WISCONSIN DEPARTMENT of HEALTH SERVICES

EMS Standards and Procedures of Practical Skills Manual

Background

This manual is intended to provide examples of tried and proven techniques of caring for patients with the various injuries or illnesses that emergency medical services (EMS) personnel will encounter in the field. It does not provide the only method or technique that may be an acceptable approach in caring for an injury or illness. However, since the various certification examinations used within the state are based on the current edition of this document as well as the current edition of the National EMS Education Standards, the Wisconsin Scope of Practice, and Wisconsin Curricula, this should be considered a companion to the curricula used for the education of EMS personnel. This is a consensus document, endorsed by the EMS Training Centers, the Office of Preparedness and Emergency Health Care (OPEHC) in the Department of Health Services (DHS) and the EMS Physician Advisory Committee for purposes of instruction.

This manual contains descriptions of those skills included in the scope of practice for all EMS personnel. The scope of practice for each level of provider, as defined by BCDER and local protocol, shall define which of these skills may be used at each provider level.

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Section 1: Assessment tools: blood pressure measurement, pulse oximetry, blood glucose measurement, 12-lead ECG, and capnography

Objectives:

- To consistently obtain accurate blood pressure measurement through the use of auscultation and palpation methods, and use of mechanical units.
- To accurately measure the percent of circulating hemoglobin saturated with oxygen.
- To accurately measure the blood glucose level through the use of a glucometer
- To acquire and transmit a 12-Lead ECG.
- To objectively measure the partial pressure of End-tidal CO2.

I. Blood pressure measurement

Points of emphasis:

- Correctly size and position the blood pressure cuff
  - The inflatable portion of the cuff's length should encircle at least 80 percent of the upper arm and should be wide enough to cover 40 percent of the arm at mid-point of the bladder.
  - A cuff that is too large may give a false low reading.
  - A cuff that is too small may give a false high reading.
- Locate the brachial pulse in the antecubital space.
- Inflate the cuff 30 mmHg above the point at which the pulse is lost.
- Deflate cuff proportionate to the rate of the pulse and record the results.

Skills:

A. Palpitation method
   1. Position the patient with the arm at heart level.
   2. Palpate the brachial or radial pulse.
   3. Apply the cuff snugly around the extremity with the lower edge at least one (1) inch above the antecubital space with the cuff's bladder centered over the brachial artery.
   4. Inflate the blood pressure cuff to 30 mmHg above the point at which the pulse disappears.
   5. Deflate cuff slowly while noting the reading at which the pulse is felt to return
   6. Record systolic blood pressure as #/P.

B. Auscultatory method
   1. Position the patient with the arm at heart level.
   2. Palpate the brachial pulse.
   3. Apply the cuff snugly around the extremity with the lower edge at least one (1) inch above the antecubital space and the cuff's bladder centered over the brachial artery.
   4. Insert stethoscope earpieces in ears with earpieces pointing slightly forward; test diaphragm for sound conduction by gently tapping on diaphragm.
   5. Palpate or auscultate brachial artery while inflating cuff to 30 mmHg above the loss of pulse.
   6. Deflate cuff slowly with stethoscope diaphragm over brachial artery listening for the pulse to return and again disappear.
      a. The point at which the pulse returns is the systolic pressure

b. The point at which the pulse disappears again is the diastolic pressure (At times you will be able to hear the pulse during complete deflation of the cuff).

C. Automatic blood pressure measuring devices
   1. Various types of equipment available
   2. Refer to manufacturer's directions

II. Pulse oximetry

Points of emphasis:

- Do not depend on oximeter reading alone to assess patient's oxygenation status.
- Typically, a normal pulse oximetry reading is greater than 93%. For some chronically ill patients the percentage may be lower.
- The accuracy of the measurement may be affected by low blood flow, CO poisoning, nail polish, gel nails, dirt, jaundice, patient movement, bright light. If pulse count or waveform on the machine does not correlate with the patient's pulse, the accuracy of the reading should be questioned. Care should be directed by other signs and symptoms of the patient.

- A pediatric adhesive style transducer can be utilized for an adult patient when the finger does not provide a reading. Adhere the transducer over the bridge of the patient's nose.

Skills:

A. Select and place the appropriate transducer on the patient (finger, toe, earlobe, etc.)
   1. Clean site with alcohol wipe, if necessary
   2. Tape around great toe or foot - pediatric patient
   3. Tape across the bridge of the nose - pediatric transducer on adult patient

B. Turn on monitor

C. Verify that pulse reading on oximeter is equal to patient's pulse

D. Note and record reading

III. Blood glucose measurement

Points of emphasis:

- Record reading in mg/dL.
- Consider use on all patients with altered level of consciousness.
- Ensure unit is calibrated per manufacturer's specifications.
- Check expiration date of test strips.
- Protocols may suggest wiping away first drop of blood, using second drop for sample.

Skills:

A. EMR Blood Glucose Monitoring with specific training and approvals in accordance with DHS rule
   1. Prepare equipment (glucometer, lancet device, alcohol wipes, Band-Aid®, gauze pad and sharps container) in advance, according to manufacturer's recommendations
   2. Clean finger with alcohol prep pad, allowing alcohol to dry for 30 seconds
   3. Turn unit on
   4. Confirm test strip code with glucometer display reading according to manufacturer's guidelines
   5. Prick finger with lancet to obtain blood sample
   6. Apply sample to test strip
   7. Cover puncture site with Band-Aid® if bleeding continues
   8. Properly dispose of lancet

B. Note and record reading

IV. 12-lead ECG

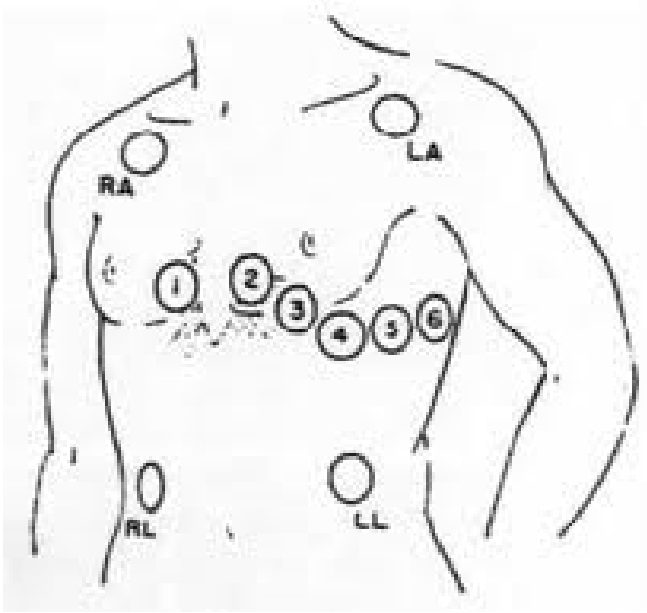
Points of emphasis:

- Identify need for 12-Lead ECG.
- Cover exposed areas as appropriate.
- If ambulance is moving, vehicle should be stopped in order to acquire accurate ECG.

Skills:

A. Prepare the skin as needed
B. Place patient in a recumbent position
C. Connect electrodes to cables
D. Apply electrodes to limbs (the limb leads must be placed distal to the shoulder and distal to hip joints to obtain an accurate ECG)
   1. LL=Left leg
   2. RL=Right leg
   3. RA=Right arm
   4. LA=Left arm
E. Place chest leads using appropriate landmarks (see figure below)
   1. V1=4th Intercostal space just to right of sternum (1)
   2. V2=4th Intercostal space just to left of sternum (2)
   3. V3=halfway between V2 and V4 (3)
   4. V4=5th Intercostal space in the mid-clavicular line (4)
   5. V5=anterior axillary line, level with V4 (5)
   6. V6=mid-axillary line level with V4 (6)
F. Enter patient information into monitor
G. Instruct patient to remain still and quiet while acquiring tracing
H. Acquire 12 Lead ECG
I. Check 12 Lead for quality
J. Transmit electronically or print tracing

Placement example of 12-leads:



V. End tidal CO2 (capnography)

Points of emphasis:

- Identify need for End-tidal CO2 monitoring.
- Monitors the measurement of carbon dioxide in the airway at the end of each breath. Helps determine the ventilation, circulation and cellular perfusion.
- Displayed in numeric reading value and/or graphic waveform.
- Prepare equipment according to manufacturer's recommendations.
- Normal values = 35-45 mmHg.
- Excess secretions or blood can interfere with the sensor's ability to read the EtCO2.

Skills:

A. Select proper sensor and connect to patient Verify EtCO2 numerical value
B. Verify continuous wave form (if applicable)
C. Continually monitor patient and values and adjust interventions as needed

Section 2: Lifting and moving patients

Objectives:

- To provide mechanisms of patient movement and transport which eliminate or minimize the potential for further patient injury while providing a rate of transport or movement appropriate to existing emergency conditions.
- To provide mechanisms of patient movement and transport which provide the greatest degree of patient and EMS provider safety.

I. Emergency moves

When using emergency moves it is assumed the patient must be moved to a position of relative safety immediately and no time is available to begin an assessment or provide spinal immobilization. Three sample emergency moves are listed here.

Points of emphasis:

- The greatest danger in moving a patient quickly is the potential for aggravating injuries.
- Pull in the direction of the long axis of the patient's body when possible
- Avoid bending or twisting the patient's torso.
- The patient should be in a position to protect airway and facilitate breathing.

Skills:

A. Blanket drag
    1. Place patient on blanket
    2. Drag blanket in direction of long axis of patient's body
        a. Keep head as close to floor as possible
        b. Move patient's head first whenever possible
B. Clothes drag
    1. Grasp patient's clothing, pulling from the neck or shoulder area
    2. Drag in direction of the long axis of the patient's body
        a. Keep patient's head as close to the floor as possible
        b. Drag in direction of the long axis of the body
C. One-EMS provider drag
    1. Place hands under the patient's armpits from the back
    2. Grasp the patient's forearms and drag in the direction of the long axis of the body

II. Urgent moves

Urgent moves are required when the patient must be moved quickly but adequate time is available to perform an initial assessment and provide spinal immobilization precautions when necessary.

Points of emphasis:

- The greatest danger in moving a patient quickly is the potential for aggravating injuries.
- Pull in the direction of the long axis of the patient's body when possible
- Avoid bending or twisting the patient's torso.
- Manual C-spine stabilization may be done if time and personnel allow.
- Manual C-spine stabilization may need to be transferred between EMS providers during patient transfer because of vehicle obstacles.
- To permit emergency extrication of a patient when their condition does not allow the time required to apply full head and torso immobilization with a short extrication device.
- To permit emergency extrication in a hazardous situation (fire, Hazmat, etc.).
- To provide an alternative extrication technique when a short immobilization device is not available.

Skills:

A. Rapid extraction (Patient sitting in vehicle)

1. First EMS provider brings cervical spine into neutral, in-line position and provides manual stabilization
2. Second EMS provider applies cervical immobilization device (rigid cervical collar)
3. Third EMS provider positions the foot-end of a long board at the door opening, then moves to opposite side of patient
4. Second EMS provider supports and stabilizes the patient's torso as the third EMS provider frees the patient's legs
5. At the direction of the EMS provider holding manual C-spine stabilization, the patient is rotated in several short, coordinated moves until the patient's back is in the open doorway and his/her legs are on the seat
6. The foot end of the long board is placed against the patient's buttocks. Additional EMS providers support the opposite end of the board as the first and second EMS providers lower the patient to the board
7. The second and third EMS providers slide the patient into the proper position on the board in short, coordinated moves while the first EMS provider maintains manual C-spine stabilization
8. First EMS provider maintains manual stabilization as the patient is moved to a place of relative safety

B. Blanket collar extraction (patient sitting)

Skills:

1. Hold a full-size cloth blanket diagonally at opposite corners: Loosely swing like a jump rope to make a bulky, long cravat
2. Position the blanket for C-spine control and movement
   a. Place the middle of the blanket on the front of the patient's neck
   b. Bring the ends over the shoulders
   c. Cross the blanket behind the neck
   d. Pass the ends over the shoulders

   e. Pass the ends under the armpits

f. Ends should be pointing towards the patient's back

3. Hold the blanket ends close to the armpits
   a. Twisting the ends may provide better stabilization and control of the patient
   b. Hold the blanket snuggly against the neck to provide support
4. Tilt the patient's upper body to clear the doorframe as needed
5. Slide the patient off and lower into a sitting position onto the ground or directly on to a long board
6. Lower the patient to a supine position

III. Non-urgent moves

Non-urgent moves are those moves that are used when adequate time is available to perform a thorough assessment and provide all appropriate immobilization precautions.

C. Direct ground lift (no suspected spinal injury)
1. Two or three EMS providers line up on one side of the patient
2. EMS providers kneel on one knee (preferably the same knee for all EMS providers)
3. The EMS provider at the head places one arm under the patient's neck and shoulders while cradling the patient's head. S/he places the other hand under the patient's lower back
4. The second EMS provider places one arm under the patient's knees and the other arm just above the patient's buttocks
5. If a third EMS provider is available, s/he should place both arms under the patient's waist and the other EMS providers should slide their arms either up to the mid-back or down to the buttocks as appropriate
6. On signal, the EMS providers lift the patient to their knees and roll the patient toward their chests
7. On signal, the EMS providers stand and move the patient to the stretcher
8. To lower the patient, the steps are reversed

D. Extremity lift (no suspected spinal or extremity injuries – patient supine)
1. Properly position the stretcher beside the patient
2. One EMS provider kneels at the patient's head and one kneels at the patient's side by the knees
3. The EMS provider at the head places one hand under each of the patient's shoulders while the EMS provider at the foot grasps the patient's wrists and pulls the patient to a sitting position
4. The EMS provider at the head slips his/her hands under the patient's arms and grasps the patient's wrists
5. The EMS provider at the patient's feet places his/her hands under the patient's knees
6. Both EMS providers move to a crouching position
7. Both EMS providers stand simultaneously and move with the patient to the stretcher

E. Supine transfer (direct carry)
1. Position the stretcher perpendicular to the bed with the head end of the stretcher at the foot of the bed or the foot end of the stretcher at the head of the bed
2. Both EMS providers stand between bed and stretcher, facing patient
3. First EMS provider slides arm under patient's neck and cradles patient's head and shoulders
4. Second EMS provider slides hands under patient's hips and lifts slightly
5. First EMS provider slides other arm under patient's back
6. Second EMS provider places arms under hips and calves

7. EMS providers slide patient to edge of bed
8. On signal, patient is lifted and curled toward EMS provider's chests
9. EMS providers rotate and place patient gently on stretcher

F. Supine transfer (draw sheet method)
1. Loosen bottom sheet beneath patient
2. Position stretcher next to and parallel to bed
3. Prepare stretcher and adjust to bed height. If a transfer board is used, it should be placed to cover the seam formed between the stretcher and bed
4. EMS providers then reach across stretcher and grasp sheet firmly at the patient's head, chest, hips and knees
5. On signal, slide the patient gently onto stretcher

G. Orthopedic stretcher (scoop)
1. Adjust stretcher, per the manufacturer's instructions
2. Place one half of stretcher on each side of patient
3. Slide stretcher halves under patient and latch head end together
4. Close foot end of stretcher being careful not to pinch patient
5. Secure patient to orthopedic stretcher, padding as necessary
6. Position the patient on the wheeled stretcher

H. Stand and pivot (seated patient to a cot)

Points of emphasis:
- The patient must be able to bear some weight.
- One or two EMS providers may be used.
- Position the cot close to the patient with its height about the same as a chair seat.
- The patient may want to hold onto the EMS provider's shoulders.
- If the patient has footwear that will easily slide on the floor's surface, the EMS provider may need to stand toe-to-toe with the patient to prevent slipping.

Skills:
1. While facing the patient, grasp the patient by the waistband or under the armpits
2. On the EMS provider's count, assist the patient to a standing position
3. Assist the patient in turning (pivoting) so their posterior is toward the cot
4. Once the patient's legs are touching the cot, lower the patient to a seated position
5. Position the patient on the cot

IV. Equipment moves

Refer to manufacturers' instructions for proper use.

6. Stair Chair
7. Stretchers
   a. Manual
   b. Powered
   c. Flexible
   d. Portable
8. Neonate isolette
9. Child passenger safety seats
10. Vacuum mattress

11. Long and short backboards (see section 10)

12. Lifting devices for bariatric patients

Section 3: Airway and respiratory management

Objectives:

- To create a properly functioning oxygen delivery system, through the assembly of individual components, capable of providing appropriate oxygen concentrations for the purpose of patient resuscitation and inhalation therapy.
- To provide the proper positioning of an unconscious patient for the purpose of maintaining patency of the patient's airway.
- To facilitate the patency of a patient's airway through the use of basic and advanced airway adjuncts.
- To create a properly functioning suction system, through the assembly of individual system components, capable of removing foreign materials, blood, fluids and bodily secretions from the upper airway.
- To facilitate the removal of foreign body and/or displaced body tissues from the patient's upper airway through appropriate use of the Magill forceps and laryngoscope.
- To provide adequate resuscitation and/or ventilatory assistance through the use of adjunct airway devices.

Points of emphasis:

- Always position the patient properly to assure an open airway.
- Open the airway using the head-tilt/chin lift or jaw thrust maneuvers.
- Modifications for maintaining the airway may be necessary due to the patient's injuries and/or condition.
- Confirm a patent airway by observing chest rise and fall, air exchange and skin color.
- Artificial ventilation should never be delayed if airway adjuncts or supplemental oxygen are not readily available.
- Auscultate lung sounds bilaterally to ensure adequacy.
- Be alert for changes in the patient's airway status.

I. Oxygen administration and discontinuance

Points of emphasis:

- Oxygen cylinders must be handled carefully since the contents are under high pressure.
- Selection of a delivery device will depend on the patient's condition.
- Regulators reduce the cylinder's pressure to a safe level and regulate the flow of gas in liters per minute.
- Cylinders should retain a safe residual volume of 500 psi or per local protocol.

Skills:

A. Preparing oxygen tank for use
   1. Identify oxygen cylinder by color, correct pin code and 100% USP marking
   2. Remove protective cap or tape
   3. Quickly "crack" (open and close cylinder valve) to remove any impurities, which may have accumulated on the mating surfaces between the tank and regulator
   4. Attach regulator and flowmeter and ensure a leak-proof seal
   5. Turn on cylinder and check pressure gauge to ensure adequate pressure

B. Oxygen administration

1. Attach appropriate delivery device to flowmeter
2. Adjust flow control to deliver recommended level
3. Place delivery device on patient

4. Check adequacy of flow to patient

C. Oxygen discontinuance
   1. Remove oxygen delivery device from patient
   2. Shut off cylinder and bleed regulator
   3. Return flowmeter control to “off” position

II. Patient positioning (Non-trauma unresponsive patient)

Points of emphasis:

- This position may be useful for maintaining a patent airway and preventing aspiration in patients who are unable to properly protect their own airway.
- Airway, ventilations and vital signs should be monitored continuously.

Skills:

A. Recovery and lateral recumbent position
   1. Roll the patient onto his side while supporting the head and neck
   2. Flex uppermost leg and position knee to support weight
   3. Position lower arm out behind patient or place lower arm and forearm under head for support
   4. Position upper arm alongside patient’s face to assist in supporting weight
   5. Ease patient’s head back and jut chin to facilitate airway

III. Oropharyngeal airway insertion

Points of emphasis:

- Always measure airway.
- Use jaw thrust without head-tilt for patients with possible cervical spine injury.
- Tongue depressor or similar device may be used to ease insertion.
- Only to be used on patients without a gag reflex.

Skills:

A. Select airway by measuring from the corner of the patient’s lips to the bottom of the earlobe or angle of the jaw
B. Open mouth using cross-finger technique
C. Insert airway
   1. Adult – with tip pointing toward roof of mouth, insert airway until point touches soft palette, rotate 180 degrees into position with flange resting against lips or teeth
   2. Adult, child or infant – Using a tongue depressor or similar device, move the patient’s tongue forward and down. Insert airway in anatomical position so as to follow the normal curvature of the oropharynx until the flange rests against the lips or teeth
D. Check for adequate air exchange

IV. Nasopharyngeal airway insertion

Points of emphasis:

- If resistance is felt, stop and try other nare.
- Do not use in patients under one (1) year of age.
- Do not use in patients with suspected basal skull fracture.

