



Standard Operating Guidelines

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Introduction

These Standard Operating Guidelines (SOGs) have been designed as patient care directives for Region IV prehospital care providers. Providers should rely on these guidelines to guide a patient's treatment prior to arrival in the emergency department.

At all times, providers should evaluate each patient, make an assessment, and treat as directed by the appropriate SOG(s). A patient may require utilization of more than one SOG. The prehospital care provider should always keep the best interests of the patient in mind.

The medical directors of Region IV understand that varying and exceptional circumstances do occur. Indeed, it may be necessary, at times, to make reasonable deviations from these SOGs. However, it should be noted that the SOGs do NOT replace contact with Medical Control, particularly when deviation from the SOGs is deemed necessary by the prehospital care provider.

The Region IV SOGs are divided by category. Each patient shall undergo a general medical or trauma exam, the breadth of which shall be dictated by the time allowed and the nature of the patient's illness or injury.

Next, the Circulation, Airway, and Breathing of each patient shall be assessed without exception. While evaluation of each is often conducted simultaneously, these "Basic Concepts" are delineated in separate chapters, along with specific emergencies pertinent to each.

Following evaluation of a patient's Circulation, Airway, and Breathing, each patient shall be assessed for Disability.

Next, the Region IV SOGs include separate chapters for pain control, medical emergencies, obstetric emergencies, etc.

Section I: General Medical Care

GENERAL MEDICAL ASSESSMENT

FR/BLS/ILS/ALS

1. Scene Survey
 - a. Identify possible hazards.
 - b. Assure safety for patient and responder.
 - c. Observe for mechanism of injury/nature of illness.
 - d. Make note of any pertinent physical or environmental observations. Note anything suspicious at the scene, i.e. medications, household chemicals, other ill family members.
 - e. Assess any discrepancies between the history and the patient presentation.
 - f. Initiate appropriate body substance isolation (BSI) precautions.
 - g. Assess the number of patients. If appropriate, begin triage, and initiate MCI procedures.
 - h. Assess need for additional resources.

2. General Approach to the Stable/Conscious *Pediatric* Patient
 - a. Assessments and interventions must be tailored to each child in terms of age, size, and development.
 - b. Smile if appropriate to the situation.
 - c. Do not lie.
 - d. Kneel down to the level of the child, if possible.
 - e. Keep your voice at an even, quiet tone; don't yell.
 - f. Speak slowly; use simple, age appropriate terms.
 - g. Use toys or penlight as distracters; make a game of assessment.
 - h. Be cautious in the use of touch. In the stable child, make as many observations as possible before touching (and potentially upsetting) the child.
 - i. Keep small children with their caregiver(s); encourage assessment while caregiver is holding the child.
 - j. Adolescents may need to be interviewed without their caregivers present if accurate information is to be obtained regarding drug use, alcohol use, LMP, sexual activity, and/or child abuse.

3. Much insight can be gained on a patient's oxygenation, ventilation, and neurologic status prior to making physical contact. This is particularly true for children. Pay particular attention to the elements of the "Pediatric Assessment Triangle" – appearance, work of breathing, and circulation to the skin. While walking up to the patient, observe the following:
 - a. General appearance, age appropriate behavior. Does the patient have a malnourished appearance? Is a child looking around, responding with curiosity or fear, playing, sucking on a pacifier or bottle, quiet, eyes open but not moving much or uninterested in environment?
 - b. Interactiveness – How alert is the patient? How readily does a person, object, or sound distract a child or draw his/her attention? Will he/she reach for, grasp and play with a toy or exam instrument such as a penlight or tongue blade? Or, is he/she uninterested in playing or interacting with the caregiver or prehospital professional?

- c. Consolability – Can the child be consoled or comforted by the caregiver or by the prehospital professional? Or, is his/her crying or agitation unrelieved by gentle assurance?
 - d. Look/Glaze – Does he/she fix his/her gaze on a face? Or, is there an empty, blank stare?
 - e. Speech/Cry – Is his/her cry strong and spontaneous, or weak or high-pitched? Is the content of the speech age-appropriate, or confused or garbled?
 - f. Obvious respiratory distress/increased work of breathing: retractions, nasal flaring, accessory muscle use, head bobbing, grunting.
 - g. Color: pink, pale, blushed, cyanotic, mottled.
 - h. Position of the patient. Are the head, neck or arms being held in a position suggestive of spinal injury, chest pain, severe dyspnea, etc.? Is the patient sitting up or tripodding?
 - i. Muscle tone: good vs. limp. Is he/she moving or resisting examination vigorously? Does he/she have good muscle tone? Or, is he/she limp, listless or flaccid?
 - j. Movement: spontaneous, purposeful, or symmetrical.
 - k. Obvious injuries, bleeding, bruising, impaled objects or gross deformities.
 - l. Assess for pain.
 - m. Determine weight – ask child or caretakers or use length/weight tape.
4. Initial Assessment – Assess the patient’s Circulation, Airway, Breathing, and Disability.
 - a. Refer to the C, A, B, and D Basic Concepts, and correct life-threatening problems as identified.
 - b. Expose and Examine
 - Expose the patient as appropriate, based on age and severity of illness.
 - Initiate measures to prevent heat loss and hypothermia.
 - c. Check for Medic Alert tags.
5. Form a general impression of the patient’s condition, and identify priority transports.
6. Focused History/Physical Assessment
 - a. Tailor assessment to the needs of the patient. Rapidly examine areas specific to the chief complaint.
 - b. Patient History – Acquire during/incorporate into physical exam.
 - c. Signs & Symptoms as they relate to the chief complaint. Include pertinent positives and negatives.
 - Onset
 - Provocation
 - Quality
 - Radiation
 - Symptoms
 - Time
 - d. Allergies to medications, foods, environment.
 - e. Medications: prescribed and over-the-counter; compliance with prescribed dosing regimen; time, date and amount of last dose.
 - f. Past Medical History
 - Pertinent medical or surgical problems.
 - Preexisting diseases/chronic illness.
 - Previous hospitalizations.

- Currently under medical care?
 - For infants, obtain a neonatal history (gestation, prematurity, problems with pregnancy or delivery, congenital anomalies, was infant discharged home at the same time as the mother).
- g. Last oral intake of liquid/food, Last menstrual period (when applicable).
- h. Events leading to present condition.
- Associated factors such as toxic inhalants, drugs, alcohol.
 - Injury scenario and mechanism of injury.
 - Treatment given by caregiver.
 - Assess pain using 0-10 scale or Wong-Baker faces.
7. Vital signs:
- a. Respirations.
 - b. Pulse.
 - c. Blood pressure.
 - d. Pulse oximetry, if available.
8. Detailed Physical Exam (illness or injury specific when appropriate)
- a. Systematic head to toe exam performed to detect non-life threatening conditions and to provide care for those conditions/injuries.
 - b. Usually performed en route.
 - c. Inspect and palpate each of the major body systems for the following:
 - Deformities
 - Contusions
 - Abrasions
 - Penetrations/punctures
 - Burns
 - Lacerations
 - Swelling/edema
 - Tenderness
 - Instability
 - Crepitus
9. Ongoing Assessment
- a. Reassess ABCD's and Vital Signs.
 - b. At *minimum*, every 5 minutes for unstable patients and every 15 minutes for stable patients.
 - c. Potentially unstable patients are those with vital signs outside the range of normal or those suffering from an illness or injury that may reasonably result in abnormal vital signs.

*The pediatric patient is generally considered one \leq 16 years of age.

CONSIDERATIONS FOR CHILDREN WITH SPECIAL HEALTHCARE NEEDS

1. Track Children with Special Healthcare Needs in your service community, and become familiar with both the child and his/her anticipated emergency care needs.
2. Refer to the child's emergency care plan formulated by his/her medical providers, if available. Understanding the child's baseline will assist in determining the significance of altered

physical findings. Parents/caregivers are the best source of information on: medications, baseline vitals, functional level/normal mentation, likely medical complications, equipment operation and troubleshooting, emergency procedures.

3. Regardless of underlying condition, assess in a systematic and thorough manner. Use parents/caregivers/home health nurses as medical resources.
4. Be prepared for differences in airway anatomy, physical development, cognitive development and possibly existing surgical alterations or mechanical adjuncts. Common home therapies include: respiratory support (oxygen, apnea monitors, pulse oximeters, tracheostomies, and mechanical ventilators), nutrition therapy (nasogastric or gastrostomy feeding tubes), intravenous therapy (central venous catheters), urinary catheterization or dialysis (continuous ambulatory peritoneal dialysis), biotelemetry, ostomy care, orthotic devices, communication or mobility devices, or hospice care.
5. Communicate with the child in an age-appropriate manner. Maintain communication with and remain sensitive to the parents/ caregivers and the child.
6. The most common emergency encountered with these patients is respiratory-related, and, so, familiarity with respiratory emergency interventions, adjuncts, and treatment is appropriate.

GERIATRIC EMERGENCIES

Geriatric patients are generally considered to be persons older than 65 years. A decline in body systems starts in our late 20s and progresses slowly throughout our lifespan. The reality is that we all age, and older persons are becoming a larger percentage of the population.

1. Recall that the geriatric patient may present atypically due to numerous bodily changes as he/she ages. For example:
 - a. Alterations in neurotransmitters decrease reaction time and slow complex mental functions.
 - b. Increased peripheral vascular resistance, leading to hypertension.
 - c. Muscles become less flexible, and strength declines. Progressive bone loss increases risk of fracture.
 - d. There is a decreased ability to maintain normal body temperature.
 - e. Oxygen and carbon dioxide exchange in the lungs and at the cellular level declines. The body fatigues at a faster rate than when younger.
 - f. Metabolism decreases. As a result, weight gain may be present.
 - g. Collagen production decreases; skin is wrinkled, thinner and more susceptible to bruising.
 - h. Visual changes occur due to cataracts, macular degeneration, and the eyes' inability to handle light changes.
 - i. Changes in hearing, taste, touch and smell place them at risk for injury.
 - j. The major body systems such as the cardiovascular, renal, musculoskeletal and immune systems all begin to age and function less efficiently.
2. The geriatric patient assessment is the same as all other age groups. However, do not make assumptions about an older person's level of consciousness. Never assume that an altered level of consciousness or confusion is normal.
3. Dizziness or weakness is often difficult to assess for an older patient. This complaint can be caused by a cardiac problem, infections in the inner ear or hypertension. You must consider the potential for a wide range of medical problems, including cardiac disease.
4. Altered Mental Status is a similarly elusive diagnosis. Altered Mental Status may present as very subtle changes in cognition, but may represent a potentially serious illness. The causes of altered mental status in the elderly may range from trauma to Acute Coronary Syndrome to urinary tract infections.
5. Be aware that the sensation of pain may be diminished in an older patient, leading you to underestimate the severity of his or her condition. This diminished sensation is associated with the aging nervous system. In addition, fear of hospitalization often causes the patient to either understate or minimize their symptoms.

1.04 INITIAL MEDICAL CARE

FR/BLS

1. Conduct a **General Medical Assessment**.
2. Support Circulation, Airway, and Breathing as outlined in the Basic Concepts within the individual provider's scope of practice.
 - a. Keep NPO.
 - b. Keep warm.
 - c. Position the patient appropriately.
 - d. Place the conscious patient in a semi-Fowler's position or position of comfort unless contraindicated, e.g. trauma or hypotension.
 - e. FR should place the patient with decreased mental status in the High Arm IN Endangered Spine (HAINES) position while awaiting EMS unless contra-indicated, e.g. trauma or respiratory insufficiency.
 - i. Extend one of the victim's arms above the head and roll the body to the side so the victim's head rests on the extended arm. Bend both legs to stabilize the victim.
 - f. If evidence of shock, lie supine. If no evidence of trauma or injury, raise the feet about 6 to 12 inches.
3. If, in the judgment of the provider, the patient is at risk of cardiac or respiratory compromise, administer **OXYGEN**:
 - a. Oxygen supplementation if needed to reach target of > 94%

Adult:

Stable: 2-6 LPM by nasal cannula.

Unstable: 100% oxygen by non-rebreather mask.

Pediatric:

Stable: blow-by oxygen as tolerated.

4. Obtain baseline vital signs
 - a. An initial full set of vital signs is required: pulse, blood pressure, respiratory rate, neurologic status assessment.
 - b. Glasgow Coma Score (GCS) is frequently used, but there are often errors in applying and calculating this score. With this in consideration, Glasgow Coma Score may not be more valid than a simpler field approach.
 - c. Either AVPU (Alert, Verbal, Painful, Unresponsive – see below) or only the motor component of the GCS may more effectively serve in this capacity
 - d. 12lead EKG should be obtained early in patients with cardiac complaints
 - e. Continuous cardiac monitoring, if available.
 - f. Consider waveform capnography
 - g. Assess blood glucose

Stable patients should have at least two sets of pertinent vital signs. Ideally, one set

should be taken shortly before arrival at receiving facility. Critical patients should have pertinent vital signs frequently monitored

Obtain OPQRST history:

O: onset of symptoms

P: provocation –location; any exacerbating or alleviating factors

Q: quality of pain

R: radiation of pain

S: severity of symptoms -pain scale

T: time of onset and circumstances around onset

Obtain SAMPLE history:

S: symptoms

A: allergies -medication, environmental, and foods

M: medications -both prescription and over-the-counter; bring all containers to hospital if possible

P: past medical history

i. look for medical alert tags, portable medical records, advance directives

ii. look for medical devices/implants: some common ones may be dialysis

shunt, insulin pump, pacemaker, central venous access port, gastric tubes, urinary catheter

L: last oral intake

E: events leading up to the 911 call. In patient with syncope, seizure, altered mental status, or acute stroke, consider bringing witness to the hospital or obtain their contact phone number to provide to ED care team

5. Follow the appropriate SOG(s). If none apply, contact Medical Control for further direction.
6. Obtain ALS intercept, as necessary.
7. Contact Medical Control.
8. Complete all documentation as required. Justification for on-scene time >20 minutes for medical patients and >10 minutes for trauma patients should be included in the narrative.

ILS/ALS

9. If, in the judgment of the provider, the patient is at risk of cardiac or respiratory compromise:
 - a. Establish an IV of **NORMAL SALINE** or **LACTATED RINGERS** at a TKO rate (20 ml/hr for adults, 20ml/hr for pediatric patients).
 - b. Considerations for blood draw according to receiving hospital guidelines.

ALS

10. If, in the judgment of the provider, the patient is at risk of cardiac or respiratory compromise:

- a. Monitor cardiac rhythm and pulse oximetry.
- b. Utilize capnography, if available, on any patient at risk for developing hypoventilation.

