provide the inspiratory volume. When the EMT releases his fingers – opening both to the outside – the oxygen will flow out of the whistle-stop hole and the patient's exhaled air will be vented to the outside through the open part of the "Y".

PERCUTANEOUS TRANSTRACHEAL VENTILATION (PTV)

11. Due to the restriction caused by the narrow lumen of the catheter, the times required for adequate inspiration and expiration of an equal volume will each be longer than with other methods of ventilation patients. Chest excursion – must guide the EMT rather than any pre-set concept or a number of breaths required per minute. The EMT must remember that with ventilation through a needle, the steady regular provision of good inspiratory volumes with adequate time for exhalation between them will produce a better minute volume than those which would result from too rapidly alternating between phases. The time allowed for exhalation must be even longer than the extended time required to provide a sufficient inspiratory volume with this method, if an equal amount is to be expired and air entrapment and CO₂ retention are to be avoided. As with any form of ventilation, proper air exchange should be confirmed by auscultation.

DOCUMENTATION:

1. Who performed/attempted the task.
2. BSI and equipment used.
3. Ventilations per minute.
4. Any complications or undesired side effects.
5. Time procedure was performed.

PERTRACH

PURPOSE:

To establish guidelines for Paramedics for advanced surgical airway.

INDICATIONS:

Patient is in need of airway control as a life-saving measure, and control cannot be attained despite 3 attempts using more conventional methods. These methods may include intubation by direct visualization, digital palpation or by the blind nasotracheal route. If airway can be adequately controlled by means such as an oropharyngeal airway and BVM device or through the use of another airway device (such as the COMBI-TUBE, or King Airway), then these methods are preferable over the creation of a surgical airway.

CRITERIA:

1. Patient is no less than 12 years of age.
2. Patient is in need of emergent control of his/her airway.
3. Airway cannot be attained despite 3 attempts pursuing conventional methods. (ET, Combitube, BLS Airway).
4. Paramedics able to identify the exact location of the patient's Cricothyroid membrane.
5. *Unstable Neck Fracture.
6. *Massive Facial Trauma
7. *Acute Airway obstruction caused by cancer, acute epiglottitis, facial swelling from infection or burns, throat infection with swelling.
8. *Severe Laryngeal Trauma.
9. *Airway Obstruction from Non-Removable Foreign Body.

*Note that the existence of one of the above conditions does not automatically make the patient a candidate for surgical airway.

KEY CONCEPTS:

1. The best airway method is that method which is most suitable for the patient and that which can be accomplished most rapidly under the circumstances.
2. **NO PATIENT SHOULD DIE FROM LACK OF AN AIRWAY.** Choose that method of control, which seems most appropriate and be prepared to use an alternative method if your first choice fails.
3. You must be able to identify the anatomical structures of the patient's anterior neck. These include the thyroid cartilage, cricoid ring and cricothyroid membrane. If you are unable to identify these structures for any reason, do not proceed with surgical airway. Choose another method of airway control.
4. Identify the landmarks of the neck and identify the Cricothyroid membrane.

PERTRACH

5. Cleanse the anterior neck with Betadine.
6. Attach break-away needle to 10 cc syringe. Insert needle through incision, through cricothyroid membrane and into lumen of the trachea. Make sure that bevel of needle and break-away “wings” are pointing toward the lungs. Confirm that needle is within the trachea by aspirating air through syringe.
7. Stabilize needle with your hand and remove syringe. Place guidewire/dilator/cannula through the needle as far as it will go. Squeeze wings of break-away needle together to split needle. Remove both halves of needle, leaving guidewire/dilator/cannula in place.
8. Using firm but gentle pressure, insert guidewire/dilator/cannula through the incision until device rest against the anterior neck. **REMOVE GUIDEWIRE FROM CENTER OF CANNULA.**
9. Attach BVM to cannula and ventilate patient with 100% oxygen. Confirm lung sounds in the usual manner. Attach cannula to neck using cloth umbilical tape.
10. If bleeding is encountered during the surgical airway procedure, ignore it until the airway is secured. **Remember that the surgical airway is being performed on a patient who will die from lack of an airway.** Bleeding is a common complication of the technique, but is of less concern in the patient with an airway emergency. Once the airway is secured, bleeding can be controlled by applying direct pressure with a fingertip or by applying a dressing. Do not use excessive pressure anywhere over the anterior neck, as you may risk compression of trachea or blood vessels of the neck.

DOCUMENTATION:

1. Result of assessment and indications for procedure.
2. How order was received and by whom.
3. Site used for procedure, how the procedure was performed and the equipment used.
4. Time procedure was completed.
5. Any difficulty with procedure.
6. Patient condition following procedure (results of procedure).

DEEP TRACHEAL SUCTIONING **OF THE INTUBATED PATIENT**

PURPOSE:

To establish guidelines for the performance of deep tracheal suctioning of the intubated patient.

EQUIPMENT:

1. Disposable gloves, sterile glove and full-face protection (mask and goggles or full-face shield).
2. Oxygen.
3. Sterile water or sterile saline.
4. Bag-valve-mask.
5. Suction catheters of various sizes depending on the size of the endotracheal tube (sizes 10, 12, 14 & 16 will accommodate most pediatric and adult patients).
6. Suction unit.

PROCEDURE:

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Pre-oxygenate patient.
3. Turn suction on and attach suction catheter to suction unit with removing catheter from package.
4. Open bottle of sterile water or sterile saline.
5. Put sterile glove on one hand and with the sterile gloved hand insert catheter through tube as far as it will go with suction off.
6. Begin withdrawing the catheter using rotary motion and intermittent suction.
7. Clear suction catheter and suction tubing by inserting catheter into sterile water or saline with suction on.
8. Oxygenate patient again.
9. Repeat procedure once if necessary. Suctioning more than twice at one time may induce hypoxia.

DOCUMENTATION:

1. Who performed the procedure.
2. BSI and equipment used.
3. Size of suction catheter used.
4. Results of suctioning procedure (amount and type of drainage and any change in patient condition).
5. Any complications.
6. Time of procedure.

DEEP TRACHEAL SUCTIONING

OF THE NEONATE

PURPOSE:

To establish guidelines for suctioning the lower airways in the newborn with meconium aspiration.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Suction catheters sized for the newborn (size 6, 8 & 10).
3. Bulb aspirator.
4. Meconium aspirator.
5. Several 4X4 gauze.
6. Laryngoscope handle with infant blades.
7. Newborn E.T. tubes.
8. Oxygen.
9. Suction unit set on lowest setting.

PROCEDURE:

1. Put on full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary equipment.
3. Monitor patient for necessity for DEEP TRACHEAL SUCTIONING:
 - a. Meconium staining of the amniotic fluid is present or meconium is present on the infants face or in the nose and pharynx.
 - b. Meconium may present as a green discoloration or particulate matter.
 - c. To prevent meconium aspiration, infants require thorough hypopharyngeal suctioning before initiation of respiration. Thus, ideally, management begins during the delivery of the infant.
4. After the head has been delivered, but before the thorax is delivered, the mouth and nose should be cleared of the meconium fluid. Using a bulb aspirator, gently suction mouth, both nostrils and posterior pharynx to remove any blood or amniotic fluid. A piece of gauze wrapped around the index finger may be used to collect tenacious collections of meconium from the mouth, pharynx and exterior of the nares.
5. Immediately after delivery and prior to inducing respiratory effort aspirate meconium from the trachea by way of the endotracheal tube:
 - a. Connect suction to the appropriate size endotracheal tube. If a meconium aspirator is available, place it between the endotracheal tube and the suction tubing.
 - b. Intubate the patient in the manner described in the Endotracheal Intubation section of this document.

DEEP TRACHEAL SUCTIONING **OF THE NEONATE**

- c. Apply suction directly to the endotracheal tube and withdraw slowly. Suctioning should be repeated after reintubation if the presence of significant meconium return from the initial suctioning to remove as much meconium as possible. When the meconium clears after several intubations and suctionings, use of suction catheters inserted through the endotracheal tube may be adequate and reduce the need for continuing intubations. It may not be possible to clear the trachea of all meconium before the need to initiate positive pressure ventilation.

DOCUMENTATION:

1. Who performed the procedure.
2. BSI and equipment used.
3. Size of the suction catheter used.
4. Results of suctioning procedure (amount and type of drainage and any change in patient condition).
5. Any complications.
6. Time of procedure.

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

PURPOSE:

The purpose of this procedure is to establish guidelines for the use of CPAP devices.

INDICATIONS:

1. Signs of CHF with pulmonary edema and one or more of the following:
2. Currently on medications such as digoxin or lasix
3. Pedal edema
4. Severe and/or sudden onset SOB
5. Orthopnea
6. Anxious
7. Diaphoresis
8. Rales or coarse wheezes
9. Hypertension
10. Near drowning

CONTRAINDICATIONS:

Absolute Contraindications (DO **NOT** USE):

1. Age < 8
2. Respiratory or Cardiac Arrest
3. Agonal respirations
4. Severely depressed level of consciousness
5. Systolic BP <100
6. Signs and symptoms of pneumothorax
7. Inability to maintain airway patency
8. Major trauma (especially head trauma with signs of ICP or significant chest trauma)
9. Facial anomalies or trauma (e.g., burns, fractures)
10. Vomiting

Relative Contraindications (USE CAUTIOUSLY):

1. History of Asthma/COPD
2. History of Pulmonary Fibrosis
3. Decreased LOC
4. Claustrophobia or inability to tolerate mask (after first 1-2 minutes trial)

EQUIPMENT

1. CPAP equipment
2. Oxygen supply
3. Pulse oximetry
4. Cardiac Monitor
5. Bag-Valve-Mask
6. Advanced airway adjuncts

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

PROCEDURE:

1. Patient preparation
2. Place patient in a seated position with legs dependant
3. Apply cardiac monitor and assess vital signs (BP, HR, RR, SpO₂).
Reassess V/S every 5 minutes after application of the CPAP device.
4. Treat patient according to treatment protocols.
5. Connect the generator to the oxygen source (tank or wall outlet) via quick connect. Do not attach to a flow meter – it must be a 50 psi source.
6. Attach filter on the air entrainment (air intake) port.
7. Attach corrugate tubing to WhisperFlow generator.
8. Select appropriate size mask (large for most adults, small for very small adults and children), and attach mask to corrugated tubing.
9. Attach CPAP valve to center hole of mask.
10. Attach strap to mask.
11. Verify that air is flowing to the mask.
12. Explain the procedure to the patient. The phrases below may be used to help the patient breathe normally and avoid hyperventilation:
12. Ensure that the gas is flowing, and then hold the mask to the patient's face. Gently place your other hand on the back of the patient's head to confirm a good air seal.
13. Within a few minutes (once the patient is comfortable) use the head strap to hold the mask in place.
14. Ensure that the mask is not too tight.
15. Some air leakage is acceptable unless it is in the eye area.
16. Check this frequently during transport as the patient's needs may change.
17. In most cases, the patient should improve in the first 5 minutes with CPAP.