Skills:

A. Visualize the nares and select a nasopharyngeal airway slightly smaller in diameter than the patient's largest nare

B. Size the device by measuring from the tip of the patient's nose to the tip of the earlobe or angle of the jaw

C. Lubricate the distal surface of the airway with water or a water-soluble lubricant, being careful not to occlude the opening with lubricant

D. Insert the airway into the nare
   1. If placed in the right nare, insert following the normal anatomical curvature of the nasopharynx with the bevel toward the septum. Direct it along the floor of the nose and into the oropharynx
   2. If placed in the left nare, invert the airway so the bevel of the airway follows the septum of the nose. Once the tip of the airway reaches the nasopharynx, rotate the airway 180 degrees to resume alignment with the normal anatomical curvature of the nasopharynx. Continue to insert the airway into the oropharynx

E. Check for adequate air exchange

V. Non-visualized advanced airway insertion

Points of emphasis:

- EMR non-visualized airway insertion is allowed with specific training and approvals in accordance with DHS rule.
- Ventilate the patient per AHA guidelines for a minimum of thirty (30) seconds prior to attempting placement and between airway placement attempts.
- All indications and contraindications for airway use must be considered prior to insertion.
- A maximum of thirty (30) seconds should be allowed for each airway attempt.
- A maximum of three (3) attempts per patient to place airway may be made.
- Confirm a patent airway by observing chest rise and fall, air exchange, and skin color.
- Artificial ventilation should never be delayed if airway adjuncts are not readily available.
- Placement of non-visualized airway is assessed through proper auscultation of epigastric and breath sounds.
  - Obtaining baseline breath sounds prior to advanced airway placement can assist with evaluation of airway placement.
  - The presence of certain chest injuries (i.e. pneumothorax, hemothorax, etc.) will result in absent or diminished breath sounds on the affected side(s) even with proper airway placement.
  - Bilateral breath sounds and/or epigastric sounds, may or may not be present due to reasons other than incorrect airway placement.
- The ability to suction the airway must be constantly available when inserting or removing the airway. Suctioning of the oropharynx should be done according to S & P.
- Gastric distention should be relieved by using gentle pressure to the abdomen or placement of a gastric tube.
- Place patient in neutral or sniffing position for insertion.
  - Use appropriate C-spine stabilization in cases of known or suspected c-spine trauma.
  - Obese patients may need padding under shoulders and upper back.
- Use the tongue-jaw lift to open the airway.
  - A chin lift, laryngoscope, or tongue depressor can be used to lift the tongue anteriorly to allow easy advancement of the non-visualized airway.

- Always be certain that both syringes stay with the patient as long as s/he is intubated with the Combitube®.
- For King LTS-D®:
  - It is important that the tip of the device be maintained at midline to assure that the distal tip is properly placed in the hypopharynx/upper esophagus.
  - During insertion, if tip is placed or deflected laterally, it may enter the perform fossa and will appear to bounce back upon full insertion and release.
  - Insertion can be accomplished via a midline approach by applying a chin lift and sliding the distal tip along the palate and into position in the hypopharynx (head extension may be helpful).
- Local protocols may alter the sequence in which epigastric and breath sounds are checked. Regardless of the sequence, epigastric and bilateral breath sounds must be assessed for placement verification.
- When possible, have a partner ventilate the patient while preparing equipment, during placement checks, and securing the non-visualized airway.
- Be alert for changes in the patient's airway status.
- Placement should be reconfirmed frequently and after every patient move.
- Anticipate that the patient will vomit when removing the non-visualized airway.

Skills:

A. ESOPHAGEAL-TRACHEAL COMBITUBE® (ETC)
   1. INSERTION
      a. Reconfirm assessment of absent or inadequate breathing without a gag reflex
      b. Determine cuff integrity
         1) Inflate cuffs
         2) Disconnect syringes
         3) Carefully inspect pharyngeal and distal cuffs
         4) Carefully inspect valves and pilot cuffs
         5) Deflate both cuffs
      c. Prepare all necessary accessories
         1) Preset inflation syringes to 100 mL and 15 mL (For Small Adult [SA] Model – Preset at 85 mL and 12 mL)
         2) Bag-valve-mask with supplemental oxygen
         3) Water soluble lubricant
         4) Suction device
         5) Stethoscope
      d. Suction as necessary; inspect patient's airway for obstructions, broken teeth, dentures, dental appliances, tongue piercings or other items that could damage cuffs
      e. Ventilate for a minimum of thirty (30) seconds
      f. Lubricate tip of Combitube®, avoiding any openings, with water soluble lubricant as necessary
      g. Position the patient supine with head in the neutral position. Do not hyperextend the patient's head
      h. Remove oropharyngeal airway if previously inserted
      i. While holding the patient's tongue and lower jaw to facilitate insertion:
         1) Insert Combitube® airway following the normal anatomical curvature of the oropharynx
         2) Insert firmly but gently until the insertion markers (two black lines which encircle the proximal end of the airway) are aligned on opposite sides of the patient's teeth or gums

a) Do not use force – If airway does not insert easily, withdraw and re-attempt
b) Ventilate for a minimum of thirty (30) seconds between attempts
c) Maximum of thirty (30) seconds for each attempt
d) Maximum of three (3) attempts
e) Suction as necessary between attempts

j. When Combitube® is positioned
1) Inflate the pharyngeal cuff with 100 mL of air using large syringe (85 mL for Small Adult [SA] Model) through line #1 (blue)
2) Ensure Combitube® has remained in proper position. (Combitube® will move slightly with inflation)
3) Remove syringe and ensure pharyngeal cuff inflation has occurred by observing pilot balloon
4) Inflate distal cuff with 15 mL of air using smaller syringe (12 mL for Small Adult [SA] Model) through line #2 (white)
5) Remove syringe and ensure distal cuff inflation has occurred by observing pilot balloon

k. Ventilate the patient
1) Attach bag-valve-mask (BVM) to primary tube #1 (blue) and ventilate patient
2) While ventilating, confirm tube placement by auscultation of epigastric and breath sounds
a) Assess epigastric and breath sounds
i. Esophageal placement
(1) Epigastric sounds are not present
(2) Breath sounds present high axillary
(3) Breath sounds present bilaterally
(4) Continue to ventilate through tube #1 (blue)
ii. Tracheal placement
(1) Epigastric sounds are present
(2) Breath sounds are not present high axillary
(3) Breath sounds are not present bilaterally
(4) Discontinue ventilation through primary tube #1 (blue)
(5) Ventilate through secondary tube #2 (clear)
(6) Reassess epigastric and breath sounds to confirm tracheal placement
iii. Unknown placement
(1) Epigastric sounds are not present
(2) Breath sounds are not present high axillary
(3) Breath sounds are not present bilaterally
(4) Deflate cuffs (blue then white)
(5) Reposition airway – withdrawing approximately ½ inch
(6) Re-inflate cuffs with appropriate volume of air (blue then white)
(7) Begin ventilations through primary tube #1 (blue) and reassess epigastric and breath sounds to confirm placement
(8) Ventilate as appropriate
iv. Placement remains unknown
(1) Follow removal procedures
(2) Ventilate patient for minimum of thirty (30) seconds
(3) Reattempt placement (maximum of three (3) attempts) starting at the beginning of the insertion steps

2. Removal
    a. Prepare suction and emesis collection devices
    b. Position patient in lateral recumbent position when feasible, observing appropriate C-spine precautions for trauma patients
    c. Use large syringe to deflate cuff #1 (blue) until pilot balloon is completely deflated
    d. Use small syringe to deflate cuff #2 (white) until pilot balloon is completely deflated
    e. Immediately withdraw airway with a smooth and steady motion while maintaining normal curvature of the pharynx
    f. Suction as necessary
    g. Monitor the patient's airway and breathing closely
    h. Provide high-flow oxygen via non-rebreather mask

    i. Consider nasopharyngeal airway and assist ventilations as necessary

B. King LTS-D® Advanced Airway
1. Insertion
    a. Reconfirm assessment of absent or inadequate breathing without a gag reflex
    b. Determine correct size airway based on patient's height
    c. Determine cuff integrity
        1) Inflate cuffs
        2) Disconnect syringes
        3) Carefully inspect pharyngeal and distal cuff
        4) Carefully inspect valve and pilot cuff
        5) Deflate cuffs
    d. Prepare all necessary accessories
        1) Preset inflation syringe to correct amount for device size
        2) Bag-valve-mask with supplemental oxygen
        3) Water soluble lubricant
        4) Suction device
        5) Stethoscope
    e. Suction as necessary; inspect patient's airway for obstructions, broken teeth, dentures, dental appliances, tongue piercings or other items that could damage cuffs
    f. Ventilate for a minimum of thirty (30) seconds
    g. Lubricate airway with water soluble lubricant as necessary
    h. Position the patient supine with head in the neutral or sniffing position. Do not hyperextend the patient's head
    i. Hold the King LTS-D® at the connector with dominant hand
    j. With non-dominant hand, hold mouth open and apply chin lift unless contraindicated by C-spine precautions or patient position
    k. Using a lateral approach, introduce the tip into the corner of the mouth
    l. Advance the tip behind the base of the tongue while rotating the tube back to midline so that the blue orientation line faces the chin of the patient
    m. Without exerting excessive force, advance tube until base of connector is aligned with teeth or gums
    n. Deeper placement and subsequent retraction is preferred
    o. When the King LTS-D® is positioned
        1) Inflate cuffs to volume sufficient to seal the airway
        2) Attach ventilation device to the connector of the King LTS-D®
        3) At the same time, gently bag the patient and withdraw the King LTS-D until ventilation is easy and free flowing
        4) Readjust cuff inflation to "just seal" volume
        5) Check epigastric sounds, breath sounds and chest rise and fall

p. Secure the airway
    1) Disconnect the ventilation device
    2) Tape the King LTS-D in the midline to the maxilla
    3) Avoid taping over gastric access lumen
    4) Reattach the ventilation device

2. Removal
    a. Remove the King LTS-D when protective reflexes have returned
    b. Prepare suction and emesis collection devices – suction as indicated
    c. Position patient in lateral recumbent position when feasible, observing appropriate C-spine precautions for trauma patients
    d. Deflate cuffs
    e. Immediately withdraw airway with a smooth and steady motion while maintaining normal curvature of the pharynx

    f. Monitor the patient's airway and breathing closely
    g. Provide high-flow oxygen via non-rebreather mask
    h. Consider nasopharyngeal airway and assist ventilations as necessary

VI. Endotracheal tube insertion and removal

Objective:
To provide adequate resuscitation and/or ventilatory assistance through the use of endotracheal intubation

Points of emphasis:
- Ventilate the patient per AHA guidelines for a minimum of thirty (30) seconds prior to attempting placement and between airway placement attempts.
- All indications and contraindications for airway use must be considered prior to insertion.
- A maximum of thirty (30) seconds should be allowed for each airway attempt
- A maximum of three (3) attempts per patient to place airway may be made.
- Confirm a patent airway by observing chest rise and fall, and air exchange, and skin color.
- Artificial ventilation should never be delayed if airway adjuncts are not readily available.
- Follow department guideline for which medications may be used to facilitate intubation. Two paramedics must be present at the patient's side when administering paralytics
- Position the patient properly to assure an open airway.
    – Placement of padding under the occiput of an adult may help with proper alignment.
    – Placement of padding under the shoulders of a small child or infant may help with proper alignment.
- Placement of endotracheal (ET) tube is assessed through primary and secondary methods.
    – Obtaining baseline breath sounds and sounds in the epigastric region prior to advanced airway placement can assist with evaluation of tube placement.
    – The presence of certain chest injuries (i.e. pneumothorax, hemothorax, etc.) will result in absent or diminished breath sounds on the affected side(s) even with proper placement.
    – Bilateral breath sounds and/or epigastric sounds, may or may not be present due to reasons other than incorrect tube placement.
    – Use secondary method (EtCO2, colorimetric device) to confirm and monitor placement of ET tube.
    – Correlate secondary confirmation device with patient's condition and assessment findings. Rule out possibility of false positive and false negative findings.

- The ability to suction the airway must be constantly available when inserting or removing the airway. Suctioning of the oropharynx should be done according to the Standards and Procedure Manual.
- Local protocols may alter the sequence in which epigastric and breath sounds are checked. Regardless of the sequence, epigastric and bilateral breath sounds must be assessed for placement verification.
- Be alert for changes in the patient's airway status.
- Placement should be reconfirmed frequently and after every patient move.
- Rescue airway should be readily available in case intubation is unsuccessful.
- When possible, have a partner ventilate the patient while preparing equipment, during placement checks, and securing the ET tube.
- For nasotracheal placement:
  – Do not use in patients with suspected basal skull fracture.
  – The patient must be breathing.
  – Typically, the nasotracheal tube size is one size smaller than orotracheal size

- Anticipate secretions from vomiting and/or coughing when removing an ET tube.

Skills:

A. Orotracheal intubation insertion
   1. Reconfirm assessment for need of endotracheal intubation
   2. Prepare all necessary equipment and accessories
      a. Cuff (determine cuff integrity then deflate cuff)
      b. Syringe (preset inflation syringe according to manufacturer instructions)
      c. Laryngoscope and blade (check for functioning light)
      d. Stylet (stylet tip must be recessed from the tip of the tube)
      e. Bag-valve-mask with supplemental oxygen
      f. Water soluble lubricant to lubricate tip as necessary
      g. Suction device
      h. Stethoscope
      i. Securing device
      j. Secondary device for endotracheal confirmation
      k. Other accessories that will be used such as Bougie, video scope, medications)
   3. Suction as necessary; inspect patient's airway for obstructions, broken teeth, dentures, dental appliances, tongue piercings or other items that could damage cuff
   4. Ventilate for a minimum of thirty (30) seconds
   5. Position patient's head properly. Do not hyperextend the patient's head
      a. For patients without suspected spinal injury, place in sniffing position with head tilted and neck extended
      b. For patients with a possible spinal injury, maintain inline cervical spinal stabilization during the entire intubation
   6. Remove oropharyngeal airway if previously inserted
   7. When positioned superior to the patient's head, insert laryngoscope blade into right side of mouth while displacing tongue to left
   8. Elevate mandible with laryngoscope to visualize vocal cords
      a. Insert endotracheal tube, following the normal anatomical curvature of the oropharynx
      b. Insert firmly but gently until the cuff is just distal to the vocal cords
         1) Do not use force – If airway does not insert easily, withdraw and reattempt
         2) Ventilate for a minimum of thirty (30) seconds between attempts
         3) Maximum of thirty (30) seconds for each attempt
         4) Maximum of three (3) attempts

5) Suction as necessary between attempts

9. When endotracheal tube (ET tube) is positioned
   a. Inflate the cuff with minimal amount of air to prevent air leaks
   b. Ensure ET tube has remained in proper position
   c. Remove syringe and ensure cuff inflation has occurred by observing pilot balloon
10. Maintain manual stabilization of ET tube until secured
11. Ventilate the patient confirming proper placement
    a. Ideally attach capnography or a CO2 colorimetric device before the first ventilation
    b. Attach bag-valve-mask (BVM) to ET tube and ventilate patient
    c. While ventilating, listen over the stomach
12. Confirm proper placement through primary and secondary methods
    a. Tracheal placement
       1) No epigastric sounds auscultated with ventilations
       2) Breath sounds are present bilaterally
       3) Secure endotracheal tube
    b. Esophageal placement

       1) If you hear epigastric sounds, stop ventilating, remove the tube, and continue to manage the airway
    c. Right main stem placement
       1) Epigastric sounds are not present
       2) Breath sounds are present on right
       3) Breath sounds are not present on left
       4) Deflate cuff
       5) Withdraw endotracheal tube 1-2 cm
       6) Re-inflate cuff with appropriate volume of air
       7) Begin ventilations and reassess epigastric and breath sounds to confirm placement
       8) Ventilate as appropriate
    d. Unknown placement
       1) Epigastric sounds are not present
       2) Breath sounds are not present high axillary
       3) Breath sounds are not present bilaterally
          a) Deflate cuff
          b) Reposition endotracheal tube
          c) Re-inflate cuff with appropriate volume of air
          d) Begin ventilations and reassess epigastric and breath sounds to confirm placement
          e) Ventilate as appropriate
       4) Placement remains unknown
          a) Remove endotracheal tube
          b) Ventilate patient for minimum of thirty (30) seconds
          c) Reattempt placement (maximum of three (3) attempts)
13. When placement is confirmed, secure endotracheal tube with tape or commercial device

B. Nasotracheal intubation insertion
   1. Reconfirm assessment for need of endotracheal intubation
   2. Assess the nares and select the larger for intubation
   3. Prepare all necessary equipment and accessories
      a. Cuff (determine cuff integrity then deflate cuff)
      b. Syringe (preset inflation syringe according to manufacturer instructions)

c. Bag-valve-mask with supplemental oxygen
d. Water soluble lubricant to lubricate tip as necessary
e. Suction device
f. Stethoscope
g. Securing device
h. Secondary device for endotracheal confirmation

4. Suction as necessary; inspect patient's airway for obstructions
5. Ventilate for a minimum of thirty (30) seconds
6. Maintain patient's head in the neutral position
7. Remove oropharyngeal or nasopharyngeal airway if previously inserted
8. Insert the ET tube into the selected nare with the bevel towards the septum until reaching the bridge of the nose. If using the right nare, continue with insertion; if using the left nare, rotate ET tube to follow normal curvature of airway
   a. Advance ET tube straight back along floor of nasal passage until tip is just above the vocal cords. Air movement can be heard through the tube
   b. When the patient inhales, insert ET tube firmly but gently; advance until the flange of the ET tube rests against the nare
   c. If resistance is met, remove and attempt placement in the other nare
      1) Do not use force – If airway does not insert easily, withdraw and reattempt
      2) Ventilate for a minimum of thirty (30) seconds between attempts
      3) Maximum of thirty (30) seconds for each attempt
      4) Maximum of three (3) attempts
      5) Suction as necessary between attempts
9. When endotracheal tube (ET tube) is positioned
   a. Inflate the cuff with minimal amount of air to prevent air leaks
   b. Ensure ET tube has remained in proper position
   c. Remove syringe and ensure cuff inflation has occurred by observing pilot balloon
10. Maintain manual stabilization of ET tube until secured
11. Ventilate the patient confirming proper placement
   a. Ideally attach capnography or a CO2 colorimetric device before the first ventilation
   b. Attach bag-valve-mask (BVM) to ET tube and ventilate patient
   c. While ventilating, listen over the stomach
12. Confirm proper placement through primary and secondary methods
   a. Tracheal placement
      1) No epigastric sounds auscultated with ventilations
      2) Breath sounds are present bilaterally
      3) Secure endotracheal tube
   b. Esophageal placement
      1) If you hear epigastric sounds, stop ventilating, remove the tube, and continue to manage the airway
   c. Right main stem placement
      1) Epigastric sounds are not present
      2) Breath sounds are present on right
      3) Breath sounds are not present on left
      4) Deflate cuff
      5) Withdraw endotracheal tube 1-2 cm
      6) Re-inflate cuff with appropriate volume of air
      7) Begin ventilations and reassess epigastric and breath sounds to confirm placement
      8) Ventilate as appropriate

d. Unknown placement
    1) Epigastric sounds are not present
    2) Breath sounds are not present high axillary
    3) Breath sounds are not present bilaterally
        a) Deflate cuff
        b) Reposition endotracheal tube
        c) Re-inflate cuff with appropriate volume of air
        d) Begin ventilations and reassess epigastric and breath sounds to confirm placement
        e) Ventilate as appropriate
e. Placement remains unknown
    1) Remove endotracheal tube
    2) Ventilate patient for minimum of thirty (30) seconds
    3) Reattempt placement (maximum of three (3) attempts)

13. When placement is confirmed, secure endotracheal tube with tape or commercial device

C. Endotracheal tube removal or extubation
1. Recognize need for extubation
2. Prepare suction and emesis collection devices
3. Position patient in upright or semi-Fowler's position
4. Explain procedure to patient

5. Oxygenate patient for approximately one minute, if possible
6. Suction secretions from mouth and oropharynx
7. Attach syringe to pilot balloon and deflate cuff while patient takes a deep breath
8. Instruct patient to cough as tube is pulled gently, but quickly
9. Provide supplemental oxygen and encourage patient to take some deep breaths
10. Monitor respiratory status carefully

VII. Pharyngeal and tracheobronchial suctioning

Points of emphasis:

- Always measure flexible catheter.
- Use cross-finger technique or tongue blade devices to prevent EMS provider and/or patient injury.
- Apply suction after reaching insertion depth.
- Maximum suction time for adult patients is 15 seconds.
- Maximum suction time for pediatric patients is 5 seconds.
- Suction the mouth first, then the nose on infants.
- Determining depth of insertion for suction catheters:
  – Rigid tip: Do not lose sight of the distal tip.
  – Flexible tip: Measure flexible catheter from tip of earlobe to corner of mouth.
  – Tracheobronchial suction: There are many acceptable techniques not addressed here (such as inserting catheter until tip reaches carina, pull back slightly then create suction; instilling saline prior to suctioning to loosen secretions; alternative methods for measuring insertion depth; etc.). Follow department policies approved by your medical director.
    Tracheobronchial suctioning should follow sterile technique.
- Suction unit should be set to 80-120 mmHg when using an open-suction system. If using a closed-suction system, follow the manufacturer's directions.