ALS ASSIST GUIDELINES FOR BLS/ILS UNITS (IN-FIELD SERVICE UPGRADES)

1. Any BLS unit may request ALS assistance to render a higher level of patient care for any patient.
2. A request for ALS assistance shall be implemented en route to the call when a call is received for a potentially critically ill or injured patient, i.e. a patient in cardiac arrest. Most commonly, the request for ALS assistance will occur at the end of the scene size-up.
3. Suggested criteria for requesting ALS assistance include, but are not limited to:
 - a. Patients with compromised or obstructed airways.
 - b. Respiratory distress or arrest.
 - c. Cardiac arrest.
 - d. Symptoms of acute coronary syndrome: chest pain, SOB, etc.
 - e. Altered level of consciousness.
 - f. Diabetic emergency.
 - g. Seizure or postictal state.
 - h. Pregnancy with imminent delivery.
 - i. Poisoning/overdose.
 - j. Major Trauma including, but not limited to:
 - Multiple injuries or isolated severe injuries or pain.
 - Trauma patients with entrapment.
 - Major burns or those with potential respiratory involvement.
 - k. Medical or trauma patients exhibiting signs of shock (altered mental status, hypotension, diaphoresis, tachypnea).
 - l. Any patient meeting criteria in Region IV Appendix A, B, or D.
 - m. Any case deemed by the responding agency or Medical Control as beneficial to patient outcome.
4. If there is uncertainty regarding the need for ALS assistance, request ALS! Err on the side of the patient.
5. Consideration should be given to the following:
 - a. Transport time to hospital.
 - b. Rendezvous site.
 - c. Availability of resources.
 - d. Interventions needed (defibrillation, airway, drugs).
6. If, at any time, the BLS unit has the ability to arrive at the hospital within five minutes, ALS assist can be canceled UNLESS the patient has a compromised airway. (This includes unresponsive patients, patients in respiratory or cardiac arrest, or in whom impending respiratory or cardiac arrest is suspected.)
 - a. All other cases require request for ALS intercept. The BLS unit shall call for ALS assist as soon as it is evident that ALS care is needed. The BLS unit will NOT delay transportation to the ED to await ALS assist. Rendezvous en route is appropriate in these circumstances.

7. BLS ambulance personnel at the scene of an emergency shall allow ALS ambulance personnel at the scene access to the patient for the purpose of assessing whether ALS care is warranted.
8. ALS personnel will have control of the scene.
9. If the ALS personnel determine that the patient requires advanced life support care, the BLS personnel shall transfer the care of that patient to the ALS personnel. Higher level personnel shall assume in-field responsibility for the patient during the remainder of a prehospital transport.
10. EMT-P/PHRN personnel may, on an ALS assist, temporarily transfer the ALS equipment to the BLS vehicle. A vehicle upgraded as per protocol will be recognized by IDPH as approved for the higher level of service during the remainder of the patient transport.
11. Medical Control should be contacted for clarification should patient care issues or concerns arise.
12. The BLS unit will complete a State run record to include all assessments and treatments carried out while the patient was in their care. The BLS unit should conclude their report indicating they relinquished care to the appropriate ALS unit.
13. The ALS unit will complete a State run record to include all assessments and treatments carried out while the patient was in their care.
14. The highest standards of patient care and professionalism at the scene will be maintained at all times. The care and safety of the patient is the highest priority. Should any conflict arise, submit an Incident Report to the EMS Coordinator.

Section II: Circulation Basic Concept and Cardiac Emergencies

Assessment of a patient's circulatory status is the first assessment that must be made for each patient. If a patient is in cardiac arrest, chest compressions must be started immediately, even before assessment of the patient's airway and breathing. (The only exceptions are drowning victims and the newly born.) If a patient is not in cardiac arrest on arrival, then the prehospital provider may move immediately to assessing the patient's Airway and Breathing, as per the Basic Concepts, prior to further evaluating circulatory status. Often, the evaluation of Circulation, Airway, and Breathing occurs simultaneously in a rapid, thorough manner.

Once the presence of a pulse is verified and the patient's Airway and Breathing have been addressed, the prehospital provider must next evaluate for the presence of inadequate circulation. "Shock" refers to inadequate circulation that results in hypoperfusion of organs. Left untreated, shock will progress to circulatory collapse and death. Providers should strive to determine if the patient in shock is suffering from a rate problem, a pump problem, or a volume problem. Then, refer to the appropriate SOG. Shock may be manifest by:

1. Altered mental status
2. Abnormal heart rate
3. Weak or absent distal (then central) pulses.
4. Delayed capillary refill.
5. Pale, cyanotic, or mottled skin.
6. Diaphoretic, clammy skin.
7. Note that hypotension may not be present in the patient in shock initially, while he/she is still able to compensate.

The ultimate goal of treatment of shock is to restore vital end-organ function as evidenced by improved skin color and condition, pulse rate and quality, capillary refill, and blood pressure while avoiding inadequate or excessive therapy.

In addition, the ALS provider must exclude the possibility of a life-threatening cardiac rhythm disturbance, when appropriate.

Remember, circulatory collapse in the pediatric patient is almost always due to hypoxia! Assess the airway of the pediatric patient quickly, and provide adequate oxygenation and ventilation. The second most common cause of pediatric shock and cardiac arrest is hypovolemia. Assess for a history of conditions that would cause hypovolemia in children (vomiting, diarrhea, poor PO intake) and treat aggressively. Unlike adults, shock and cardiac arrest in children is rarely due to a cardiac etiology.

2.01 PULSELESS PATIENTS

(For all ages, except the newly born)

FR

1. An ALS ambulance must be requested immediately on known cardiac arrests.
2. Initiate **General Medical Assessment & Initial Medical Care**.
3. If the patient is found to be unresponsive, not breathing or only gasping, and no pulse is detected *in 10 seconds or less*, immediately begin chest compressions.
 - a. Compression rate at 100–120 compressions per minute.
 - b. Push hard, push fast, allowing the chest to completely recoil after each compression
 - c. Minimize interruptions in chest compressions until Return of Spontaneous Circulation (ROSC) or termination of resuscitative efforts. *Limit any interruption to 10 seconds.*
 - d. Chest compression depth should be:
 - i. In adults, at least 2 inches.
 - ii. In an infant or child, at least 1/3 the anterior-posterior dimension of the chest. This is approximately 1 ½ inches in most infants and 2 inches in most children.
 - e. Rotate compressors every 2 minutes when possible.
 - f. If an AutoPulse is utilized, minimize any delays between stopping manual chest compressions and initiating compressions with the AutoPulse.
4. CPR algorithms prior to placement of an endotracheal tube or King LT:
 - a. Adults – 30:2 (regardless of number of rescuers).
 - b. Children and infants – 15:2 (two rescuers), 30:2 (one rescuer).
 - c. The two thumb encircling hand technique is preferred for infants when two or more rescuers are present. Otherwise, two fingers may be used.
 - d. Utilize oropharyngeal airways prior to placement of an advanced airway.
 - e. Avoid excessive ventilation! A Res-Q-Pod device may be utilized, if available.
5. Complete 5 cycles (2 minutes) prior to reassessing the patient. Limit pulse checks to ≤ 10 seconds.
6. Attach an AED as soon as available for a sudden, witnessed collapse.
7. On an unwitnessed cardiac arrest with call-to-arrival time greater than 4-5 minutes, EMS personnel may complete 5 cycles (2 minutes) of CPR before attaching and using the AED.
8. In patients 1-8years of age, use pediatric defibrillation pads if available. If no pediatric defibrillation pads are available, use adult pads.
9. In infants less than 1 year of age a manual defibrillator is preferred. If a manual defibrillator is not available, an AED with a dose attenuator (pediatric setting/mode) may be used. An AED without a pediatric mode may be used if neither a manual defibrillator nor one with a dose attenuator is available.

10. Follow AED prompts.

- a. If the AED indicates “SHOCK ADVISED”, call out “CLEAR!” check for the safety of others, and push the SHOCK button (or stand clear if the AED device does not require shock activation).
- b. Immediately resume CPR for 2 minutes before checking pulse.

11. If the patient regains a pulse at any time during resuscitation, then maintain the airway and assist ventilations. Monitor the patient’s pulse frequently.

12. If the patient returns to a pulseless state, resume chest compressions, and re-analyze the patient’s rhythm with the AED. Follow the AED prompts.

14. Pediatric patients in cardiac arrest are most commonly suffering from an airway occlusion or respiratory illness. Adequate ventilation is of paramount importance in this patient population.

BLS

15. (Optional, if trained) Place a King Airway, if available.

- a. Once an advanced airway is placed, give 1 breath every 6-8 seconds (8-10 breaths/min).
- b. Each breath should be administered over 1 second and produce visible chest rise.
- c. Chest compressions should now be provided continuously, with no pauses for ventilations.

ILS

16. ILS providers may choose to perform endotracheal intubation on the patient in cardiac arrest. However, due to the increased time required to place an endotracheal tube and the need to stop chest compressions, the King LT should be strongly considered.

17. Routine use of cricoid pressure is no longer recommended, but may be utilized to improve visualization of the vocal cords.

18. Utilize waveform capnography for confirmation and monitoring of endotracheal tube placement, if available. If not available, an Esophageal Detection Device or color capnometry device in addition to clinical assessment is reasonable.

19. The measurement of end-tidal CO₂ (ETCO₂) has become a valuable monitoring tool in cardiac arrest management.

- a. Normal ETCO₂ is 35 to 45 mm Hg. In an untreated cardiac arrest, ETCO₂ will approach 0 because no CO₂ is delivered to the lungs for exhalation.
- b. With initiation of CPR, cardiac output is the major determinant of CO₂ delivery to the lungs. ETCO₂ correlates well with the efficacy of chest compressions.
- c. If End-Tidal CO₂ (ETCO₂) < 10 mm Hg, attempt to improve CPR quality. Is rescuer fatigue a factor?
- d. A persistently low ETCO₂ values (<10 mm Hg) during CPR in intubated patients suggest that ROSC is unlikely. If ETCO₂ abruptly increases to a normal value (35-40 mm Hg), the patient is likely experiencing a return of spontaneous circulation.

20. Obtain IV or IO access. If IV access is not *readily available*, move immediately to IO access.
- When IV/IO access is obtained, if time and manpower allow, measure blood glucose.

ALS

21. Give **EPINEPHRINE** every 3 to 5 minutes:

- Adult

EPINEPHRINE 1.0 mg IV/IO.

If IV/IO access cannot be established or is delayed, give **EPINEPHRINE** per endotracheal tube at two times the above dose. Due to erratic and delayed absorption, IV or IO administration of medications is **HIGHLY** preferable to endotracheal administration of medications.

- Peds

EPINEPHRINE 1:10,000 0.1 ml/kg (0.01 mg/kg) IV/IO.

If IV/IO access cannot be established or is delayed, give **EPINEPHRINE 1: 1,000** 0.1 ml/kg (0.1 mg/kg) diluted in 5-10 ml of sterile water or **NORMAL SALINE** injected directly into the ET tube.

22. After IV/IO medication administration, elevate the extremity through which the medication is given if manpower allows, and give a 20mL fluid bolus.

23. Refer to rhythm-specific SOG (**Ventricular Fibrillation/Pulseless Ventricular Tachycardia** SOG or **PEA/Asystole** SOG).

24. Continue CPR with rhythm checks every 2 minutes. Take time to check a pulse only if an organized rhythm is present. Otherwise, resume CPR.

25. Consider Causes of Cardiac Arrest:

- Hypovolemia**
- Hypoxia**
- Hydrogen ion (acidosis)**
- Hypo-/hyperkalemia**
- Hypoglycemia**
- Hypothermia**
- Toxins**
- Tamponade, cardiac**
- Tension pneumothorax**
- Thrombosis (coronary or pulmonary)**

26. Consider the need for:

- DEXTROSE** or **GLUCAGON** if hypoglycemia is suspected or verify. Treat as per the **Diabetic/Glucose Emergencies** SOG.
- NALOXONE** if narcotic overdose is suspected. Treat as per the **Overdose/Poisoning** SOG.

27. **SODIUM BICARBONATE** administration is *not recommended unless* preexisting metabolic acidosis, hyperkalemia, or Tricyclic antidepressant (TCA) overdose is suspected.

28. Routine administration of **CALCIUM CHLORIDE** or **CALCIUM GLUCONATE** *is not recommended unless* preexisting hyperkalemia, calcium channel blocker or beta blocker overdose is suspected.

29. Routine administration of **MAGNESIUM SULFATE** *is not recommended unless* Torsades De Pointes is observed.

30. For cardiac arrest in the hemodialysis patient, refer to the **Hyperkalemia** SOG as well.

31. Cardiac Arrest in pregnancy:

- a. Chest compressions should be performed the same a non-pregnant female.
- b. Manually displace the gravid uterus to the patient's left side by providing firm, gentle pressure on the gravid uterus.
- c. Anticipate a difficult airway.
- d. Start IV/IO above the diaphragm.
- e. If the patient was receiving magnesium prior to cardiac arrest, stop the magnesium infusion and give **CALCIUM CHLORIDE** 1g IV/IO.
- f. Rapid transport.

Updated 11/2016

**VENTRICULAR FIBRILLATION/
PULSELESS VENTRICULAR TACHYCARDIA**

ALS

1. Perform CPR while the defibrillator is readied for use.
2. Minimize the interval between stopping chest compressions and delivering a shock.
3. Defibrillate immediately for a sudden, witnessed collapse.
 - a. On an unwitnessed cardiac arrest with call-to-arrival time greater than 4-5 minutes, EMS personnel may complete 5 cycles (2 minutes) of CPR before defibrillation.
 - b. Adults: monophasic 360 joules or biphasic equivalent per manufacturer guidelines.
 - c. Peds: 2 joules/kg monophasic or biphasic equivalent per manufacturer guidelines.
4. Immediately resume chest compressions for 2 minutes *without checking for a pulse* after defibrillation. *
5. Unless cardiac arrest is due to hypothermia, give **AMIODARONE**:
 - a. Adults: **AMIODARONE** 300mg IV/IO.
 - b. Peds: **AMIODARONE** 5mg/kg IV/IO.
6. If, after two minutes of CPR, Ventricular Fibrillation/Pulseless Ventricular Tachycardia persists or recurs, defibrillate again:
 - a. Adults: monophasic 360 joules or biphasic equivalent per manufacturer guidelines.
 - b. Peds: 4 joules/kg monophasic or biphasic equivalent per manufacturer guidelines.
7. Immediately resume chest compressions for 2 minutes *without checking for a pulse* after defibrillation.
8. Consider an additional dose of **AMIODARONE** 150mg IV/IO in adults.
9. If Torsades De Pointes is observed, give **MAGNESIUM SULFATE**:
 - a. Adult: 2gm IV/IO.
 - b. Peds: 25 to 50 mg/kg IV/IO (maximum does 2g).

*Occasionally, a patient will have immediate return of spontaneous circulation and awaken after an initial defibrillation. At any point after ROSC from Ventricular Fibrillation/Pulseless Ventricular Tachycardia, give **AMIODARONE** unless contra-indicated:

Adults: 150mg IV/IO over 10 minutes.

Peds: 5mg/kg IV/IO over 10 minutes.