PRECAUTIONS AND COMMENTS

Failure to improve:

- a. Should the patient fail to show improvement with CPAP, remove the CPAP device and assist ventilations with BVM or other advanced airway device as needed.
- b. Consider using sedation to alleviate possible anxiety associated with the CPAP device.
- c. Pulse oximetry must be used continuously

DOCUMENTATION:

1. Who performed procedure.
2. BSI and equipment used.
3. Time of application.

PULSE OXIMETER

PURPOSE:

To establish guidelines for the application of a pulse oximeter.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Pulse oximeter.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assess the patient for indications for application of pulse oximeter.
 - a. Any patient that has, or could develop, respiratory or circulatory compromise.
 1. Be aware that a patient with cold extremities or in shock may produce false low readings.
4. Apply pulse oximeter.
 - a. Attach sensor unit cable to pulse oximeter.
 - b. Apply to any finger.
 1. Assure that finger tip is clean and that fingernail is clean (no fingernail polish).
5. Obtaining pulse oximeter reading.
 - a. Apply pulse oximeter as above.
 - b. Turn power on.
 - c. Obtain reading.

DOCUMENTATION:

1. Who performed the procedure.
2. Equipment used.
3. Percentage of oxygen saturation every five (5) to (10) minutes as with other vital signs.
4. Time of each recording.

Carbon Monoxide (CO) Monitoring

Purpose:

Carbon monoxide poisoning is one of the single most common poisoning exposure in the United States. Carbon monoxide, or CO, is an odorless, colorless gas that can cause sudden illness and death. Carbon monoxide is found in combustion fumes, such as those produced by cars and trucks, gasoline engines, camp stoves, lanterns, burning charcoal and wood, gas ranges, heating systems, generators and poorly vented chimneys. Structural fires are another common source of CO exposure for both victims and fire fighters. Carbon monoxide from these sources can build up in enclosed or semi-enclosed spaces. Breathing it can poison people and animals in these spaces. All people and animals are at risk for carbon monoxide poisoning. Certain groups including pregnant women/fetuses, infants, and people with chronic heart disease, anemia, or respiratory problems are more susceptible to its effects. CO toxicity causes impaired oxygen delivery and utilization at the cellular level. CO affects several different sites within the body but has its most profound impact on the organs with the highest oxygen requirement (e.g., brain, heart). Misdiagnosis commonly occurs because of the vagueness and broad spectrum of complaints. Symptoms often are attributed to a viral illness, frequently "the flu" in winter months. It is important to remember that symptoms may not correlate well with measured HbCO levels.

The following list includes commonly recognized symptoms associated with carbon monoxide poisoning. Any of the following should alert suspicion if related to a potential source of CO and when more than one patient in a group or household presents with similar complaints at the same time:

Malaise	Flu-like symptoms	Fatigue
Dyspnea on exertion	Coma	Chest Pain
Palpitations	Lethargy	Headache
Drowsiness	Confusion	Depression
Syncope	Seizure	Impulsiveness
Distractibility	Weakness	Dizziness
Hallucination	Confabulation	Agitation
Memory impairment	Gait disturbances	Nausea
Vomiting	Diarrhea	Abdominal pain
Visual disturbance	Fecal and urinary incontinence	

Carbon Monoxide (CO) Monitoring

Carbon monoxide should be a diagnosis of exclusion, within the scope of pre-hospital practice. Common, identifiable causes of the above symptoms should be entertained. For example, hypoglycemia or drug overdose.

Not just a winter phenomenon, carbon monoxide poisoning has been seen in other climates and seasons after natural disasters, when residents use generators or pumps which are not properly ventilated. Any process which burns fuel [gasoline, diesel, kerosene, propane, natural gas, charcoal, wood etc.] in an engine, heater or construction equipment can emit C.O.

Equipment:

CO Monitor

Special Considerations

Pediatric Patients

Smokers: Cigarette smoke produces some degree of carbon monoxide. Heavy smokers can have carboxyhemoglobin levels up to 10%. Smoking status should be taken into consideration and this information combined with symptoms and history of environmental carbon monoxide.

Pregnant Women: Pregnant women maybe at higher risk in carbon monoxide situations. This is because of the increased susceptibility of the fetus to the effects of carbon monoxide. The fetal SpCO% maybe 10-15% higher than the maternal readings. All pregnant women with possible CO exposure should be encouraged to have definitive COHb blood levels and physician evaluation.

Documentation:

1. Who performed the procedure.
2. Equipment used.
3. Time of each recording.

PEAK FLOW METER

PURPOSE:

To establish guidelines for peak flow meter testing. This device is used to measure air flow rate during a maximum exhalation and is a reliable indicator of airflow. Peak flow results will vary depending on age, size and medical conditions of the patient.

EQUIPMENT:

1. Gloves and full-face protection (goggles and mask or full-face shield).
2. Peak flow meter.
3. Stethoscope.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment.
4. Connect mouthpiece to peak flow meter.
5. Make sure indicator is moved to the lowest position in the slot.
6. Sit in an erect position as much as possible.
7. Place the meter in one hand.
8. Breathe in as deep as possible (maximum inhalation).
9. Close lips around the mouthpiece to make a tight seal.
10. Blow out as hard as possible (maximum exhalation). A quick, short blast of 1-2 seconds is sufficient.
11. Read the number next to the indicator. This is the peak flow reading, repeat this procedure twice. Document the highest recorded number.
12. Administer nebulizer treatment as ordered/protocol.
13. Repeat peak flow measurement again after treatment is completed and document results.
14. Reassess lung sounds and respiratory status.

PEAK FLOW METER

WOMEN						MEN					
Age	Height					Age	Height				
	55"	60"	65"	70"	75"		60"	65"	70"	75"	80"
20	390	423	460	496	529	20	554	602	649	693	740
25	385	418	454	490	523	25	543	590	636	679	725
30	380	413	448	483	516	30	532	577	622	664	710
35	375	408	442	476	509	35	521	565	609	651	695
40	370	402	436	470	502	40	509	552	596	636	680
45	365	397	430	464	495	45	498	540	583	622	665
50	360	391	424	457	488	50	486	527	569	607	649
55	355	386	418	451	482	55	475	515	556	593	634
60	350	380	412	445	475	60	463	502	542	578	618
65	345	375	406	439	468	65	452	490	529	564	603
70	340	369	400	432	461	70	440	477	515	550	587

PEAK FLOW VALUES IN LITERS/MINUTE

DOCUMENTATION:

1. Time and who performed procedure.
2. BSI and equipment used.
3. Any complications or undesired effects.
4. Changes in patient condition before and after interventions.
5. Peak flow measurements obtained before and after treatment.

CARDIOPULMONARY RESUSCITATION

PURPOSE:

To assure current guidelines and standards are met during the performance of cardiopulmonary resuscitation.

EQUIPMENT:

In theory, none absolutely needed. However, some type of protection barrier should be used during the mouth to mouth phase of cardiopulmonary resuscitation.

1. Gloves and full-face protection (mask and goggles or full-face shield).

PROCEDURE:

Follow the current American Heart Association guidelines.

DOCUMENTATION:

1. The date, time and who started CPR.
2. How long CPR was performed.
3. Patient condition before, during and after resuscitation efforts.
 - a. Vital signs.
 - b. Presence or absence of pulses during chest compressions.
 - c. Skin color.
 - d. Level of consciousness.
4. BSI used.

AUTOMATIC EXTERNAL DEFIBRILLATOR

PURPOSE:

To establish guidelines for the application of an automatic external defibrillator to a patient who presents with cardiac arrest.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Automatic external defibrillator.
3. Defib pads.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been splattering of blood or body fluids. If so, put on full-face protection.
3. Assess patient for indications for application of automatic external defibrillator.
 - a. Patient \geq one
 - b. Unconscious.
 - c. Not breathing.
 - d. Pulseless.
 - e. If unwitnessed perform 2 minutes of CPR
4. Start CPR while applying automatic external defibrillator. **DO NOT** delay defibrillation to do CPR.
 - a. Apply defib pads:
 - i. Place positive electrode on left chest mid-axillary over fourth-intercostal space.
 - ii. Place negative electrode on anterior right chest, inferior to clavicle.
5. Defibrillation procedure:
 - a. Attach cable to defib pad and then to patient.
 - b. Turn power on.
 - c. Begin verbal report for recording on cassette tape.
 - d. Stop CPR and have everyone "clear" the patient.
 - e. Assure that other motion is stopped while AED is doing its assessment.
 - f. Do not touch the patient or cable during analysis.
 - g. If a "SHOCK ADVISED" message appears, repeat the "CLEAR THE PATIENT".
 - h. It is programmed to shock 1 time.
 - i. If patient is not in shockable rhythm, it will advise you to check breathing and pulse.

AUTOMATIC EXTERNAL DEFIBRILLATOR

- j. When check pulse message is noted, check the pulse.
 - i. If no pulse, resume CPR.
 - ii. If there is a pulse, support ventilation with 100% oxygen and monitor patient.
- k. If ILS or ALS provider, follow appropriate protocols.
- l. After 2 minute of CPR, repeat 1 shock or continue CPR if NO SHOCK is indicated.

Pediatric Patients:

- 1. Use pediatric pads if available and AED can recognize pediatric pads.
- 2. If no pediatric pads use adult
- 3. Placement should be front and back

DOCUMENTATION:

- 4. Who performed procedure.
- 5. BSI and equipment used.
- 6. Time of application.

SEMI-AUTOMATIC EXTERNAL DEFIBRILLATOR

PURPOSE:

To establish guidelines for the application of an automatic external defibrillation to a patient who presents with cardiac arrest.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Automatic external defibrillator.
3. Defib pads.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assess patient for indications for application of automatic external defibrillator.
 - a. Patient \leq one
 - b. Unconscious.
 - c. Not Breathing.
 - d. Pulseless.
4. Start CPR while applying automatic external defibrillator. DO NOT delay defibrillation to do CPR.
5. Anterior-anterior placement.
 - a. Place positive electrode on left chest mid-axillary over fourth intercostal space.
 - b. Place a negative electrode on anterior right chest, inferior to clavicle.
6. Defibrillator procedure.
 - a. Attach cable to defib pad and then to patient.
 - b. Turn power on.
 - c. Begin verbal report for recording on cassette tape.
 - d. Stop CPR and have every one "CLEAR" the patient.
 - e. Press the "PUSH TO ANALYZE" button.
 - f. Assure that other motion is stopped while AED is doing its assessment.
 - g. Do not touch the patient or cable during analysis.
 - h. If a "SHOCK ADVISED" message appears, repeat the "CLEAR THE PATIENT" command.
 - i. When "PUSH TO SHOCK" message appears, confirm that no one is touching the patient and press the "PUSH TO SHOCK" button.
 - j. Repeat analyze and shock steps a maximum of three times.
 - k. When "NO SHOCK ADVISED" message appears or three shocks have been delivered, check the pulse.