Skills:

A. Flexible or rigid tip
   1. Attach suction tip to suction device
   2. Switch on suction unit (or begin pumping) and ensure suction is present
   3. Open mouth using cross-finger technique or tongue blade device
   4. Insert suction device to the proper depth into oropharynx with no suction at tip
   5. Suction across oropharynx
   6. Remove device while maintaining suction
   7. Flush system with water as necessary
   8. Check for adequate air exchange

B. Bulb syringe (infants)
   1. Squeeze air from bulb prior to insertion
   2. Gradually reduce pressure on bulb to provide suction while removing from nose or mouth
   3. Check for adequate air exchange
   4. Repeat as necessary

C. Tracheobronchial suctioning (endotracheal tube)
   1. Preoxygenate patient for 30-60 seconds prior to each pass of the suction catheter whenever feasible
   2. Attach flexible suction tip to suction device
   3. Switch on suction unit and ensure suction is present
   4. Measure or identify the insertion length of the catheter by rough approximation or measuring against another tracheal tube to determine insertion length. Use the thumb and index finger of one hand to mark insertion length
   5. Use the other hand to feed catheter into tracheal tube without suction
   6. Once catheter is at desired insertion depth, create suction and withdraw suction catheter with a rotating/twisting technique from tracheal tube (maximum of 15 seconds for adult patient)
   7. Remove device while maintaining suction
   8. Flush system with sterile water or sterile saline until tubing is clear
   9. Once lower airway is adequately cleared of secretions, perform oropharyngeal suctioning. A rigid tip may be used for oropharyngeal suctioning
   10. Check for adequate air exchange

VII. Laryngoscope and Magill forceps

Points of emphasis:

- The laryngoscope should never be levered against the teeth.
- The Magill forceps should be held so the handle does not obstruct the view of the pharynx.
- Curved blades are to be used for foreign body removal.
- This device is intended for use on unconscious patients.

Skills:

A. Choose appropriate-sized forceps, laryngoscope handle and blade per manufacturer's specifications
B. Assemble blade and handle, ensure light is bright and tightly secured in the blade
C. Place the patient's head in the "sniffing" position
D. Hold laryngoscope in left hand
   1. Adult patient – Hold handle with entire hand
   2. Infant patient – Hold handle with thumb, index and middle fingers while supporting chin with ring and little fingers of left hand for leverage

E. With the EMS provider at patient's head, insert blade in right side of mouth and displace tongue to left by moving blade to midline
F. Lift tongue in direction of long axis of the handle without prying on teeth or gums
G. Visualize obstruction
H. Using the Magill forceps in the right hand, remove obstruction
I. Visualize airway for further obstructions before removing laryngoscope blade
J. Check for adequate air exchange

IX. Bag-valve-mask ventilation

Points of emphasis:

- This technique should be used with supplemental oxygen to deliver high concentrations of oxygen.
- Inflate only enough to make visible chest rise.
- The bag-valve-mask may be used on patients who are not breathing or patients who are breathing but not exchanging adequate amounts of air.
- Do not delay ventilations to attach supplemental oxygen.
- This procedure should be performed as a two-EMS-provider technique whenever possible.
- Appropriate C-spine considerations should be taken when managing patients with potential spinal injuries.
- Pediatric bag-valve devices may have a pop-off valve.

Skills:

A. Select and insert appropriate airway adjunct
B. Select adult, pediatric or infant size bag-valve-mask and assemble components
C. Attach oxygen supply to bag-valve-mask; adjust oxygen supply to recommended level

D. Seal mask on patient's face while maintaining head-tilt, chin-lift or attach to advanced airway adjunct fitting
E. Squeeze bag, ventilating patient according to AHA guidelines
F. Observe chest rise and fall with each ventilation. If no chest rise, reassess equipment, technique and patient
G. If two EMS providers are available, one EMS provider uses two hands to maintain the airway and mask seal, while the second EMS provider uses two hands to compress the bag to provide ventilations

X. Manually triggered ventilation devices

Points of emphasis:

- Prolonged depression of ventilation button may result in gastric distention.
- Proper airway positioning minimizes the potential of gastric distention.
- Manually triggered ventilation devices are not recommended for use with pediatric or chest trauma patients.
- Must be reduced to deliver no more than 40 LPM of oxygen.
- May be used by spontaneously breathing patients.
- Follow local medical protocols governing the use of this device.
- Appropriate C-spine considerations should be taken when managing patients with potential spinal injuries.

Skills:

A. Connect device to oxygen source

B. Open cylinder and check for leaks
C. Select and insert appropriate airway adjunct, if indicated
D. Press ventilation button to clear line and check operation
E. Seal mask on patient's face while maintaining head-tilt, chin-lift or attach to advanced airway adjunct fitting
F. Depress ventilation button until patient's chest rises
G. Release ventilation button and observe patient's exhalation
H. Ventilate per AHA guidelines

XI. Pocket mask

Points of emphasis:

- Oxygen concentrations will be increased by attaching supplemental oxygen.
- Do not delay ventilations to attach supplemental oxygen.
- Remove one-way valve when attaching pocket mask to bag-valve device.
- Appropriate C-spine considerations should be taken when managing patients with potential spinal injuries.

Skills:

A. Select and insert properly sized oropharyngeal or nasopharyngeal airway, if available
B. Unfold pocket mask as appropriate and attach one-way valve
C. If available, attach oxygen delivery tube to oxygen source and to mask inlet
D. Turn on oxygen and adjust liter flow to recommended level
E. While maintaining head-tilt, chin-lift, seal mask on patient's face
F. Ventilate patient through one-way valve attached to mask until chest rises
G. Allow patient to exhale while maintaining mask seal to face
H. Ventilate per AHA guideline

XII. Continuous positive air pressure (CPAP)

Point of emphasis:

- All indications and contraindications for the use of CPAP must be considered.

Skills:

A. Application
    1. Explain the procedure to the patient
    2. Ensure adequate oxygen supply to ventilation device
    3. Place the patient on continuous pulse oximetry
    4. Place the patient on cardiac monitor (if available) and record rhythm strips along with vital signs
    5. Place the delivery device over the mouth and nose
    6. Secure the mask with provided straps or other provided devices
    7. Use appropriate cm H_2O of PEEP per local protocol
    8. Check for air leaks
    9. Monitor and document the patient's respiratory response to treatment
    10. Check and document vital signs every five minutes
    11. Administer appropriate medication as certified (continuous nebulized albuterol for COPD/asthma and repeated administration of nitroglycerin spray or tablets for CHF)
    12. Continue to coach patient to keep mask in place and readjust as needed
    13. Request ALS intercept if available
    14. If respiratory status deteriorates, remove device and consider intermittent positive pressure ventilation via BVM and/or placement of non-visualized airway or endotracheal intubation

B. Removal procedure
    1. CPAP therapy needs to be continuous and should not be removed unless the patient cannot tolerate the mask or experiences respiratory arrest or begins to vomit
    2. Intermittent positive pressure ventilation with a bag-valve-mask, placement of a non-visualized airway and/or endotracheal intubation should be considered if the patient is removed from CPAP therapy

XIII. Percutaneous surgical or needle cricothyrotomy

Objective:

- To provide an emergent airway via a surgical or needle cricothyrotomy when unable to manage airway by any other means.

Points of emphasis:

- Complete patient assessment must be performed to determine the patient needs an emergent cricothyrotomy.
- To minimize risk of infection, prep the area of puncture and maintain sterility of equipment.
- Administer 100% oxygen, and/or BVM ventilate the patient.
- Gather equipment before starting procedure and maintain sterility of equipment. Equipment may be a kit and/or include:
    - 14 gauge, or larger, needle for adult patient; 18- or 20-gauge needle for pediatric patient
    - Antimicrobial cleaning solution for cleansing site
    - 3.0 mm and 7.0 mm endotracheal tube adapter
    - Syringes ranging between 3 ml and 10 ml
    - Scalpel
    - Hemostats, small rake retractors or tracheal hook
    - Twill-tape or umbilical tape
    - Jet insufflator and/or bag-valve device
    - 7.0 endotracheal tube or tracheostomy tube for an adult patient; 5.0 for pediatric patient
    - Stethoscope
    - EtCO2 detector
    - Sharps container
- Surgical cricothyrotomy
    - Not recommended for patients under 12 years of age.
    - A vertical midline incision may result in a small amount of venous bleeding but avoids the laterally located vasculature of the neck.
    - A distinct ‘pop’ will be felt as the scalpel pierces the membrane and enters the trachea.
    - If the incision is lost, the location can be identified by means of air bubbles produced during exhalation. If the patient is apneic, apply pressure to the anterior chest wall to simulate exhalation and thereby produce air bubbles.
- Document procedure and results, including any unusual circumstances and/or difficulties encountered.

Skills:

A. Needle cricothyrotomy
    1. Place patient in the supine position
    2. Identify the anatomic landmarks
        a. Palpate the thyroid cartilage (the first prominent landmark on the anterior neck), the cricoid cartilage (caudal to the thyroid cartilage), and the area between them, which is the cricothyroid space that contains the membrane

b. With the non-dominant hand, stabilize the area using the first and third digits to either side of the thyroid cartilage, leaving the index finger to palpate the membrane

3. Prep the area with antimicrobial agent
4. Don sterile gloves
5. Attach a 14 gauge, or larger, over-the-needle catheter to a 5-10 ml syringe
6. Use non-dominant hand, with sterile glove on, to re-identify anatomic landmarks and stabilize the puncture area
7. Puncture the skin midline and directly over the cricothyroid membrane while stabilizing the trachea
8. Direct the needle at a 45-degree angle caudally
9. Carefully advance the needle through the cricothyroid membrane with constant aspiration (aspiration of air indicates entry into the tracheal lumen)
10. Withdraw the metal needle while gently advancing the plastic catheter
11. While using oxygen
    a. If using a jet insufflator: connect catheter to jet insufflator (50 psi or 15L/min) with the inspiratory/expiratory ratio set at 1:2
    b. If using a bag-valve device: attach the catheter to either a 3 mm ET tube adapter or combine barrel of a 3 ml syringe and a 7mm ET tube adapter and ventilate using the bag-valve device
12. Confirm proper placement through primary and secondary methods
13. Secure the apparatus to the patient's neck
14. Dispose of contaminated equipment in appropriate receptacle
15. Continually reassess patient for desired/undesired effects

B. Surgical cricothyrotomy
1. Place patient in the supine position
2. Identify the anatomic landmarks
    a. Palpate the thyroid cartilage (the first prominent landmark on the anterior neck), the cricoid cartilage (caudal to the thyroid cartilage), and the area between them, which is the cricothyroid space that contains the membrane

    b. With the non-dominant hand, stabilize the area using the first and third digits to either side of the thyroid cartilage, leaving the index finger to palpate the membrane
3. Prep the area with antimicrobial agent
4. With the dominant hand, make a midline vertical incision, approximately 3 cm long and skin deep, over the cricothyroid membrane
5. Palpate the cricothyroid membrane through the incision, using the index finger of the non-dominant hand
6. Make a horizontal stab incision through the membrane
7. Insert the tracheal hook or rake retractor at the superior end of the incision and retract the skin and membrane cephalically. Keep the scalpel in place until the tracheal hook or rake is inserted
8. Insert an appropriately sized cuffed ETT or tracheostomy tube directing it caudally
9. Inflate the cuff and ventilate the patient with bag-valve device
10. Confirm proper placement by chest rise, auscultation over epigastrium and bilaterally over each lung while using waveform EtCO2, if available, to accurately monitor the patient's real time cellular perfusion
11. Secure the tube to the patient's neck
12. Dispose of contaminated equipment in appropriate receptacle
13. Continually reassess patient for desired/undesired effect

Section 4: Patient assessment

The assessment process recognizes that trauma patients, medical patients, conscious patients and unconscious patients have different assessment priorities. Using the critical thinking process, the mechanism of injury (MOI), whether it be significant or insignificant, and the nature of illness (NOI), needs to be considered as the assessment is performed on each and every patient.

Objectives:

- To determine the presence or absence of actual or potential hazards which pose a threat to the health and safety of the EMS provider, patient or bystander during EMS provider operations and/or during transport.
- To determine the presence or absence of injury or illness through a systematic assessment process incorporating inspection, auscultation, palpation, the taking of a patient history and the patient's vital signs.

Points of emphasis:

- Safety is paramount throughout the call.
- Scene size-up and primary assessment must be completed prior to the secondary assessment.
- MOI / NOI determines path of assessment.
- Patients with an altered mental status include those who are unresponsive and those who are unable to respond reliably or provide a history.
- If the patient becomes unstable at any time, immediately repeat the primary assessment.

Skills:

I. Patient assessment

A. Scene size-up
   1. Determine the nature of illness (NOI) or mechanism of injury (MOI)
      a. En route to scene:
         1) Dispatch information
         2) Other units at scene
      b. Upon arrival at scene:
         1) Inspect the scene
         2) Patient, family, witnesses, bystanders, other EMS providers
   2. Utilize appropriate PPE
   3. Determine whether the scene is safe
      a. Environmental considerations--weather
      b. Personal protection--crash scenes, hazmat, crime scenes, behavioral
      c. Unstable surfaces
      d. Other hazards
      e. If the scene is not safe, make it safe, or do not enter
   4. Determine the number of patients
   5. Determine the need for and request additional resources prior to patient contact (as possible)
   6. Recognize the need for C-Spine precautions

B. Primary Assessment
   1. Form a general impression of the patient as you approach, telling the patient your first name and explaining that you are an EMS provider
      a. Establish approximate age

b. Establish gender
c. Identify race
d. Assess environmental clues
e. Note position and location of patient and whether patient is stable or unstable
f. Note any and treat life-threatening injuries, if present

2. Assess the patient's mental status and maintain C-spine stabilization, if needed
   a. Speak to the patient
      1) AVPU scale
         a) **A**lert
         b) Responds to **V**erbal stimuli
         c) Responds to **P**ainful stimuli
         d) **U**nresponsive
3. Assess the patient's airway
   a. Is the patient talking or crying?
      1) Yes: Assess breathing
      2) No: Open airway
4. Assess the patient's breathing
   a. If the patient is not responsive but breathing is adequate, open and maintain the airway and initiate oxygen therapy
   b. If the patient is not breathing adequately, open and maintain the airway, initiate oxygen therapy, utilize appropriate adjuncts and/or assist ventilations as necessary to maintain adequate tidal volume and rate
   c. If the patient is not breathing, open and maintain the airway, utilize airway adjuncts and ventilate with supplemental oxygen
5. Assess the patient's circulation
   a. Pulse-present
      1) Less than one year old: Palpate the brachial artery
      2) More than one year-old and responsive: Palpate the radial artery
      3) More than one year old and unresponsive or more than one year old with absent radial pulse: Palpate carotid pulse
   b. If pulse absent
      1) Initiate CPR
      2) Implement AED protocol as appropriate
   c. Assess and control major external bleeding
   d. Assess skin color, temperature, condition and capillary refill time (CRT) (Note: CRT is a more reliable indicator in patient under six years of age)
6. If patient's condition warrants, consider performing a rapid physical exam (rapid scan) or neurological exam to determine potential life threats
7. Establish a differential diagnosis/field impression
8. Expose as necessary and integrate life-saving interventions as warranted
9. Evaluate patient stability and priority of patient care
10. Determine the patient's transport priority, consider ALS back-up

NOTE: The sequence in which History-Taking and Vital Signs are performed or when Monitoring Devices are used may depend on circumstances, the number of available EMS providers and the presence of life-threatening problems requiring urgent intervention. Remember that the patient's priority is constantly being evaluated and subject to change.

C. Begin History-Taking

1. Investigate the chief complaint utilizing various sources such as patient, family, bystanders, medical identification jewelry
2. Obtain statistical and demographic information such as correct dates, age, gender, race
3. Obtain current health status relative to tobacco and alcohol use, diet, immunizations
4. Obtain history of past/present illness (SAMPLE)
    a. Signs and symptoms
    b. Allergies
        1) Medicines
        2) Foods
        3) Environmental
    c. Medications
        1) Prescriptions
        2) Over-the-Counter
        3) Alternative medication, herbal supplements
    d. Pertinent/past medical history
        1) Heart disease
        2) Respiratory conditions
        3) Diabetes
        4) Seizures
        5) Recent hospitalizations/surgeries
    e. Last oral intake
    f. Events leading to the injury or illness
5. Assess history of present injury or illness (OPQRST)
    a. **O**nset
    b. **P**rovocation
    c. **Q**uality
    d. **R**adiation
    e. **S**everity
    f. **T**ime
6. Additional questions regarding present illness including pertinent negatives

D. Assess baseline vital signs
1. Breathing-rate, rhythm and quality
2. Pulse-rate, rhythm and quality
3. Blood Pressure
4. Pupils
5. Skin color and condition (capillary refill reliable under six years of age)

E. Use other monitoring devices as necessary
1. Pulse oximeter per manufacturer's directions
2. Blood glucose monitor per manufacturer's directions
3. Automated blood pressure measuring devices per manufacturer's directions
4. Other devices

F. Secondary Assessment
1. Perform an appropriate physical exam
    a. Rapid physical (full-body) scan (if not done in primary assessment)
        1) Used for unresponsive medical or trauma patient with significant MOI
        2) Assess for DCAP/BTLS
            a) Deformities or discoloration
            b) Contusions
            c) Abrasions
            d) Punctures/penetrations
            e) Burns

f) Tenderness
g) Lacerations
h) Swelling

b. Focused assessment
1) Used for a responsive medical patient or a trauma patient with no significant mechanism of injury
2) Based on the patient's chief complaint
3) Narrows exam to injury location or medical complaint

c. Secondary assessment (full body scan)
1) Head-to-toe, slower, more deliberate assessment
2) May be performed at scene, during transport or may be prohibitive depending upon patient care and condition

2. Establish a management plan and continue/initiate appropriate interventions
3. Re-evaluate transport decision

G. Reassessment
1. Repeat primary assessment
2. Reassess and record vital signs every five minutes (unstable patient) or every fifteen minutes (for stable patient)
3. Repeat physical assessment as appropriate for patient
4. Recheck interventions and patient's response to treatment; revise treatment, as necessary

Section 5: Cardiac management

I. Cardiopulmonary resuscitation

All cardiopulmonary resuscitation (CPR) procedures shall be performed as directed in the current American Heart Association (AHA) guidelines

II. Automated external defibrillation

All AED procedures shall be performed as directed in current AHA guidelines in concurrence with local protocols/ DHS Sample Approved protocol

III. Electrical therapy

All electrical therapy procedures shall be performed as directed in current AHA guidelines in concurrence with local protocols/ DHS Sample Approved protocol.

Objectives:

- To safely provide electrical therapy for life-threatening emergencies.
- To deliver electrical energy through defibrillation.
- To deliver electrical energy through synchronized cardioversion.
- To deliver electrical energy through transcutaneous pacing.

General principles:

- Always ensure good adherence of defibrillation/pacer pads to the patient.
- An IV/IO should be started (if within scope of practice) when electrical therapy is needed.
- Electrical therapy should be used in conjunction with medications according to AHA guidelines (if within scope of practice).
- The appropriately sized defibrillation pads/paddles should be used. However, if pediatric pads/paddles are not available, adult pads/paddles should be used on a pediatric patient.

- Hands-free defibrillation is safest.
- When placing pre-gelled pads, roll the pads onto the prepped area. Press firmly on the adhesive and gently on the gelled area to remove trapped air and ensure good skin contact.
- Do not place defibrillation pads/paddles and pacing pads over an implanted pacer or cardioverter-defibrillator generator, medication patches, ECG cables and electrodes or dressings.

A. Manual defibrillation

Points of emphasis:

- Assess the environment for safety concerns when performing defibrillation (patient clear of fluids/puddles, good adherence of defibrillation pads, etc.).
- Complete patient assessment to determine that patient is in cardiac arrest.
- Prep the area where the pads are to be applied by drying the skin, removing debris, minimizing hair, etc..
- Select defibrillation energy per AHA guidelines and manufacturer recommendations for model of defibrillator.
- Always verbally and visually clear the patient prior to defibrillating the patient.
- Assure high quality CPR is performed per AHA guidelines.
- Initiate an IV/IO as soon as possible; do not delay defibrillation to initiate vascular access.
- Manual defibrillation paddles
  - Paddles may allow operator to change energy level and may offer a “quick look” feature.
  - Defibrillation through paddles is achieved by simultaneously depressing both defibrillation buttons on the paddles.