PULSELESS ELECTRICAL ACTIVITY (PEA)/ASYSTOLE

ALS

1. For PEA arrests, it is imperative that the ALS provider consider the underlying causes of cardiac arrest:
 - a. **Hypovolemia** – For suspected Hypovolemia, administer **NORMAL SALINE** at a wide open rate IV/IO. 2 large bore catheters may be utilized.
 - b. **Hypoxia** – ensure adequate ventilation as per above.
 - c. **Hydrogen ion (acidosis)** – For cases of suspected metabolic acidosis prior to cardiac arrest (DKA, renal failure, salicylate or tricyclic antidepressant overdose etc.), administer **SODIUM BICARBONATE** 1 mEq/kg IV/IO.
 - d. **Hypo-/hyperkalemia** – Following **Hyperkalemia** SOG if indicated.
 - e. **Hypoglycemia** – Check blood glucose and treat, or administer **DEXTROSE** 25g IV/IO.
 - f. **Hypothermia** – Actively warm patient.
 - g. **Toxins** – For suspected salicylate or tricyclic antidepressant overdose, administer **SODIUM BICARBONATE** 1mEq/kg IV/IO. For suspected narcotic overdose, administer **NALOXONE** per **Overdose/Poisoning** SOG.
 - h. **Tamponade, cardiac** – Cardiac Tamponade is seen in victims of chest trauma, dialysis patients, and patients with cancer, liver disease, or heart failure. Administer **NORMAL SALINE** at a wide open rate IV/IO. 2 large bore catheters may be utilized. Rapid transport is required.
 - i. **Tension pneumothorax** – For suspected tension pneumothorax, perform needle chest decompression.
 - j. **Thrombosis (coronary or pulmonary)**
2. For asystole arrests:
 - a. If the provider is unsure if the rhythm is fine Ventricular Fibrillation vs. asystole, withhold defibrillation and **AMIODARONE** until certain that Ventricular Fibrillation is present.
 - b. Neither atropine nor transcutaneous pacing are indicated in the management of asystolic cardiac arrest.

POST-CARDIAC ARREST CARE

FR/BLS

1. Continue to be alert for recurrent cardiac arrest!
2. Support Airway and Breathing as necessary, per the Basic Concepts. Ventilate, as needed, at 10-12 breaths per minute in adults, 12 to 20 breaths per minute in children and infants. If ventilations are adequate, provide high flow oxygen.
3. Avoid hyperthermia.
4. Check blood glucose, if manpower allows.
5. Watch for seizures. Treat per **Seizure** SOG.
6. Watch for vomiting, and take appropriate precautions.
7. Elevate HOB to 30 degrees if advanced airway is placed, unless the patient is hypotensive or spinal motion restriction is indicated.

ILS

8. Monitor ETCO₂, if available. Titrate ventilation rate to maintain ETCO₂ of 35 to 40 mm Hg. Avoid routine hyperventilation after ROSC. This may worsen global brain ischemia by inducing excessive cerebral vasoconstriction.
9. Monitor pulse oximetry.
10. Evaluate for signs of shock. If signs of shock are present, evaluate for possible causes (rate, pump, volume problem). Follow the appropriate Shock SOG

ALS

11. If signs of shock are present, follow the appropriate Shock SOG.
12. If an arrhythmia is present, follow the appropriate rhythm-specific SOG.
13. If a PCI-capable center is at least as close as the closest facility, transport to the PCI-capable center. Call Medical Control for orders to transport to a PCI center if the patient is relatively stable, and the ALS provider would like to bypass a closer facility.
14. Screen for Therapeutic Hypothermia candidacy.

REGION IV DO NOT RESUSCITATE POLICY

A person has the fundamental right to control decisions relating to the rendering of his/her own medical care, including the decision that no resuscitative measures be initiated and the decision to have death-delaying procedures withheld or withdrawn.

Purpose:

To set forth the procedures to be followed by *all* EMS personnel when a physician issues an order that no resuscitative measures be initiated on behalf of a patient and the procedures to be followed when a patient or his/her agent instructs EMS personnel that death-delaying procedures shall not be utilized for the prolongation of his/her life.

FR/BLS/ILS/ALS

1. DNR orders apply only to certain patients in cardiopulmonary arrest. A DNR order *does not* mean that necessary medical treatment or hospitalization be withheld from a seriously ill patient.
2. EMTs/Prehospital RNs will ***withhold*** resuscitative measures for a patient in cardiac arrest when:
 - a. Obvious sign of death:
 - Rigor mortis without profound hypothermia
 - Decomposition
 - Decapitation
 - Profound dependent lividity
 - b. Patient has been declared dead by a coroner or patient's physician.
 - c. Patient has a valid DNR order. (Look quickly on refrigerator.)
3. Record on run sheet if patient declared dead by coroner or patient's physician and request coroner or physician to sign the run sheet.
4. If signs of death are confirmed, EMS personnel may then notify the coroner and police/sheriff. EMS should remain on scene until advised by the coroner or police/sheriff.
5. In all other cases of cardiopulmonary arrest, unless indicated as above, resuscitative measures should begin immediately by the first on-scene EMS personnel and carried out per region protocols.
6. Once resuscitative measures have been initiated by EMS personnel, resuscitative measures may be stopped ***only*** by order of the Resource Hospital physician or private physician. Document physician's name on the run report.

7. When there is no indication to the contrary, all patients receive *full* ACLS resuscitative measures.
8. Contact Medical Control if any other conditions to resuscitation are requested.

Do Not Resuscitate Orders

1. Do Not Resuscitate (DNR) orders are orders issued by a physician, based on the patient's previous request, that no resuscitative measures be initiated on behalf of that patient.
2. DNR refers to the withholding of cardiopulmonary resuscitation (CPR); electrical therapy to include pacing, cardioversion and defibrillation; tracheal intubation and manually or mechanically assisted ventilations, unless otherwise stated on the DNR order.
3. A valid DNR order shall consist of a written document, which has not been revoked, containing at least the following information:
 - a. Name of patient
 - b. Name and signature of attending physician
 - c. Effective date
 - d. The words "Do Not Resuscitate"
 - e. Evidence of consent (one of the following):
 - Signature of patient
 - Signature of legal guardian
 - Signature of Durable Power of Attorney for Health Care agent
 - Signature of surrogate decision-maker
 - Attached living will or other advance directive prepared by, or on behalf of the patient.

*NOTE: A living will by itself *cannot* be recognized by prehospital care providers.

4. System personnel must make a reasonable attempt to verify the identity of the patient named in the valid DNR, e.g., identifying bracelet, identification by another person.
5. Revocation: A person's consent to a DNR order or instruction that death delaying procedures be withheld or withdrawn may be revoked at any time by the patient, without regard to the person's mental or physical condition.
6. In transporting a patient *with* a valid DNR order, if the patient arrests en route, proceed to the designated hospital and do *not* start resuscitative measures.

Durable Power of Attorney for Health Care

1. A Durable Power of Attorney for Health Care (DPA) is a written document allowing an individual to delegate his or her power to make health care decisions to an appointed agent *in the event the individual becomes mentally disabled or incompetent*.
2. The written document must:
 - a. Be signed and dated by the individual granting the power.
 - b. Name an agent.
 - c. Describe health care powers granted to the agent.
3. A written document does **NOT** have to be seen; a verbal report from the agent will suffice.
4. The DPA may grant the agent any and all powers to make health care decisions or it may grant only limited powers.
5. A valid DPA for health care must be honored by any health care provider. A health care provider may refuse to comply with an agent's directions only if they conflict with the provider's right of conscience or medical judgment, but the provider must then arrange for another provider to assume care for the patient which would be highly unpractical in the EMS field setting.

TERMINATION OF RESUSCITATION FOR NON-TRAUMATIC CARDIAC ARREST

ALS

1. Termination of resuscitative efforts for victims of non-traumatic cardiac arrest should be considered when:
 - a. An adult suffers non-traumatic cardiac arrest that is not witnessed by bystanders or prehospital care providers, AND
 - b. No bystander CPR is provided, AND
 - c. The patient has received 20-30 minutes of full resuscitative effort from the time of the arrival of the first responding personnel including:
 - Adequate CPR.
 - Airway managed with endotracheal intubation or King LT placement.
 - IV or IO access has been obtained.
 - All rhythms have been treated with ACLS protocols.
 - d. There is no evidence of drug overdose, hypothermia, internal bleeding, or preceding trauma, AND
 - e. The patient remains in asystole or a wide-complex pulseless bradycardic rhythm (rate less than 60), AND
 - f. All personnel agree to discontinue resuscitative efforts.
OR
 - g. Resuscitation efforts were inappropriately initiated when criteria to withhold CPR were present,
OR
 - h. A valid DNR was discovered after resuscitative efforts have been initiated.
2. Logistic factors should be considered such as patient size and location, weather, collapse in a public place, family wishes, and the safety of the crew and public.
3. Online Medical Control must be contacted prior to termination of resuscitation.
4. Transmit EKG.
5. When the order to terminate resuscitative efforts is received, the coroner and law enforcement must be notified.
6. Notify the patient's primary care physician.
7. EMS providers should provide support to the patient's family. Offer to contact family members or clergy.
8. The following are not candidates for prehospital termination of resuscitation unless highly extenuating circumstances exist:
 - a. Pediatric patients.

- b. The patient is hypothermic.
- c. EMS providers have been unable to manage the patient's airway with endotracheal intubation or King LT placement or unable to establish IV/IO access therefore preventing full ACLS efforts.
- d. The patient has return of spontaneous circulation at any point in the resuscitative efforts.
- e. The patient has a rhythm of Ventricular Tachycardia or Ventricular Fibrillation at any point in the resuscitative efforts. This includes situations where the patient receives defibrillation via an AED prior to EMS arrival.
- f. The family is uncomfortable with prehospital termination of resuscitation.
- g. Any prehospital care provider feels uncomfortable with prehospital termination of resuscitation.
- h. Cardiac arrest occurred in a public area or other setting where prehospital termination of resuscitation is undesirable, i.e. potentially violent scenes.

SHOCK (UNDIFFERENTIATED)

Shock can result from a failure of the heart's pumping ability, from an abnormal dilation of the vessels that prevents blood from reaching all tissues, or from excessive fluid loss. All of these have the similar result of less blood circulating around the body.

Providers should evaluate the patient for evidence of inadequate tissue perfusion:

1. Increased pulse rate.
2. Weak/thready pulse.
3. Ischemic EKG changes.
4. Delayed capillary refill (> 2 seconds).
5. Pale, cool skin.
6. Diaphoresis, mottling.
7. Increased/labored respiratory rate.
8. Altered mental status or decreased level of consciousness.
9. Difficulty concentrating.
10. Restless or anxious.
11. Agitated or uncooperative.
12. Weakness.
13. Nausea & Vomiting.
14. Tremendous thirst.

Note that a patient in shock need not be hypotensive. Initially, the patient may be able to compensate for the cause of shock and maintain a normal blood pressure. However, the above signs of shock will be present. Eventually, the patient will no longer be able to compensate, and hypotension will ensue.

Hypotension is defined as SBP \leq 90 mm Hg or 30mm Hg below the patient's normal SBP. In a pediatric patient, hypotension is defined as:

Term neonates (0 to 28 days) -- <60 mm Hg.

Infants (1 to 12 months) -- < 70 mm Hg.

Children 1 to 10 years -- < 70 mm Hg + (2 x age in years).

Children \geq 10 years of age -- < 90.

FR

1. Initiate **General Medical Assessment & Initial Medical Care**.
2. Address the patient's Airway and Breathing, as per Basic Concepts.
 - a. If Airway and Breathing are adequate, provide 100% FiO₂ by non-rebreather mask.
3. Monitor pulse oximetry, if available.
4. Control bleeding as appropriate.
5. Maintain warmth.
6. Place the patient supine, if possible, with legs elevated 6 to 12 inches.

7. Attempt to determine the cause of the patient's inadequate perfusion/shock:
 - a. Cardiogenic:
 - Rate/Rhythm Problem – Follow rhythm-specific SOG.
 - Pump problem – Follow **Cardiogenic Shock** SOG.
 - b. Hemorrhage/Hypovolemic – Follow **Hemorrhagic Shock** or **Septic Shock** SOG.
 - c. Distributive
 - Septic – See **Septic Shock** SOG
 - Anaphylactic Shock – See **Anaphylactic Shock** SOG.
 - Neurogenic Shock – See **Head and Spinal Cord Trauma** SOG.
 - d. Obstructive Shock
 - Cardiac Tamponade.
 - Tension Pneumothorax.

BLS

8. Approved BLS services should obtain a 12-lead EKG unless trauma is suspected.

ILS

1. For pediatric patients with non-cardiogenic shock and without a cardiac history, provide a **NORMAL SALINE** bolus of 20ml/kg IV/IO.
 - a. This should be reduced to 10ml/kg IV/IO for volume sensitive children (neonates, children with congenital heart disease, chronic lung disease, or chronic renal failure).

ALS

2. Cardiac Monitor
3. Utilize capnography, if available.
 - a. When a patient is in shock, the ETCO₂ is often lower than normal. Reduced tissue perfusion leads to reduced delivery of CO₂ back to the lungs. As resuscitation begins and shock is successfully treated, the ETCO₂ should rise back to normal levels. If ETCO₂ levels remain low after aggressive treatment, the patient is quite ill.

CARDIOGENIC SHOCK*

In addition to actions in the **Undifferentiated Shock** SOG:

ILS

1. Place a saline lock.
2. If the patient has clear lungs, give a **NORMAL SALINE** bolus:
 - a. Adults: 250mL IV/IO.
 - b. Peds: 5-10 mL/kg IV/IO.**
3. Reassess vital signs and breath sounds, and repeat as needed.

ALS

4. Obtain a 12-lead EKG, if possible.
5. For hypotension unresponsive to fluid therapy, initiate a **DOPAMINE** drip at 5-20mcg/kg/min with 60 drop tubing or Dial-a-Flow as available.
 - a. Titrate to maintain a systolic blood pressure of at least 90mmHg in adults or within normal limits for children as specific above.

CCEMT-P

6. Begin **DOBUTAMINE** 2-20 mcg/kg/min in lieu of **DOPAMINE**. If etiology is unclear, use **DOPAMINE**.

*This SOG applies to cardiogenic shock NOT related to a rhythm or rate issue.

**Note that hypovolemic or septic shock is MUCH more likely in the pediatric patient without a cardiac history. Also note that the pediatric patient has an exceptional ability to compensate by increasing peripheral vascular resistance and heart rate. Bradycardia and hypotension are signs of rapidly impending cardiac arrest.

VENTRICULAR ECTOPY

ALS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
3. Obtain a 12-lead EKG.
4. Rule out and treat other possible causes of ectopy (hypoxia, acidosis, hypotension, dehydration).
5. If bradycardia is present with PVCs, treat per **Bradycardia SOG**.
6. Contact Medical Control to consider:
 - a. **AMIODARONE** 150mg IV in 50-100mL D5W over 10 minutes.

*Never treat third degree heart block with ventricular escape beats with **AMIODARONE**.*

WIDE COMPLEX TACHYCARDIA WITH A PULSE

Assess for evidence of instability. Instability is defined as acutely impaired end organ function or imminent cardiac arrest. The unstable patient will present with these findings:

1. Acutely altered mental status.
2. Dizziness or lightheadedness.
3. Ischemic chest discomfort.
4. Acute heart failure
5. Hypotension or other signs of shock that persist despite adequate airway and breathing.
6. Weak, thready, or absent peripheral pulses.
7. Diaphoresis
8. Central Cyanosis or coolness.

ALS

1. *If no pulse, treat as ventricular fibrillation.*
2. **General Medical Assessment & Initial Medical Care.**
3. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
4. Rule out and treat other possible causes (hypoxia, acidosis, hypotension, dehydration).