SEMI-AUTOMATIC **EXTERNAL DEFIBRILLATOR**

1. If no pulse, resume CPR.
2. If there is a pulse, support ventilation with 100% oxygen.
 - l. If ILS provider, follow appropriate protocol.
 - m. After one minute of CPR, reanalyze and repeat steps g through l.
 - n. If BLS provider, contact Medical Control.

DOCUMENTATION:

1. Who performed procedure.
2. BSI and equipment used.
3. Time of application.
4. Rhythm strips if available.

ELECTROCARDIOGRAM

PURPOSE:

To establish guidelines for the proper application of the ECG.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. ECG monitor.
3. ECG electrodes.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.
4. Select the location for electrode placement and clean the site if there is sweat or dirt present:
 - a. Lead II – Place the negative electrode on the right (white) midclavicular/second intercostal space. The ground electrode is placed on the left midclavicular/second intercostal space (black). The positive electrode is placed on the left midaxillary fifth intercostal space (red).

DOCUMENTATION:

1. Who performed the procedure.
2. BSI and equipment used.
3. Time the procedure performed.
4. Rhythm strips should accompany documentation. Rhythm strips should be obtained any time that changes are noted in the rhythm, when procedures are performed or when medication is administered. The time should be noted on the rhythm strip.
5. Identify rhythm and any changes in the rhythm.

12-LEAD EKG

PURPOSE: The 12-Lead EKG is used to support the diagnosis of Acute Myocardial Infarction (AMI).

EQUIPMENT:

1. Gloves.
2. 12-Lead EKG monitor.
3. Electrodes.
4. Cellular phone.

PROCEDURE:

1. Put on gloves.
2. Determine indication is met for 12-lead EKG (chest pain that is cardiac in origin).
3. Assemble all necessary supplies and equipment.
4. Electrode placement:

Lead	Electrode location.
V1	Fourth intercostal space at the right sternal border.
V2	Fourth intercostal space at the left sternal border.
V3	Midway between location V2 and V4.
V4	Mid-clavicular line in the fifth intercostal space.
V5	Anterior axillary line on the same horizontal level of V4.
V6	Mid-axillary line on the same horizontal level as V4 and V5.
RA & LA	Anywhere on the arm (prefer midway between the elbow & shoulder.
RL & LL	A few inches above ankle (to reduce muscle artifact may be placed on the upper leg as close to the torso as possible).
5. Connect monitoring cables to electrodes.
6. Turn on machine.
7. Enter patient name and age and
8. Press 12-lead indicator button.
9. Transmit 12-lead to receiving hospital (if able) via cellular phone.
10. After arrival at receiving facility remove EKG cables and disconnect from 12 lead machine.

DOCUMENTATION:

1. Time of procedure and who performed EKG.
2. Document the rhythm.

EXTERNAL PACEMAKER

PURPOSE:

To establish guidelines for the application of an external pacemaker in the adult patient (18 years of age or older) who presents with atropine refractory, symptomatic bradycardia, 2nd degree heart block type II (Mobitz II), and 3rd degree heart block.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Pacemaker unit (this procedure describes use of the "Quick-Pace" electrodes).
3. ECG monitor.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assess patient for indications for external pacing:
 - a. Systolic blood pressure of 90 or below and heart rate of below 60 beats per minute:
 1. Decreased level of consciousness due to bradycardia or,
 2. Chest pain of suspected myocardial origin, Shortness of breath, pulmonary congestion, or CHF.
4. Apply pacemaker:
 - a. Anterior-Lateral placement is preferred:
 1. Place negative electrode on left anterior chest halfway between the xiphoid process and the left nipple with the upper edge of the electrode below the nipple line.
 2. Place the positive electrode on the left posterior chest beneath the scapula and lateral to the spine.
 - b. Anterior-Anterior placement:
 1. Place negative electrode on left chest mid-axillary over fourth intercostal space.
 2. Place positive electrode on anterior right chest, inferior to clavicle.
 - a. This position should only be used if anterior – posterior positioning is not possible.
5. Pacing Procedure:
 - a. Attach ECG monitor to patient. Patient must remain monitored during entire pacing procedure.
 - b. Connect pacing cable to ECG monitor.
 - c. Connect Quick-Pace electrodes to pacing cable – matching electrode color to connector color.
 - d. Position pacing electrodes as above.
 - e. Push "PACER" button.
 - f. Increase pacing rate to 60 beats per minute.

EXTERNAL PACEMAKER

- g. Observe monitor. "Sensor marker" (.) should appear on each QRS complex. If sensing marker is not present on QRS or appears elsewhere, adjust ECG size control for optimal sensing. If this fails, select another lead and re-adjust ECG size. If ECG size is adjusted too low, pacer will not be able to operate in a synchronous mode and ECG will be difficult to assess. If ECG size is adjusted too high, ECG artifact may inhibit pacing appropriately.
- h. Activate pacemaker by pushing the "start/stop" button. The indicator will flash and a positive pacing spike will be seen with each pacing impulse.
- i. Slowly increase current (mA). Watch monitor for electrical capture of pacing stimulus. Assess pulse and blood pressure for evidence of mechanical capture.
- j. The recorder will document the selected pacing parameters.
- k. If the intrinsic heart rate exceeds the pacing heart rate, the pacemaker will sense the cardiac activity and will not discharge.
- l. Musculoskeletal contractions may be observed while pacing. This may be somewhat uncomfortable for some conscious patients. Discomfort may be minimized by using the lowest current that produces capture and by varying the position of the pacing electrodes. In some cases Versed sedation may be necessary at ALS level only.

DOCUMENTATION:

1. Who performed the procedure.
2. BSI and equipment used.
3. Which placement was used.
4. Rhythm strips before and after application of pacemaker.
5. Side effects.
6. Time of application

DEFIBRILLATION AND SYNCHRONIZED CARDIOVERSION

PURPOSE:

To establish guidelines for defibrillation and/or synchronized cardioversion for the patient experiencing lethal arrhythmias.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. ECG monitor and defibrillator.
3. Apply ECG electrodes in the usual manner or use the “quick look” paddles to confirm rhythm.
4. If rhythm shown is one for which defibrillation is indicated, confirm absence of pulses, and proceed as below:
 - a. Apply defibrillation pads to patient’s bare chest.
 - b. Turn on and charge defibrillator to appropriate energy level.
 - c. Place pads on patient’s chest in the correct position. One paddle is placed over the right sternal border at the second intercostal space and one over the apex of the heart.
 - d. Insure that no one is in direct or indirect contact with the patient and advise all team members to clear.
 - e. Defibrillate the patient by pushing the button on the monitor
 - f. Re-evaluate the ECG rhythm and pulses and continue care as directed by MCAEMS Protocols and Standing Orders.
5. If rhythm displayed requires synchronized cardioversion, proceed as below:
 - a. Premedicate whenever possible. If time and the patient’s clinical condition permit, give conscious sedation.
 - b. Apply pads.
 - c. Turn and charge defibrillator to appropriate energy level.
 - d. Place pads on the chest in the correct position (one pad is placed over the right sternal border at the second intercostal space and one pad over the apex of the heart).
 - e. Push the “sync” button on the monitor.
 - f. Insure that no one is in direct or indirect contact with the patient and advise team members to clear.
 - g. Cardiovert the patient by pushing the button on the monitor Hold buttons until shock is delivered.
 - h. Re-evaluate the ECG rhythm and continue care as directed by MCAEMS Protocols or Medical Control.

DOCUMENTATION:

1. Indication for procedure.
2. Watt seconds utilized and change in rhythm if any following each defibrillation and/or cardioversion. Note the time for each on the rhythm strip and the corresponding trip sheet.
3. Patients condition following procedure
4. Time of procedure.
5. BSI and equipment us

VALSALVA MANEUVERS

CARDIOVERSION

PURPOSE:

To establish guidelines for the performance of vagal maneuvers such as Valsalva.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. ECG monitor.
3. Patent IV.

PROCEDURE:

1. Put on gloves.
2. Determine if there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment.
4. Assess monitored patient and determine that dysrhythmia is PSVT and that the patient is hemodynamically stable.
5. If unable to differentiate between PSVT, sinus tachycardia or atrial flutter, vagal maneuvers may be attempted. If patient is experiencing PSVT, rhythm will either be converted or nothing will happen. In contrast, if rhythm is ST or AF, a transient slowing of the ventricular response may occur during the procedure. (Sometimes a vagal maneuver will transiently slow down the PSVT).
6. Perform the vagal maneuver permitted under MCAEMS Protocols or by orders from Medical Control.
 - a. Valsalva – direct the patient to exhale against the closed glottis. Have the patient push with his/her abdominal muscles against your hand.
7. If after several attempts there has been no change, consult Medical Control for further orders. If the rhythm is PSVT, the arrhythmia will either abruptly terminate or do nothing.
8. Monitor the patient for desired effects.
9. Monitor the patient for potential complications.
 - a. Syncope, CVA, sinus arrest, high grade AV block, prolonged asystole and ventricular tachyarrhythmia in patients with digitalis toxicity.
 - b. Should not be attempted in patients with history of sick sinus syndrome, carotid bruits, cerebrovascular disease or when digitalis toxicity exists.

COMPLICATIONS:

SYNCOPE

1. Put on gloves.
2. Determine if there has been any splattering of blood or body fluids. If so, put on full-face protection.

VALSALVA MANEUVERS

3. Assemble all necessary supplies and equipment.
4. Monitor the patient for potential SYNCOPES AND/OR ARRHYTHMIAS:
 - a. Complications may develop in elderly patient or patients with a previous history of carotid bruits, cerebrovascular disease, digitalis toxicity or sick sinus syndrome.
 - b. Syncope may present with an abrupt change in the heart rate and accompanying symptoms such as pallor, diaphoresis and hypotension.
5. Patients receiving vagal maneuvers should have an IV in place prior to the procedure being performed. This allows for quick pharmacological intervention.
6. Dysrhythmias that develop should be treated according to MCAEMS Protocols for the specific dysrhythmia.

DOCUMENTATION:

1. Results of initial assessment and indications for procedure.
2. How order was obtained and by whom.
3. Site used for the procedure and how it was performed.
4. Time procedure was completed.
5. Difficulties with the procedure.
6. Changes in the patient's condition following the procedure.
7. Complications.

BLEEDING CONTROL

PURPOSE:

To assure that bleeding is rapidly controlled with safe methods.

EQUIPMENT:

1. Gloves and full-face protection (mask & goggles or full-face shield).
2. Dressing material.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Direct pressure and elevation.
 - a. Apply a dressing material keeping the dressing and the wound as clean as possible.
 - b. Elevate wound above the heart and use direct or diffuse pressure.
 - c. If bleeding occurs through the original dressing after using direct or diffuse pressure then remove the dressing and look for a major bleeding point.
 - d. Apply fingertip pressure directly on the point of bleeding.
 - e. Large gaping wounds may require packing with sterile gauze and direct hand pressure if direct fingertip pressure fails to control bleeding.
4. Pressure points
 - a. Document time and location pressure started.
 - b. MAINTAIN direct pressure to the wound.
 - c. Check distal pulses after pressure point application.
5. Splints
 - a. Reduction of motion of bone ends will reduce the amount and aggravation of tissue damage and bleeding associated with a fracture.
 - b. Use of air pressure split can help control severe bleeding associated with lacerations of soft tissue or when bleeding is associated with fractures.