Skills:

1. Confirm the absence of patient pulses
2. Direct partner(s) to initiate high quality CPR
3. Turn the monitor/defibrillator on and check that defibrillation cable is attached to unit
4. Apply defibrillation pads either in sternal/apex or anterior/posterior position
   a. Hands free defibrillator pads
      1) Follow manufacturer’s recommendation for pad placement
      2) Assure pads have good skin contact
      3) Pads should be at least 1 inch apart
      4) Attach defibrillation pad cable to defibrillator
      5) When performing defibrillation (step #9 below), press the appropriate button
   b. Defibrillation paddles
      1) Applying the paddles to the patient may be done after charging
      2) Electrode jelly or gel defibrillation pads should be used with paddles
      3) Paddles must be in full contact with patient’s skin
      4) Place paddles in the sternal/apex position (upper right anterior chest under the clavicle and on the left chest at the 5th intercostal space between the mid-clavicular and the anterior axillary lines)
      5) When performing defibrillation (step #9 below), hold paddles firmly in place and apply 25 pounds of pressure on each paddle until machine discharges
5. Select energy level after identifying rhythm as ventricular fibrillation or pulseless ventricular tachycardia
6. Charge defibrillator

7. Start paper recording to document rhythm. Information may be stored on memory card on some units
8. Verbally and visually "clear" everyone from the patient
9. Deliver defibrillation by pressing correct button(s)
10. Resume high quality CPR immediately after defibrillation
11. Coordinate prompt and repeated defibrillation with CPR and other basic and advanced skills
    a. Oxygen administration
    b. Airway placement
    c. Vascular access
    d. Medication administration
12. Repeat steps #5-10 as needed

B. Synchronized cardioversion

Points of emphasis:

- Assess the environment for safety concerns when performing cardioversion (patient clear of fluids/puddles, good adherence of defibrillation pads, etc.).
- Complete patient assessment to determine if patient's instability is due to a rapid heart rate.
- Consider administering sedation prior to or after performing cardioversion as patient condition allows.
- Prep the area where the pads are to be applied by drying the skin, removing debris, minimizing hair, etc.
- Adjust size (gain) or lead being used to ensure QRS is properly 'flagged'.
- Select cardioversion energy per AHA guidelines and manufacturer recommendations for model of defibrillator.
- Many defibrillator units require operator to activate synchronization mode every time. Other units will stay in synchronization mode until they are manually turned off.
- Always verbally and visually clear the patient prior to cardioverting the patient.
- Many machines will automatically print a rhythm strip with cardioversion.
- Initiate an IV/IO as soon as possible.
- Unsynchronized cardioversion can be done in an unstable patient when you cannot get the defibrillator to synchronize.

Skills:

1. Turn the monitor/defibrillator on and check that defibrillation cable is attached to unit
2. Identify rhythm as tachycardia and that patient is symptomatic due to tachycardia
3. Obtain 12-lead electrocardiogram, if able
4. Determine what the rhythm is in order to select the correct energy level
5. Explain procedure to patient
6. Apply defibrillation pads either in sternal/apex or anterior/posterior position
    a. Hands-free defibrillator pads
        1) Follow manufacturer's recommendation for pad placement
        2) Assure pads have good skin contact
        3) Pads should be at least 1 inch apart
        4) Attach defibrillation pad cable to defibrillator
        5) When performing cardioversion (step #13 below), press the appropriate button
    b. Defibrillation paddles
        1) Applying the paddles to the patient may be done after charging
        2) Electrode jelly or gel defibrillation pads should be used with paddles

3) Paddles must be in full contact with patient's skin
4) Place paddles in the sternal/apex position (upper right anterior chest under the clavicle and on the left chest at the 5th intercostal space between the midclavicular and the anterior axillary lines)
5) When performing cardioversion (step #13 below), hold paddles firmly in place and apply 25 pounds of pressure on each paddle until machine discharges

7. Activate synchronization mode on defibrillator unit
8. Identify that the QRS is being flagged
9. Select energy level
10. Charge defibrillator
11. Start paper recording to document rhythm. Information may be stored on memory card on some units
12. Verbally and visually "clear" everyone from the patient
13. Deliver cardioversion by pressing and holding correct button(s)
14. Coordinate prompt and repeated synchronized cardioversion with other basic and advanced skills
    a. Oxygen administration
    b. Vagal maneuvers
    c. Vascular access
    d. Medication administration
15. Repeat steps #7-13 as needed
16. Obtain print-out of post cardioversion rhythm and a 12-lead electrocardiogram after successful cardioversion

C. Transcutaneous pacing

Points of emphasis:

- Assess the environment for safety concerns when performing pacing (patient clear of fluids/puddles, good adherence of pacing pads, etc.).
- Complete patient assessment to determine if patient's instability is due to a slow heart rate.
- Consider administering sedation prior to or after initiating transcutaneous pacing as patient condition allows.
- With some units, a decision must be made for fixed rate or demand pacing.
- Prep the area where the pads are to be applied by drying the skin, removing debris, minimizing hair, etc..
- Adjust size (gain) or lead being used to ensure QRS is properly 'flagged'.
- If patient's response to successful capture of pacing is inadequate, increasing the pacing rate may increase cardiac output.
- When possible, initiate an IV/IO prior to starting transcutaneous pacing.

Skills:

1. Turn the pacing unit on and check that pacing cable is attached to unit
2. Identify rhythm as bradycardia and that patient is symptomatic due to bradycardia
3. Obtain 12-lead electrocardiogram, if able
4. Explain procedure to patient
5. Apply pacing pads either in sternal/apex or anterior/posterior position
    a. Follow manufacturer's recommendation for pad placement
    b. Assure pads have good skin contact
    c. Pads should be at least 1 inch apart

d. Attach pacing pad cable to defibrillator
6. Activate pacing mode
7. Set desired pacing rate, usually between 60-80 beats per minute
8. Identify that the QRS is being flagged
9. Increase current (milliamps) until 100% capture is noted on the monitor
10. Increase current (milliamps) per protocol over where capture was achieved
11. Assess for mechanical capture by checking if patient's pulse matches the set rate
12. Reassess patient's response to pacing (vitals, LOC, etc.)
13. Coordinate prompt transcutaneous pacing with other basic and advanced skills
    a. Oxygen administration
    b. Vascular access
    c. Medication administration

IV. Cardiac monitoring

Objective:

To apply a cardiac monitor for rhythm identification and monitoring

Points of emphasis:

- Identify need for cardiac monitoring.
- Print a rhythm strip at the onset of monitoring and with rhythm changes.
- Consider need for a 12-lead electrocardiogram.
- Monitoring may be done with 3,4 or 5 leads. When placing electrodes on patient, consider if a 12-lead will be done for optimal placement on the limbs.
- Place electrodes, avoiding large muscle masses, large quantities of hair, or anything that would keep electrodes from resting flat on the skin.

Skills:

A. Turn the monitor on
B. Prep the skin as needed
C. Connect electrodes to cables
D. Apply electrodes to patient
    1. RA=Right arm
    2. LA=Left arm
    3. LL=Left leg
    4. RL=Right leg
E. Enter patient information into monitor
F. Assess rhythm and correlate to patient condition

Section 6: Medication preparation and administration

Objectives:

- To prepare the appropriate delivery device for the purpose of administering medications.
- To prepare the appropriate delivery device for the purpose of administering fluids.
- To administer medication enteral and parenteral routes.

Points of emphasis:

- Medication must be administered in compliance with local protocols and medical direction.

- A comprehensive assessment must be performed on all patients to whom medications will be administered to determine:
  - Indication for medication
  - Contraindication(s) for medication
  - Appropriate dose for patient
  - Response to medication
- Before administering any medication, always be certain you have the “six rights”:
  - The right patient
  - The right medication
  - The right dose
  - The right time
  - The right route
  - The right documentation
- Prior to medication preparation and delivery, inspect the medication to ensure it:
  - Contains the correct medication
  - Contains the correct dose
  - Has not expired
  - Has not been contaminated in any manner. Non-intact packaging may indicate loss of sterility
- Documentation should include (per local protocol):
  - Medication
  - Dose delivered
  - Route
  - Site/method
  - Time given
  - Physician ordering medication
  - EMS provider delivering medication
- Generally rectal administration is contraindicated in the presence of active rectal bleeding, diarrhea and low platelet count.

I. Enternal routes: oral, sublingual, buccal, rectal, and gastric tube medications

A. Preparation of oral, sublingual, buccal, rectal, and gastric tube medications
   1. Tablets
      a. Inspect the medication
      b. Shake out the proper number of tablets to obtain the proper dose. The tablets should be placed in the lid of the medication bottle or an appropriate container. The medication should be transferred from the lid to the patient’s hand or to the EMS provider’s gloved hand for administration
      c. Re-check the label for proper medication and dosage information
      d. Give directions to patient for medication administration
      e. The medication is now ready to be administered
   2. Sublingual spray
      a. Inspect the medication
      b. Give directions to patient for medication administration
      c. The medication is now ready to be administered
   3. Buccal (between cheek and gum):
      a. Inspect the medication
      b. Buccal medication may be applied to a tongue depressor for administration

c. Give directions to patient for medication administration
d. The medication is now ready to be administered

4. Gastric tube
   a. Inspect the medication
      1) Liquid form: Preferred type of medication. Measure prescribed dose
      2) Tablet: Crush pill into a fine powder (enteric coated and time released tablets should not be crushed). Mix with at least 30 ml of water. Assure that particles are dissolved in solution
   b. Draw up 30 ml of water to flush tube after medication administration
   c. Recheck the label for proper medication and dosage information
   d. The medication is now ready to be administered
5. Rectal
   a. Inspect the medication
   b. Prepare the medication as needed
      1) Remove packaging
      2) Lubricate syringe tip or suppository
      3) A large bore IV catheter (without the needle) can be attached to the syringe for liquid medication administration
   c. Re-check the label for proper medication and dosage information
   d. The medication is now ready to be administered

B. Administration of oral, sublingual, and buccal medications
1. Re-check the six rights
2. Explain procedure to the patient:
   a. Oral: Swallow the medication with a small amount of water
   b. Chewed: Chew the medication and do not swallow for about 10 seconds
   c. Sublingual: Place the medication under the tongue and do not swallow for 10 seconds
   d. Sublingual spray: Spray on or under the tongue; be careful the patient does not inhale medication
   e. Buccal: Apply medication between patient's cheek and gum
3. Give the medication to the patient to take or place medication in the patient's mouth
4. Assure the medication is swallowed, chewed or dissolved
5. Document medication administration
6. Provide an ongoing assessment of your patient to identify any effects of the medication

C. Administration of gastric tube medications
1. Re-check the six rights
2. Inspect the medication. Assure that it is in liquid form and particles are dissolved in solution
3. Place the patient in high-Fowler position, unless contraindicated by patient's condition
4. Explain procedure to patient as needed
5. Verify proper placement of the gastric tube by aspirating for gastric contents or by auscultating over the gastric area while injecting a bolus of air
6. Remove plunger from syringe to be used for medication administration
7. Insert syringe into gastric tube or medication port
8. Pour medication (liquid or dissolved tablet) into syringe. Medication should flow by gravity. If it does not flow freely, you can:
   a. Raise syringe height
   b. Reposition patient slightly
   c. If above steps do not work, replace the plunger and give a gentle push to facilitate flow
9. Once medication administration is done, flush the tube with 15 ml of water
10. Reposition patient as needed

D. Administration of rectal medications

1. Re-check the six rights
2. Inspect the medication
3. Explain rectal medication administration procedure to patient
4. Remove clothing from waist down so rectum is accessible taking care to provide for patient's privacy
5. Position patient
    a. Assist patient to lateral recumbent position (preferably on left side) with the top leg flexed forward
    b. If unable to position patient on their side, other positions are acceptable. Having one or both of the patient's legs flexed will facilitate medication administration
6. Re-check medication and lubricate
    a. Suppository: Lubricate rounded end with a water-soluble lubricant. Lubricate your gloved index finger also
    b. Syringe: Lubricate tip of syringe with a water-soluble lubricant
7. Instruct patient to take slow, deep breaths through mouth and relax anal sphincter
8. Retract patient's buttocks and give medications
    a. Suppository: With gloved finger, insert suppository gently through anus, past internal sphincter (about 4 inches for an adult, 3 inches for a child, and 2 inches for an infant)
    b. Syringe: Insert syringe tip gently through anus, past internal sphincter (about 4 inches for an adult, 3 inches for a child, and 2 inches for an infant) and gently depress plunger
9. Keep finger or syringe in rectum for about three seconds to ensure that medication will not come out
10. Withdraw finger or syringe and wipe excess lubricant from anal area
11. For best results the patient should remain on his side for 5-10 minutes

II. Inhaled medications

Points of emphasis:

- Follow manufacturer's recommendation for liter flow and assembly of equipment.
- Many IM/IV medications can be given via the intranasal route; follow local protocol for approved medications.
- Only select medications can be delivered via endotracheal route.
- Needles should be removed for medication instillation into the ET tube to prevent accidental puncture of the ET tube or loss of needle in the ET tube.

A. Preparation of inhaled medications
    1. Metered dose inhaler
        a. Inspect the medication
        b. Shake the inhaler canister vigorously
        c. Wait 1-2 minutes between inhalations; shake canister before each inhalation
    2. Nebulizer
        a. Select a nebulizer delivery method based on the patient's ability to hold the device and coordinate inhalation and breathing technique
            1) If using the hand-held delivery, attach the reservoir hose and mouthpiece to opposite ends of the "T" fitting
            2) If using a mask delivery, use a nebulizer mask or remove the reservoir bag and the one-way valves (flaps) from a non-rebreather mask
        b. Assemble the medication cup by screwing the top and bottom sections together. Most nebulizer medication cups must be kept upright to avoid spilling the medication

c. Inspect the medication
d. Place the ordered dose of medication(s) into the medication cup and attach it to the bottom of the “T” fitting or mask
e. Attach the oxygen tubing to the inlet port of the medication cup. Attach the other end to an oxygen source capable of delivering a 6-8 lpm flow
f. Turn on oxygen and adjust flow for best results

3. Intranasal
   a. Draw up medication to be given in a syringe (see IM/IV medication preparation section)
      1) Maximum volume per nostril is 1 ml
      2) Add 0.1 ml to dose calculation to account for dead space in atomizer
   b. Attach atomizer delivery device to syringe (remove needle if one is present)
4. Endotracheal
   a. Draw up medication to be given in a 10 ml syringe (see IM/IV medication preparation section)
      1) ET dose is usually 2-2.5 times the IV dose
      2) Add sterile water or saline to make 10 ml

B. Administration of inhaled medications
1. Recheck six rights
2. Metered dose inhaler
   a. Inspect the medication
   b. Verify the inhaler belongs to the patient
   c. Shake the inhaler canister vigorously
   d. Explain procedure to the patient:
      1) Forcibly exhale
      2) Place lips around the inhaler
      3) Activate inhaler while inhaling deeply
      4) Hold breath as long as comfortably able
   e. Remove supplemental oxygen from the patient if needed for the medication administration
   f. Assist with medication administration as needed
   g. Replace oxygen and encourage patient to take several deep breaths
   h. Repeat steps c-g to obtain ordered dosage(s). Wait 1-2 minutes between inhalations
3. Nebulizer
   a. Assemble nebulizer delivery device as previously described in this section
   b. Explain procedure to the patient:
      1) Seal lips around the mouthpiece of the hand-held nebulizer or place mask on patient
      2) Take slow breaths and inhale as deeply as possible
      3) Hold breath as long as comfortably able, up to 10 seconds
      4) Continue until the medication is gone; there is no misting
   c. Remove supplemental oxygen from patient
   d. Start nebulizer with oxygen at 6-8 lpm – adjust until it makes a fine mist. The mist should "disappear" with each breath. Much of the mist that can be seen is too large to actually be absorbed
   e. Encourage patient to take slow, deep breaths until the medicine is gone from the medication cup. As the medication is administered and the level drops in the medication cup, the cup may need to be tapped to deliver all the medication
   f. Replace supplemental oxygen when the treatment is completed
4. Intranasal
   a. Explain procedure to patient

b. Place atomizer within nostril
c. Depress plunger quickly to administer medication
d. If needed, switch nostrils to administer remaining dose if over 1ml
e. Remove atomizer from nostril
f. If patient sneezes, medication does not have to be repeated

5. Endotracheal
a. Pre-oxygenate patient with bag-valve device prior to delivering medication
b. Remove bag-valve device and instill medication into endotracheal tube. If using an ET tube with a medication port, the bag-valve device does not have to be removed
c. Distribute medication with several positive-pressure ventilations prior to resuming normal ventilations with bag-valve device

III. Topical medications

Points of emphasis:

- Application sites for topical medications.
  - Avoid hairy surfaces and scar tissue
  - Preferred areas are chest, back, upper arm, or legs
  - Some patches identify placement location

A. Preparation of topical medications
1. Nitroglycerine ointment
a. Inspect the medication
b. Date, time and initial paper guide
c. Apply desired number of inches of ointment on paper guide
d. Re-check the label for proper medication and dosage information
e. The medication is now ready to be administered
2. Transdermal patch
a. Inspect the medication and remove from outer packaging
b. Using a soft-tip or felt-tip pen, write date, time and your initials on the outer side of the patch (or overlay, if provided)
c. Re-check the label for proper medication and dosage information
d. The medication is now ready to be administered

B. Administration of topical medications
1. Re-check the six rights
2. Nitroglycerine ointment
a. Remove previous dose paper and wipe off residual medication
b. Apply ointment to skin surface by placing paper measuring guide (with medication towards patient's skin)
c. Do not rub or massage ointment into the skin
d. Date, time and initial paper (may be done prior to application)
e. Secure ointment and paper with a transparent dressing or tape
3. Transdermal patch
a. Remove all old patches before applying a new patch and wipe off residual medication
b. Fold old patch in half with sticky sides together prior to disposal
c. Re-check medication and dosage
d. Select a clean, dry area of the body. Site should be different than where old patches were removed
e. Apply patch to the skin by holding it by the edge and not touching adhesive edges
f. Press firmly with the palm of one hand for 10 seconds and ensure the patch sticks well around all edges
g. Apply overlay, if provided with patch

IV. Injectable medications

Points of emphasis:

- Maintain clean/sterile techniques throughout procedure as appropriate.
- Utilize safety engineered devices to minimize risk of needle sticks (use is mandatory except with auto-injectors).
- Identify distal connection type for syringes and IV tubing ("luer lock" versus "slip tip" connections).
- Always ensure that all sharps are properly disposed of in a timely manner in an approved sharps disposal container.
- Route of administration and size of the patient are used to determine the appropriate size needle.
  - A 23- to 25-gauge, 5/8-inch-long needle is appropriate for subcutaneous injections
  - The needle gauge for IM injections should be larger to accommodate viscous solutions and suspension. Recommend 21G to 23G needles, 1" to 2" in length
  - As a rule of thumb, a 200-lb (90-kg) patient requires a longer needle (i.e., 2") for an IM injection; a 100-lb (45-kg) patient will require a 1-1⁄4" to 1-1⁄2" needle
- Prefilled systems may have an air bubble that will need to be purged prior to medication administration.
- When drawing up medication from a vial or ampule, draw up a little extra that can be wasted when purging air bubbles.
- Assure the proposed site for injection is free of inflammation, swelling, infection and any skin lesions.
- Never recap used needles.
- Allow alcohol to dry for 30 seconds for bacteria to be killed and to minimize discomfort of the injection.
- Prior to injection, tell the patient that they will feel a poke.
- If blood is present when aspirating, withdraw the needle and discard the medication. Start over with new medication and a new site.