Stable Patient:

5. The majority of wide complex tachycardia's are ventricular in origin. However, if uncertainty exists, the ALS provider may, *in the stable patient*, give one dose of **ADENOSINE**:
 - a. Adult: **ADENOSINE** 6mg IV/IO.
 - b. Peds: **ADENOSINE** 0.1mg/kg (max dose 6mg) IV/IO.Note: **ADENOSINE** may **NEVER** be given if the rhythm is irregular or polymorphic!
6. Give **AMIODARONE**:
 - a. Adult: **AMIODARONE** 150mg IV in 50-100 mL D5W over 10 minutes.
 - b. Peds: **AMIODARONE** 5mg/kg IV/IO over 20 minutes. (Max dose 150mg.)
7. If Wide Complex Tachycardia persists, consider:
 - a. Cardioversion OR
 - b. Repeat **AMIODARONE** 150mg IV in 50-100mL D5W over 10 minutes (Adults).
8. If **AMIODARONE** is ineffective and/or the patient develops symptoms of instability, it may be necessary to proceed to the unstable algorithm.

Unstable Patient:

9. Proceed immediately to **SYNCHRONIZED CARDIOVERSION**:
 - a. Adult: 100 Joules (monophasic or biphasic). If unsuccessful: 200J, 300J, 360J.
 - b. Peds: 0.5-1J/kg. If unsuccessful: 2J/kg, 4J/kg.
 - c. Consider sedation, as per **Sedation SOG**.*
10. Following cardioversion, give **AMIODARONE** at above dose.
11. Do not give **AMIODARONE** if rhythm is bradycardic with PVCs or runs of Ventricular Tachycardia. Follow the **Bradycardia SOG**.
12. If Torsades de Pointes suspected:
 - a. Provide unsynchronized shocks (defibrillations) AND
 - b. Give **MAGNESIUM SULFATE**:
 - i. Adult: **MAGNESIUM SULFATE** 2 grams in 10 mL D5W IV/IO over 10-15 minute.
 - ii. Peds: **MAGNESIUM SULFATE** 50mg/kg IV/IO, max 2 grams.
13. Obtain 12 lead EKG after conversion, if possible.

CCEMT-P

14. In the patient with known or suspected WPW presenting with a wide complex rhythm, the CCEMT-P may choose **PROCAINAMIDE** 30mg/minute up to 17mg/kg in lieu of **AMIODARONE**. Stop the infusion immediately if QRS prolongation is noted.

*Do not delay cardioversion for vascular access in the unstable patient.

SUPRAVENTRICULAR TACHYCARDIA
(NARROW COMPLEX TACHYCARDIA, RATE > 150)

It is important to differentiate sinus tachycardia from SVT. Sinus tachycardia typically demonstrates gradual onset and variability with activity or stimulation (will undergo normal speeding up and slowing down). It is typically associated with signs of an underlying cause such as fear/anxiety, fever, or dehydration and exhibits rates <180 in a child or adult, < 220 in an infant.

SVT demonstrates very abrupt onset and termination and often is not seen in the presence of an underlying cause of ST (fever, pain, dehydration, etc.) No variability is seen on the monitor. SVT is typically > 180 bpm in a child or adult, > 220 bpm in an infant.

If the ALS practitioner determines that the patient's rhythm is sinus tachycardia, search for the underlying cause. Treat per the appropriate SOG.

Assess for evidence of instability. Instability is defined as acutely impaired end organ function or imminent cardiac arrest. The unstable patient will present with these findings:

1. Acutely altered mental status.
2. Dizziness or lightheadedness.
3. Ischemic chest discomfort.
4. Acute heart failure
5. Hypotension or other signs of shock that persist despite adequate airway and breathing.
6. Weak, thready, or absent peripheral pulses.
7. Diaphoresis.
8. Central cyanosis or coolness.

ALS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
3. Rule out and treat other possible causes (hypoxia, acidosis, hypotension, dehydration).

Stable:

4. Attempt vagal maneuvers while preparing medication.
 - a. Adult: Valsalva maneuver.
 - b. Peds: Apply an ice bag to top of the infant's head. Instruct older children to blow through an occluded straw.
5. Give **ADENOSINE**:
 - a. Adult: **ADENOSINE** 6mg rapid IV/IO.
 - b. Peds: **ADENOSINE** 0.1mg/kg rapid IV/IO (max 6mg).
6. If no response in 2 minutes, repeat **ADENOSINE**:

- a. Adult: **ADENOSINE** 12mg rapid IVP
- b. Peds: **ADENOSINE** 0.2mg/kg rapid IV/IO (max 12 mg).

Each **ADENOSINE** dose should be given through the closest IV/IO port followed by a 10ml rapid fluid bolus.

Reduce the adult dose (or pediatric max dose) of **ADENOSINE** to 3mg in patients taking carbamazepine (Tegretol) or patients status post heart transplant.

ADENOSINE should not be given to irregular rapid rhythms or wide complex.

7. If **ADENOSINE** fails, contact Medical Control to consider:
 - a. **AMIODARONE**
 - Adult: **AMIODARONE** 150mg IV in 50-100mL D5W over 10 minutes.
 - Peds: **AMIODARONE** 5mg/kg IV/IO over 20 minutes. (Max dose 150mg.)
 - OR
 - b. Synchronized Cardioversion (see below). Consider sedation per **Sedation SOG**.

Unstable:

8. If IV/IO access is easily obtained, the ALS provider may attempt ONE dose of **ADENOSINE**:
 - a. Adult: **ADENOSINE** 6mg rapid IV/IO.
 - b. Peds: **ADENOSINE** 0.1mg/kg rapid IV/IO (max 6mg).
9. Proceed immediately to **SYNCHRONIZED CARDIOVERSION**:
 - a. Adult: 100 Joules (monophasic or biphasic per manufacturer's recommendation). If unsuccessful: 200J, 300J, 360J or equivalent biphasic per manufacturer's recommendation.
 - b. Peds: 0.5-1J/kg. If unsuccessful: 2J/kg, 4J/kg.
 - c. Consider sedation, as per **Sedation SOG**.*
10. If Synchronized Cardioversion is unsuccessful, contact Medical Control for further direction.
11. After conversion, obtain a 12 lead EKG.
12. In the stable or unstable patient, for suspected cocaine or methamphetamine-induced SVT, administer **MIDAZOLAM** unless altered mental status is present:
 - a. Adult: **MIDAZOLAM** 2-4 mg IVP.

*Do not delay cardioversion for vascular access in the unstable patient.

ATRIAL FIBRILLATION OR ATRIAL FLUTTER

Assess for evidence of instability. Instability is defined as acutely impaired end organ function or imminent cardiac arrest. The unstable patient will present with these findings:

1. Acutely altered mental status.
2. Dizziness or lightheadedness.
3. Ischemic chest discomfort.
4. Acute heart failure
5. Hypotension or other signs of shock that persist despite adequate airway and breathing.
6. Weak, thready, or absent peripheral pulses.
7. Diaphoresis
8. Central cyanosis or coolness.

ALS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
3. Rule out and treat other possible causes (hypoxia, acidosis, hypotension, dehydration). Specifically evaluate for the presence of fever or hypovolemia.
4. If hypovolemia is present, give a **NORMAL SALINE** bolus:
 - a. Adult: 250ml NS IV/IO and reassess.
 - b. Peds: 10ml/kg NS IV/IO and reassess.

Stable:

5. Observe.

Unstable:

6. Proceed immediately to **SYNCHRONIZED CARDIOVERSION**:
 - a. Adult: 200 Joules (monophasic) or 120-200 J (biphasic per manufacturer's recommendation). If unsuccessful: 300J, 360J or equivalent biphasic per manufacturer's recommendation.
 - b. Peds: 0.5-1J/kg. If unsuccessful: 2J/kg, 4J/kg.
 - c. Consider sedation, as per **Sedation SOG**.*
7. Contact Medical Control to consider:
 - a. **AMIODARONE**

- Adult: **AMIODARONE** 150mg IV in 50-100mL D5W over 10 minutes.
- Peds: **AMIODARONE** 5mg/kg IV/IO over 20 minutes. (Max dose 150mg.)

8. After rate control or cardioversion, obtain a 12-Lead ECG.

*Do not delay cardioversion for vascular access in the unstable patient.

CCEMT-P

9. Contact Medical Control to consider **PROCAINAMIDE**:
- a. Adult Dose: 20mg/min until the arrhythmia is suppressed, hypotension ensues, or the QRS is prolonged by 50% from its original duration, or to maximum dose of 17mg/kg.

SINUS BRADYCARDIA AND SECOND DEGREE HEART BLOCK MOBITZ TYPE I

Assess for evidence of instability. Instability is defined as acutely impaired end organ function or imminent cardiac arrest. The unstable patient will present with these findings:

1. Acutely altered mental status.
2. Dizziness or lightheadedness.
3. Ischemic chest discomfort.
4. Acute heart failure
5. Hypotension, or other signs of shock that persist despite adequate airway and breathing.
6. Weak, thready, or absent peripheral pulses.
7. Diaphoresis
8. Central cyanosis or coolness.

In the pediatric patient, bradycardia generally arises due to hypoxia. Therefore, airway, ventilation and oxygenation are the highest management priorities. The cause of hypoxia should be identified and corrected.

BLS/ILS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
3. Rule out and treat other possible causes (hypoxia, acidosis, hypothermia, hypotension, dehydration).
4. If the patient is asymptomatic or minimally symptomatic, no further treatment is required.
5. Approved BLS/ILS services should obtain a 12 lead EKG. ILS services should obtain IV access.

ALS

6. If the patient demonstrates any of the above symptoms, treatment is required.
7. Give **ATROPINE***:
 - a. Adults: **ATROPINE**: 0.5mg IVP/IO. May repeat every 3 minutes as needed to a total dose of 3mg.
 - i. As alternative, **ATROPINE** may be given at a dose of 1mg per ETT while setting up transcutaneous pacing, if IV/IO access is not available.
 - b. Peds: **EPINEPHRINE** (1:10,000) 0.1 ml/kg (0.01 mg/kg) IV/IO or **EPINEPHRINE** (1:1,000) 0.1 ml/kg (0.1 mg/kg) ET.
 - i. Repeat every 3-5 minutes as long as bradycardia with hypoperfusion persists.
8. In the severely symptomatic patient, also move immediately to either:
 - a. **TRANSCUTANEOUS PACING.**

- i. *Adults: Initial rate of **60bpm**.*
 - ii. *Peds: Initial rate of **100bpm***
 - iii. Consider sedation, as per **Sedation** SOG or pain control as per **Pain Control** SOG.**
 - OR
 - b. **DOPAMINE**: 2-20mcg/kg/min IV/IO. Titrate to maintain heart rate > 60 (adults) or within normal range per age (pediatrics) by slowly increasing drip rate.
9. Consider CPR if the patient is unresponsive and the heart rate is less than 40 (adults) or less than 60 (pediatrics).
10. If bradycardia is not responsive to above measures, contact Medical Control to consider:
- a. **EPINEPHRINE** 0.1-0.3 mg 1:10,000 IV/IO.
- OR
- b. **EPINEPHRINE** drip 2-10 mcg/min IV/IO. Titrate to patient response as above.
11. In the setting of suspected Calcium Channel Blocker or Beta Blocker overdose, refer to the **Overdose/Poisoning** SOG.
12. In the setting of hypothermia, refer to the **Hypothermia** SOG.
13. For suspected hyperkalemia, refer to the **Hyperkalemia** SOG.

*Transplanted hearts will not respond to **ATROPINE**. Go at once to TRANSCUTANEOUS PACING.

**Do not delay transcutaneous pacing for vascular access in the unstable patient.

SECOND DEGREE MOBITZ TYPE II OR THIRD DEGREE HEART BLOCK
(COMPLETE HEART BLOCK)

BLS/ILS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
3. Rule out and treat other possible causes (hypoxia, acidosis, hypothermia, hypotension, dehydration).
4. If the patient is asymptomatic or minimally symptomatic, no further treatment is required.
5. If the patient demonstrates any of the above symptoms, treatment is required.
6. Approved BLS/ILS services should obtain a 12 lead EKG.

ALS

7. In the severely symptomatic patient, move immediately to either:
 - a. **TRANSCUTANEOUS PACING.**
 - *Adults: Initial rate of 60bpm.*
 - *Peds: Initial rate of 100bpm*
 - Consider sedation, as per **Sedation SOG** or pain control as per **Pain Control SOG**.*
 - OR
 - b. **DOPAMINE:** 2-20mcg/kg/min IV/IO Titrate to maintain heart rate > 60 (adults) or within normal range per age (pediatrics) by slowly increasing drip rate.
 8. Consider CPR if the patient is unresponsive and the heart rate is less than 40 (adults) or less than 60 (pediatrics).
 9. If bradycardia is not responsive to above measures, contact Medical Control to consider:
 - a. **EPINEPHRINE** 0.1-0.3 mg 1:10,000 IV/IO.
 - OR
 - b. **EPINEPHRINE** drip 2-10 mcg/min IV/IO. Titrate to and titrate to patient response as above.
 10. In the setting of suspected Calcium Channel Blocker or Beta Blocker overdose, refer to the **Overdose/Poisoning SOG**.
 11. In the setting of hypothermia, refer to the **Hypothermia SOG**.
 12. For suspected hyperkalemia, refer to the **Hyperkalemia SOG**.
- * Do not delay transcutaneous pacing for vascular access in the unstable patient.

IMPLANTED CARDIAC DEFIBRILLATORS **(AICD)**

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
3. Any patient who has been shocked by his/her ICD should be encouraged to seek medical attention in the ED or contact his/her cardiologist while EMS is on scene.
4. Approved BLS/ILS services should obtain a 12 lead EKG.

ILS

5. NS lock.

ALS

6. Treat dysrhythmias per appropriate SOG.
7. If AICD is repeatedly firing and patient is hemodynamically stable (BP within normal limits, absence of tachycardia, and capillary refill within normal limits) consider sedation or pain control per appropriate SOG.
8. Call Medical Control to consider AICD deactivation. Patient must meet the following criteria:
 - a. Three or more distinct shocks AND
 - b. Obvious device malfunction with EMS provider-witnessed inappropriate shock (e.g., alert patient in atrial fibrillation with rapid ventricular rate or SVT).

HYPERKALEMIA

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
 - a. Do not obtain blood pressures in the same arm as that with the graft or fistula.
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts.
3. Rule out and treat other possible causes (hypoxia, acidosis, hypothermia, hypotension, dehydration).

ILS

4. Obtain IV access.
 - a. IVs should not be attempted on the extremity with a graft or fistula unless a life-threatening emergency exists and no other access is available.
5. When emergencies occur during dialysis, the staff may clamp the dialysis tubing, leaving access needles in place. If this is the only accessible site, request their assistance to connect your IV tubing.
6. Vascular access catheters may be utilized as a last resort in hemodialysis patients suffering a life-threatening emergency when no other IV access or IO access is readily obtainable.
7. For hypotension:
 - a. Adults: If lungs are clear, infuse 200ml **NORMAL SALINE** bolus. May repeat one time if lungs are clear and hypotension persists.
 - b. Peds: Infuse 5ml/kg **NORMAL SALINE** IV/IO.
8. Approved ILS services should obtain a 12 lead EKG.