BLEEDING CONTROL

6. Tourniquet
 - a. LAST RESORT – Call for order!
 - b. Document time, locations, who started and duration of tourniquet application.
 - c. Use at least a 2” band for the tourniquet. (e.g. Blood Pressure Cuff)
 - d. Check distal pulses before and after application.

7. Quick Clot
 - a. Take Proper Body Substance Isolation (BSI) procedures
 - b. Tear open package of QuikClot® 1st Response™
 - c. Remove excess pooled blood from wound, while preserving any clots already in the wound if possible.
 - d. Pack QuikClot® 1st Response™ tightly and directly onto bleeding source. More than one may be required. Product may feel warm (typically 105°F / 40.5°C).
 - e. Quickly apply pressure until bleeding stops. Suggested time 3 to 5 minutes of continuous pressure.
 - f. Leave QuikClot® 1st Response™ in place. Wrap to secure the product in the wound.
 - g. Not for internal use

DOCUMENTATION:

1. Location and type of bleeding.
2. Method of controlling the bleeding.
3. Response to therapy.
4. BSI used.

BANDAGING TECHNIQUES

AND WOUND CARE

PURPOSE:

To assure that the proper type of dressing is applied to the appropriate patient.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Bandaging material.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering blood or body fluids. If so, put on full-face protection.
3. Closed wounds:
 - a. Cold pack to wound – Assure that there is some type of protective barrier between cold pack and patient.
 - b. Compression – A light pressure dressing is applied to help reduce swelling.
 - c. Elevation – Elevate the wounded area above the heart level if there are no other injuries to that area.
4. Open wounds:
 - a. Apply a snug bandage in a distal to proximal fashion over the dressing already applied.
 - b. Check distal pulses, movement and sensation before and after bandage is applied and every 10 minutes thereafter.
 - c. MAINTAIN pressure and elevation to wound.
 - d. Bandages should be as clean as possible.
5. Special wound care:
 - a. Open chest wounds.
 - i. Occlusive dressing.
 - a. Vaseline gauze.
 - b. Plastic wrap.
 - ii. Flutter valve dressing.
 - iii. Seal on expiration.
 - iv. Observe for development of pneumothorax.
 - b. Open abdominal wound.
 - i. Apply a sterile, moist dressing to the evisceration.
 - ii. Cover the moist dressing with a dry dressing.
 - iii. DO NOT put tissue back in.

BANDAGING TECHNIQUES **AND WOUND CARE**

- c. Impaled object
 - iv. DO NOT remove the object still impaled.
 - a. Exception of airway involvement
 - ii. Impaled in cheek.
 - iii. Obstructed airway.
 - iv. CPR
 - v. Secure the object to aid in bleeding control.
 - vi. Apply a bandage around the object to aid in bleeding control.
- d. Eye injuries
 - vii. Cover both eyes with a loose dressing.
 - viii. If enucleation has occurred use some type of protective cup and cover both eyes.
- e. Infected wounds
 - i. Follow proper infection control procedures.
- f. Amputation
 - i. Control hemorrhage.
 - ii. Loose, bulky, bandage to the stump.
 - iii. Obtain the missing body parts and then wrap with a moist, clean dressing.
 - iv. Place the moist dressing and body parts into a plastic bag and then place the bag onto an ice water solution.
 - v. DO NOT let the body parts come in contact with the ice water solution.
- g. Burns
 - i. Eliminate source of burn. (Scene Safety)
 - ii. Protect the airway.
 - iii. Apply a dry, sterile dressing to the affected area.
 - a. May cool burns of 1 degree with water for pain relief.
 - iv. Use caution not to rupture any blisters that may appear.
 - v. Determine depth and percent of body area burned (“rule of nines”).

DOCUMENTATION:

1. Type and location of wound.
2. Pulses, color, movement and sensation, distal to the injury, before and after the wound was cared for.
3. Type of dressing, who applied it and when it was applied.
4. How, when and who cared for the wound.
5. Depth and percent of body area burned (“rule of nines”).
6. BSI used.

SPINAL IMMOBILIZATION

PURPOSE:

To assure that a patient requiring spinal immobilization is secured to the proper piece of equipment in the appropriate manner.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Rigid cervical immobilization device.
3. KED.
4. Long spine board.
5. Straps or spider straps, or equivalent
6. Head immobilizer for the long spine board.
7. Blankets.
8. Towels.
9. Pediatric Immobilization device.

BASIC SPINAL IMMOBILIZATION

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Cervical immobilization.
 - a. Manually maintain cervical stability and also maintain a patient airway. A jaw thrust maneuver is used to maintain the airway in a patient with airway compromise.
 - i. DO NOT hyper-extend the neck.
 - ii. NO TRACTION.
4. Apply a rigid cervical collar.
 - a. Use manufacturer's guidelines for actual application of the cervical collar.
 - b. Maintain manual stabilization until patient is completely secured to the long spine board.
 - c. Maintain a patient airway.
 - d. Prepare to immobilize the patient to the short or long spine board.
5. Spinal immobilization.
 - a. Extrication device application.
 - i. Maintain cervical stability and have a cervical collar in place prior to applying an extrication device.
 - ii. Use the manufacturer's guidelines in application of the specific extrication device.
 - iii. Move patient to a long spine board and secure as indicated.

SPINAL IMMOBILIZATION

6. Long spine board application.
 - a. Move patient to long spine board. Use of the log roll method is recommended.
 - b. Using a minimum of three to five straps, secure the patient to the long spine board in a manner so that the cervical, thoracic, lumbar, sacral and coccyx spine are immobilized.
 - c. Secure the head of the patient to the long board in a manner in which the cervical spine is completely immobilized. Use padding around the head if necessary to keep the cervical spine immobile. A commercially manufactured device is preferred. Towel rolls may be used. The use of sandbags is prohibited.

KED APPLICATION

PROCEDURE:

1. Maintain cervical stability and have cervical collar in place prior to applying the KED.
2. Place the KED behind the patient with the help of a partner.
3. Using a minimum of two straps, secure the patient to the KED so that there is complete immobilization of the thoracic spine.
4. Secure the head to the KED in a manner that holds the cervical spine in complete immobilization. If necessary using padding to fill the void between the cervical collar and the KED.
5. Move patient to a long spine board and secure as defined in basic spinal immobilization.

SPINAL IMMOBILIZATION FOR THE STANDING PATIENT

PROCEDURE:

1. Manually stabilize patient's head using the tallest rescuer.
2. Apply cervical collar and continue manual stabilization.
3. Position long spine board behind patient.
4. Two (2) rescuers face the patient and reach their arm that is nearest the patient under the patient's armpits. They then grasp a handhold that is above or level to the patient's armpits.
5. With manual stabilization still being held, gently lower the board and patient to the ground.
6. Fully secure the patient's body and head to the board with a minimum of three to five straps.

SPINAL IMMOBILIZATION

SIZING A CERVICAL SPINAL IMMOBILIZATION DEVICE

PROCEDURE:

1. While your partner is used to stabilize the head of the patient, prepare to measure the patient's neck for proper size fitting cervical immobilization device.
2. Place your fingers on the patient's neck under the corner of the jawbone.
3. Determine the height (length) to the shoulder using the width of your hand or fingers.
4. Size the device to the same measurement as the patient's neck.

DOCUMENTATION:

1. When and who applied cervical immobilization.
2. What type of spinal immobilization was used and how was it applied.
3. Who applied the devices.
4. The patients condition and distal pulse, motor and sensory, before and after application of devices.

NOTE:

A cervical spinal immobilization device must be sized appropriately before being applied to the patient. An improperly sized cervical spinal immobilization device can cause further injury and can do more harm than good.

SPLINTING TECHNIQUE

PURPOSE:

To assure that the appropriate type of splint and splinting technique is used on the patient requiring splinting of a mid shaft femur fracture.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Splinting material.
3. Traction splint.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. General rules for splinting.
 - a. Remove clothing from area to be splinted.
 - b. Check pulses, color, movement and sensation distal to the injuries.
 - c. Control hemorrhage and cover all wounds.
 - d. Splint the joint above and below the possible fracture site.
 - e. Pad the splints.
 - f. Fill in any space between the patient and the splint with padding.
 - g. Minimize movement of the area being splinted.
 - h. Check pulses, color, movement and sensation distal to the injuries before and after splint is applied.
4. Traction splinting.
 - a. Follow the general rules for splinting.
 - b. For actual splint application, follow the manufacture guidelines for the specific type of traction splint.

DOCUMENTATION:

1. What type of splint was applied.
2. Who and when the splint was applied.
3. Pulses, color, movement and sensation, distal to the injury, before and after the splint was applied.
4. Changes in the patient after the splint application.

CHEST DECOMPRESSION

PURPOSE:

To establish guidelines for emergency decompression of a tension pneumothorax, by ILS and ALS personal, when in combination with:

1. Arrest or pre-arrest situation (SBP<90).
2. Absent or diminished lung sounds on affected side.
3. Tracheal deviation.
4. May see JVD.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Antiseptic cleaning solution.
3. Large bore over-the catheter (14-18 gauge).
4. Stethoscope.
5. Asherman Chest Seal
6. Tape.

PROCEDURE:

1. Put on gloves and full-face protection (mask and goggles or full-face shield).
2. Assemble all necessary equipment and supplies.
3. Assess patient to assure that condition is due to tension pneumothorax:
 - a. Shock.
 - b. Poor ventilation despite an open airway.
 - c. Neck vein distention. May not be present if there is associated hemorrhage.
 - d. Tracheal deviation away from the side of injury. (May be late sign).
 - e. Absent or diminished breath sounds on the affected side.
 - f. Tympany (hyperresonance to percussion on the affected side).
4. Give patient high flow oxygen and ventilatory assistance.
5. Determine that the indications for decompression are present.
6. Identify the intercostal space between the 2nd and 3rd rib in the mid-clavicular line on the affected side.
7. Prepare the puncture site. Cleanse with antiseptic cleansing solution. Start with small area and wipe in widening circles around it allowing a broad margin around the site to be punctured.

CHEST DECOMPRESSION

8. Perform the decompression in the following manner:
 - a. Insert the needle/catheter into the skin over the third rib (mid-clavicular) and direct it just over the top of the rib. Insert the catheter through parietal pleura until air escapes. Air should exit under pressure.
9. Remove the needle and leave the catheter in place.
10. Dispose of the needle appropriately
11. Cover with an Asherman chest seal.
12. Monitor the patient for potential complications.