I. Preparation of injectable mediations syringe and vial
   1. Inspect the medication
   2. Select an appropriate size syringe for the medication to be delivered
   3. Remove the protective "flip-off" cap from the top of the vial
   4. Wipe the rubber stopper with alcohol prep or other suitable antiseptic swab
   5. If reconstituting a medication:
      a. Pierce the center of the medication vial's stopper with the needle on the syringe of diluting solution
      b. Inject diluting solution
      c. Remove the needle/syringe from the vial
      d. Gently shake the vial to assure the medication dissolves
      e. Continue with drawing up the medication with a new needle and syringe
   6. If drawing a medication or diluting solution from a vial:
      a. Draw up the same volume of air as the volume to be withdrawn
      b. Pierce the center of the vial's stopper with the needle on the syringe
      c. Inject air
      d. Holding the vial upside down in one hand and being careful to keep the end of the needle within the fluid level of the vial, pull back gently on the plunger to draw the medication or diluting solution into the syringe
      e. Withdraw the needle and syringe from the vial

7. Replace the needle with an appropriate size safety engineered needle for subcutaneous or IM injections
    a. For patient comfort, change the needle prior to injection. Most needles have a fine silicon coating to facilitate easy entry into muscle mass which may be lost when drawing up the medication through a rubber stopper
    b. Also, literature has shown some rubber stoppers contain trace amounts of latex that may cause a sensitivity reaction
    c. Common practice is to use a larger needle for drawing up the drug, and a smaller needle for injecting
8. With the needle pointing upward, gently tap the syringe to move any air bubbles to the top
9. Gently depress the plunger of the syringe until air is expelled and only the desired amount of medication remains in the syringe
10. The medication is now ready to be delivered

II. Syringe and ampul
1. Inspect the medication
2. Select a syringe of appropriate size for the volume of medication to be delivered
3. Select a filter needle (also called a “filter straw”) of appropriate size and length to withdraw the medication and attach to the syringe
4. Hold the ampule upright and gently “flick” it to move any medication trapped in the head of the ampule to the base
5. Wipe the area between the head and base of the ampule with an alcohol prep or other suitable antiseptic swab
6. Once the medication is removed from the head of the ampule, open the ampule by holding the ampule at arm’s length and break by snapping the head toward you. This will cause any glass shards to be directed away rather than toward you when the ampule breaks
    a. Use a commercially available device or gauze square to grasp the head of the ampule when breaking the head from the base
    b. If the ampule fails to break cleanly and glass shards can be observed, dispose of the ampule and replace with another
7. Using the filter needle and syringe, withdraw medication for administration. Discard any remaining medication and properly dispose of both portions of the ampule in a sharps container
8. Remove the filter needle used to withdraw the medication from the ampule and properly dispose of the filter needle in a sharps container
9. Replace the filter needle with an appropriate size safety engineered needle for subcutaneous or IM injections
10. With the needle pointing upward, gently tap the syringe to move any air bubbles to the top of the syringe
11. Gently depress the plunger of the syringe until air is expelled and only the desired amount of medication remains in the syringe
12. The medication is now ready to be delivered

III. Pre-loaded syringes
1. Prefilled systems
    a. Inspect the medication
    b. Remove the protective caps from the medication cartridge and the barrel of the syringe assembly
    c. Insert the medication cartridge into the barrel assembly and rotate clockwise until the medication cartridge is secure in the barrel. The medication cartridge is now the plunger

d. With the unit now fully assembled, remove the protector from the distal tip and gently depress the plunger until air is expelled and only the desired amount of medication remains in the syringe
e. Attach an appropriately sized safety engineered needle for subcutaneous or IM injections
f. The medication is now ready to be delivered

2. Syringe Cartridge System (e.g. Carpuject)
   a. Inspect the medication cartridge
   b. Insert and secure the syringe cartridge into the cartridge holder following the manufacturer's directions
   c. Attach an appropriately sized safety engineered needle for subcutaneous or IM injections
   d. With the unit now fully assembled, remove the protector from the distal tip and gently depress the plunger of the syringe until air is expelled and only the desired amount of medication remains in the syringe
   e. The medication is now ready to be delivered
3. Auto-injector systems
   a. Inspect the medication
   b. Never place your thumb or finger over the ends of the auto-injector
   c. Remove the safety cap only immediately before placing the device against the previously prepared injection site
   d. The medication is now ready to be administered

IV. Administration of injectable medications intramuscular injection
1. Prepare medication as previously described in this section
2. Re-check the six rights
3. Ensure the correctly sized safety needle is attached for administration route (not applicable for auto-injector)
4. Select an injection site
   a. Deltoid
   b. Vastus lateralis (lateral thigh)
5. After selecting the injection site, gently tap it to stimulate the nerve endings which will minimize pain when the needle is inserted. Using the stretch technique may accomplish this also
6. Cleanse the injection site with alcohol prep or other suitable antiseptic swab in an outward circular motion for about 2 inches
7. Hold the syringe in dominant hand and remove the needle cover
8. Stabilize the injection site with your non-dominant hand using:
   a. "Pinch" technique
   b. Stretch technique
9. Holding the syringe like a dart, quickly but not forcefully insert the needle into the injection site at a 90-degree angle until the proper depth is reached
10. Release the skin while continuing to hold the syringe in place with the dominant hand
11. Grasp the plunger with one hand and the barrel of the device with the other. Pull back (aspirate) slightly on the plunger and wait five seconds
12. If no blood aspirates into the syringe, proceed with the injection. Slowly depress the plunger to administer the injection. A slow, steady injection rate allows the muscle to distend gradually and accept the medication under minimal pressure

13. Once the medication has been administered, wait ten seconds, then withdraw the needle using appropriate safety features and/or activating the needle safety engineering device
14. Cover the injection site with an alcohol or gauze pad and apply gentle pressure to the area to help reduce pain and improve absorption
15. Properly dispose of the syringe and needle assembly in an appropriate sharps container
16. Place a bandage over the injection site

V. Auto-injector
1. Prepare medication as previously described in this section
2. Re-check the six rights
3. Select the vastus lateralis (lateral thigh) injection site
4. Cleanse the injection site with alcohol prep or other suitable antiseptic swab in an outward circular motion for about 2 inches
5. Grasp the auto-injector by wrapping fist around the unit; never place your thumb or finger over the ends of the auto-injector
6. Place dispensing end of auto-injector against the prepared site on the lateral thigh at a 90-degree angle
7. Stabilize the patient's leg to prevent pulling away
8. Apply a gentle pressure against leg with auto-injector until it clicks
9. Hold in place for 10 seconds before removing auto-injector
10. Properly dispose of the auto-injector in an appropriate sharps container
11. Place a bandage over the injection site

VI. SUBCUTANEOUS INJECTION
1. Prepare medication as previously described in this section
2. Re-check the six rights
3. Ensure the correctly sized safety needle is attached for administration route (not applicable for auto-injector)
4. Select an injection site
5. Cleanse the injection site with alcohol prep or other suitable antiseptic swab in an outward circular motion for about 2 inches
6. Hold the syringe in dominant hand and remove the needle cover
7. Stabilize the injection site with your non-dominant hand using the "pinch" technique
8. Holding the syringe like a dart, quickly but not forcefully insert the needle into the injection site at a 45–90-degree angle (shorter needles or patient size may affect the angle of injection) until the proper depth is reached
9. Release the skin while continuing to hold the syringe in place with the dominant hand
10. Slowly depress the plunger to administer the injection (10 seconds per mL)
11. Once the medication has been administered, wait ten seconds, then withdraw the needle using appropriate safety features
12. Cover the injection site with an alcohol or gauze pad and put gentle pressure on the area to help reduce pain and improve absorption
13. Properly dispose of the syringe and needle assembly in an appropriate sharps container
14. Place a bandage over the injection site

VII. Intravenous bolus medications (IVP) - Assumes a patent IV is present
1. Prepare medication as previously described in this section
2. Re-check the six rights
3. Ensure the correctly sized safety needle is attached for administration route (not applicable for auto-injector)
4. Use an alcohol prep or other suitable antiseptic swab to wipe the surface of the IV tubing med-port closest to the patient
5. Remove the protective cap from the syringe
6. Connect the syringe to the prepared med-port by:

a. Twisting clockwise for luer lock connections
b. Inserting blunt cannula for ports designed for this safety device
c. Inserting needle through self-sealing ports designed for needle puncture

7. Kink off the IV tubing between the selected med-port and the IV solution bag
8. Inject the medication at the proper rate
9. Disconnect syringe from med-port
10. Following injection of the medication, flush the IV tubing slowly
    a. Bolus flush by syringe
    b. Open flow of IV
11. Properly dispose of the syringe and needle assembly in an appropriate sharps container

IV. Intravenous or intraosseous administration and care

Points of emphasis:

- Maintain sterile technique throughout procedure.
- An intraosseous (IO) line is used the same as an intravenous (IV) line for fluid and medication administration.
- Utilize safety-engineered devices to minimize risk of needle sticks (mandatory).
- Always ensure that all sharps are properly disposed of in a timely manner in an approved sharps disposal container.
- Assure the proposed site for cannulation is free of inflammation, swelling, infection and any skin lesions.
- Never recap used needles.
- Allow alcohol to dry for 30 seconds for bacteria to be killed and to minimize discomfort of the insertion.
- Whenever possible, the IV bag should be hung in a vertical position to facilitate preparation.
- If too much fluid enters the drip chamber, invert the bag and drip chamber and squeeze some of the fluid back into the bag.
- If tape is used, it should be torn to appropriate size and length prior to beginning the procedure.
- Many taping methods and commercial securing devices are available. Follow local protocols.
- For IO insertion:
  – Landmarking correctly helps avoid piercing growth plate. If unable to landmark, choose another site.
  – A 3-way stopcock is optional and can be used at hub or distal end (from patient) of extension tubing.
  – Aspiration for cloudy fluid is optional since lack of cloudy aspirate is not uncommon and does not mean improper placement.
  – If the IO does not flow, apply some pressure to the IV bag by squeezing it. If this works, place a pressure device on IV bag.

A. IV administration set preparation
1. Select the appropriate solution based on patient condition and local protocols
    a. Inspect the solution; a slight amount of moisture inside the outer bag is normal and not cause for concern
    b. Open outer packaging by tearing pre-cut slit at either end of the bag
        1) Re-check clarity
2. Select an appropriate IV administration set (macro and micro administration set) based on patient condition
3. Open the administration set
    a. Check to be certain the end caps that preserve the sterile field of the administration set remain in place

b. Uncoil the tubing in preparation for spiking the IV bag
c. If adjunct devices such as extensions or flow meters are to be used, they should be opened and attached to the administration set at this time

4. Move the flow control clamp to a convenient location and close off the IV tubing by:
   a. Rotating the control knob (roller clamp)
   b. Sliding the clamp (slide clamp)
   c. Pinching the clamp (pinch clamp)
5. Spike the IV bag
   a. Method one
      1) If not previously done, hang the IV bag with the tail ports extending downward
      2) Grasp the IV port just above the plastic tab. With the other hand, pull the plastic tab from the port. Be careful to maintain sterility of the port
      3) Remove the protective cap from the IV tubing spike, being careful to protect the sterile field
      4) Insert the IV tubing spike into the IV port by pushing and twisting the spike until it punctures the seal of the port
      5) Squeeze the drip chamber to fill it approximately half full of fluid
   b. Method two
      1) Holding the IV bag at its base, invert the bag so the tail ports extend upward
      2) While continuing to hold the IV bag, grasp its IV port just below the plastic tab. With the other hand, pull the plastic tab from the port. Be careful to maintain sterility of the port
      3) Remove the protective cap from the IV tubbing spike being careful to protect the sterile field
      4) Insert the IV tubing spike into the IV port by pushing and twisting the spike until it punctures the seal of the port
      5) Invert the bag so it is in an upright position and hang the IV bag
      6) Squeeze the drip chamber to fill it approximately half full of fluid
6. Place the end of the tubing in a convenient location while preserving sterility by keeping protective cap in place, however, some protective caps do not allow fluid to flow once they are wet. If the protective cap needs to be removed to complete priming, maintain sterility and replace cap when tubing is primed
7. Open the flow control clamp and allow the IV fluid to completely fill the line (small amount of fluid may be flushed into the environment). It is often necessary to invert and “flick” med-ports with your fingers to remove larger air bubbles
8. Once the line is completely filled with fluid, and larger air bubbles removed, close the flow clamp and place the “primed” line in position for use

B. Initiating venous access
1. Prepare IV administration system as previously described in this section
2. Prepare the necessary equipment and supplies
   a. Sharps container
   b. Tape and/or commercially available device for securing the IV
   c. Alcohol prep pads or other suitable antiseptic swab per local protocol
   d. Gauze pads
   e. Site dressing
   f. Tourniquet (latex free)
   g. Catheter(s)
   h. Band-Aid®
3. Select a venipuncture area (hand, wrist, forearm or antecubital space).
4. Apply a venous tourniquet approximately 4 to 8 inches above the selected area

5. Cleanse the intended venipuncture site with alcohol prep or other suitable antiseptic swab in an outward circular motion for at least 2 inches
6. Based on the intent of the IV and the size of the vein selected, choose an appropriately sized IV catheter
7. Remove the catheter from its packaging and the protective plastic sheath
8. Inspect equipment for any defects
9. Slightly twist the catheter on the needle to ensure the catheter moves freely on the needle (optional step)
10. Grasp the patient's extremity near the area where the IV will be started using your non-dominant hand in order to stabilize the vein at the venipuncture site. Maintain sterility while placing IV by keeping stabilizing hand and fingers out of the way of the catheter assembly. This may be accomplished by:
    a. Pulling traction distal
    b. Holding extremity circumferentially so area is taut
11. Ensure the bevel of the needle is facing upward in relation to the patient's skin. Consideration may be given to a bevel down approach for pediatric and geriatric patients with small veins
12. Holding the catheter assembly with fingers of your dominant hand, and in such a manner as to be able to visualize the flash chamber, approach the injection site with the needle held at approximately a 15 – 20-degree angle
13. Inform the patient they will feel a slight "pinch" as the needle enters their skin
14. While continuing to apply traction to the skin to hold the vein steady, quickly, but carefully, enter the skin with the needle and continue until the needle tip is against the wall of the vein itself. Maintain traction and vein stabilization until catheter is in the lumen of the vein
15. Slowly advance the needle through the vein wall and into the lumen of the vein
    a. A "pop" may be felt as the needle enters the vein
    b. The flash chamber may fill with blood when entering the vein
        1) Smaller catheters will be slower to have a flash
        2) Patients with poor perfusion may not have a significant flash
16. Once you have entered the vein, continue to advance the needle and catheter assembly slightly (0.5 cm further) so the tip of the catheter enters the vein. No more than one-half the length of the catheter should be below the skin at the point the needle enters the vein or only a small portion of the catheter will actually be within the vein for the finished IV
17. When the catheter tip is within the lumen of the vein, slowly advance the catheter along the needle until the hub meets the patient's skin. Slide the catheter while holding the needle steady
18. After the catheter has been threaded into the vein, slightly pull back the needle from the catheter, but DO NOT withdraw it completely
19. If not drawing blood via the IV catheter, release the tourniquet. If blood draws are to be made using the IV catheter, leave the tourniquet in place and obtain blood samples before releasing tourniquet
20. Palpate the end of the catheter beneath the patient's skin and occlude the vein just proximal to the end of the catheter with direct pressure
21. Remove the needle and activate any safety features before disposing of it in an approved sharps container
22. With your free hand, remove the protective cap from the end of the IV tubing and attach it to the catheter hub, making sure not to push the catheter further in or pull it out
23. Open the IV flow clamp and observe the flow of fluid into the drip chamber
    a. If the IV does not flow:
        1) Ensure the tourniquet has been released

2) Carefully withdraw the catheter slightly while observing the drip chamber since the tip may be occluded by a valve or the side of the vein
3) Determine if the IV is positional and troubleshoot as necessary
4) Begin the process anew using another site

b. With the IV running, and before securing the IV catheter in place, inspect the venipuncture site for signs of infiltration
c. If an IV cannot be made to flow properly or infiltration is observed, discontinue the IV immediately

24. If the IV is observed to flow properly:
    a. Using a gauze pad or alcohol prep pad as necessary, wipe away any fluid or blood that may be present in order to dry the site sufficiently that tape will adhere
    b. Secure the IV and the IV tubing in place; cover insertion site with a sterile dressing or commercially available device
25. Secure the patient's extremity as appropriate to maintain flow
26. Adjust the flow rate by closing flow clamp or other flow-metering device to the appropriate setting
27. Continue to monitor the patient for:
    a. Signs of a fluid overload
    b. Other complications resulting from the IV
    c. Appropriate flow rate
    d. Infiltration
28. Continue to monitor the IV to ensure appropriate flow rate is maintained and the venipuncture does not infiltrate

C. Changing the solution bag of an established IV
1. Select and inspect the IV solution
2. Open outer packaging by tearing pre-cut slit at either end of the bag
3. Shut off the flow clamp on the nearly empty IV bag to prevent air from entering the IV tubing as the solution bag is being changed
4. Invert the nearly empty bag to prevent any remaining fluid from running out, and remove the IV tubing spike from the bag
    a. Use extreme care to ensure the IV tubing spike does not touch anything to contaminate the sterile field
    b. Follow one of the methods previously described in this section to puncture the bag
    c. Discard the used solution bag after noting the approximate amount of any remaining fluid
5. Re-establish the IV flow rate

D. Intravenous piggyback (IVPB) medication (assumes a patent primary IV is infusing)
1. Inspect the medication or premixed IV solution
2. If using a premixed medicated IV solution, the medication is now ready to be administered
3. If mixing the piggyback IV bag:
    a. Draw up the correct amount of medication into the syringe as described above
    b. Select the appropriate IV solution and size for the IV piggyback
    c. Cleanse the medication port of the piggyback IV bag
    d. Insert the needle of the syringe into the medication port
    e. Depress syringe plunger to inject medication into the piggyback IV bag
    f. Withdraw needle and discard into sharps container
    g. Mix medication thoroughly in piggyback IV bag
    h. Label piggyback IV bag with:
        1) Name of medication
        2) Amount of medication

3) Date and time medication added
4) Name or initials of preparer

i. Calculate the dose/ml and gtt/min that is needed
j. Select the appropriate IV tubing based on above calculations
k. Spike the piggyback IV bag and flush the tubing as you would a non-medicated IV
l. The piggyback IV medication is now ready to be administered
m. Re-check the six rights and infusion calculations for the dose/ml and gtt/min that is needed
n. Use an alcohol prep or other suitable antiseptic swab to wipe the surface of the med-port of the primary IV tubing (usually use the med-port closest to the patient)
o. Connect the piggyback IV tubing to the prepared med-port (methods are the same as for an IVP medication)
p. Shut off primary IV tubing flow to ensure that the piggyback IV fluid is flowing to the patient
q. Open the flow control clamp on the piggyback IV tubing and adjust flow rate to desired rate
r. Continue to monitor the patient for:
1) Desired effects and side effects of IVPB medication
2) Other complications resulting from the IV
3) Appropriate flow rate
4) Infiltration
s. Continue to monitor the IVPB to ensure appropriate flow rate is maintained and the venipuncture does not infiltrate
t. When stopping the IVPB medication, shut off flow control clamp of IVPB tubing. Open primary IV tubing using its flow control clamp and adjust rate of primary solution

E. Discontinuing an IV
1. Prepare the necessary materials
a. Gauze square(s)
b. Tape
c. Band-Aid®
d. Disposal container
2. Close the flow clamp of the IV administration set
3. Gently remove the tape and/or securing device to expose the venipuncture site
4. Cover the venipuncture site with gauze square and apply gentle pressure as you remove the IV catheter
5. Inspect the catheter to ensure it is complete, noting any abnormalities
6. Affix an adhesive bandage that will continue to apply pressure until bleeding has stopped
7. Properly dispose of all materials
8. Monitor venipuncture site for bleeding

F. Initiating an intraosseous infusion
1. Prepare IV administration system as previously described in this section
2. Prepare the necessary equipment and supplies
a. Sharps container
b. Tape and/or commercially available device for securing the IV
c. Alcohol prep pads or other suitable antiseptic swab per local protocol
d. Gauze pads
e. Site dressing
f. IO needle or commercial device
g. Syringe with saline for flush
h. 3-way stopcock (optional)
3. Select an intraosseous site as approved by local protocol and identify landmarks

a. Proximal tibia
    1) Flex the knee slightly to facilitate landmarking; place padding behind the knee as necessary
    2) Palpate the tibial tuberosity, just below the knee
    3) Locate a consistent flat area of bone 2 cm distally and 2 cm medially to the tibial tuberosity (measurements vary by patient anatomy)
b. Distal tibia
    1) Slightly abduct and externally rotate the hip to expose the site; place padding as necessary
    2) Palpate the medial malleolus
    3) Move your finger about 3 cm proximal and palpate the anterior and posterior borders of the tibia (measurements vary by patient anatomy)
    4) Insertion site is on the flat center aspect of the bone
c. Proximal humerus
    1) Position the patient so the arm is adducted (elbow close to the body)
        a) Flexed at the elbow with their palm against their abdomen
        b) With arm extended at side, rotate medially with thumb to the posterior
    2) Slide your thumb up the anterior shaft of the humerus until greater tubercle is noted
    3) Insertion site is approximately 1 cm above the greater tubercle (measurements vary by patient anatomy)
d. Sternum
    1) Position the patient to access the sternum
    2) Commercial devices are used for this approach; follow manufacturer's directions for landmarking and insertion

4. Choose an appropriately sized IO needle and prepare it for puncture. Some types of needles require adjustment for insertion depth; commercial devices should be prepared according to manufacturer's directions
5. Consider using a local anesthetic prior to needle puncture, if patient condition and local protocol allows
6. Cleanse the intended puncture site with alcohol prep or other suitable antiseptic swab in an outward circular motion for at least 2 inches
7. Stabilize insertion site with non-dominant hand; stabilizing hand must be placed to avoid accidental puncture
8. Place needle against IO insertion site and angle needle for insertion to avoid the growth plate
    a. Proximal tibia: insertion angle is 10-15 degrees caudally
    b. Distal tibia: insertion angle is 10-15 degrees cephalad
    c. Proximal humerus: insertion angle is 45 degrees
9. Advance the IO needle into the bone; when the bone's core is entered, a 'pop' will be felt
    a. If placing manually, a back-and-forth rotational motion is used to advance the needle
    b. If using a commercial device, follow manufacturer's directions
10. Remove the trocar; IO needle/catheter should stand up unsupported
11. Attach the syringe with saline to the needle/catheter or an extension set with syringe (system should be flushed)
12. Inject fluid into the bone while watching for any signs of infiltration. If there are any signs of infiltration, swelling, or fluid leakage at the insertion site, remove the IO from bone and apply gentle pressure to insertion site
13. When IO placement is verified, remove syringe and attach the IV tubing
14. Open the IV flow clamp and observe the flow of IV fluid into the drip chamber

15. Secure the IO needle/catheter, supporting it as needed. Extremity may need to be secured to minimize movement (especially for proximal humeral placement)
16. Cover insertion site with a sterile dressing or commercially available device
17. Secure the patient's extremity as appropriate to maintain flow
18. Adjust the flow rate by closing flow clamp or other flow-metering device to the appropriate setting
19. Continue to monitor the patient for:
    a. Signs of a fluid overload
    b. Other complications resulting from the IO placement
    c. Appropriate flow rate
    d. Infiltration
20. Continue to monitor the IO to ensure appropriate flow rate is maintained and the venipuncture does not infiltrate

Section 7: Management of soft tissue injuries

Objectives:

- To control external bleeding.
- To prevent further injury and reduce pain.
- To prevent further wound contamination and reduce the potential of subsequent infection.
- To secure dressings through the application of appropriate bandaging techniques.