ALS

9. For signs of hyperkalemia (prolonged PR interval or absent P waves, wide QRS complex, peaked T waves) or any **CARDIAC ARREST** in a hemodialysis patient, immediately administer:
 - a. **SODIUM BICARBONATE** 1 mEq/kg IV/IO (Adults and Peds). AND
 - b. **CALCIUM CHLORIDE***:
 - Adult: 1g (10mL) IV/IO.
 - Peds: 20mg/kg IV/IO (Max 1g). AND
 - c. **ALBUTEROL** 10mg nebulized.

CCEMT-P

10. Administer **HUMULIN INSULIN** 10 units IVP.
 11. Administer **DEXTROSE** 50% AS NEEDED to maintain a blood glucose > 90 mg/dL.
Typically administer 25-50g **DEXTROSE** at the time of **INSULIN** administration unless the patient has hyperglycemia.
 12. Measure blood glucose every 15 minutes or sooner if consciousness deteriorates.
- *Do not administer **CALCIUM**, if the patient is prescribed Digoxin (Lanoxin).

2.18 PULMONARY EDEMA (DUE TO HEART FAILURE)

Pulmonary edema, in the setting of congestive heart failure, is due to the heart's inability to pump blood to tissues, thereby causing a backup of fluid into the lungs. This may be due to markedly elevated blood pressure and/or volume overload. Pay particular attention to the presence of:

1. Rales (crackling in lungs)
2. JVD
3. Peripheral Edema (fluid overload)
4. Signs of shock.

Does the patient have a **history** of hypertension, congestive heart failure, acute coronary syndrome, pulmonary embolism? Did the patient take their heart failure medication yesterday or today?

There is controversy regarding the use of Lasix in acute pulmonary edema in the prehospital setting, and use is not recommended at this time. Lasix has been widely used in the treatment of CHF and acute pulmonary edema despite limited studies on its effectiveness. Since pulmonary edema is more commonly a problem of volume distribution than overload, administration of furosemide provides no immediate benefit for most patients. There are potential risks of hypokalemia, arrhythmias and increased systemic vascular resistance through enhancement of the Renin Angiotensin System, all of which may be deleterious to the acute CHF patient. Misdiagnosis of CHF and subsequent inducement of inappropriate diuresis can lead to increased morbidity and mortality in patients

Nitrates provide both subjective and objective improvement, and might decrease intubation rates, incidence of MIs, and mortality. High-dose nitrates can reduce both preload and afterload and potentially increase cardiac output. Because many CHF patients present with very elevated arterial and venous pressure, frequent doses of nitrates may be required to control blood pressure and afterload. High dose nitrate therapy, nitroglycerin SL, 0.8–2 mg q 3–5 minutes has been used in patients in severe distress such as hypoxia, altered mentation, diaphoresis, or speaking in one word sentences. A concern with high doses of nitrates is that some patients are very sensitive to even normal doses and may experience marked hypotension; it is therefore critical to monitor blood pressure during high-dose nitrate therapy

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.

3. Place the patient in an upright position if the SBP >100mmHg.
4. Give **OXYGEN**. Supplement to maintain pulse oximetry:
 - a. In a patient with a history of COPD, maintain oxygen saturation between 90%-93%.
 - b. In a patient without a history of COPD, maintain Oxygen saturation between 95%-100%.
5. Administer **ASPIRIN** 324mg (4 baby **ASA**) unless contraindicated by patient allergy or level of consciousness.
 - a. **NOTE:** If **ASPIRIN** has been taken in the past 12 hours withhold administration and document why it was not given. Inform the receiving hospital.
6. Consider **NITROGLYCERIN** as per **Assisted Nitroglycerin** Procedure.
7. Evaluate the severity of the patient's condition:
 - a. Mild/Moderate
 - Expiratory wheezes
 - Speak in full sentences
 - O₂ sat > 90%
 - b. Severe
 - Decreased air entry throughout with expiratory wheezes
 - Unable to speak in full sentences
 - Accessory muscle use increased respiratory rate.
 - O₂ sat <90%
 - Near Death/In Extremis
 - Decreased LOC, lethargic.
 - Decreased respiratory rate.
 - Unable to Speak
 - Cyanosis
 - Ineffective respiratory effort

BLS

8. Approved BLS services: If the patient exhibits severe dyspnea or is in extremis, initiate CPAP at 10cm H₂O.
9. Approved BLS services should obtain a 12 lead EKG.

ILS

10. Obtain IV access.

ALS

11. Place the patient on continuous cardiac monitor. Treat arrhythmias per the appropriate SOG.
12. If the patient is hypotensive, treat per **Cardiogenic Shock** SOG. Withhold **FUROSEMIDE** and **NITROGLYCERIN**.

13. Administer **NITROGLYCERINE** 0.4mg sublingual or 1 metered dose if systolic blood pressure >100mmHg. May repeat the **NITROGLYCERINE** 0.4mg sublingual or 1 metered dose every 5 minutes if systolic blood pressure remains >100mmHg for continued complaint of chest pain.
 - c. NOTE: Initial **NTG** may be given prior to IV start. Vital signs must be obtained and documented prior to each **NTG** administration.
 - d. Dropping the hypertensive patient's blood pressure too greatly in too short of a time period can lead to complications such as renal failure and stroke. Contact Medical Control to determine optimal goal blood pressure.
 - e. Once goal blood pressure has been reached or if patient's symptoms subside and if SBP remains greater than 100mmHg, apply **NTG paste** 1(one) inch topically.
14. If the patient exhibits severe dyspnea or is in extremis, initiate CPAP at 10cm H2O.
 1. Only if signs of volume overload are present (peripheral edema, recent weight gain, medication noncompliance, etc.), give the patient **FUROSEMIDE** 0.5-1mg/kg IVP (or the patients daily dose). Not to exceed 120mg's. For patients who are not on daily diuretics, give **FUROSEMIDE** 20-40mg IV.

(Consider Medical Control Guidance prior to Lasix administration)

Note that the presence of flash pulmonary edema in the setting of markedly elevated blood pressure does not, in and of itself, demonstrate volume overload.

CCEMT-P

16. In place of the Boussignac (or comparable), a system approved Critical Care Ventilator may be used to initiate CPAP 10cm H2O or BiPAP (I : 12cm H2O & E: 5cm H2O).

Updated 11/2016

HYPERTENSIVE EMERGENCIES

Symptoms of a hypertensive emergency are broad, but may include sudden rise in BP > 200/130 mmHg, nausea, vomiting, weakness, dizziness, and blurred vision.

Note: If the patient has signs/symptoms of pulmonary edema, follow the **Pulmonary Edema** SOG. If the patient has signs/symptoms of a stroke, follow the **Stroke** SOG.

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.

ILS

3. Obtain IV with saline lock.

ALS

4. Monitor cardiac rhythm
5. Reassess patient and vital signs every 5 minutes for changes.
6. If no sign/symptoms of CVA, no neurological deficits, no signs/symptoms of pulmonary edema and HR>60, contact Medical Control to consider:
 - a. **LABETALOL** 10-20mg SLOW IVP over 2 minutes.

ACUTE CORONARY SYNDROME

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
3. Keep the patient at rest, and do not allow the patient to exert himself/herself.
4. Sit patient upright in a position of comfort, and loosen clothing.
5. Provide emotional support, and reassure the patient.
6. Give **OXYGEN**. Supplement to maintain pulse oximetry:
 - a. In a patient with a history of COPD maintain Oxygen saturation between 90%-93%.
 - b. In a patient without a history of COPD maintain Oxygen saturation between 95%-100%.
7. Administer **ASPIRIN** 324mg (4 baby **ASA**) unless contraindicated by patient allergy or level of consciousness.
 - a. **NOTE:** If **ASPIRIN** has been taken in the past 12 hours withhold administration and document why it was not given. Inform the receiving hospital.
8. Consider **NITROGLYCERINE** as per **Assisted Nitroglycerine** Protocol.
9. Approved BLS/ILS services should obtain a 12 lead EKG **as soon as possible and transmit to the receiving facility after acquisition.**

ILS

10. Obtain IV with saline lock or isotonic solution at TKO.

ALS

11. Administer **NITROGLYCERINE** 0.4mg sublingual or 1 metered dose if systolic blood pressure >100mmHg. May repeat the **NITROGLYCERINE** 0.4mg sublingual or 1 metered dose every 5 minutes if systolic blood pressure remains >100mmHg for continued complaint of chest pain.*
 - a. **NOTE:** Initial **NTG** may be given prior to IV start.
 - b. BP must be obtained and documented prior to each **NTG** administration.
12. If **NTG SL** is effective in relieving all of the patient's symptoms and SBP >100 mm Hg, apply **NTG** paste 1 inch.
13. If the patient's systolic BP drops below 100mmHg, wipe the **NTG paste** off.

14. If pain persists
 - a. If SBP > 100 mm Hg and pain unrelieved by NTG x 3: consider:
 - i. **MORPHINE SULFATE** per **Pain Control SOG**.
 - b. Narcotics should be used with caution in unstable angina (UA)/NSTEMI due to an association with increased mortality in a large registry. This is not true of patients suffering from STEMI.
15. Consider **ONDANSETRON** as needed per **General Illness SOG**.
16. For chest pain due to cocaine or methamphetamine overdoses, consider:
 - a. **MIDAZOLAM** 2-4 mg IVP.OR
 - b. **DIAZEPAM** 5mg IV.
17. Obtain and transmit a 12-lead EKG to hospital. Continue to monitor patient closely for significant changes in cardiac rhythm.

Acute ST Elevation Myocardial Infarction

18. If 12-lead automatic interpretation indicates ***Acute MI Suspected***, or 12-lead is interpreted by the paramedic or physician as an Acute MI, transport the patient to a PCI-capable hospital if such a facility is less than 30 minutes from the scene. Otherwise, transport to the closest hospital as soon as possible. **Minimize scene times to 10 minutes.**

<u>Infarct</u>	<u>Location</u>	<u>Leads</u>	<u>Culprit Vessel</u>
Septal		V1-V2	LAD or branch
Anterior		V3-V4	
Lateral		I, aVL, V5, V6	Circumflex or branch
High			
Lateral		I, aVL	
Inferior		II, III, aVF	RCA

19. Note that if the patient is markedly unstable, EMS may choose to divert to the closest facility for stabilization.
20. Obtain a 2nd IV if time allows. Minimize the number of IV sticks if the patient is a candidate for thrombolytics.
21. Place the patient on 100% FiO₂ unless the patient suffers from COPD.
22. Be alert for dysrhythmias. Refer to the appropriate SOG as needed.
23. If the patient is suffering from an inferior and/or posterior AMI, perform a right sided 12-lead, time permitting. *

24. Screen for appropriateness for thrombolytics, if time allows:
- a. Has the patient experienced chest discomfort for greater than 15 minutes and less than 12 hours?
 - b. Does ECG show STEMI or new or presumably new LBBB?
 - c. Are there contraindications to fibrinolysis?
 - Systolic BP > 180-200 mm Hg or diastolic BP > 100-110 mm Hg.
 - Right vs left arm systolic BP difference > 15 mm Hg.
 - History of structural CNS disease.
 - Significant closed head/facial trauma within the previous 3 weeks.
 - Stroke > 3 hours or < 3 months.
 - Recent (within 2-4 weeks) major trauma, surgery (including laser eye surgery), GI/GU bleed.
 - Any history of intracranial hemorrhage.
 - Bleeding, clotting problem, or blood thinners.
 - Pregnant female (relative).
 - Serious systemic disease (i.e. Advanced cancer, severe liver or kidney disease).
 - d. Is the patient at high risk?
 - Heart rate \geq 100/min AND systolic BP < 100 mm Hg.
 - Pulmonary edema.
 - Signs of shock (cool and clammy).
 - Contraindications to fibrinolytic therapy.
 - Required CPR.

*Note that **NITROGLYCERIN** is contra-indicated in the setting of a proven inferior STEMI. Proceed directly to **MORPHINE** for pain control.

CHEST PAIN (NOT SUSPECTED ACUTE CORONARY SYNDROME)

Fortunately, most patients who present to the ED with chest pain are not suffering from an acute coronary syndrome. This does not imply that the cause of the patient's chest pain is not serious in nature. While most patients suffer from musculoskeletal pain, others may present with aortic dissections, pulmonary embolism, pneumonia, etc.

FR/BLS/ILS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
3. Keep the patient at rest, and do not allow the patient to exert himself/herself.
4. Sit patient upright in a position of comfort and loosen clothing.
5. Provide emotional support and reassure the patient.
6. Give **OXYGEN**. Supplement to maintain pulse oximetry:
 - a. In a patient with a history of COPD maintain Oxygen saturation between 90%-93%.
 - b. In a patient without a history of COPD maintain Oxygen saturation between 95%-100%.
7. Consider **ASPIRIN** 324mg (4 baby **ASA**) unless contraindicated by patient allergy or level of consciousness.
 - a. **NOTE:** If **ASPIRIN** has been taken in the past 12 hours withhold administration and document why it was not given. Inform the receiving hospital.

ALS

8. A 12-lead EKG may be performed on any patient with chest pain if the prehospital provider wishes to further exclude Acute Coronary Syndrome.
9. Consider pain control per **Pain Control SOG**. **KETOROLAC** is particularly effective for musculoskeletal pain and may be administered IM if IV access is not otherwise warranted.

SYNCOPE / NEAR SYNCOPE
Non-traumatic loss of consciousness

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
3. Obtain and record blood glucose level, if available. Treat per **Diabetic/Glucose Emergencies** SOG as appropriate.
4. Complete a neurologic exam.

ILS

5. Obtain an IV of **Isotonic Solution** at TKO for adults.

ALS

6. Apply cardiac monitor. Obtain 12 lead EKG as soon as possible.
7. Document changes in neurologic exam and/or Glasgow Coma Scale.
8. Anticipate underlying etiologies and treat according to appropriate SOG:
 - a. Metabolic
 - b. Cardiac
 - c. Hypovolemic
 - d. CNS Disorder
 - e. Vasovagal

APPARENT LIFE-THREATENING EVENT (ALTE)

An ALTE is an episode in an infant or child less than 2 years old that is frightening to the observer and is characterized by some combination of the following:

1. Apnea.
2. Skin color change: cyanosis, erythema (redness), pallor, plethora (fluid overload).
3. Marked change in muscle tone.
4. Choking or gagging not associated with feeding or a witnessed foreign body aspiration.

Most patients will appear stable and exhibit a normal physical exam upon assessment by responding field personnel. However, this episode may be the sign of a serious underlying illness or injury. Further evaluation by medical staff is required, and it is essential to transport all patients who experience ALTE. If the parent or primary care giver wishes to refuse treatment and transport, contact Medical Control.

FR/BLS/ILS/ALS

1. **General Medical Assessment & Initial Medical Care.**
2. Obtain a description of the event including nature, duration and severity.
3. Obtain a medical history with emphasis on the following conditions:
 - a. Known chronic diseases
 - b. Evidence of seizure activity
 - c. Current or recent infections
 - d. Gastroesophageal reflux
 - e. Recent trauma
 - f. Medications (current or recent)
4. Assess the environment for possible causes.
5. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts. Special attention should be made to ensuring adequate oxygenation.
6. Obtain and record blood glucose level, if available. Treat per **Diabetic/Glucose Emergencies** SOG as appropriate.
7. Complete a neurologic exam.
8. Be prepared to assist with ventilation if this type of episode occurs again during transport.