COMPLICATIONS: LACERATION OF INTERCOSTAL VESSEL

1. Monitor patient for potential laceration of Intercostal Vessel.
 - a. Poor placement of the needle used for decompression can result in a lacerated vessel. Symptoms will depend upon the size and type of vessel laceration and may be difficult to detect initially.
 - b. Patient may present with signs and symptoms of hemothorax and/or hemorrhagic shock (tachycardia, tachypnea, hypotension, chest may be dull to percussion and have absent or congested lung sounds at the site of injury).
2. Laceration of intercostal vessels can be avoided with proper placement of the needle prior to decompression. The intercostal artery and vein run along the inferior borders of the ribs. Placement above the rib will prevent laceration of these vessels.
3. Management will include administration of 100% oxygen and treatment for any signs and/or symptoms of hemorrhagic shock. (Fluid replacement and monitoring of vital signs.)

PNEUMOTHORAX

1. Monitor patient for pneumothorax re-occurrence:
 - a. Pneumothorax may be created if not already present.
 - b. Pneumothorax will be characterized by diminished or absent lung sounds on the affected side.

CHEST DECOMPRESSION

2. The occurrence of pneumothorax may be minimized by adequately assessing the patient for positive symptoms of tension pneumothorax (deviation of the trachea away from the affected side, distended neck veins and further signs of respiratory compromise) prior to attempting to decompress the chest.
3. Administer 100% oxygen and continue to assess patient.

DOCUMENTATION:

1. Result of assessment and indications for procedure.
2. How order was received and by whom.
3. Site used for procedure, how the procedure was performed and the equipment used.
4. Time procedure was completed.
5. Any difficulty with procedure.
6. Patient condition following procedure (results of procedure).
7. BSI used.

GLUCOSE TESTING

PURPOSE:

To establish guidelines for blood glucose testing.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Glucose monitoring device.
3. Test strips.
4. Glucose control high & low (if applicable).
5. Calibration test strip (if applicable).
6. Penlet automatic blood sampling pen.
7. Sterile lancets.
8. Capillary bulb.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment.
4. Select a suitable finger and cleanse finger with alcohol swab.
5. Set up glucose monitoring device per manufacturer's directions.
6. Obtain a blood sample and complete glucose testing per manufacturer's direction.
7. Record results.
8. Remove the test strip and discard in biohazard container.
9. Place a dressing over the puncture site.

DOCUMENTATION:

1. Who performed task.
2. Numbers of attempts.
3. BSI and equipment used.
4. Site of finger stick.
5. Any complications or undesirable side effects.
6. Time procedure was performed.
7. Document the results.

INTRAVENOUS ACCESS

PERIPHERAL SITES AND INTRAOSSEOUS

PURPOSE:

To establish guidelines for the initiation of peripheral or intraosseous IVs to provide a route for replacement of fluids, electrolytes or blood products or to provide a route for administration of drugs.

NOTE: **Unless otherwise ordered by protocol or Medical Direction, IV flow rates should be set at TKO (<50cc/hr).**

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Intravenous cannulas.
 - a. Hollow needle (including those attached to a syringe and the "butterfly" type).
 - b. Indwelling plastic catheter over a hollow needle (angiocath).
 - c. Intraosseous needle.
3. IV fluid.
4. Infusion set.
5. Extension set.
6. Antiseptic cleaning solution.
7. Sterile dressing.
8. IV securing device (adhesive tape cut into strips or commercial IV securing device).
9. 2 X 2.
10. Tourniquet (soft rubber tubing, flat latex, tourniquet, commercial tourniquet or BP cuff).

PROCEDURE:

PERIPHERAL SITE

1. Put on gloves.
2. Determine whether there has been a splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment. Check the IV fluid for correct solution, expiration date, seal leakage and contamination or cloudiness.
4. Select a suitable vein. In general, the forearm is the preferred site, with the back of the hand second. Avoid the following:
 - a. Areas of bone articulation.
 - b. Areas where arterial pulsations are palpable.
 - c. Veins near or distal to injured areas.
 - d. Veins of the lower extremities.
 - e. Areas where there is obvious skin disease or skin injury or tattoo.
 - f. Avoid IV access on side of mastectomy and old shunt sites.
5. Secure the tourniquet proximal to the selected IV site. Check to make sure that the distal pulse is still present. If not, loosen the tourniquet slightly.

INTRAVENOUS ACCESS

PERIPHERAL SITES AND INTRAOSSEOUS

6. Prepare the vein puncture site. Cleanse with antiseptic cleansing solution. Start from the area above the vein and wipe in widening circles around it, allowing a broad margin around the site to be punctured. If using iodine, a final wipe with alcohol is recommended.
10. Stabilize the vein by applying pressure on the skin distal to the point of entry. With the bevel of the IV catheter needle up, pass the needle through the skin and enter the vein from either side or above. You should be able to feel the needle “pop” through into the vein. When the needle has entered the vein, there will be blood return through the needle. If using the over-the-needle catheter, advance the needle about 2 mm beyond the point where the blood return was first encountered. Advance the catheter over the needle into the vein. Carefully withdraw the needle, holding the catheter steady.
11. **DO NOT RECAP THE NEEDLE.** Dispose of the needle in a puncture resistant biohazard container.
12. Release the tourniquet.
13. Attach the IV tubing and open the clamp to permit unimpeded flow. The fluid should flow freely in a steady stream into the infusion reservoir. If the flow appears minimal, pull back slightly on the catheter, as the tip may be against the wall of the vein.
14. When good flow has been established, secure the catheter in place using tape or a commercial IV securing device. Loop the IV tubing and secure it to the arm.

PROCEDURE:

SCALP VEIN SITE

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment. Check the IV fluid for correct solution, expiration date, seal leakage and contamination or cloudiness. Connect the butterfly’s flexible extension tubing to the IV tubing and charge the tubing with IV fluid to purge all of the air.
4. Select a suitable vein. Scalp veins are usually the easiest to find on small infants and neonates. Hand and foot veins can be difficult at best to locate because of the “baby fat” on infant extremities.
5. To promote distention of the scalp veins and make them easier to cannulate, place a large rubber band around the infant’s head. The band needs to be tight enough to impede venous blood flow without being so tight that the skin is injured.

INTRAVENOUS ACCESS

PERIPHERAL SITES AND INTRAOSSEOUS

6. Prepare the vein puncture site. Cleanse with antiseptic cleansing solution. Start from the area above the vein and wipe in widening circles around it, allowing a broad margin around the site to be punctured. If using iodine, a final wipe with alcohol is recommended.
7. When cannulating a scalp vein the needle should be held with its tip pointing in caudad direction directly over the vein. Enter the vein with the bevel up and the needle held at a 15 degree angle.
8. When the needle has entered the vein, there will be blood return through the needle. Once you are in the vein, lower the hub of the needle and insert it slightly further into the vein. Then, lower the IV bag to see if you get a blood return into the butterfly's extension tubing.
9. With the IV in place, gently pull out on a piece of rubber band and then cut off the rubber band with a pair of scissors.
10. Tape the butterfly and tubing to the infant's scalp, making sure to not tape over the venipuncture site itself. .

PROCEDURE: EXTERNAL JUGULAR VEIN SITE

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment. Check the IV fluid for correct solution, expiration date, seal leakage and contamination or cloudiness.
4. Place the patient in a supine, head down position to fill the jugular vein; turn the patient's head to the side opposite the selected IV site.
5. Cleanse the skin with antiseptic cleansing solution. Start from the area above the vein and wipe in widening circles around it, allowing a broad margin around the site to be punctured.
6. Stabilize the vein by applying light pressure with one finger just above the clavicle. With the bevel of needle up, pass the needle through the skin and enter the vein midway between the angle of the jaw and mid-clavicular line. The needle should be inserted toward the heart. You should be able to feel the needle "pop" through into the vein. When the needle has entered the vein, there will be blood return through the needle.
7. **DO NOT RECAP THE NEEDLE.** Dispose of the needle in a puncture resistant biohazard container.

INTRAVENOUS ACCESS

PERIPHERAL SITES AND INTRAOSSEOUS

8. Attach the IV tubing and open the clamp to permit unimpeded flow. The fluid should flow freely in a steady stream into the infusion reservoir. If the flow appears minimal, pull back slightly on the catheter, as the tip may be against the wall of the vein.
9. When good flow has been established, secure the catheter in place using tape or a commercial IV securing device. Do not put circumferential dressings around the neck.

PROCEDURE: INTRAOSSEOUS SITE Bone Injection Gun (BIG)

1. Assemble and prepare necessary equipment and choose the desired depth of penetration (Pediatric B.I.G. Only) as indicated below, prior to bone penetration.
2. Identify the site, proximal tibia;
 - a. Infants 0 –6 years old: 1 cm medially and 1 cm distally to the tibial tuberosity.
 - b. Pediatrics 6 –12 years old: 1-2 cm medially and 1-2 cm distally to the tibial tuberosity.
 - c. Adults: 2 cm medially and 1 cm proximally to the tibial tuberosity.
3. Prep the skin with Betadine, if available, three (3) times
4. Grasp the base (bottom) of the B.I.G. device with one hand and apply firm downward pressure at a 90° angle to the skin surface, remove the safety latch and trigger the B.I.G. device with the other hand.
5. Carefully remove the B.I.G. device, pull out the stylet trocar, and aspirate with an empty 10 ml syringe. Note: Lack of bone marrow is NOT a reason to discontinue use of the IO.
6. Remove the aspiration syringe and flush with a 10 ml syringe filled with sterile saline. The fluid should infuse freely. If the needle is clogged, re-insert the stylet, then remove it and re-attempt the flush.
7. Attach standard IV tubing and infuse fluid and/or medications. IV fluids should infuse freely.
8. Secure the needle utilizing the safety latch device fixed around needle and tape it to the skin surface.

INTRAVENOUS ACCESS

PERIPHERAL SITES AND INTRAOSSEOUS

COMPLICATIONS OF ALL IV SITES: INFILTRATION

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.
4. Monitor the patient for signs of LOCAL INFILTRATION:
 - a. Edema and pain at site of venipuncture.
 - b. Significant decrease in infusion rate or complete cessation of flow.
 - c. Failure to elicit a blood return into the catheter when the infusion bag is lowered below the level of the patient and the clamp is wide open.
5. If local infiltration occurs, discontinue the infusion immediately. Remove the needle/catheter from the vein. Place a cold compress over the venipuncture site to reduce swelling and to help diminish the pain.
6. Start an IV in the opposite extremity with a new IV solution following the IV guidelines.
7. Occurrence of local infiltration is common and occurs when the needle/catheter is dis-lodged from the vein, particularly when a small, thin-walled vein is used.

THROMBOPHLEBITIS

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment.

INTRAVENOUS ACCESS

PERIPHERAL SITES AND INTRAOSSEOUS

4. Monitor the patient for signs of THROMBOPHLEBITIS:
 - a. Pain along the course of the vein, which may be inflamed and tender.
 - b. Redness and edema at venipuncture site.
5. Thrombophlebitis usually does not occur until several hours after the IV was initiated. If you suspect that it has occurred, put on full-face protection, stop the infusion and discontinue the IV.
6. Start an IV in the opposite extremity with a new IV solution following the IV guidelines established.
7. Cold compresses may be applied to the site initially, followed by warm compresses.
8. Thrombophlebitis is a frequent complication of IV therapy and can be caused by prolonged use of an IV at one site, irritation to the vein by certain IV solutions, or excessive motion of the needle/catheter.