Points of emphasis:

- Consider MOI for other injuries.
- Expose the wound site to determine the extent of injury.
- Use sterile dressings.
- Cover the entire wound site with the sterile surface of the dressing.
- Immobilize the injury site as appropriate.
- Apply bandage snugly, making certain not to cut off circulation distal to injury site.
- Secure the dressing(s) with roller gauze, cravats, or tape applying gentle, even pressure over the wound site.
- Consider shock and prevent/treat as appropriate: oxygen, patient positioning, and maintenance of body temperature.
- CMS should be checked frequently and bandaging adjusted to maintain a pulse if necessary.

I. Bleeding control

Points of emphasis:

- Must be addressed and controlled in the primary assessment.
- Bleeding control is part of the "C" in the "ABC's".
- Do not let spinal immobilization interfere with bleeding control. Do not hide an uncontrollable wound with a C-collar.
- Direct pressure with a gloved finger or hand is the most effective means of bleeding control; even larger wounds may have a single point of maximal bleeding which can be amendable to fingertip pressure.
- Soaked bandages indicate uncontrolled bleeding.
- Hemostatic agents are intended for use by the EMT, AEMT, Intermediate and Paramedic provider levels; they are not intended for use by Emergency Medical Responders (EMRs).

Skills:

1. Expose the injury(ies)
2. Direct pressure is the mainstay of bleeding control
    a. Apply direct pressure as close as possible to actual source of bleeding (e.g. fingertip on the end of a bleeding vessel)
        1) Place tip of a finger on the end of a cut artery
        2) Pinch the edges of a wound, particularly those of the scalp, between the finger and the thumb
    b. Use pressure dressing, ensuring the bandages are not so thick as to prohibit monitoring of site
3. If bleeding continues, remove bandages and look for the source of bleeding to provide re-directed well-aimed direct pressure
4. If bleeding continues, a tourniquet should be used
5. Large wounds without an identifiable point source should be packed with bandage and broad pressure applied with continued monitoring for bleeding control
6. If air splints are used to provide direct pressure, ensure the wound can be visualized to monitor bleeding control
7. Consider use of hemostatic agents or dressings if available

II. Head

Points of emphasis:

- Do not exert point pressure to scalp if underlying fracture is suspected.
    – If direct pressure is needed, you can pinch the wound edges with your fingers
- Do not pack nose or ear to stop blood or cerebral spinal fluid (CSF) flow.
- Use the patient's brow ridge, chin and occipital ridge as necessary to provide natural anchoring points for bandaging head wounds.
- If the chin is used, monitor the patient carefully for airway problems. Cut bandage and fold flaps up if bandage interferes with airway or causes patient discomfort.

Skills:

Head (side wound)

1. Open dressing to preserve sterile surface
2. Apply sterile surface to wound site and control bleeding
3. Anchor bandage securely under brow and occipital ridges
4. Cover dressing completely with bandage
5. Exert even pressure over entire wound site with finished bandage
6. Leave eyes uncovered; leave ears either completely covered or completely uncovered

Head (top wound)

1. Open dressing to preserve sterile surface
2. Apply sterile surface to wound site and control bleeding
3. Anchor bandage securely under brow and occipital ridges
4. Bring bandage over dressing and under chin and tighten down over dressing
5. Cover dressing completely and apply even pressure with bandage over area
6. Anchor bandage securely by making additional wraps around head, securing under brow ridge and occipital ridge
7. Cut bandage under chin and fold ends up if it interferes with the airway
8. Make last few turns around brow, overlapping folded section

III. Eye

Points of emphasis:

- If areas around eye are lacerated but the eyeball is not involved, use direct pressure to control bleeding.
- If eyeball injury is suspected, close eye and apply loose dressing.
- Do not cut a hole in dressings or padding as it may leave small particles of fabric in the eye.
- If chemical burn is involved, irrigate eye with normal saline continuously.
- If thermal burns are involved, apply dressing moistened with sterile saline solution.
- If light burns are involved, cover eyes with moist, lightproof pads.
- Cover both eyes when injury occurs as consensual eye movement may cause further injury.
- Never touch the globe or the penetrating object with your hand.
- The finished bandage should hold the eye and/or penetrating object in place.
- Maintain verbal and physical contact with the patient as you explain your actions.
- Always irrigate from the bridge of the nose outward in order to avoid infecting or contaminating the uninjured eye.

Skills:

Eye injury – Non-penetrating

1. Have patient close eyes
2. Apply sterile surface of dressing to injury(ies)
3. Secure bandage around head, anchoring under occipital ridge
    a. Bandage snugly if eyeball is uninjured
    b. Bandage loosely if injury to the globe is suspected
    c. Cover both eyes with finished bandage; do not occlude mouth or nose
4. Restrain patient's hands as necessary to prevent patient from touching the bandaged area

Eye injury – Penetrating

1. Surround injured eye with sterile padding
2. If penetrating object, cut hole in end of cup just large enough for object to pass through; waxed or paper cup is preferred to a Styrofoam or plastic cup
3. Place cup or cone over eye, resting it on pads, but do not touch the eye.
4. Secure the cup/cone to head with bandage wrapped around cup and then around head anchoring on occipital ridge
5. Wrap bandage to cover uninjured eye, leaving the nose and mouth exposed
6. Restrain patient's hands as necessary to prevent patient from touching the bandaged area

IV. Neck

Points of emphasis:

- Use an occlusive dressing to prevent air embolus from being sucked into jugular vein.
- DO NOT use a circumferential bandage around the neck.

Skills:

Place dressing over wound

Secure dressing in place by wrapping the bandage over the dressing and over the top of the opposite shoulder, crossing under the axilla and back again to form a figure eight

Unless contraindicated, transport patient on left side in moderate Trendelenberg position

V. Torso

Points of emphasis:

- Chest injuries can be life threatening and must be assessed and treated immediately.
- Penetrating objects should be left in place unless they interfere with the patient's ability to breathe or maintain an airway.
- Penetrating objects must be removed if CPR is necessary.
- Open or penetrating injuries to the chest or abdomen should be sealed with an occlusive dressing.
- Large penetrating objects may be shortened to facilitate transport or provide stabilization.

- Control bleeding with direct pressure around organs, never on top of them.
- Look for multiple entry/exit wounds with any form of penetrating trauma.
- Use sterile solution-soaked dressings on protruding organs.
- Administer high flow oxygen and assist ventilations as appropriate.
- Transport patients rapidly to the closest appropriate medical facility.
- Consider ALS intercept early where available.

Skills:

A. Open check (sucking chest)
    a. Immediately apply manual pressure to seal wound after patient forcibly exhales
    b. Apply and secure an occlusive dressing
    c. Auscultate for breath sounds
    d. Closely monitor patient for signs of deterioration
B. Penetrating object
    a. Stabilize object with hand(s)
    b. If in chest, upper abdomen or neck area, apply occlusive dressing surrounding the base of the object
    c. Stack bulky dressings in alternating layers to stabilize object from all sides
    d. Secure dressings with bandage to control bleeding and immobilize the object
    e. Restrain patient's hands as necessary to prevent patient from removing object
    f. Transport rapidly in position of comfort
C. Abdominal evisceration
    a. Cover exposed or protruding organs with a sterile dressing moistened with sterile saline
    b. Cover with occlusive dressing to prevent moisture loss
    c. Cover with bulky dressings to preserve body warmth
    d. Secure dressings loosely in place
    e. Transport patient in supine or lateral recumbent position with knees flexed
D. Shoulder

Points of emphasis:

- May be accompanied by fractures or dislocations.
- Suspect C-spine injury with significant MOI.
- Remove patient's jewelry from the affected extremity.

Skills:

    a. Apply sterile dressing to wound and control bleeding with direct pressure
    b. Check CMS distal to injury prior to applying bandages
    c. Position forearm flexed across chest and bring upper arm along line of body

d. Wrap bandage around body, covering wounded arm and crossing under arm on the uninjured side to secure dressing
e. Re-check CMS distal to injury

E. Axillary

Points of emphasis:

- Dressing of axillary wounds can easily impair circulation. Check CMS often.
- Remove patient's jewelry from the affected extremity.

Skills:

a. Apply occlusive dressing to wound and control bleeding with direct pressure
b. Check CMS distal to injury prior to applying bandages
c. Add dressings over the first to achieve bulk as necessary
d. Bandage around injured armpit and shoulder
e. Position forearm flexed across chest, hand pointing toward opposite shoulder, and re-check CMS
f. Wrap bandage around body, over outside surface of arm on injured side and under opposite shoulder
g. Re-check CMS distal to injury

F. External genitalia

Point of emphasis:

- Preserve the patient's privacy as able.

Skills:

a. Apply sterile dressing to wound site and control bleeding
b. Secure the dressing by running a bandage over dressing, between legs and around pelvis

VI. Extremities

Points of emphasis:

- Remove patient's jewelry from the affected extremity.
- Elevate extremity to reduce pain and control bleeding.
- Leave digits or tips exposed whenever possible to check for CMS.
- Consider use of splint to restrict movement.

Skills:

A. Hand
1. Check CMS
2. Apply sterile surface of dressing to wound and control bleeding
3. Place bandage roll or dressing in palm of hand to maintain position of function
4. Anchor bandage around wrist
5. Wrap hand to prevent release from position of function
6. Achieve some restriction of wrist joint movement with bandage
7. Place hand in elevated position
8. Re-check CMS distal to injury

B. Amputation or avulsion

Points of emphasis:

- Follow local protocols as to application of dry or moist dressing.

- Save all amputated or avulsed parts. Transport with patient whenever possible.
- Wrap in a sterile dressing.
- Protect in watertight container.
- Keep part(s) cool during transport, but do not allow to freeze.

Skills:

1. Apply sterile dressing to wound and control bleeding with direct pressure
2. Wrap bandage around circumference of extremity and pass bandage several times across end of stump to achieve pressure over bleeding area, then secure with several additional circumferential turns
3. Keep stump elevated, if possible
4. If partially attached:
   a. Fold skin flap back over wound
   b. Secure with sufficient pressure to control bleeding
   c. Keep partial amputation cool

VII. Burns

Points of emphasis:

- Make certain the scene is safe to enter.
- Always take appropriate hazard precautions as well as body substance isolation precautions.
- Burns involving the hands, feet, face or genitalia should be considered critical burns.
- Any burns associated with respiratory injuries are critical injuries.
- Burn patients are especially susceptible to shock (hypoperfusion) and hypothermia.
- Care must be taken to minimize the potential for infection when dealing with burn patients.
- Avoid types of dressings that may leave fragments in burn injuries.
- Follow local protocols as to application of wet dressing verses dry dressing for percentage of burn surface area.
- Never use any type of ointment, lotion or antiseptic.
- Avoid breaking blisters.

Skills:

A. Thermal burns
   1. Stop the burning process as rapidly as possible using water or saline
   2. Remove jewelry and any easily removable clothing or debris from the affected area
   3. Continually monitor the airway and breathing for signs of airway impairment or respiratory distress
   4. Prevent further contamination of the burned area
   5. Cover the wound with a clean dressing
   6. Treat for shock
   7. Transport

B. Electrical burns
   1. Do not attempt to remove a patient from the electrical source unless trained to do so
   2. Do not touch a patient unless you are certain s/he is no longer in contact with the electrical source
   3. If appropriate, and after assuring no electrical threat remains, stop the burning process as rapidly as possible using water or saline
   4. Remove jewelry, and any easily removable clothing, or debris from the affected area
   5. Continually monitor the airway and breathing for signs of airway impairment or respiratory distress

6. Monitor the patient for signs of cardiac impairment or irregularity
7. Prevent further contamination of the burned area
8. Treat any soft tissue injuries or fractures associated with the burn. Look for multiple entry/exit wounds
9. Cover any exposed burned area with a dry, sterile dressing
10. Treat for shock
11. Transport

C. Chemical burns
1. Always consider the potential impact of hazardous materials. Patient(s) should not be transported until primary decontamination is completed.
2. Brush dry powders off prior to flushing
3. Remove jewelry and any easily removable clothing or debris from the affected area
4. Flush the affected areas with large quantities of water or saline
5. Continue flushing the contaminated area(s) during transport
6. Do not contaminate uninjured or unaffected areas while flushing
7. Continually monitor the airway and breathing for signs of airway impairment or respiratory distress
8. Prevent further contamination of the burned area
9. Treat any soft tissue injuries associated with the burn
10. Treat for shock
11. Transport

Section 8: Pneumatic anti-shock garment (PASG)

Objectives:

- To define the indications and contraindications for the use of the pneumatic anti-shock garment.
- To define the manner in which the PASG can be used to stabilize suspected pelvic fractures and apply circumferential pressure to suspected intra-abdominal bleeding accompanied by signs of shock.

Points of emphasis:

- PASG may be applied without inflation to any patient having the potential to develop shock. A systolic blood pressure of 90 mmHg or less, associated with signs and symptoms is generally regarded as a prime indicator for inflation. However, protocols vary.
- Inflate the PASG based on protocol.
- The only absolute contraindication to inflation is pulmonary edema.
- There are relative contraindications to inflation of all three compartments.
- Inflation should be only to a level at which shock symptoms subside. Careful and frequent monitoring of the vital signs after inflation is essential.
- Do not deflate in the field unless ordered to do so by medical control.

NOTE: Extreme circumstances may arise when the PASG may be deflated in the field, but only under authority of Medical Control. (Field deflation is not a generally accepted practice)

Skills:

A. Inflation
1. Assess patient for and record signs/symptoms of shock. If spinal injury is suspected, maintain spinal stabilization
2. Determine and record the patient's blood pressure
3. Leave deflated blood pressure cuff in place on patient

4. Auscultate breath sounds
5. Remove clothing from patient's abdomen and lower extremities
6. Cover any open wounds with sterile dressings and bandage in place
7. Restore alignment of extremity fractures, if possible
8. Contact medical control, if required by local protocol, for permission to inflate garment. If medical control contact is not required, proceed according to local protocol
9. Open and arrange anti-shock garment
10. Apply anti-shock garment
    a. Method One:
        1) Lift patient's lower extremities and buttocks, sliding the garment beneath the patient
        2) If spine injury is suspected, use orthopedic stretcher, log roll or straddle slide to position patient
    b. Method Two:
        1) Loosely secure all three compartments
        2) One EMS provider puts pants over his/her arms from the foot end and grasps the patient's ankles
        3) Other EMS provider pulls garment onto patient like a pair of trousers
11. Verify that the superior edge of the garment is just inferior to the patient's costal margin
12. Secure garment – legs then abdomen
13. Attach inflation pump lines to garment and open all in-line valves except if ordered otherwise by medical control or in cases in which protocol indicates that a specific compartment is not to be inflated
14. Inflate garment until:
    a. Patient's clinical status improves satisfactorily, or
    b. Velcro fasteners begin to crackle, indicating separation, or
    c. Air escapes from relief valve(s), or
    d. If respiratory distress develops or worsens
15. Close all in-line valves
16. Leave inflation pump attached to garment during movement and transport
17. Re-assess and record, immediately and at frequent intervals en route to the hospital, the patient's:
    a. Blood pressure
    b. Pulse rate
    c. Respiratory status
    d. Level of consciousness

B. PASG deflation procedure

NOTE: Extreme circumstances may arise when the PASG may be deflated in the field, but only under authority of Medical Control.

Points of emphasis:

- Deflate only with direct physician supervision.

Skills:

1. Assure the patient has functioning IV lines
2. Assess and record the patient's vital signs
3. Gradually deflate the abdominal section of the garment
    a. Monitor blood pressure carefully

b. For each 4 - 6 mmHg drop in the patient's blood pressure, stop deflation and infuse fluids until stabilized at baseline level
c. If blood pressure continues to drop despite infusion, re-inflate garment and re-assess resuscitation

4. After abdominal deflation, gradually deflate each leg segment while monitoring blood pressure and resuscitating as above

Section 9: Orthopedic trauma

Objectives:

- To immobilize suspected fractures and /or dislocations by adequate immobilization of skeletal structure distal and proximal to the injury site.
- To apply manual stabilization and utilize appropriate splinting techniques.
- To determine the presence or absence of circulation, movement and sensation distal to the injury site.
- To restore normal circulation distal to injury sites whenever possible and appropriate, with one attempt to align with gentle traction before splinting.
- To reduce the potential of further injury to nerves, blood vessels and soft tissue surrounding the injury site.
- To reduce hemorrhage and pain at the injury site and thereby reduce and/or minimize the potential of injury-related shock.

Points of emphasis:

- Control external bleeding, as needed.
- Prevent further wound contamination and reduce the potential of subsequent infection by covering open wounds with a sterile dressing.
- Assess circulation, movement and sensation (CMS) prior to and following splint application; loosen splint, if necessary, to regain pulse.
- Prevent further injury and reduce pain by immobilizing the joint above and below the long bone injury.
- Prevent further injury and reduce pain by immobilizing the bone above and below the joint injury in the position found, or position where pulse is regained.
- Remove clothing from affected area prior to splinting.
- Pad as appropriate to prevent pressure and discomfort to patient.
- Knots should be tied over rigid splints (if applicable) and should be tied to the side of the neck or torso.
- Consider application of cold packs to injury site to reduce swelling.
- Always consider the Mechanism of Injury (MOI).
- Suspect cervical spine injury with significant MOI.
- Consider shock and prevent/treat as appropriate: oxygen, patient positioning, and maintenance of body temperature.
- Use of commercial splints should be in accordance with manufacturer's directions.

I. Thorax

Points of emphasis:

- Provide high flow oxygen and assist ventilations as necessary.
- Monitor patient closely for signs and symptoms of a pneumothorax.
- Lung sounds should be auscultated before and after application of dressing.
- Encourage and facilitate deep breathing.

- In injuries involving the shoulder girdle, it is important to immobilize the entire shoulder girdle.
- Sling and swathe method.
  - Check CMS in the extremity on the injured side
  - Position the forearm of the injured side across the chest, hand slightly elevated toward opposite shoulder. Pad void between arm and chest if necessary
  - Place triangular bandage under and over arm with point at elbow and ends tied around neck. Knot should be placed at side of neck for patient comfort
  - Pin or tie pointed end to form a cup to support elbow
  - Leave fingers exposed to facilitate circulation check
  - Wrap wide bandage around injured arm and body as swathe to pull injured shoulder back and secure extremity to body
  - Re-check CMS in the extremity on the injured side
  - Transport in sitting or semi-sitting position, if patient's condition permits

Skills:

A. Rib injuries
   1. Position forearm of injured side across chest, hand slightly elevated toward opposite shoulder and secure with roller bandage or sling and swathe
   2. Sling and swathe method (optional)
   3. Transport in sitting or semi-sitting position, if patient's condition allows

B. Flail chest
   1. Place patient in the supine position or on injured side while maintaining spinal immobilization as appropriate
   2. Provide oxygen and assist ventilations as necessary

C. Collar bone (Clavicle), shoulder blade, and shoulder injuries
   1. Sling and swathe method

II. Extremities

Points of emphasis: (upper extremities)

- Apply and maintain manual stabilization of the extremity until the splinting process is complete.
- Align severely angulated fractures with gentle traction unless resistance is felt.
- Do not attempt to replace protruding bone ends into the wound, if present.
- Injuries involving joints should generally be immobilized in the position found.
- Make one attempt to restore circulation distal to an injury site.
- Avoid applying pressure to the injury site, whenever possible.
- Remove jewelry from injured extremities, place hands in position of function.
- Transport patient in sitting or semi-sitting position, as patient's condition permits.