ILS

9. Consider initiating an IV/IO of **NS** or **LR TKO** if infant remains symptomatic. Contact Medical Control for guidance if uncertain.

ALS

10. Place patient on cardiac monitor.

Section III: Airway Basic Concept and Emergencies

BASIC AIRWAY EVALUATION & MANAGEMENT (FR, BLS, ILS, ALS)

Early evaluation of a patient's airway is absolutely vital in all patients, with the exception of adult patients suffering sudden cardiac arrest. Most patients obviously have a patent airway, as they are alert, breathing, and able to converse easily.

However, some patients require more in depth evaluation. Patients suffering an airway emergency require rapid evaluation and treatment in order to preserve life.

Most patients with a compromised airway merely require repositioning to open their airway. In the patient with altered mental status, open his/her airway via head tilt/chin lift or jaw thrust, as indicated. The airway of obese patients is often best managed by placing the patient in a slight incline (a "ramped" position), rather than lying in a flat supine position.

Assess if the patient's airway is maintainable with positioning or if the patient requires an adjunct such as an oral or nasal airway.

Listen for any audible airway noises, i.e. stridor, snoring, gurgling, or wheezing. Assess the patient's posterior pharynx for foreign bodies (food, dentures, etc.) or fluids such as saliva, vomit, or blood. Remember, no blind finger sweeps! Remove dentures as needed and suction fluids from the posterior pharynx liberally.

Pediatric Patients

The pediatric airway varies anatomically from the adult airway:

1. The airway is smaller and more flexible.
2. The tongue is relatively larger.
3. The glottis is higher and more anterior.
4. The narrowest portion is at the cricoid ring, just *below* the level of the vocal cords.
5. The occipit (back of the head) is very prominent.

Proper ventilation with a bag valve mask is the ventilation method of choice for the pediatric patient. Tidal volumes which produce enough ventilation for visible chest rise should be used.

If no chest rise is visible, readjust the patient's airway immediately!

ADVANCED AIRWAY EVALUATION AND MANAGEMENT

(BLS, ILS, ALS)

Basic, intermediate and advanced life support providers have an expanded arsenal to manage a patient's airway. This includes endotracheal intubation and King LT or LMA placement. It is, therefore, vital that these providers have an in depth understanding of airway evaluation.

Advanced airway control via endotracheal intubation or King LT or LMA placement is typically indicated if a patient:

1. Is unresponsive, with or without a gag reflex.
2. Has severely impaired breathing.
3. Is responsive, but requires assisted ventilations to sustain life.

The only exceptions involve readily reversible causes such as hypoglycemia, narcotic overdose, or improving mental status following a seizure.

However, endotracheal intubation, in particular, is not without risk. Frequently, intubation attempts result in transient hypoventilation and hypoxia. This can lead to arrhythmias. In addition, even small episodes of hypoxia have been shown to worsen survival in our trauma patients, particularly those with closed head injuries.

Also, in cardiac arrest patients, the time required to intubate a patient by even the most skilled provider results in deleterious pauses in chest compressions. For this reason, the King LT may be preferable to endotracheal intubation in some circumstances, such as cardiac arrest. Finally, endotracheal intubation can result in a vasovagal response causing bradycardia or a sympathomimetic response causing tachycardia and hypertension.

Prior to endotracheal intubation, the prehospital provider must assess the patient's airway, particularly when using a sedative agent such as etomidate or midazolam to facilitate intubation. The prehospital care provider should have an honest appraisal of his/her skill level. No one can intubate every patient. Skill levels vary considerably among providers, and all deteriorate over time when unused.

Know how to predict failure. Be alert for the following indicators of a potentially difficult intubation:

1. Anatomically abnormal face.
2. Prominent upper incisors.
3. Receding mandible.
4. Obese.

In addition, be cognizant of these indicators of a patient potentially difficult to ventilate with a bag-valve-mask:

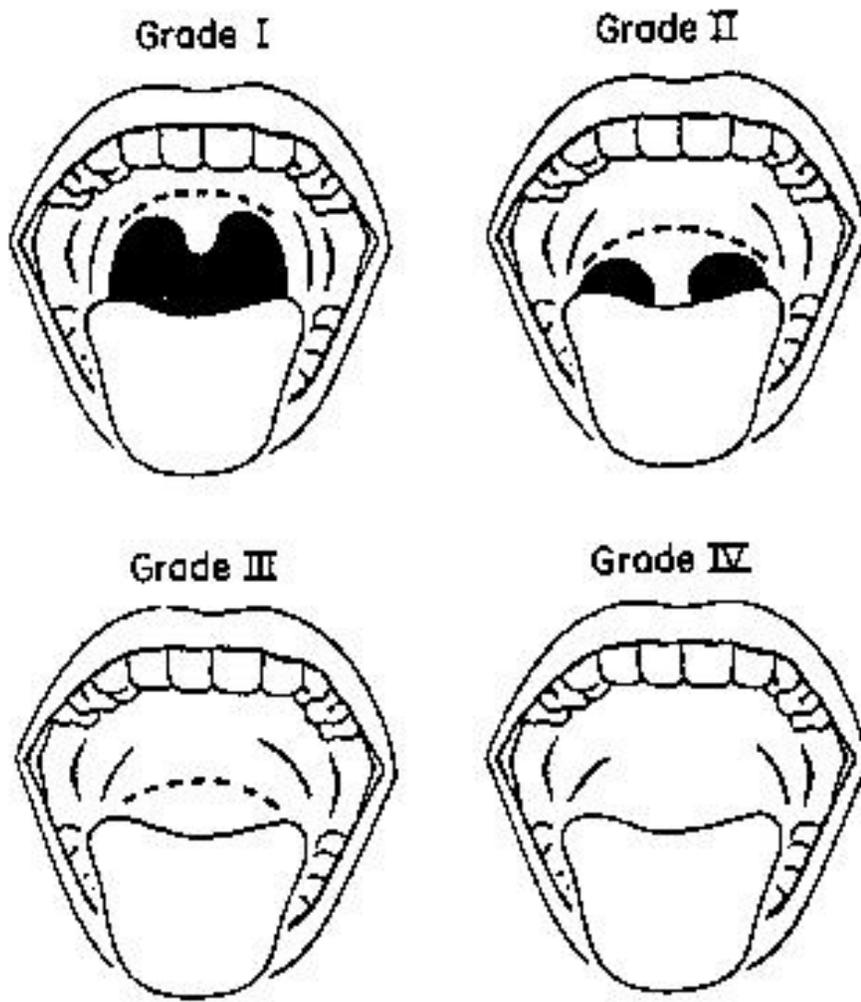
1. Edentulous
2. Obesity
3. Beard
4. Anatomically abnormal face

5. Facial/neck trauma
6. Obstructive airway disease (asthma, COPD)
7. Third-trimester pregnancy

Assess Cervical Spine Mobility. The patient with a short or thick neck, with limited cervical spine mobility, or in a rigid cervical collar will present a more challenging intubation.

Assess the Airway

1. 3-3-2 Rule
 - a. Assess mouth opening. The patient should ideally be able open his/her mouth wide enough to insert 3 of his/her fingers between the central incisors.
 - b. Ideally, there will be a distance of 3 fingers' width from the chin to the hyoid bone and 2 fingers' width from the hyoid bone to the larynx.
2. Mallampati Classification – ranges from Grade I (typically very easy intubation to Grade IV (typically very difficult intubation).



Pediatric Patients

ILS and ALS providers should establish basic airway and ventilation measures prior to intubation. If basic maneuvers are successful, strongly consider continuing these efforts en route to the hospital. BLS maneuvers have been shown to produce better outcomes in the prehospital setting in most pediatric patients than endotracheal intubation. If visible chest rise is not seen with bag valve mask ventilation, readjust the patient's airway and attempt to ventilate once again before moving to endotracheal intubation.

ET tube size can be estimated by:

1. The size of a child's nostril (nare).
2. The size of the child's little finger
3. The formula $(\text{age} + 16) / 4$, or $(\frac{1}{4} \text{ age} + 4)$.

Children less than 1 year of age usually need a #1 straight laryngoscope blade, children 1-4 years usually need a #2 blade, and children more than 4 years of age usually need a #3 blade.

DIFFICULT AND FAILED AIRWAY

The Unanticipated Difficult Airway

If an initial attempt at intubation fails, the prehospital care provider has encountered a difficult airway. He/she should:

1. Provide bag valve mask ventilations.
2. Make, at most, one more attempt at intubation (or proceed to step 3).
3. Consider repositioning the patient's airway.
 - a. Consider laryngeal manipulation.
 - b. Change your position.
 - c. Change the blade.
 - d. Change the provider who is intubating.
4. Re-evaluate the need for an ET versus King LT or LMA versus expedited transport of patient to definitive care with BLS airway management.
5. If the second attempt at intubation fails, the King LT or LMA should be placed.
6. If the King LT or LMA cannot be placed, provide supplemental ventilations with a bag valve mask and oral airway (if possible).
7. If the patient cannot be ventilated by any other means, the patient has a failed airway. Death is imminent; the prehospital care provider should proceed immediately to translaryngeal jet ventilation in children or surgical cricothyroidotomy in adults.

The Anticipated Difficult Airway

Often times, the prehospital care provider will be able to ascertain that he/she is faced with a potentially difficult airway. In these circumstances:

1. Assess for indications of difficulty ventilating.
 - a. If the patient appears to present a potentially difficult intubation but no difficulty ventilating is anticipated, the prehospital care provider may proceed with intubation (utilizing sedation if necessary). Alternatively, the prehospital care provider may proceed directly to the King LT or LMA.

- b. If the patient appears to present a potentially difficult intubation and difficult ventilation, **NO SEDATION SHOULD BE GIVEN PRIOR TO SECURING AN AIRWAY!** Proceed to step 2.
2. Attempt Blind Nasotracheal Intubation if the patient is alert. Attempt King LT or LMA placement if the patient is not alert.
3. If the King LT or LMA cannot be placed, provide supplemental ventilations with a bag valve mask and oral airway (if possible).
4. If the patient cannot be ventilated by any other means, the patient has a failed airway. Death is imminent; the prehospital care provider should proceed immediately to translaryngeal jet ventilation in children or surgical cricothyroidotomy in adults.

Finally, when preparing to intubate a patient, have an escape plan. The King LT must be readily available in the event that intubation is unsuccessful. Keep in mind your ETA to the ED where help is available.

AIRWAY CONFIRMATION (ILS, ALS)

Once an endotracheal tube is placed, it is *crucial* that all efforts are made to ensure it is definitively placed.

To confirm proper placement of an endotracheal tube:

1. Visualize the placement of the tube through the vocal cords.
2. Auscultate for breath sounds over both lungs and epigastrium.
3. Observe for equal chest rise and fall.
4. Monitor pulse oximetry.
5. Monitor changes in vital signs, especially skin color.
6. All advanced airway placements must be confirmed by ETCO₂ (colorimetric and/or capnographic when available).

The utilization of waveform capnography is ideal. Not only is it useful for confirmation of tube placement, but it may also be used to monitor effective ventilations with both an endotracheal tube and King LT (though it is less reliable with a King LT).

Remember to secure the tube well, then reassess placement! Maintaining proper placement of the endotracheal tube is the highest priority when any patient movement is undertaken.

AIRWAY OBSTRUCTION

Airway obstructions are a true life-threatening emergency.

FR/BLS/ILS/ALS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts.
3. Assess for evidence of Partial Airway Obstruction:
 - a. Stridor
 - b. History of choking episode
 - c. Drooling
 - d. Hoarseness
 - e. Evidence of severe difficulty breathing: retractions, tripod position, etc.
4. Assesses for evidence of Complete Airway Obstruction:
 - a. No air movement.
 - b. Diminishing level of consciousness.
5. Determine a possible etiology:
 - a. Suspected foreign body.
 - b. Suspected non-foreign body.
 - c. Body positioning in the unresponsive patient.
 - d. Anaphylaxis.
 - e. Angioedema.
 - f. Epiglottitis.
 - g. Croup.

FOREIGN BODY AIRWAY OBSTRUCTION

Partial Airway Obstruction

FR/BLS/ILS/ALS

1. If the patient has a partly obstructed airway and is still conscious:
 - a. Encourage the patient to cough.
 - b. Avoid agitation
 - c. Administer oxygen at 15 L/min.

ILS

2. Place an IV saline lock.
3. Monitor pulse oximetry.

ALS

4. Cardiac Monitor

Complete Airway Obstruction

FR/BLS

1. Determine if the patient is responsive.

If responsive:

2. <1 year of age – Provide 5 back slaps and 5 chest thrusts with head down. Repeat until object removed or infant becomes responsive.
3. ≥ 1 year of age – Implement abdominal thrusts in rapid sequence until object is removed or patient becomes unconscious. If abdominal thrusts are not effective, the rescuer may consider chest thrusts.
4. For morbidly obese adults or women in 2nd or 3rd trimester of pregnancy, substitute chest thrusts.
5. If the patient becomes unresponsive, begin CPR with 30 chest compressions.

If unresponsive:

6. DO NOT perform blind finger sweeps.
7. Begin CPR.

8. If airway obstruction is relieved, place victim in the HAINES recovery position if breathing adequately. Assess ABCs frequently.
9. Support ventilation as necessary with bag-valve-mask, or provide 100% oxygen by non-rebreather.

ILS

If unresponsive:

10. Visualize the airway with a laryngoscope and attempt to clear using Magill forceps and/or suction.
11. If still obstructed, attempt forced ventilation. Intubate, and push foreign body into right mainstream bronchus. Then, pull the tube back into the trachea, and ventilate the left lung.
12. Transport and ventilate with 100% oxygen by BVM.
13. Assess pulse frequently. Initiate CPR if the patient becomes pulseless.
14. Obtain IV access if manpower allows.

ALS

15. If the airway remains obstructed after above efforts, move immediately to translaryngeal jet ventilation in children or surgical cricothyroidotomy in adults.

NON-FOREIGN BODY AIRWAY OBSTRUCTION

Possible etiologies include:

1. Croup – Croup is a viral infection of the airway just below the level of the vocal cords. It commonly affects infants and children 3 months to 3 years of age. A patient with croup generally has had symptoms of a cold or upper respiratory tract infection that has progressed into upper airway obstruction and respiratory distress. A child with croup has a characteristic “seal-like” bark or cough, a hoarse voice, and/or high pitched stridor.
2. Epiglottitis – Acute epiglottitis is an infection of the epiglottis and surrounding tissue at the base of the tongue. It may become fatal because of sudden airway obstruction. Historically, epiglottitis has been associated with children between the ages of 2 and 7 years. However, it may present at any age. In fact, it is becoming more common in adults and less common in children. Patients with epiglottitis usually demonstrate abrupt onset of sore throat and high fever, evidence of difficulty breathing (often seated in tripod position), and drooling (due to an inability to swallow).

In both croup and epiglottitis, lung sounds are clear.