CIRCULATORY OVERLOAD

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.
4. Monitor the patient for signs of CIRCULATORY OVERLOAD:
 - a. A reaction characterized by an abrupt temperature elevation, severe chills, backache, headache, malaise, nausea and vomiting and occasionally vascular collapse.
5. Reaction usually occurs within 30 minutes after infusion has been initiated. If a pyrogenic reaction occurs, stop the infusion immediately.
6. Start an IV in the opposite extremity with a new IV solution following the IV guidelines established.
7. If hypotension or shock are present, treat according to MCAEMS PROTOCOLS. Consult Medical Control and consider Benadryl 50 mg IV to control allergic components of pyrogenic reaction if ALS.
8. Occurrence of pyrogenic reactions can be minimized by careful inspection of IV solutions for evidence of leakage or cloudiness.

AIR EMBOLISM

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.

INTRAVENOUS ACCESS

PERIPHERAL SITES AND INTRAOSSEUS

4. Monitor the patient for signs of AIR EMBOLISM:
 - a. Sudden shock with cyanosis.
 - b. Hypotension.
 - c. Tachycardia.
 - d. Diminished level of consciousness.
5. If an air embolism is suspected to have occurred, immediately clamp off the administration tubing and turn the patient onto his left side with his head down and his legs elevated.
6. Contact Medical Control for further orders.
7. Air embolism may be avoided using the following precautions:
 - a. Inspect tubing for defects before using.
 - b. Make sure all connections are tight.
 - c. Discontinue the infusion before the bag is empty.
 - d. Avoid circumstances that will increase negative pressure in the tubing, such as:
 1. Elevation of extremity receiving the infusion above the level of the heart.
 2. Placement of the low regulating clamp too high on the tubing; it should be approximately at the level of the patients heart.

CATHETER SHEAR

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.
4. Monitor the patient for signs of CATHETER SHEAR:
 - a. Sudden onset of chest pain.
 - b. Dyspnea.
 - c. Arrhythmia.
 - d. Tachycardia.
 - e. Tachypnea.

INADVERTENT ARTERIAL PUNCTURE

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.
4. Monitor the patient for signs of INADVERTENT ARTERIAL PUNCTURE:
 - a. Bright red blood will spurt out through the catheter.
 - b. Different flow characteristics.

INTRAVENOUS ACCESS

PERIPHERAL SITES AND INTRAOSSEOUS

5. If an inadvertent arterial puncture occurs, immediately withdraw the needle/catheter.
6. Apply a firm pressure to the puncture site for at least five (5) minutes, or until the bleeding stops.
7. Start an IV in the opposite extremity with a new IV solution, following the IV guidelines.
8. To reduce the risk of inadvertent arterial puncture, avoid areas where arterial pulsations are palpable when selecting an IV site.

DOCUMENTATION:

1. Who performed/attempted the task.
2. Number of attempts vs. successful.
3. BSI and equipment used.
4. Drip rate.
5. Site of IV insertion.
6. Any complications or undesired side effects.
7. Time procedure was performed.

Blood Draw

PURPOSE:

To obtain blood samples from the patient at the time of IV being started.

EQUIPMENT:

1. Blood tubes in colors Blue, Green, Purple, and Yellow. 12 or 20cc syringe.
2. Bloods tends not to break apart when use of a 12cc syringe
3. Gloves and full-face protection (goggles and mask or full-face shield).

PROCEDURE:

1. Establish the IV
2. Use 12 or 20cc syringe to draw back blood samples
3. Transfer blood into blood tubes
4. Blue all the way till it stops filling
5. Green
6. Purple
7. Yellow
8. Red
9. **DO NOT RECAP THE NEEDLE.** Dispose of the needle in a puncture resistant biohazard container.

DOCUMENTATION:

6. Time and who performed procedure.
7. BSI and equipment used.
8. Any complications or undesired effects.
9. Changes in patient condition before and after interventions.

ASSEMBLY OF IV ADMINISTRATION SET

PURPOSE:

To establish guidelines for the assembly of IV administration set.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. IV bag in ordered amount and fluid type.
3. Minidrip, macrodrip, Buretrol or trauma tubing administration set as determined by patient condition.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment. Check IV for correct solution, expiration date, seal leakage, contamination or cloudiness.
4. Connect the mini/macro drip tubing to the bag while the flow regulator is shut off. Fill fluid reservoir half way. Attach extension set if indicated. Open flow regulator wide to push all air out of the tubing.
5. Check tubing completely for any air bubbles. If present, open tubing to clear air bubbles.

VOLUME REGULATION CHAMBER BURETROL

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment. Check IV for correct solution, expiration date, seal leakage, contamination or cloudiness.
4. Spike the IV bag using the volume control chamber in the same way that you would for regular IV.
5. Once the bag and drip set are connected and hung, close the flow clamp at the bottom of the volume control chamber.
6. Open the flow clamp above the chamber, which regulates the flow from the IV bag into the volume chamber. Fill the chamber with the appropriate desired ml volume of the IV solution. Then close the clamp to stop further flow of fluid from the IV bag.
7. Open the flow clamp at the bottom of the chamber and fill the drip chamber and tubing with fluid in the customary manner.

DOCUMENTATION:

1. Fluid type and amount.
2. Time prepared and by whom.
3. Mini (60 gtt/min.), macro (10-15gtt/min.), Buretrol, or Trauma tubing administration set.

ADMINISTRATION OF IV BOLUS MEDICATIONS

PURPOSE: To establish guidelines for administering fluids or medications by intravenous bolus.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Antiseptic cleansing solution.
3. Syringe (large enough to contain the required amount of fluid or medications).
4. Needle – preferably 18 gauge, and a filtered needle if drawing from an ampule
5. Medication or fluid to be administered.

IV PUSH ADMINISTRATION OF MEDICATIONS

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment. Check for correct medications or fluid you are to administer.
4. Assess IV for patency.
5. Confirm the order/dosage by Medical Control or Protocol.
6. Ascertain from the patient if he or she has an allergy to the medications or fluid you are to administer.
7. Explain the medication administration procedure to the patient.
8. Obtain the fluid or medication.
9. If you are using an ampule, shake it down. This will force the solution to the lower portion to prevent spillage.
10. Using a 4x4 gauze pad or alcohol prep wrapped around the ampule, break the ampule.
11. Affix the 18 gauge filter needle to the syringe and withdraw the solution from the ampule.
12. If withdrawing the medication from a multi-dose vial, remove the top of the vial to expose the rubber membrane.
13. Cleanse the rubber top of the medication vial with the antiseptic cleansing solution.
14. Draw up air into the syringe, with the needle attached, equal to the amount of fluid that is to be withdrawn.
15. Insert the needle into vial, expel air into vial, keep the needle below the fluid level and withdraw the required amount of fluid.
16. Withdraw the syringe/needle and invert the syringe (needle up) and expel the air.
17. Locate a medication port on the IV administration set and cleanse it with antiseptic cleansing solution.

ADMINISTRATION OF MEDICATIONS

18. Insert needle with syringe into medication port.
19. Pinch IV ring above the administration site.
20. Administer the solution in a slow, deliberate fashion. Be aware of slower administration times with some medications.
21. Remove the needle with syringe and wipe off the medication port with antiseptic cleaning solution.
22. **DO NOT RECAP THE NEEDLE.** Dispose of the needle/syringe in a puncture resistant biohazard container.
23. Release the pinched line.
24. In some cases, where more than one medication is to be given through the same IV line, it may be necessary to flush the line in between administrations.
25. Confirm the correct dosage administered and closely monitor the patient for the desired therapeutic effects or possible side effects.
26. Monitor for potential complications.

COMPLICATIONS: RUPTURE OF VEIN

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.
4. Monitor the patient for **RUPTURE OF VEIN**.
 - a. Rupture of the vein may occur if the medication is administered too rapidly.
 - b. Signs of injury will include hematoma at site and other possible complications dependent upon site of IV.
5. Rupture may be avoided or minimized by administering the medication at the prescribed rate.
6. Contact Medical Control for further orders.

TOXICITY

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.
4. Monitor the patient for **TOXICITY**:
 - a. All medications should be administered at the prescribed rate and concentration.

ADMINISTRATION OF MEDICATIONS

- b. Medications that are administered faster than indicated or in larger concentrations than indicated may produce symptoms of toxicity in the affected patient.
5. Contact Medical Control for further orders.

DOCUMENTATION:

1. Who attempted/performed task.
2. Number of attempts vs. successful.
3. BSI and equipment used.
4. Name, concentration and dosage of medication.
5. Site of administration.
6. Any complications or undesired side effects.
7. Were desired therapeutic effects attained.
8. Time medication was administered.

IV INFUSION OF MEDICATIONS

PURPOSE:

To establish guidelines for administration of medications in a slower and more controlled manner than IV push.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Medications to be administered.
3. Syringe to transfer medications or previously pre-packaged, assembled syringe with medication.
4. Bag of solution or diluent.
5. Administration set and/or extension set.
6. Antiseptic cleansing solution.
7. Two 18 gauge needles.
8. Label.
9. Tape.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies. Check for correct medication and concentration, dosage, expiration date, seal leakage, contamination, cloudiness or abnormal color.
4. Assess patency of IV.
5. Confirm the order/dosage by Medical Control or Protocol.

ADMINISTRATION OF MEDICATIONS

6. Ascertain from the patient if he/she is allergic to the medication to be administered.
7. Explain the administration procedure to the patient.
8. Cleanse the medication port on the IV bag with the antiseptic cleansing solution. Withdraw the required medication from the ampule or vial, or prepare prepackaged medication for Injection into IV bag.
9. Inject the required amount of medication into the IV bag. Invert the bag several times to mix the medication with the fluid.
10. **DO NOT RECAP THE NEEDLE.** Dispose of the needle/syringe in a puncture resistant biohazard container.
11. Place an administration set on IV bag, fill the reservoir to line, open clamp on tubing and bleed out the air in the tubing.
12. Attach the needle to the end of the tubing.
13. Cleanse the medication port on the administration set of the already established IV with the antiseptic cleansing solution. (This bag should have no other medications mixed in.) If there are medications in this bag, establish a second IV for infusion of the second medication.
14. Insert the needle into the medication port on the already established IV.
15. Tape the needle down securely.
16. Adjust the flow rate of the piggyback to the desired dose.
17. Label the bag. Write down the name of the medication in the bag, the concentration of the medication, the flow rate of fluid and the time the medication started infusing. Readjust the flow rate of the initial IV.
18. Monitor the patient for desired therapeutic effects and possible complications.

DOCUMENTATION:

1. Who attempted/performed the task.
2. Number of attempts vs. successful.
3. BSI and equipment used.
4. Name, concentration and dosage of medication.
5. Site of administration.
6. Complications or undesired side effects.
7. Were desired therapeutic effects attained.
8. Time the medication was administered.

INTRAMUSCULAR ADMINISTRATION OF MEDICATIONS

PURPOSE:

To establish guidelines for intramuscular administration of medications.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).