Skills:

A. Arm (humerus)
   1. Check CMS distal to injury site
   2. Stabilize manually proximal and distal to injury site
   3. First EMS provider will straighten any severe angulation with gentle traction above and below the fracture site
   4. Place a rigid splint on the lateral aspect of the arm to maintain alignment and secure in place
   5. Apply sling and swathe or optional wrist sling and swathe, to the injured arm to hold the arm in place, elevating the hand and immobilizing the shoulder. Sling should not encompass the elbow
   6. Re-check CMS distal to injury site

B. Elbow
   1. Check CMS distal to injury site
   2. Stabilize manually proximal and distal to injury site
   3. Immobilize elbow joint, upper arm and forearm with rigid splint
   4. Secure in place
   5. Re-check CMS distal to injury site
C. Forearm (radius and ulna)
   1. Check CMS distal to injury site
   2. Stabilize manually proximal and distal to injury site
   3. Place a rigid splint on the entire anterior aspect of the forearm to maintain alignment and secure in place
   4. Wrap splint and forearm with bandage leaving finger tips exposed
   5. Apply sling and swathe to keep elbow immobilized and hand pointing slightly upward toward opposite shoulder
   6. Re-check CMS distal to injury site
D. Wrist
   1. Check CMS distal to injury site
   2. Stabilize manually proximal and distal to injury site
   3. Immobilize wrist with hand in position of function
   4. Place a rigid splint on the entire anterior aspect of the forearm to maintain alignment and secure in place
   5. Secure splint and forearm with bandage leaving wrist and finger tips exposed
   6. Sling and swathe method, if needed
   7. Re-check CMS distal to injury site. Capillary refill may be best option for determining circulation
E. Hand
   1. Check CMS distal to injury site
   2. Stabilize manually proximal and distal to injury site
   3. Immobilize hand in position of function
   4. Place a rigid splint on the entire anterior aspect of the forearm to maintain alignment and secure in place, leaving finger tips exposed
   5. Keep hand elevated
   6. Re-check CMS distal to injury site. Capillary refill may be best option for determining circulation

Points of emphasis: (lower extremities)

- Apply and maintain manual stabilization of the extremity until the splinting process is complete.
- Align severely angulated fractures with gentle traction unless resistance is felt.
- Do not attempt to replace protruding bone ends into the wound, if present.
- Injuries involving joints should be immobilized in the position found.
- Make one attempt to restore circulation distal to an injury site.
- Avoid applying pressure to the injury site, whenever possible.
- Watch for the development of hypovolemic shock due to internal hemorrhage associated with pelvic, hip and femur fractures.
- PASG may be used as a splinting device for pelvic and lower extremity fractures, as well as an anti-shock device per local protocol. If anticipating using PASG, place PASG on long board before positioning patient.
- For all devices evaluate indications and contraindications.
- Follow local protocols regarding the use of traction devices with open fractures.

F. Pelvic injuries
   1. Check CMS in both lower extremities
   2. Immobilize legs by tying knees and ankles together with bandages, padding between thighs and knees, unless this increases patient's pain
   3. Lift and/or slide the patient as a unit on to a long board or use orthopedic stretcher. DO NOT log roll patient
   4. Flex the patient's knees with pillows underneath for comfort, if possible, and secure patient to long spine board or orthopedic stretcher
   5. Re-check CMS in both lower extremities

G. Hip injuries
   1. Check CMS in both lower extremities
   2. Lift and/or slide the patient as a unit onto the cot or use an orthopedic stretcher. DO NOT log roll patient
   3. Support the extremity in the position found using blankets, pillows or similar materials
   4. Secure the patient to the cot
   5. Re-check CMS in both lower extremities

H. Thigh injuries (Femur)
   1. Traction splint (Hare style)

      a. First EMS provider takes position at injured extremity out of the way of person applying splint
      b. Second EMS provider removes footwear and sock
      c. First EMS provider checks CMS distal to injury site
      d. First or Second EMS provider may apply the ankle hitch
      e. First EMS provider grasps and supports the calf with one hand and with the other hand, grasps ankle, or ankle hitch strap, in preparation for lifting
      f. First EMS provider, when directed by Second EMS provider, applies traction sufficient to stabilize the injured thigh until traction can be assumed by splint
      g. Second EMS provider adjusts the length of the splint by measuring against the length of the uninjured leg and locks securely in place
      h. Second EMS provider positions leg support straps on splint with two proximal to the knee, one distal to the knee and one just proximal to the ankle hitch
      i. Second EMS provider releases traction mechanism and extends traction strap
      j. Second EMS provider directs first EMS provider to lift and apply traction to injured extremity
      k. Second EMS provider positions splint under injured extremity
      l. Second EMS provider extends or attaches heel stand to support splint
      m. Second EMS provider verifies that the ischial pad is firmly against the ischial tuberosity
      n. Second EMS provider firmly secures groin strap, using care not to pinch the external genitalia
      o. First or Second EMS provider, if not previously done, applies ankle hitch to patient's ankle so as to maintain foot at right angle to leg when traction is applied
      p. First or Second EMS provider attaches traction mechanism to ankle hitch
      q. First or Second EMS provider tightens traction mechanism until:
         1) First EMS provider reports mechanical traction equals manual traction
         2) Patient acknowledges pain relief
      r. First or Second EMS provider readjusts leg support straps if necessary with two proximal to the knee, one distal to the knee and one proximal to the ankle hitch
      s. First or Second EMS provider secures leg support straps
      t. First or Second EMS provider rechecks CMS distal to injury site

u. First and Second EMS provider secures patient and splint to long board

2. Traction split (Sager style)
   a. Check CMS distal to injury
   b. Adjust length of splint
   c. Slide groin strap under injured leg. NOTE: Splint may be applied to either the lateral or medial aspect of the leg
   d. Secure the groin strap using sufficient padding to ensure patient comfort. Assure male genitals are clear of strap
   e. Estimate the size of the ankle and fold down the number of pads needed
   f. Apply the ankle harness snugly around the patient's ankle
   g. Extend the inner shaft of the splint by holding the shaft lock in the open position and pulling the inner shaft out until the desired amount of traction, per manufacturer's recommendations, is noted on the calibrated wheel
   h. Apply the longest strap as high up on the thigh as possible
   i. Apply the second longest strap as low as possible on the thigh
   j. Apply the shortest strap over the ankle harness and lower leg
   k. Apply figure eight strap around both ankles by slipping the strap under the ankles. Cross strap over the heel and secure buckle snugly
   l. Recheck CMS distal to injury site
3. Traction splint (Kendrick Traction Device)

   a. Check CMS distal to injury
   b. Apply ankle hitch tightly around the leg, slightly above the ankle
   c. Tighten stirrup by pulling the green tabbed strap, until snug under patient's heel
   d. Apply upper thigh system by sliding the pronged portion of buckle under the leg, at the knee, and seesaw upward until positioned in groin area. Secure buckle. Assure male genitals are clear of strap
   e. Cinch the groin strap until traction pole receptacle is positioned in line with the iliac crest
   f. Extend the traction pole
   g. Place traction pole along the lateral aspect of the injured leg, extending approximately eight (8) inches (one pole section) beyond the bottom of the foot. Make sure that each joint of pole is securely seated
   h. Insert pole end(s) into traction pole receptacle
   i. Secure yellow elastic strap around knee
   j. Place yellow tab end of blue cinch strap (located on ankle hitch) over the dart end of traction pole
   k. Apply traction by pulling the red tab end of cinch strap until patient comfort improves
   l. Apply upper (red) elastic strap and lower (green) elastic strap around patient's leg and traction pole
   m. Re-check CMS distal to injury site

I. Knee injuries
   1. Check CMS distal to injury site
   2. Stabilize manually proximal and distal to the injury site
   3. Splint the knee in the position found
   4. Immobilize knee joint with rigid splints
   5. Re-check CMS distal to injury site

J. Leg injuries (tibia and/or fibula)
   1. Check CMS distal to injury site
   2. Stabilize manually proximal and distal to the injury site

3. Immobilize with rigid splint(s). If using two board splints, apply one medial and one lateral to the leg; if using one board splint, apply to the posterior aspect of the leg
4. If using a commercial splint, pad any voids to provide secured/padded splint
5. Secure in place
6. Re-check CMS distal to injury site

K. Ankle and foot injuries
1. Check CMS distal to injury site
2. Stabilize manually proximal and distal to injury site
3. Immobilize with pillow, blanket, or appropriate commercial splinting device, leaving toes exposed
4. If using a commercial splint, pad any voids to provide secured/padded splint
5. Elevate foot and ankle to reduce edema
6. Re-check CMS proximal and distal to injury site

Section 10: Spinal injuries

Definitions:

- *Spinal Stabilization:* Keeping the head, neck, and spine inline, or limiting motion if the spine cannot be brought in line. This usually can be accomplished with the use of a well-fitting cervical collar, "blanket horse collar", or rolled towel when commercial cervical collar cannot be properly fitted. Additional equipment that can assist in spinal stabilization include head blocks, blanket rolls, or tape. Please note that long spine boards, short spine boards, KED (or other extrication devices), and scoop stretchers are not a required component to spinal stabilization. These

  devices can be used for patient movement but should be removed as soon as the patient has reached the ambulance cot (if life-sustaining treatment doesn't preclude patient movement). The mattress on an ambulance cot contours to a patient's spine and provides better stabilization than a firm board while at the same time decreases pain and pressure points. Also note that if a patient is placed with the pelvis at the hinge point of the ambulance cot, the spine can remain inline while the head of the cot can be raised 15 to 30 degrees. This slight elevation can improve ventilation, improve brain perfusion, and decrease the risk of aspiration.
- *Neck pain:* Neck pain includes any stiffness or tenderness upon palpation at the posterior midline or paraspinal area of the cervical spine or back.
- *Decisional patient:* The patient must be calm, cooperative, sober, oriented and alert. There can be no communication barriers including but not limited to: age, language, closed head injury, deafness, intoxication or other injury that interferes with the patient's ability to concentrate on or cooperate with the examination.

Objectives:

- To provide protection of the spinal column in a patient with a suspected spinal fracture/dislocation and/or potential for spinal cord injury from blunt trauma.
- To provide spinal stabilization while maintaining a patent airway.
- To restore and maintain normal anatomical alignment of the spinal column and head.
- To provide spinal stabilization throughout all patient handling, packaging and transport procedures.

Points of emphasis:

- Patients with penetrating traumatic injuries should only undergo spinal stabilization if a focal neurologic deficit is noted on physical exam (Although there is little evidence of benefit, even in these cases. Follow local protocol.)

- Assess circulation, movement and sensation (CMS) prior to and following patient movement and stabilization to cot or mechanical device.
- Document patient's neurologic condition (circulation, sensation, movement) before and after splinting or movement.
- One EMS provider is responsible for stabilization of the head, neck (manual cervical stabilization) and maintenance of the airway.
- It is permissible for EMS providers to exchange positions while providing stabilization.
- EMS provider maintaining manual stabilization directs patient movement.
- Restoring spinal alignment may be appropriate during the spinal stabilization. Process. However, if resistance to movement of the neck or spine is felt, or the patient experiences an increase in pain, stabilize the patient in the position found.
- In general, a cervical collar should be used during the stabilization process. A cervical collar alone may not be adequate for protecting the cervical spine.
- Depending on the style of C- collar in use, the chinstrap may be more appropriately placed on the C-collar below the chin.
- When using tape to secure patient's head to cot or long board, avoid applying sticky side of tape on eyebrows.
- If stabilization has been completed with a mechanical device, the device may be positioned to assist in maintaining a patent airway.
- Patients may be stabilized to a long or short stabilization device using straps, tape, cravats, Velcro® closures, commercial devices, etc. Appropriate padding such as blankets, towels, dressings, etc., may be needed to prevent movement of the patient in or on the stabilization device.
- Consider padding board for patient comfort.
- Spinal stabilization exclusion may be instituted only after approval by the service medical director, the state EMS office, and appropriate training of all personnel.
- Decisional patients have the right to refuse aspects of treatment including spinal stabilization. If a patient refuses spinal stabilization, after being informed of the possible permanent paralysis, document the patient's refusal in your medical record.

Skills:

A. Spinal stabilization assessment for exclusion or inclusion
   1. A complete patient assessment will be completed on all trauma patients including those who are potential candidates for spinal stabilization exclusion under this section
   2. This section does not exclude any patient from spinal stabilization if the EMS crew feels spinal stabilization precautions are warranted
   3. Documentation on the patient care report should reflect positive and negative physical findings as outlined below
   4. Spinal stabilization may be excluded if the patient meets **all** of the following criteria and allowed in local protocol:
      a. The traumatic incident is minor with no significant mechanism of injury, vehicle or environmental damage
      b. There are no high-risk mechanism triage criteria present from the Wisconsin Trauma Field Triage Guidelines
      c. The patient does not have significant head or facial trauma
      d. The decisional patient denies neck or spine pain or tenderness with or without palpation
      e. There is no history of new or temporary neurologic deficit such as numbness or weakness in an extremity
      f. There is no history of loss of consciousness associated with the trauma

g. The patient has no history of altered mental state associated with the trauma
h. The patient does not appear to be under the influence of drugs or alcohol
i. There are no significant distracting injuries that may distract the patient from perceiving pain/tenderness. Note: Distracting injuries include, but are not limited to fractures, lacerations, burns, crush injuries, and other causes of severe or distracting pain

5. If the patient has met all of the above criteria, have the patient rotate their head 45 degrees to both sides. If there is still no discomfort, spinal stabilization is not required

B. Spinal stabilization – ambulatory patient, standing
1. Check CMS in all four extremities
2. Patient may ambulate to ambulance cot and lie down, with pelvis near hinge point of cot
3. Place appropriately sized cervical collar on patient
4. Instruct patient to hold head still. Secure head to mattress with a piece of tape across the forehead if patient is not following commands to keep head still
5. Elevate head of cot 15-30 degrees if possible for comfort
6. Re-check CMS in all four extremities

C. Spinal stabilization – ambulatory patient, sitting
1. Check CMS in all four extremities
2. Place appropriately sized cervical collar on patient
3. Allow patient to self-extricate/stand with assistance as needed
4. Patient may ambulate to ambulance cot and lie down, with pelvis near hinge point of cot
5. Instruct patient to hold head still. Secure head to mattress with a piece of tape across forehead if patient is not following commands to keep head still
6. Elevate head of cot 15-30 degrees if possible for comfort
7. Re-check CMS in all four extremities

D. Spinal stabilization – non-ambulatory patient, sitting

1. First EMS provider
a. Stabilize and support the head in a neutral position
b. Maintain stabilization until patient's head is secured with tape
2. Second and Third EMS provider
a. Check CMS in all four extremities
b. Place appropriately sized cervical collar (may use horse collar or other stabilization technique if more appropriate for situation and patient body size)
c. Rotate the patient as a unit, maintaining spinal alignment and manual stabilization
d. Lay patient onto board and slide patient to the top of the long board. A KED or other commercial extrication device for a seated patient should only be used if a vertical rescue is needed and this patient has to be lifted in a seated fashion when horizontal vehicle entry is not possible (see appropriate skill)
e. Temporarily secure patient to long board for carrying patient
f. Temporarily secure patient's forehead to board with tape and release manual spinal stabilization
g. Restrain patient's extremities in appropriate manner, if needed, for safety
3. To transfer patient from long board to the EMS cot:
a. Position the cot level at approximately EMS provider waist height
b. Place long board (with patient) on the foot end of the cot; long board should be about half on the cot
c. EMS provider one supports the foot of the long board
d. EMS providers two and three
1) Unstrap patient from board, including removing forehead tape

2) Stand on opposite sides of the cot/patient, facing the head of the cot and grasp the patient under the axilla with their arm that is closest to the cot
3) Place the palm of the hand, which is furthest away from the patient, on the patient's ear to maintain manual cervical stabilization. A fourth EMS provider, if available, could take manual stabilization from the head of the cot
4) Place their cot side foot near the wheel of the cot to stabilize it. Fourth EMS provider, if available, can assist in holding the cot in place while holding manual stabilization from the head of the cot
5) Slide the patient from the long board onto the cot while EMS provider one continues to hold the foot of the long board in place

e. It is important to be sure that the patient is slid up far enough on the cot such that the patient's pelvis is near the hinge point of the cot. This can allow for elevation of the patient's head without bending the lumbar spine
f. Instruct patient to hold head still. Secure head to mattress with a piece of tape across forehead if patient is not following commands to keep head still
g. The patient's head can be elevated 15 - 30 degrees to improve ability to breathe and decrease intracranial pressure
h. Secure patient to cot with straps

4. Re-check CMS in all four extremities
5. Patient transfer from EMS cot to ED stretcher can be done by:
   a. Using the hospital's plastic slider board while taking manual cervical stabilization (preferred method)
   b. If slider board is not available, patient can be moved as a unit with sheet or blanket that is already under the patient while providing manual cervical stabilization

E. Log roll to long board – non-ambulatory patient, supine (3 EMS providers)

Point of emphasis:

- Scoop stretcher has less spinal movement than log rolling for the supine patient.

Skills:

1. First EMS provider
   a. Stabilizes and supports the head in a neutral position
   b. Maintains manual cervical stabilization until patient's head is secured with tape or with head immobilizer
2. Second and Third EMS provider
   a. Check CMS in all four extremities
   b. Place appropriately sized cervical collar (may use horse collar or other stabilization technique if more appropriate for situation and patient body size)
   c. Tie patient's lower extremities together, if needed
   d. Place long board parallel to the patient on the opposite side from EMS providers
   e. Second EMS provider raises the patient's near arm over patient's head to prevent arm from obstructing roll or places arm along patient's side with hand against thigh
   f. Second and third EMS providers reach across patient and place their hands along patient's body evenly spaced between shoulder and knees. Hand spacing may be adjusted to accommodate patient's weight and height
   g. On signal from first EMS provider, second and third EMS providers roll patient toward them, maintaining spinal alignment
   h. Second and third EMS providers each use hand closest to patient's feet to position the long board on the floor next to the patient's back

i. On signal from first EMS provider, all roll the patient back onto long board and place patient's arm at their side
j. If centering of the patient is necessary; on signal from first EMS provider, the patient may be centered through the use of either direct lateral movement or the "Z" method, which combines longitudinal and lateral movement while maintaining spinal alignment
    1) Ideally move patient off longboard onto cot as outlined above
    2) If keeping patient on long board for transport
        a) Third EMS provider secures patient to long board at chest, pelvis, thighs, and below knees, padding as necessary
        b) Second EMS provider secures patient's head to long board, padding as necessary to maintain neutral alignment
        c) First EMS provider may then release manual stabilization
k. Re-check CMS in all four extremities
l. Secure patient to cot with straps

F. Log roll to long board – non-ambulatory patient, prone on side (3 EMS providers)

Skills:

1. First EMS provider
    a. Stabilizes and supports the head in in position found
    b. Maintains manual cervical stabilization until patient's head is secured with tape or with head immobilizer
2. Second and Third EMS provider
    a. Check CMS in all four extremities
    b. Secure patient's lower extremities together
    c. Place long board parallel to the patient so the back of the patient's head is next to the board
    d. Both EMS providers kneel on board facing the patient with second EMS provider at the patient's chest and third EMS provider at the patient's thighs
    e. Second EMS provider raises patient's arm nearest the device and positions it over the patient's head or alongside the patient's body with the hand against the thigh
    f. Second and third EMS providers reach across the patient and place their hands along patient's body evenly spaced between shoulder and knees. Hand spacing may be adjusted to accommodate patient's weight and height
    g. On signal from first EMS provider, second and third EMS providers roll patient toward them onto long board
    h. As patient is rolled, first EMS provider brings head into neutral position, if possible, achieving spinal alignment (If resistance is felt, head is stabilized at that point)
    i. If centering of the patient is necessary; on signal from first EMS provider, the patient may be centered through the use of either direct lateral movement or the "Z" method, which combines longitudinal and lateral movement while maintaining spinal alignment
    j. Place appropriately sized cervical collar (may use horse collar or other stabilization technique if more appropriate for situation and patient body size)
        1) Ideally move patient off longboard onto cot as outlined above
        2) If keeping patient on long board for transport
            a) Third EMS provider secures patient to long board at chest, pelvis, thighs, and below knees, padding as necessary
            b) Second EMS provider secures patient's head to long board, padding as necessary to maintain neutral alignment
            c) First EMS provider may then release manual stabilization
    k. Re-check CMS in all four extremities
    l. Secure patient to cot with straps

G. Movement of a supine patient to a cot using the scoop stretcher
   1. Take manual cervical spine stabilization and maintain until head is secured with tape
   2. Check CMS in all four extremities
   3. Adjust stretcher length, if scoop stretcher design allows, to the height of the patient
   4. Release stretcher locks and separate into two sections, one on each side of the patient
   5. Slide stretcher halves under the patient without disturbing spinal alignment
   6. Close and lock the head end of the scoop stretcher
   7. Close and lock the foot end of the scoop stretcher, taking care not to pinch the patient
   8. Temporarily secure patient to scoop stretcher for moving patient
   9. Temporarily secure patient's forehead to board with tape or maintain manual stabilization
   10. Position scoop stretcher so the patient's pelvis is near the hinge point of the cot. This can allow for elevation of the patient's head without bending the lumbar spine
   11. Open the foot end of the scoop stretcher
   12. Open the head end of the scoop stretcher
   13. Remove scoop stretcher without disturbing spinal alignment
   14. Instruct patient to hold head still. The patient's forehead can be secured with tape to the mattress if the patient is unable to follow instructions to hold head still
   15. The patient's head can be elevated 15 - 30 degrees to improve ability to breathe and decrease intracranial pressure
   16. Secure patient to cot with straps
   17. Re-check CMS in all four extremities

Points of emphasis:

- A KED or other commercial extrication device for a seated patient should only be used if a vertical rescue is needed and this patient has to be lifted in a seated fashion when horizontal vehicle entry is not possible.
- Groin straps may be utilized in the "criss-cross" or "same-side" configuration.