3. Anaphylaxis – Anaphylaxis is a severe allergic reaction. Many patients with severe allergic reactions have had no contact with a known trigger.
4. Angioedema – Angioedema is a poorly-understood swelling of the tongue, lips, uvula, or posterior pharynx. It is most often seen in patients prescribed ACE Inhibitors. Many patients suffering from angioedema have taken ACE Inhibitors for many years. They need not be recently prescribed.

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient’s Circulation, Airway, and Breathing, as per Basic Concepts.
3. Do not increase anxiety or apprehension in the child or adult through any treatment or assessment action. Do NOT attempt to examine the throat.
4. Assess severity.
 - a. Mild severities – Patients demonstrate effective air exchange and are able to speak in full sentences.
 - b. Moderate severity – Patients demonstrate effective air exchange and are able to speak in full sentences, but stridor is present.
 - c. Severe – Patients demonstrate decreased air exchange. They have increased respiratory rates, are unable to speak in full sentences, have accessory muscle use, and may or may not be hypoxic.

- d. Near Death – Patients near death have decreased level of consciousness, cyanosis, are unable to speak, and may have ineffective respirations.
5. Patients of mild severity may be treated with supplemental oxygen (blowby oxygen for children) and transported by a BLS unit.
6. ALS assist should be requested, when available, for patients of moderate severity or worse. High flow oxygen should be provided, and respirations assisted with bag valve mask as indicated.

ILS

7. Do not start IV on a child unless he/she presents in impending arrest.
8. Adults presenting with anaphylaxis or angioedema require IV access and ALS assist, when available.

ALS

9. For suspected croup:
 - a. NS 6ml in nebulizer by mask or aim mist at child's face (allow caregiver to hold mask).
 - b. Follow routine procedure as above for intubation and securing the patient's airway. Though croup is an airway emergency, the obstruction is typically below the level of the vocal cords and does not impede intubation.
10. For obstruction at the level of the cords – laryngeal edema, laryngospasm, etc. – it is reasonable to sedate and attempt emergent intubation if the situation is dire.
 - a. If impending airway collapse is suspected, and you have a lengthy ETA to the ED.
 - b. Intubation **MUST** be attempted by the most highly skilled person.
 - c. Prehospital providers **MUST** have a backup plan immediately available (King LT or LMA, translaryngeal jet ventilation, surgical cricothyroidotomy).
11. *For patients of Near Death severity only (impending respiratory arrest)*, administer 0.01 mg/kg of **EPINEPHRINE** 1: 1,000 IM (Max single dose of 0.5 mg).
12. For obstruction above the level of the cords – anaphylaxis, angioedema, epiglottitis, etc. – **NO SEDATION** should be given to these patients until the airway is secure! These patients are almost impossible to intubate by even the most skilled provider.
 - a. In children with suspected epiglottitis, attempt IV access and cardiac monitoring only for impending respiratory arrest.
 - b. In adults, place an IV, and utilize cardiac monitoring and pulse oximetry unless doing so would cause undue anxiety.
 - c. Do **NOT** attempt intubation. Utilize a bag valve mask only. If this fails, then a gentle look with a laryngoscope or placement of a King LT (adult) may be undertaken once. However, intubation will typically be unsuccessful, forcing the prehospital care provider to move to translaryngeal jet ventilation in children or surgical cricothyroidotomy in adults.

- d. Attempt blind nasotracheal intubation if the adult patient is in extremis.
- e. If unsuccessful, move to King LT placement, then translaryngeal jet ventilation in children or surgical cricothyroidotomy in adults.

Section IV: Breathing Basic Concept and Emergencies

After airway evaluation, assessment of breathing is a second critical concept in emergency medical care. The prehospital provider should assess patients for:

1. Respiratory rate and depth, chest expansion.
2. Work of breathing: retractions (supraclavicular, intracostal, substernal), nasal flaring, accessory muscle use, head bobbing, grunting.
3. Positioning: sniffing position, tripod position.
4. Lung sounds.
5. Skin color.
6. Mental status.

Prehospital care providers should understand that oxygenation is a process independent of ventilation. Oxygenation defines how well oxygen enters the bloodstream from the lungs, and consequently, is delivered to the tissues. Ventilation defines how well CO₂ is eliminated from the lungs, and consequently, from tissues. CO₂ binds to a different location on hemoglobin molecules than oxygen. A disease process may affect the removal of CO₂ without affecting oxygenation and vice versa.

For example, pulse oximetry measures oxygenation. However, many disease processes, such as COPD, often allow for effective oxygenation with supplemental oxygen, yet ventilation is greatly affected. A patient may present with severe dyspnea (poor air exchange, increased work of breathing, etc.) and progress toward respiratory failure even after oxygenation is optimized. This is because these patients are having difficulty *ventilating*. Therefore, even when pulse oximetry readings are relatively normal, prehospital care providers must still assess for the above indicators of difficulty breathing. Services employing waveform capnography may utilize it to assist in the evaluation of a patient's ventilation.

In the apneic patient, address the patient's airway as per the Airway Basic Concept. It is of the utmost importance to closely monitor the efficacy of artificial ventilations by observing for adequate chest rise and fall. If good chest rise and fall is not seen, re-evaluate the patient's airway immediately and resume ventilations. Proper facemask seal during artificial ventilations is imperative to assure adequate ventilation.

When treating a patient in respiratory arrest (including cardiac arrest), it is easy to ventilate at an inappropriately fast rate. Overzealous positive pressure breaths can impair venous return and cardiac output in patients. This is particularly detrimental for cardiac arrest patients, those with hypovolemia, acute exacerbations of COPD or asthma, and other conditions that might already impair circulation (e.g. tamponade, tension pneumothorax or severe hemorrhage).

Once a patient is intubated or King LT is placed, a tidal volume equal to a one-hand squeeze of the BVM should be used (produce enough ventilation for visible chest rise). Begin ventilation at a rate of 10-12 breaths per minute in any patient in cardiac arrest or any adult. Children with a pulse may be ventilated at 12-20 breaths per minute. If waveform capnography is available, adjust ventilation rates in an effort to keep end tidal CO₂ within normal limits (35-45 mmHg).

RESPIRATORY ARREST

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts.
3. Provide spinal motion restriction as indicated.
4. If airway obstructed, refer to **Airway Obstruction SOG**.
5. If not breathing, assist ventilations with a bag-valve-mask and 100% oxygen. Provide one breath every 3-5 seconds. Observe for an increase in heart rate and improved color. If the patient is unresponsive, hypotensive due to bradycardia, and has a pulse less than 60 (in children) or less than 40 (in adults) begin chest compressions as well.
6. Determine blood glucose level. Follow the **Diabetes/Glucose Emergencies SOG** as appropriate.
7. Monitor frequently for cardiac arrest.
8. Transport as soon as possible.

ILS

9. Provide Routine Cardiac Care
10. If no improvement, manage the airway as per Airway Basic Concept.
11. Establish vascular access via IV/IO.

ALS

12. Monitor for cardiac dysrhythmias and for cardiac arrest.
13. Consider possible underlying etiologies and treat according to the appropriate SOG.

RESPIRATORY DISTRESS

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts.
3. Determine severity of patient's distress:
 - a. Mild/Moderate:
 - Expiratory wheeze
 - Speak in full sentences
 - O₂ sat > 90%
 - b. Severe:
 - Decreased air entry throughout with expiratory wheeze.
 - Unable to speak in full sentences.
 - Accessory muscle use increased respiratory rate.
 - O₂ sat <90%.
 - Near Death/In Extremis:
 - Decreased LOC, lethargic.
 - Decreased respiratory rate.
 - Unable to Speak.
 - Cyanosis.
 - Ineffective respiratory effort.
4. Obtain pulse oximetry. (Do not delay oxygen therapy to obtain pulse oximetry.)
5. Give **OXYGEN**. Supplement to maintain pulse oximetry:
 - a. In a patient with a history of COPD maintain Oxygen saturation between 90%-93%.
 - b. In a patient without a history of COPD maintain Oxygen saturation between 95%-100%.

BLS

NOTE: Only an EMT-Basic working for a BLS service that has completed the CPAP for BLS training may apply CPAP as a BLS skill. (Until the system implements training for all EMT-Basics.

6. **Approved BLS services:** see Continuous Positive Airway Pressure (CPAP). Apply CPAP to patients in severe distress, unless contra-indicated.
 - a. These services must assure that all EMTs using CPAP have completed Region/System CPAP training through an approved FTO or the EMS Office. A minimum of pulse oximetry must be utilized continuously when CPAP is applied.

7. Transport and notify receiving hospital as soon as possible.
8. Arrange an ALS intercept en-route to the hospital as necessary.
9. If an asthma exacerbation is suspected, assist with **ALBUTEROL MDI** as per Procedure. If symptoms are severe, contact Medical Control to consider administration of an Epi-Pen.

ILS

10. Address the patient's airway via the Airway Basic Concept.
11. Place a saline lock in adults presenting with moderate distress and an IV of isotonic fluids at TKO rate in children presenting with severe distress.

ALS

12. Assess the possible etiology of respiratory distress. Choose from the following, and follow the appropriate SOG:
 - c. Asthma/COPD/RAD
 - d. CHF/pulmonary edema – See **Pulmonary Edema** SOG.
 - e. Stridor/upper airway obstruction – See Airway SOGs
 - f. Anaphylaxis – See **Anaphylaxis** SOG.
 - g. Unknown or other cause, i.e. pneumonia, pulmonary embolism – See **Uncertain or Other Case** SOG.
 - h. Dyspnea in the patient with a tracheostomy or stoma.
13. Capnography may be utilized for patients in moderate to severe distress.
14. Monitor for cardiac dysrhythmias and/or cardiac arrest.

ASTHMA /COPD/REACTIVE AIRWAY DISEASE

FR/BLS/ILS

1. Consider **Assisted Administration of Albuterol** Procedure.

BLS

System Specific

Approved BLS services: consider CPAP per protocol unless contraindicated. Refer to CPAP Guideline page 183 of SOG's for indications.

ALS

2. Mild/Moderate distress
 - a. Adult -- **ALBUTEROL** 5mg (3 ml) into nebulizer treatment. May be repeated twice if needed.
 - b. Pediatric -- **ALBUTEROL** 2.5 mg (< 20 kg), 5 mg (> 20 kg) into nebulizer treatment. May be repeated twice if needed.
3. Severe Distress/Near Death
 - a. ADULT:
SOLU-MEDROL 125mg IVP or **DEXAMETHASONE** 10mg IVP/IO.
EPINEPHRINE 1:1,000 0.3-0.5mg IM*.
MAGNESIUM SULFATE 2g IV/IO over 10 minutes.
 - b. PEDIATRIC:
EPINEPHRINE 1:1,000 0.01mg/kg with maximum of 0.3mg subcutaneously.
 1. ≤ 10 kg = 0.1mg or 0.1ml IM
 2. 11 – 20 kg = 0.2mg or 0.2ml IM
 3. 21 – 30 kg = 0.3mg or 0.3ml IM**SOLU-MEDROL** 2mg/kg IVP/IO or **DEXAMETHASONE** 0.25mg/kg IVP/IO.
MAGNESIUM SULFATE 25-50mg/kg IV/IO (Max 2g) over 10 minutes.
4. Contact Medical Control prior to administration of subcutaneous epinephrine if the patient is elderly, has an irregular heart rate, has a heart rate > 150bpm or has a history of heart disease or hypertension.
5. For all asthmatic patients in cardiac arrest, and especially for patients in whom ventilation is difficult, the possible diagnosis of a tension pneumothorax should be considered and treated as appropriate.
6. Apply CPAP to patients in severe distress, unless contra-indicated.
7. If the patient is intubated or King LT placed, provide inline albuterol. Ventilate with a low respiratory rate and tidal volume.

CCEMT-P

8. In place of the Boussignac, the Newport HT-50 may be used to initiate CPAP 5cm H₂O or BiPAP (I : 12cm H₂O & E: 5cm H₂O).

** Note: The differential diagnosis of asthma should be considered. Asthma can be simulated by other pulmonary problems which cause wheezing or shortness of breath such as upper airway obstruction, aspiration of foreign body, anaphylaxis, pulmonary embolism, or pulmonary edema/CHF. **

UNCERTAIN OR OTHER CAUSE

FR/BLS/ILS

1. Consider **Assisted Administration of Albuterol** Procedure.

BLS

1. For mild to moderate respiratory distress:
 - a. Routine BLS cardiac care.
2. For severe respiratory distress:
 - a. Routine BLS cardiac care.
 - b. Approved BLS services: refer to CPAP policy pages 183, unless contra-indicated

ALS

3. For mild to moderate distress:
 - a. Routine cardiac care.
 - b. If wheezing and COPD, pneumonia, or asthma seems to be the most likely diagnosis, administer **ALBUTEROL** treatment x 1.
4. For severe distress:
 - a. Routine cardiac care.
 - b. CPAP, unless contra-indicated
 - c. If wheezing, may administer one **ALBUTEROL** neb and observe for effect. **ALBUTEROL** may be given in-line with CPAP. If symptoms improve, may repeat **ALBUTEROL** neb.
 - d. If hypertensive, may administer **NTG** for possible CHF.
 - e. No diuretics if the diagnosis of pulmonary edema is uncertain.

CCEMT-P

5. In place of the Boussignac, the Newport HT-50 may be used to initiate CPAP 5cm H2O or BiPAP (I : 12cm H2O & E: 5cm H2O).

**RESPIRATORY DISTRESS OR ARREST IN A PATIENT WITH
A TRACHEOSTOMY TUBE OR STOMA**

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts.

Respiratory Distress:

3. If the patient is NOT in respiratory arrest, administer 100% O₂ per tracheostomy collar. A non-rebreather mask may be placed over the tracheostomy or stoma if a tracheostomy collar is not available. Remove any speaking valves that may be present.
4. Suction the tracheostomy or stoma as necessary. Then, reassess the airway's patency.
5. If the patient is receiving mechanical ventilation, remove the ventilator and provide ventilations with a bag valve mask with 100% FiO₂.

Respiratory Arrest:

For patients with a stoma:

1. It is important to realize that some patients have had a laryngectomy -- typically cancer patients. His/her airway begins at the stoma. There is no connection between the patient's oropharynx and his/her airway. Most patients, however, maintain continuity between their oropharynx and trachea. These patients usually received a tracheostomy due to prolonged respiratory failure.
2. In the patient who has had a laryngectomy, you **MUST** assist ventilations via the stoma.
 - a. Utilize a child or infant mask that fits securely over the stoma and can be sealed against the neck.
 - b. Watch for adequate chest rise and fall. Assess to be certain that air is escaping back through the stoma during exhalation.
3. In the patient who has not had a laryngectomy (the majority of patients with a stoma), you **MUST** cover the stoma prior to assisting ventilations via the usual technique.