ADMINISTRATION OF MEDICATIONS

2. Syringe (large enough to accommodate the required amount of medications).
3. Needle (preferably 1" or 1 ½" long and 21 gauge) for injection; withdrawal of medication from vial or ampule (18 gauge); or prepackaged syringe with medication and needle for injection.
4. Antiseptic cleansing solution.
5. 4 X 4
6. Medication to be administered.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies. Check for correct medication and concentration, expiration date, seal leakage, contamination or abnormal color or cloudiness.
4. Confirm order/dosage by Medical Control or Protocol.
5. Ascertain from the patient if he/she has an allergy to the medication that you are to administer.
6. Explain the medication administration procedure to the patient.
7. Draw up the medication into the syringe.
8. Choose a site for injection. IM injections are usually given in the thick gluteal muscles of the buttock's upper outer quadrant, toward lateral superior portion of quadrant, or in the outer part of the upper arm, the deltoid muscle. If injecting the gluteal muscle, the needle is inserted into the upper, outer portion of the buttock by drawing two (2) imaginary lines that divide the buttock in four (4) quadrants. The flesh at this site is stretched and flattened until the needle has penetrated the skin. If using the deltoid, the skin may be pinched until the needle has penetrated the skin.
9. Insert the needle at a 90 degree angle to the skin.
10. Gently aspirate the syringe to assure that a blood vessel has not been entered. If a blood return is noted, withdraw the syringe and needle, apply light pressure to the area, dispose of the syringe/medication/needle in a puncture resistant biohazard container and begin again.
11. Inject the medication slowly.
12. Remove the syringe and needle.
13. **DO NOT RECAP THE NEEDLE.** Dispose of the needle/syringe in a puncture resistant biohazard container.
14. Apply pressure to the site with a 4x4.
15. Monitor the patient for desired therapeutic effects.
16. Monitor the patient for potential complications.

ADMINISTRATION OF MEDICATIONS

COMPLICATIONS: INJECTION INTO A BLOOD VESSEL

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.
4. Monitor the patient for signs of ADMINISTRATION INTO A BLOOD VESSEL:
 - a. Aspiration of the syringe prior to administration of medication will prevent injection into a blood vessel.
 - b. Injection into a blood vessel may induce pain at the site and possible toxicity.
5. Contact Medical Control for further orders.

DOCUMENTATION:

1. Who attempted/performed task.
2. Number of attempts vs. successful.
3. BSI and equipment used.
4. Name, concentration and dosage of medication.
5. Site of administration.
6. Any complications or undesired side effect.
7. Were desired therapeutic effects attained.
8. Time medication was administered.

SUBCUTANEOUS ADMINISTRATION OF MEDICATIONS

PURPOSE:

To establish guidelines for administration of medications into the subcutaneous tissues with a needle and syringe.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Syringe (large enough to accommodate the required amount of medication).
3. Needle for injection (preferably 5/8" long and 25 gauge) and withdrawal of medication from vial or ampule or prepackaged syringe with medication and needle for injection.
4. Antiseptic cleansing solution.
5. 4X4.
6. Medication to be administered.

PROCEDURE:

1. Put on gloves.

ADMINISTRATION OF MEDICATIONS

2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies. Check for correct medication and concentration, expiration date, seal leakage, contamination or abnormal color or cloudiness.
4. Confirm the order/dosage by Medical Control or Protocol.
5. Ascertain from the patient if he/she has an allergy to the medications that you are to administer.
6. Explain medication administration procedure to the patient.
7. Draw up the medication into the syringe.
8. Choose a site for injection. Subcutaneous injections are administered in an area where bones and blood vessels are not near the surface. The areas commonly used are the upper part of the arms and thighs. The lower abdomen is sometimes used, i.e. insulin.
9. Prepare the site for injection. Cleanse with the antiseptic cleansing solution. Start with a small area and wipe in widening circle around the site allowing a broad margin around the site to be punctured.
10. Insert the needle into the subcutaneous tissue at a 45-50 degree angle depending on the relative obesity of the patient.
11. Gently aspirate the syringe to assure that a blood vessel has not been entered. If blood return is noted, withdraw the syringe and needle. Apply light pressure to the area. Dispose of the syringe, medication/needle in a provided biohazard container and begin again.
12. Inject the medication.
13. Remove the syringe and needle.
14. **DO NOT RECAP THE NEEDLE.** Dispose of the needle-syringe in a puncture resistant biohazard container.
15. Apply pressure to the site with a 4X4.
16. Monitor the patient for desired therapeutic effects.
17. Monitor the patient for potential complications.

COMPLICATIONS: INJECTION INTO A BLOOD VESSEL

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies.
4. Monitor the patient for signs of ADMINISTRATION INTO A BLOOD VESSEL:
 - a. Aspiration of the syringe prior to administration of medication will prevent injection into a blood vessel.
 - b. Injection into a blood vessel may induce pain at the site and possible toxicity.

ADMINISTRATION OF MEDICATIONS

5. Contact Medical Control for further orders.

DOCUMENTATION:

1. Who attempted/performed task.
2. Number of attempts vs. successful.
3. BSI and equipment used.
4. Name, concentration and dosage of medication.
5. Site of administration.
6. Any complications or undesired side effects.
7. Were desired therapeutic effects attained.
8. Time medication was administered.

SUBLINGUAL ADMINISTRATION OF MEDICATION

PURPOSE:

To establish guidelines for sublingual administration of medications.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face protection).
2. Medication.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies. Check for correct medication and concentration, expiration date, seal leakage, contamination or abnormal color or cloudiness.
4. Confirm the order/dosage by Medical Control or Protocol.
5. Ascertain from the patient if he/she has an allergy to the medications that you are to administer.
6. Place the tablet or medication that is to be administered directly under the patient's tongue. Have the patient close mouth and let the medication dissolve.
7. Watch to see that patient does not swallow medication as this may diminish the effects of the medication.
8. Monitor patient for desired therapeutic effects and/or potential complications.

DOCUMENTATION:

1. Who performed task.
2. BSI and equipment used.
3. Name, concentration and dosage of medication.

ADMINISTRATION OF MEDICATIONS

4. Any complications or undesired side effects.
5. Were desired therapeutic effects attained.
6. Time medication was administered.

ORAL ADMINISTRATION OF MEDICATIONS

PURPOSE:

To establish guidelines for the oral administration of medications.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Medication.
3. Cup with water.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies. Check for correct medication and concentration, expiration date, seal leakage, contamination or abnormal color or cloudiness.
4. Confirm the order/dosage by Medical Control or Protocol.
5. Ascertain from the patient if he/she has any allergies to the medication that is to be administered.
6. Wait until ambulance is stopped.
7. Give patient medication and water.
8. Direct patient to swallow medication and follow with water.
9. Watch to see that medication is swallowed and that patient is experiencing no difficulties with swallowing or choking.
10. Monitor patient for desired therapeutic effects and/or potential complications.

DOCUMENTATION:

1. Who performed the task.
2. BSI and equipment used.
3. Name, concentration and dosage of medication.
4. Any complications or undesired therapeutic side effects.
5. Were desired therapeutic effects attained.
6. Time medication was administered.

ADMINISTRATION OF MEDICATIONS

ENDOTRACHEAL ADMINISTRATION OF MEDICATIONS

PURPOSE:

To establish guidelines for endotracheal administration of medications when a patient IV cannot be established in a timely manner during the respiratory and/or cardiac arrest scenario.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Medication to be given in prefilled cartridge or drawn up into syringe, at two to two and one half times the normal dose.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies. Check for correct medication and concentration, expiration date, seal leakage, contamination or abnormal color or cloudiness.
4. Ascertain from a family member or other means if possible (medical I.D. tags or bracelets) if patient has allergies to medication that is being administered.
5. Prepare the pre-filled cartridge or syringe of medication.
6. Assess patient to determine the necessity for endotracheal administration of medication:
 - a. Medication cannot be given intravenous route.
 - b. Medication is compatible with endotracheal administration.
 - c. The urgency of situation warrants that the medication be administered by this route and there is an absence of other possible routes of administration.
7. Administer the medication via the endotracheal tube using any of the following methods: (Total volume instilled should be between 10 and 20 ml in the adult patient and between 3 and 10 ml in the child).
 - a. Ventilate the patient for 20-30 seconds and remove the bag-valve-mask unit. Instill the medication into the ET tube. Re-attach the tube and promptly resume bag-valve-mask ventilation.
8. Monitor patient for desired therapeutic effects. Ventilate the patient using (100% oxygen and wait at least 1-2 minutes before suctioning via the endotracheal tube.
9. Monitor patient for potential complications.
 - a. If patient has any lung capacity compromise, it may be difficult to administer the entire contents of the syringe.

ADMINISTRATION OF MEDICATIONS

DOCUMENTATION:

1. Who performed the task.
2. BSI and equipment used.
3. Name, concentration and dosage of medication.
4. Any complications or undesired therapeutic side effects.
5. Were desired therapeutic effects attained.
6. Time medication was administered.

NEBULIZER ADMINISTRATION OF MEDICATIONS

PURPOSE:

To establish guidelines for the administration of medications through a nebulizer.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Medication to be instilled into the nebulizer.
3. Sterile saline for dilution/humidification of medication (5-10 ml).
4. Nebulizer with oxygen connecting tubing.
5. Oxygen.
6. Bag Valve Mask (If indicated)
7. 4X4's.
8. Convenience bag.
9. Stethoscope.

PROCEDURE:

1. Put on gloves and full-face protection.
2. Assemble required equipment and supplies.
3. Check for correct medication, dosage, concentration, expiration date, seal leakage (if single dose, contamination, abnormal color or cloudiness).
4. Confirm order/dosage by writing it down.
5. Ascertain from the patient if he/she has any allergies to the medication that is to be administered.
6. Explain the administration procedure to the patient.
 - a. If the mist will be inhaled via mouthpiece, the patient must tightly seal his lip around the mouthpiece and breathe only through his mouth.
 - b. If the mist will be inhaled via a mask, there should be a tight fit to the face to avoid any excess leakage. The mask employed in this situation should be one, which is properly designed or adapted for inhalation medication administration.

ADMINISTRATION OF MEDICATIONS

7. Instill the medication into the dropper. Place the cover back on the nebulizer and assemble according to manufacturer's direction for the equipment being used. Connect the nebulizer to the oxygen source and turn on the oxygen to the required flow.
8. Place patient into a sitting position for maximum respiratory movement and direct the patient to inhale slowly and deeply to allow his lungs to be filled and to then exhale as completely as possible before the next inspiration.
9. If patient needs to expectorate, have 4X4's and emesis pan available.
10. Continue the procedure until the nebulizer is no longer discharging the humidified oxygen mixture.
11. Re-connect any previous oxygen to patient.
12. If indicated for BVM pre-oxygenate the patient.
13. Hook the "T" piece to the bag.
14. The blue tubing is then hooked to the "T" piece.
15. Use a multi adapter to connect the tubing to the mask of the BVM or to the ET tube and administer medication.
16. Auscultate lung fields following procedure to assess any change in patient condition.
17. Monitor the patient for desired therapeutic effects and/or potential complications.