H. Kendrick extraction device (KED)
   1. Assess need for KED; indication for the KED is infrequent
   2. First EMS provider
      a. Stabilizes and supports the head in a neutral position
      b. Maintains stabilization until patient's head is secured to KED
   3. Second EMS provider
      a. Checks CMS in all four extremities
      b. Assists in repositioning the patient's body to a neutral position, as necessary
      c. Selects and applies an appropriately sized cervical collar
      d. Prepares and positions KED behind patient (request additional help in positioning patient if necessary)
      e. Secures KED with center and bottom chest straps. Assure firm contact of device with lower back and armpits
      f. Pads any void between patient's head and the device to preserve neutral alignment as is necessary
      g. Secures head to device; first strap over forehead, second strap over chin
         NOTE: The chin strap may be omitted or removed if airway compromise exists
      h. First EMS provider may now release manual stabilization
      i. Re-check CMS in all four extremities
   4. Both EMS providers

a. Secure groin and top chest straps, if not done previously. Groin strap must be properly positioned under the mid-line of each buttock to properly secure device to patient
b. Tie hands together and lower extremities together, if necessary
c. Position long board adjacent to patient
d. Slide and pivot patient; support patient at thighs and with device handles
e. Lower patient to long board; maintain legs in flexed position
f. Move patient to head of long board or directly onto stretcher
    1) Release groin straps and lower the patient's legs to the long board
    2) Loosen top chest strap as necessary to facilitate breathing and patient comfort
    3) Reassess head, strap placement and tension
g. Secure patient to long board or stretcher at chest, pelvis, thighs, and below knees, padding as necessary
h. Re-check CMS in all four extremities

I. Spinal injury – XP-ONE (XP-1) (optional)
1. First EMS provider
    a. Stabilizes and supports the head in a neutral position
    b. Maintains stabilization until patient's head is secured to XP-1
2. Second EMS provider
    a. Checks CMS in all four extremities
    b. Assists in repositioning the patient's body to a neutral position, as necessary
    c. Applies Med-Spec extrication collar
    d. Prepares and positions XP-1 behind patient (Request additional help in positioning patient if necessary)
    e. Secures XP-1 with center and bottom chest straps. Assures firm contact of device with lower back and armpits
    f. Secures head to device, chooses appropriate tabs and attaches them to the Velcro® on both sides of the collar. Places forehead pad on patient and attach tabs
3. Both EMS providers
    a. Secure groin straps
    b. Apply top chest strap; draw shoulder straps down, loop Velcro around top on top and middle chest straps and secure in place
    c. Position long board adjacent to patient
    d. Slide and pivot patient; support patient at thighs and with device handles
    e. Lower patient to long board; maintain legs in flexed position
    f. Move patient to head of long board or stretcher
    g. Release groin straps and lower the patient's legs to the long board or stretcher. Loosen top chest strap as necessary to facilitate breathing and patient comfort
    h. Remove chin strap, if needed, to assure an airway
    i. Secure patient to long board or stretcher at chest, pelvis, thighs, and below knees, padding as necessary
    j. Re-check CMS in all four extremities

J. Sling and spine board
1. First EMS provider
    a. Stabilizes and supports the head in a neutral position
    b. Maintains stabilization until patient's head is secured with tape or device
2. Second EMS provider
    a. Checks CMS in all four extremities
    b. Selects and applies an appropriately-sized cervical collar
    c. Positions sling across chest and under armpits of patient and tightens around body

d. Secures patient's hands together if possible
e. Positions long board at slight elevation to patient's longitudinal axis. Supports at this angle while pulling patient
f. On command, pulls patient slowly onto board, keeping sling close to board at all times as first EMS provider guides patient's body and maintains stabilization of the head
g. As first EMS provider approaches head of board, lowers board gently and moves back as pull is completed
h. Secures patient to long board at chest, pelvis, thighs, and below knees, padding as necessary
i. Secures patient's head to long spine board, padding as necessary
j. First EMS provider may then release manual stabilization
k. Re-checks CMS in all four extremities

K. Straddle lift (4 EMS provider minimum)

1 First EMS provider
a. Stabilizes head, neck and spine in neutral position
b. Maintains stabilization until patient's head is secured with tape or device

2 Second, Third and Fourth EMS providers
a. Check CMS in all four extremities
b. Select and apply an appropriately-sized cervical collar
c. Second and third EMS providers straddle patient facing first EMS provider
d. Second EMS provider bends and places hands under patient's chest below the shoulders
e. Third EMS provider bends and places hands under patient's pelvis
f. Fourth EMS provider positions long spine board lengthwise at the patient's head or feet
g. At signal from the first EMS provider, second and third EMS providers lift patient just enough to allow the long spine board to pass under the patient's body
h. Fourth EMS provider slides long spine board under patient in one smooth, unbroken movement
i. On signal from first EMS provider, second and third EMS providers lower patient on the long spine board
j. If centering of the patient is necessary; on signal from first EMS provider, slide patient with gentle even motion while maintaining spinal alignment
k. Third EMS provider secures patient to long board at chest, pelvis, thighs, and below knees, padding as necessary

l. Second EMS provider secures patient's head to long spine board, padding as necessary to maintain neutral alignment
m. First EMS provider may then release manual stabilization
n. Re-check CMS in all four extremities

L. Helmet removal

Points of emphasis:

- The ability to maintain an airway is of ultimate importance when managing helmeted patients.
- Consideration should be given to leaving a well-fitting helmet, which allows ready access to perform all necessary airway maneuvers, in place.
- Proper stabilization of patients wearing helmets and other protective equipment often requires the patient's body or head to be padded to maintain appropriate neutral position.

- Glasses, microphones, head-sets or other obstructions must be removed before attempting to remove the helmet.
- Depending on the style of helmet being worn, it may be necessary to use a closed face helmet procedure to remove the helmet.
- When at a sporting event, work in conjunction with coach/training staff as often they are familiar with the functionality of the device and may provide removal / padding recommendations.
- Shoulder pads may elevate the patient's body to an extent that traditional immobilization devices will no longer provide adequate stabilization.
- If the patient is wearing other protective equipment, once the helmet is removed care must be taken to pad between the occiput and the immobilization device to maintain the head in a neutral alignment.
- Because of the variations in sports equipment, it is important to be familiar with the equipment your local schools utilize though regular training with coaches and/or athletic training staff.

Skills:

1. Open and full-faced helmets/half helmets
    a. From the cephalic position, first EMS provider provides manual stabilization by placing one hand on each side of the helmet with the fingers on the mandible
    b. Second EMS provider removes the face shield and unfastens the restraining strap
    c. Second EMS provider places one hand on each side of the patient's neck with thumbs resting against the angle of the jaw and the fingers extending behind the occiput to support the patient's head and maintain manual stabilization
    d. First EMS provider then removes the helmet by grasping the straps or edges of the helmet to spread it as it is gently pulled along the long axis of the body and tilted slightly forward
    e. Throughout the removal process, the second EMS provider maintains manual stabilization of the patient's head and neck
    f. First EMS provider resumes control of manual stabilization
    g. The second EMS provider selects and applies an appropriately-sized cervical collar in preparation for moving the patient to a long immobilization device
    h. EMS providers move patient to long immobilization device using appropriate technique as previously described in this section
2. Football Helmet (Patient supine)
    a. First EMS provider provides manual stabilization by placing one hand on each side of the helmet with the fingers on the mandible
    b. Second EMS provider removes the face shield by using paramedic shears to cut the nylon straps holding the shield in position
    c. Second EMS provider then unfastens chin strap(s) at the side snaps, removing it completely
    d. Using the closed trauma shears as a lever, the second EMS provider pries the lower lateral interior pads from the helmet and removes them
    e. If the helmet is equipped with an air bladder, the second EMS provider releases the air valve of the helmet and deflates the bladder
    f. Second EMS provider places one hand on each side of the patient's neck with the thumbs resting against the angle of the jaw and the fingers extending behind the occiput to support the patient's head and maintain neutral alignment
    g. First EMS provider then removes the helmet by grasping its edges to spread it as it is gently pulled along the long axis of the body and tilted slightly forward
    h. Throughout the removal process the second EMS provider maintains manual stabilization of the patient's head and neck
    i. First EMS provider resumes control of manual stabilization

j. Second EMS provider selects and applies an appropriately sized cervical collar in preparation for moving the patient to a long immobilization device
k. EMS providers move the patient to a long immobilization device using appropriate technique as previously described in this section
l. The second EMS provider pads as necessary under the patient's head to maintain neutral alignment
m. Patient is secured to long immobilization device using appropriate technique as previously described in this section

Section 11: Other ALS skills

I. Nasogastric or orogastric tube insertion

Objectives:

- To provide a means for medication administration.
- To provide a means for gastric lavage and/or decompression.
- To allow for removal of large particulate pills in cases of overdose.
- To decompress the stomach and reduce the chance of regurgitation and aspiration.
- To allow freer downward movement of the diaphragm, making ventilation easier.

Points of emphasis:

- Utilize general patient supportive care.
- For patients with suspected facial or basilar skull fracture, the tube should be inserted orally rather than nasally.

Skills:

A. If possible, sit patient upright for optimal neck/stomach alignment
B. Approximate the length of the nasogastric tube needed by measuring from the tip of nose to earlobe, then to the point halfway between the end of the sternum and the navel
C. Mark measured length with a marker or note the distance
D. Lubricate the distal 2-4 inches of the tube with water-soluble lubricant
E. Insert gastric tube (It is helpful to have the patient swallow as attempting to pass the tube into the esophagus):
    1. For nasal insertion:
        a. Examine nostrils for deformity/obstructions to determine best side for insertion
        b. For the patient with an endotracheal tube in place, insert the nasogastric tube into the patient's nostril, directing the advancement straight back along the floor of the nasal passage (posteriorly, past the pharynx into the esophagus and then the stomach)
    2. For oral insertion, insert the orogastric tube into the patient's mouth, directing the advancement posteriorly, past the pharynx into the esophagus and then the stomach
F. Advance the tube until:
    1. The measured/marked length of the tube has been reached
    2. Gastric contents appear in the tube
    3. Gastric distention has been relieved
G. Check the posterior pharynx to be sure the tube is not curled up in the back of the mouth
    1. If found curled in the pharynx, withdraw and reinsert the tube, advancing it if necessary with Magill forceps under direct visualization with a laryngoscope and blade
    2. Withdraw tube immediately if changes occur in patient's respiratory status
H. Once insertion is complete, inject approximately 20-30 ml of air into the nasogastric tube while listening over the stomach with the stethoscope to confirm placement
I. Secure tube with tape or a commercially prepared tube holder

J. If placed for suctioning gastric contents:
   1. Remove syringe from free end of tube
   2. Connect to suction
   3. Set machine on type of suction and pressure as per protocol

II. Thoracentesis

Objectives:

- To provide an open pathway into the pleural space to decompress a suspected tension pneumothorax.
- To release the trapped air causing a tension pneumothorax (a progressive build-up of air within the pleural space.)

Points of emphasis:

- Administer 100% oxygen, and ventilate the patient if necessary.
- Assess patient to confirm the presence of tension pneumothorax.
- Gather equipment before starting procedure and maintain sterility of equipment. Equipment may be a kit and/or include:
  – 14-gauge, 2 inch (or larger) IV catheter (ideally at least 3-inch needle for anterior approach)
  – Antimicrobial solution for cleansing site
  – Tape
  – 10 ml syringe (optional)
  – Flutter valve (optional)
  – Stethoscope
  – Sharps container
- Complete patient assessment to determine/confirm presence and side of tension pneumothorax.
- To minimize risk of infection, prep the area of puncture and maintain sterility of equipment.
- If tension pneumothorax recurs (as noted by return of respiratory distress), repeat the needle decompression on the injured side.
- Document procedure and results, including any unusual circumstances and/or difficulties encountered.

Skills:

A. Administer 100% oxygen, and ventilate the patient if necessary
B. Explain procedure to patient and/or family, if appropriate
C. Determine which side of the chest has a tension pneumothorax
D. Locate anatomic landmarks: second intercostal space between the second and third rib at the mid-clavicular line on the side of the pneumothorax. (Alternative site is fifth intercostal space, midaxillary line)
E. Prep the area with antimicrobial agent
F. Don sterile gloves
G. Remove the protective sheath and confirm the catheter is in place on the 14-gauge needle
   1. If using a 10 mL syringe, attach it to the catheter before entering skin
   2. If using catheter without syringe, remove the plastic cap from the needle hub
H. Use non-dominant hand, with sterile glove on, to re-identify anatomic landmarks
I. Insert the over-the-needle catheter at a 90º angle to the chest wall just above the cephalad border of the 3rd rib on the affected side. When the tip of the needle has passed through the chest skin and touches the 3rd rib, alter the angle and “walk” the needle over the 3rd rib, advancing it into the pleural cavity
J. Advance the needle until you feel a "pop" while listening for a possible rush of air that may be released

K. Remove the needle leaving the catheter in place
L. Apply flutter valve, if using one. If not using a flutter valve, the cannula is left open to air
M. Secure the catheter in place
N. Dispose of contaminated equipment in appropriate receptacle
O. Auscultate for increased breath sounds and observe for decreased respiratory distress
P. Continually reassess patient for desired/undesired effects

III. Pericardiocentesis

Objectives:

- To use an emergency technique to manage a suspected cardiac tamponade causing hemodynamic compromise.
- To relieve the excessive pressure being placed on the heart due to accumulation of large amounts of fluid in the sac surrounding the heart.

Points of emphasis:

- Administer 100% oxygen, and ventilate the patient if necessary.
- Assess patient to determine that patient truly has a cardiac tamponade and is in hemodynamic compromise.
  - Hypotension
  - Tachycardia
  - Distended neck veins
  - Narrow pulse pressure
  - Lack of pulses with high quality CPR
- Should consider obtaining vascular access if not already done and time allows.
- Explain procedure to patient and/or family, if appropriate.
- Pericardiocentesis should be viewed as a temporary measure only and must not be viewed as a definitive therapeutic procedure.
- Patient needs to be monitored closely for the recurrence of tamponade and be transported to an appropriate facility for possible surgical interventions.
- Document procedure and results, including any unusual circumstances and/or difficulties encountered.

Skills:

A. Administer 100% oxygen, and ventilate the patient if necessary
B. Explain procedure to patient and/or family, if appropriate
C. Select, check and prepare appropriate equipment using sterile technique
   1. Antimicrobial agent
   2. 50 ml syringe
   3. Consider 3-way stopcock
   4. 3 to 3-1/2 inch 18 ga spinal needle
   5. BSI procedures and selection of proper PPE
D. If patient has a pulse
   1. Monitor vital signs
   2. Monitor ECG rhythm
   3. Consider placing the patient's upper torso elevated at approximately 30-degree angle
E. Prep the anterior sub-xiphoid thoracic abdominal region with antimicrobial agent
F. With the 50 ml syringe attached to the 18-gauge spinal needle, insert the needle just below and left lateral of the xiphoidchondral junction, and then continue at a 45-degree angle while aiming at the inferior tip of the left scapula or left shoulder
G. Advance the needle superiorly while maintaining negative pressure (aspiration) on the syringe

H. Stop advancement of the needle when blood/fluid appears in the syringe
I. Aspirate as much blood as possible from the pericardial sac. If more than 50 ml of blood is removed from the pericardial sac without hemodynamic improvement, the needle may be in the left ventricle
J. Withdraw the needle at the same angle at which it was inserted
K. Save any aspirated fluid and transport with patient
L. Dispose of contaminated equipment in the appropriate receptacle
M. Reassess the patient's condition for any clinical improvement
N. Repeated aspirations may be necessary as the patient's condition warrants

Glossary of Common Abbreviations

ABCs.....Airway Breathing & Circulation
AED.....Automated External Defibrillator or Defibrillation
AHA.....American Heart Association
ALS.....Advanced Life Support
ARC.....American Red Cross
ASA.....Aspirin
AVPU.....Alert, Verbal, Painful, Unresponsive
BLS.....Basic Life Support
BP.....Blood Pressure
BSA.....Body Surface Area
BSI.....Body Substance Isolation
BVM.....Bag-valve Mask
CC.....Chief Complaint
CO.....Carbon Monoxide
CO2.....Carbon Dioxide
C-spine.....Cervical Spine
CID/HID.....Cervical Immobilization Device/Head Immobilization Device
CMS.....Circulation, Movement & Sensation
CNS.....Central Nervous System
CPAP.....Continuous Positive Air Pressure
CPR.....Cardiopulmonary Resuscitation
CSF.....Cerebral Spinal Fluid
DCAP/BTLS.....Deformities, Contusions, Abrasions, Penetrations, Burns, Tenderness, Lacerations, Swelling
dL.....Deciliter
EMS.....Emergency Medical Services
EMT.....Emergency Medical Technician
ET.....Endotracheal
ETC.....Esophageal Tracheal Combitube®
EtCO2.....End-tidal Carbon Monoxide
gtts.....drops
IM.....Intramuscular
IO.....Intraosseous

IV.....Intravenous
IVP.....Intravenous push
KED.....Kendrick Extrication Device
kg.....kilogram
KTD.....Kendrick Traction Device
lbs.....Pounds
LOC.....Level of Consciousness
lpm.....Liters per Minute
mg.....Milligram
mL.....Milliliter
mmHg.....Millimeters of Mercury
MOI.....Mechanism of Injury
NOI.....Nature of Illness
NPO.....Nothing by Mouth
NTG.....Nitroglycerin
O2.....Oxygen
OB.....Obstetrics
OPQRST.....Onset, Provocation, Quality, Radiation, Severity, Time
PASG.....Pneumatic Anti-Shock Garment
PO.....By mouth
PPE.....Personal Protective Equipment
PPVD.....Positive Pressure Ventilation Device
prn.....as needed, as desired, as necessary
PSI.....Pounds per square inch
pt.....patient
SAMPLE.....Signs & Symptoms, Allergies, Medications, Past pertinent medical history, Last oral Intake, Events preceding incident
SC.....Subcutaneous
SIDS.....Sudden Infant Death Syndrome
SL.....Sublingual
SQ.....Subcutaneous
SOB.....Shortness of Breath
SpO2.....Saturation percentage of oxygen
S/S.....Signs & Symptoms
SVN.....Small Volume Nebulizer
USP.....United States Pharmacopeia
VS.....Vital Signs

References:

- American Heart Association (AHA) Guidelines
- Emergency Medical Services (EMS) Education Standards
- 2011 Wisconsin Emergency Medical Technician: A Practiced Based Approach to EMS Education
- NAEMT PHTLS - National Association of Emergency Medical Technicians Pre-Hospital Traumatic Life Support