DOCUMENTATION:

1. Who performed the task.
2. BSI and equipment used.
3. Name, concentration and dosage of medication.
4. Any complications or undesired therapeutic side effects.
5. Were desired therapeutic effects attained.
6. Time medication was administered.

EPI-PEN

PURPOSE:

To establish guidelines for the using a metered-dose injection.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face protection).
2. Medication.

PROCEDURE:

1. Put on gloves.

ADMINISTRATION OF MEDICATIONS

2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Epi-Pen resembles a large felt-tip marker pen. The outer shell houses a recessed intramuscular needle, a pre-measured dose of Epinephrine 1:1,000, and a spring-loaded device that propels the needle and medication into the patient.
4. When the needle end of the Epi-Pen is pushed against a large muscle, such as the vastus lateralis of the thigh or the deltoid muscle, the resistance encountered is registered by the spring-loaded mechanism. When the resistance exceeds a preset limit, the mechanism activates and drives the needle from the barrel and into the muscle. This also disperses the Epinephrine stored within the device through the needle and into the muscle.
5. Clean the outer thigh site with alcohol.
6. To use an Epi-Pen, remove the gray safety cap from the back end of the device and place the black tip firmly against the outer thigh.
7. With a smooth motion, push in hard until the needle enters the skin and then hold the Epi-Pen in place for ten more seconds to allow the epinephrine to be injected through the needle and into the muscle.
8. Continue to monitor the patient for signs of improvement or the need for additional treatment. Take and record vital signs on a regular basis.

DOCUMENTATION:

1. Who performed the task.
2. BSI and equipment used.
3. Name, concentration and dosage of medication.
4. Any complications or undesired therapeutic side effects.
5. Were desired therapeutic effects attained.
6. Time medication was administered.

PRESSURE INFUSER

PURPOSE:

To establish guidelines for how to use pressure infusers.

EQUIPMENT:

1. Gloves and face protection.
2. IV pressure infuser. (If available).
3. Blood Pressure cuff.
4. IV solution.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any spattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary supplies and equipment.
4. Commercial IV pressure infuser are designed to cover a one liter or smaller IV bag. A blood pressure cuff wrapped around an IV bag will work just as well. When using a blood pressure cuff, you have to continuously inflate the cuff as the bag of fluid empties so that the cuff maintains its pressure upon and does not slip off the IV bag. An extra pair of hands squeezing the IV bag will also work well as a pressure infuser.
5. When using the commercial IV pressure infuser, slide the IV bag into the cover until it is completely inside the infuser.
6. With the IV started and running wide open into the vein, begin inflating the bladder with the bulb pump until the drip chamber fills up and you get a good stream of fluid running through the tubing.
7. Monitor the IV site to insure that the vein is handling the volume of fluid being forced through it.
8. When an IV infuser if being used the IV bag does not have be hung or carried above the patient, since the flow is not dependent upon gravity as long as the inflation pressure in the pressure infuser is maintained.

DOCUMENTATION:

1. Who performed/attempted the task.
2. BSI and equipment used.
3. Drip rate and type of pressure infuser used.
4. Site of IV insertion.
5. Any complications or undesired side effects.
6. Time procedure was performed.

NOTE:

IV pressure infusers are used to force fluid out of an IV bag to infuse fluid volume into a patient's circulatory system more rapidly than would be possible using only gravity and the customary drip method.

SALINE LOCK

PURPOSE:

To establish guidelines for the initiation of a saline lock.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. Indwelling plastic catheter over a hollow needle. (Angiocath).
3. Antiseptic cleansing solution.
4. Sterile dressing.
5. IV securing device (adhesive tape cut into strips or commercial IV securing device).
6. Tourniquet.
7. J-loop with injection site.
8. Sterile 3 cc syringe with fill needle and 2 cc of saline from a multi-dose vial (multi-dose vial will be discarded after single patient use) or Tubex holder/syringe and a 2 cc cartridge of normal saline.
9. Saline injection for flush.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full face protection.
3. Assemble all necessary supplies and equipment.
4. Check the saline solution for correct solution, amount, expiration date, seal leakage, contamination, cloudiness or abnormal color.
5. Cleanse the rubber stopper of adapter with alcohol and prime adapter and j-loop with saline.
6. Select a suitable vein. In general, the forearm is the preferred site, with the back of the hand second. Avoid the following:
 - a. Areas of bone articulation.
 - b. Areas where arterial pulsations are palpable.
 - c. Veins near or distal to injured areas.
 - d. Veins of the lower extremities.
 - e. Areas where there is obvious skin disease or skin injury.
7. Secure the tourniquet proximal to the selected IV site. Check to make sure that the distal pulse is still present. If no, loosen the tourniquet slightly.
8. Prepare the venipuncture site. Cleanse with antiseptic cleansing solution. Start from the area above the vein and wipe in widening circles around it, allowing a broad margin around the site to be punctured. If using iodine, a final wipe with alcohol is recommended.

SALINE LOCK

9. Stabilize the vein by applying pressure on the skin distal to the point of entry. With the bevel of the IV catheter needle up, pass the needle through the skin and enter the vein from either side or above. You should feel the needle “pop” through the vein, there will be a blood return through the needle. When the needle has entered the vein, there will be a blood return through the needle. Advance the needle about 2 mm beyond the point where the blood return was first encountered. Advance the catheter over the needle into the vein. Carefully withdraw the needle, holding the catheter steady.
10. DO NOT RECAP THE NEEDLE. Dispose of the needle in a puncture resistant biohazard container.
11. J-Loop and saline lock should be prefilled with saline.
12. Can be flushed with additional saline once hooked up.
13. Instill prescribed amount of saline flush.
14. Secure the J-loop/angiocath in place using tape or a commercial IV securing device.

DOCUMENTATION:

1. Who attempted/performed the task.
2. Number of attempts vs. successful.
3. BSI and equipment used.
4. Amount of saline flush used.
5. Site of saline lock and time procedure was performed.
6. Any complications or undesirable side effects.

ADDITION OF MEDICATIONS TO IVS

PURPOSE:

To establish guidelines for the addition of medications to IVs.

EQUIPMENT:

1. Gloves and full-face protection (mask and goggles or full-face shield).
2. IV solution in bag.
3. Minidrip or macrodrip administration set as ordered.
4. Extension set if required.
5. Syringe and needle for withdrawal of medication from ampule or vial or prepackaged medication in syringe with needle.
6. Antiseptic cleansing solution.

PROCEDURE:

1. Put on gloves.
2. Determine whether there has been any splattering of blood or body fluids. If so, put on full-face protection.
3. Assemble all necessary equipment and supplies. Check for correct medication, solution, expiration date, seal leakage, contamination, abnormal color or cloudiness.
4. Obtain the appropriate concentration and amount of medication to be administered.
5. Cleanse the injection port on the IV bag.
6. Inject the medication into the bag through the injection port.
7. **DO NOT RECAP THE NEEDLE.** Dispose of the needle/syringe in a puncture resistant biohazard container.
8. Invert the bag 2-3 times to mix the medication with the IV fluid.
9. Label the bag with medication information:
 - a. Name of medication.
 - b. Amount and concentration of medication.
 - c. Paramedic's name.
 - d. Time medication was added.
 - e. Flow rate for IV fluid.
10. Attach tubing to IV and run as a "piggyback" to the original IV.

DOCUMENTATION:

1. Who performed the task.
2. BSI and equipment used.
3. Name, concentration and dosage of medication.
4. Concentration of medication/fluid.
5. Flow rate of medication/fluid.
6. Complications or undesired side effects.
7. Time administered.
8. Desired therapeutic effects attained.

USE OF RESTRAINTS

PURPOSE:

To establish guidelines for the use of safe reasonable force necessary to keep a patient from injuring himself/herself or others. Reasonableness is determined by all circumstances, remembering that scene safety is paramount.

EQUIPMENT:

1. Soft or leather restraints
2. Posey or sheet.

PROCEDURE:

1. Form a plan.
2. Be sure adequate help is available.
3. One person is assigned to calm and reassure the patient.
4. Approach with at least 4 persons (one for each limb).
5. Acting in unison, take hold and secure all four limbs to cot with restraints.
Secure patient's midsection (waist) with a Posey or sheet to prevent patient from "bucking." Position patient supine.

DOCUMENTATION:

1. Who performed the procedure.
2. BSI and equipment used.
3. Time of application.
4. Documentation on Utstein style report.

ResQPOD Circulatory Enhancer

PURPOSE:

The ResQPOD is an impedance threshold device that prevents unnecessary air from entering the chest during the decompression phase of CPR. When air is prevented from rushing into the lungs as the chest wall recoils, the vacuum (negative pressure) in the thorax pulls more blood back to the heart, resulting in a:

1. Doubling of blood flow to the heart.
2. 50% increase in blood flow to the brain.
3. Doubling of systolic blood pressure.

EQUIPMENT:

5. Gloves and full-face protection (mask and goggles or full-face shield).
6. ResQPOD Circulatory Enhancer
7. Suction.
8. Bag-valve-mask.

INDICATIONS:

1. Cardiopulmonary arrest 12 years and older.

CONTRAINDICATIONS:

1. Patients under 12 years of age.

PROCEDURE:

- A. Confirm absence of pulse and begin CPR immediately. Assure that chest wall recoils completely after each compression.
- B. Place the ResQPOD into ventilation circuit:
- C. Using the ResQPOD on a facemask:
 1. Connect ResQPOD to facemask.
 2. Connect ventilation source (BVM) to top of ResQPOD. If utilizing a mask without a bag, connect a mouthpiece.
 3. Establish and maintain a tight face seal with mask throughout chest compressions. Use a two-handed technique or head strap.
 - a. Perform CPR:
 4. Prepare for endotracheal intubation.
- D. Using the ResQPOD on an endotracheal tube or Combitube:
 1. Endotracheal intubation is the preferred method of managing the airway when using the ResQPOD.

ResQPOD Circulatory Enhancer

2. Place endotracheal tube or Combitube and confirm placement.
3. Move the ResQPOD from the facemask to the advanced airway and turn on timing assist lights (remove clear tab).
4. Continue CPR with minimal interruptions:
 - a. Provide continuous (no pauses) chest compressions (approximately 10 per light flash).
 - b. Ventilate asynchronously over 1 second when light flashes (10/min).
5. Perform ACLS as appropriate.
6. If a pulse is obtained, remove the ResQPOD and assist ventilations as needed (adults: 10 – 12/min; children: 12 – 20/min) but do not hyperventilate.

Special Notes:

1. Always place ETCO₂ detector between the ResQPOD and ventilation source.
2. Administer endotracheal medications directly into endotracheal tube.
3. Do not interrupt CPR unless absolutely necessary.
4. If a pulse returns, discontinue CPR and the ResQPOD. If the patient rearrests, resume CPR with the ResQPOD.
5. Do not delay compressions if the ResQPOD is not readily available.