Note: For patients with tracheostomy tubes:

1. If the patient is receiving mechanical ventilation, remove the ventilator and provide ventilations with a bag valve mask with 100% FiO₂.
2. If the tracheostomy is obstructed:

- a. If you are unable to ventilate the patient, the patient's airway is likely obstructed. Remove the inner cannula if present and repeat suctioning or ask the caregiver to assist.
 - b. If the tracheostomy tube remains obstructed, have the caregiver change the tracheostomy tube if a replacement is available. Then reassess patency.
 - c. If the tracheostomy remains obstructed, deflate the cuff (if present) and remove the tracheostomy tube or ask the caregiver to do so. Then ventilate as described above for stoma patients.
4. If the tracheostomy is patent, determine if the tracheostomy is cuffed or uncuffed.
- a. Many patients no longer requiring mechanical ventilation have uncuffed tracheostomy tubes (or cuffed tubes that are deflated).
 - b. Because there is no cuff on these tracheostomy tubes, ventilation with a BVM is ineffective because instead of sending all the ventilation air into the lungs, some of it escapes through the upper airway or around the tracheostomy tube. **An un-cuffed tracheostomy in an apneic patient is not secure.**
 - c. Assess the patient's airway for a "pilot balloon". (This looks just like the balloon on an ET tube and serves the same purpose.) If there is a pilot balloon, make certain the balloon is inflated. The balloon is inflated with 5 ml of air just like an ET tube balloon. Once the pilot balloon is inflated the airway is secure and the patient can be ventilated with a BVM.
 - d. If there is not a pilot balloon or on the right side of the flange it says "no-cuff", this is an un-cuffed tube. If you are unsure if the trach is cuffed or not, try to ventilate the patient. If the trach is uncuffed:
 - The patient's color will not improve with ventilation, there will be poor rise and fall of the chest, and breath sounds will be poor.
 - There will be an expulsion of air through the lips with bagging (like the sound a horse makes through his lips).
 - You may see air bubbles forming around the lips.
 - e. If you determine the patient's tracheostomy is uncuffed, remove it and ventilate as described above for stoma patients.
5. Initiate ALS intercept as soon as possible.

ILS/ALS

Respiratory Distress:

3. Mucous frequently obstructs a stoma or tracheostomy tube. If thick secretions inhibit suctioning, provide a **NORMAL SALINE** neb to the stoma/tracheostomy. Then, reattempt suctioning.
4. Remember that patients with stomas/tracheostomy tubes are subject to the same illnesses as anyone else. Assess breathing as per Breathing Basic Concept, and follow the appropriate SOG.

Respiratory Arrest:

1. For patients with a stoma:
 - a. Intubate the stoma as described above.
 - b. If unable to intubate the stoma, attempt orotracheal intubation if the patient has not had a laryngectomy.
2. The obstructed tracheostomy:
 - a. Attempt above measures first. If still unable to ventilate:
 - b. Remove the tracheostomy, and insert an appropriately sized endotracheal tube. Tracheostomy tubes are sized the same as endotracheal tubes. The size is typically on the side of the tube.
 - c. Only insert the endotracheal tube 3-4cm. If you meet resistance, do NOT force the tube into the stoma. Reposition the patient's neck.
 - d. If you continue to be unsuccessful, ventilate with a bag valve mask as directed above.
 - e. Stabilize the tube by hand at all times, and confirm tube placement as you normally would.
4. The un-cuffed tracheostomy tube:
 - a. Replace the uncuffed tube with an endotracheal tube as described above.

Section V: Disability Basic Concept and Emergencies

Following evaluation and stabilization of a patient's Circulation, Airway, and Breathing emergency care providers must evaluate a patient for evidence of neurologic deficits.

The differential diagnosis of causes of neurologic abnormalities is broad, and includes:

1. Hypercarbia and/or Hypoxia.
2. Hypotension.
3. Infection.
4. Diabetic states.
5. Metabolite build up (usually due to malfunctioning organs).
6. Poisoning and overdose.
7. Hypothermia or Hyperthermia.
8. Seizure.
9. Structural Abnormalities, i.e. tumor, strokes, etc.
10. Traumatic Injuries.

Consider the mnemonic AEIOU TIPPS:

A	Alcohol intoxication	T	Trauma, Temperature abnormalities
E	Epilepsy, electrolytes, encephalopathy	I	Infection
I	Insulin	P	Psychological problems
O	Opiates, overdose	P	Poison
U	Uremia	S	Shock, seizures, stroke, space-occupying lesion, subarachnoid hemorrhage, shunt

During your assessment, consider the following:

1. Trauma:
 - a. Note the surroundings and possible mechanism of injury.
2. Diabetes:
 - a. Does he/she have medication or sugar source in pocket?
 - b. Does patient have insulin syringes in the house?
 - c. Is there insulin in the refrigerator?
 - d. Is there a fruity odor on their breath?
3. Drug Overdose:
 - a. Check for medication containers.
 - b. Check extremities for needle tracks.
 - c. Are pupils pinpoint or dilated?
4. Stroke:
 - a. Are the pupils equal?
 - b. Is there paralysis, numbness or weakness on either side of the body?
 - c. Is the patient taking hypertensive medications or have history of hypertension?
 - d. What is the blood pressure?
 - e. Did the patient complain of severe headache?
5. Infection:
 - a. Has the patient had a fever or been confused?
 - b. Did he/she complain of severe headache?

- c. Does the patient have a rash?
- d. Is the patient's neck stiff?
- 6. Postictal Phase of Seizure:
 - a. Was there a history of seizure activity?
 - b. Did the patient bite their tongue?
 - c. Was the patient incontinent of bladder or bowel?
 - d. Is the patient taking any seizure medication?
- 7. Alcohol Intoxication:
 - a. Is there any possible alcohol on their breath?
 - b. Are there bottles lying around?
 - c. Does the patient have a history of drinking in excess?

We can do little in the prehospital setting to minimize damage caused by primary injuries – tissue damage occurring at the time of the event. However, prehospital providers can have a significant impact on the ultimate outcome of a patient by minimizing secondary injuries – those resulting from the hypoxia, hypercarbia, hypotension or increased intracranial pressure that can occur secondary to the actual event.

Components of a complete neurological exam include:

- 1. Determining the patient's level of consciousness.
 - a. AVPU (Alert, Responsive to Verbal Stimuli, Responsive to Painful Stimuli, Unresponsive)
 - b. Glasgow Coma Scale
- 2. Pupil Assessment
- 3. Conducting a focal neurologic exam including the Cincinnati Stroke Scale.
- 4. Vital Signs.
- 5. Blood Glucose analysis.

COMA OF UNKNOWN ORIGIN
Adult / Pediatric

FR

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts.
3. Utilize bystanders or family to obtain as much medical history (current and past) as possible.
4. Implement Spinal Motion Restriction if trauma is a possible etiology of the patient's altered mental status.
5. Monitor for vomiting.
6. Monitor for seizures.

BLS

7. Check Blood glucose level. Refer to [Diabetic/Glucose Emergencies](#) SOG if applicable.
8. Consider the following medication:

ADULTs Only
NALOXONE 0.4-2 mg-Intra-nasally (**IN**)

ILS

9. Assess and maintain the patient's Airway, Breathing, and Circulation as per the Basic Concepts.
10. Obtain IV of **Isotonic Solution** at TKO.

ALS

11. Apply cardiac monitor.
12. Refer to **Diabetic/Glucose Emergencies** SOG, if applicable.
13. Refer to **Overdose/Poisoning** SOG, if applicable.
14. Consider the following medications:

ADULT
NALOXONE 0.4-2mg IV/IO/IM/IN

PEDIATRIC
NALOXONE 0.1mg/kg IV/IO/IM
Maximum 2mg

THIAMINE 100mg IV or IM

SEIZURE

FR

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts.
3. Assess for the following:
 - a. Does the patient have a history of any of the following:
 - Seizures
 - Head injuries
 - Alcohol or drug use
 - Diabetes
 - Heart Disease
 - Stroke
 - Major recent infections
 - Brain tumors
 - b. Has the patient had a recent fever, headache, or stiff neck?
 - c. Obtain a description of the seizure from family member or bystander.
 - d. Was the patient incontinent of bowel and/or bladder?
 - e. Check for injuries elsewhere on the body – Dislocated shoulder, bleeding from the mouth, etc.
 - f. Check the neck for rigidity.
 - g. Check for Medic Alert tags and bracelets.
4. If the patient is actively seizing, do not attempt to restrain him/her. (You may move him/her to protect from imminent danger or harm.)
5. Do not try to force anything into their mouth once their teeth are clenched.
6. Administer **OXYGEN** at 12-15 liters per minute via non-rebreather mask or assist ventilations with BVM if indicated.
7. Obtain pulse oximetry.
8. Loosen any restrictive clothing.
9. Once the seizure has ceased, place the patient in the HAINES recovery position, provided there is no potential for spinal injury.
10. Watch for vomiting.

11. Continue reassessment of level of consciousness, CAB's, and vital signs. Monitor closely for recurrent seizures.

12. For febrile seizures, cool patient by removing clothing. Do NOT induce shivering. Do NOT rub with alcohol or place in cold/ice water.

BLS

13. Check Blood Glucose. Refer to **Diabetic/Glucose Emergencies** SOG, if applicable.

ILS

14. Obtain IV of **Isotonic Solution** at TKO.

- a. An IV is NOT necessary for an isolated febrile seizure in a child if mental status is improving.

ALS

15. Utilize cardiac monitor and pulse oximetry.

16. Capnography may be utilized.

17. If actively seizing, administer **DIAZEPAM** or **MIDAZOLAM** as follows:

Adult:

May give **DIAZEPAM** 5mg slow IV/IO .

Peds:

DIAZEPAM IV/IO 0.1-0.2 mg/kg; <5 yrs (max dose 5mg), >5 yrs (max dose 10mg).
OR 0.5mg/kg PR (maximum dose 5mg).
Refer to **Rectal Diazepam Administration** Procedure.

OR

MIDAZOLAM 4mg IV/IO/IM/IN as initial dose. May be repeated in 2mg increments to maximum of 10mg's.

OR

MIDAZOLAM 0.1-0.2mg/kg IV/IO/IM/IN (Max 4mg.)

18. Monitor respiratory status closely.

19. If suspected that seizure is secondary to overdose or poisoning, see **Overdose/Poisoning** SOG.

20. If the patient is pregnant or delivered within past 6 weeks, refer also to the **Pregnancy Complications** SOG.

21. Monitor for recurrent seizures and vomiting.

5.03 STROKE

Stroke is the leading cause of brain injury in adults and the third leading cause of death in the United States. 75% are ischemic, making most stroke patients possible candidates for fibrinolytic agents and endovascular procedures. However, time is of the essence! Early recognition and rapid transport is essential!

INCLUSION CRITERIA

Signs & Symptoms of a stroke include:

1. Sudden weakness or numbness of the face, arm, or leg, especially if on one side of the body.
2. Facial droop.
3. Unequal grips.
4. Trouble speaking or understanding.
5. Altered level of consciousness or seizures.
6. Sudden confusion.
7. Sudden, severe headache with no known cause.
8. Sudden trouble seeing in one or both eyes.
9. Generalized weakness.
10. Sudden trouble walking.
11. Frequent or unexplained falls.
12. Dizziness, loss of balance or coordination.

EXCLUSION CRITERIA

1. If glucose < 60 refer to Hypoglycemia/Hyperglycemia guideline
2. If trauma and GCS < 13, refer to Head Injury and General Trauma Management guidelines

Pertinent historical data includes:

- a. History: “last seen normal”
- b. TPA exclusions
 - i. Previous cerebral hemorrhage
 - ii. Current anti-coagulant therapy
 - iii. Head trauma or prior stroke in previous 3-months
 - iv. Symptoms suggest subarachnoid hemorrhage
 - v. Arterial puncture at noncompressible site in previous 7-days
 - vi. History of previous intracranial hemorrhage
 - vii. Elevated blood pressure (systolic > 185 mm Hg or diastolic > 110 mm Hg)
 - viii. Evidence of active bleeding on examination
 - ix. Blood glucose concentration < 50 mg/dl
 - x. Minor or rapidly improving stroke symptoms (clearing spontaneously)
 - xi. Seizure at onset with postictal residual neurologic impairments
 - xii. Major surgery or serious trauma within previous 14 days
 - xiii. Recent gastrointestinal or urinary tract hemorrhage (within previous 21 days)
 - xiv. Recent acute myocardial infarction (within previous 3 months)

Transport:

Hospitals must meet criteria to be eligible for State Primary Stroke Center (PSC) or Emergent Stroke Ready Hospital (ESRH)

If the patient does meet the inclusion criteria stroke, transport patient to closest PSC or ESRH

If the patient does not meet the field triage guidelines for stroke:

1. Consideration will given to transport the patient to the hospital of his/her choice.
2. If a family member is at the scene of the emergency and that person has Power of Attorney for health care, then he/she can request that the patient be taken to a specific hospital.
3. If the patient is less than 18 years of age and not critical, the parent can request that the child be taken to a specific hospital.

Bypass Policy for Region 4 is covered in EMS Regional plan.

For current stroke center designations,

visit: http://dph.illinois.gov/sites/default/files/publications/strokecenterlisting_0.pdf

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts.
3. Limit scene time.
4. Implement **Spinal Motion Restriction** if trauma is a possible etiology.
5. Give **OXYGEN**. Supplement to maintain pulse oximetry:
 - a. In a patient with a history of COPD maintain Oxygen saturation between 90%-93%.
 - b. In a patient without a history of COPD maintain Oxygen saturation >94%.
 - c. Note that high flow oxygen is only indicated if needed to maintain SpO2 as above or if significantly altered mental status.
6. If BP >90 mmHg, elevate head of bed 15-30 degrees unless patient is unresponsive.
7. Monitor and record neurological status using GCS and note any changes.
8. To facilitate accuracy in diagnosing stroke and to expedite transport, a rapid neurological examination tool is recommended. The most common prehospital exam used is the CSS (Cincinnati Stroke Scale). One new onset positive sign on the CSS indicates a 72%

probability of stroke. Three new onset positive signs on the CSS indicates a greater than 85% probability of stroke. Assess patient for:

Facial Droop (ask the patient to show their teeth or smile)

Normal – Both sides of the face move equally/symmetrically.

Abnormal – One side of the face does not move as well as the other.

Arm Drift (ask the patient to close their eyes and hold both arms out straight with palms up for 10 seconds).

Normal – Both arms move the same.

Abnormal – One arm turns over, drifts down compared to the other arm, or is flaccid.

Speech (ask the patient to say, “You can’t teach an old dog new tricks”)

Normal – The patient says the phrase correctly with no slurring/slowness of words.

Abnormal – The patient slurs words, uses the wrong words or is unable to speak.

Known Well Time: the last time the patient was known to be without symptoms. Determine time of onset as closely as possible and record on the prehospital run report.

Obtain name and contact information (cell phone) of anyone who witnessed the onset of stroke symptoms. Transport a witness, family member, or caregiver with the patient to verify the time of stroke symptom onset.

Notify the receiving hospital as soon as possible. Early Notification: Contact Medical Control to notify of possible stroke if CSS exam is positive (based on 1 or more new onset findings of the exam) and/or associated symptoms of stroke are present, including any clinical findings and time of onset of symptoms.

9. If applicable: Cardiac Monitor - Acquire 12-lead EKG if possible
10. Obtain pulse oximetry
11. If glucose < 60 refer to Hypoglycemia/Hyperglycemia guideline

ILS

12. Obtain IV of **Isotonic Solution** at TKO.

ALS

1. Capnography may be utilized.
2. Cardiac Monitor – Acquire 12-Lead EKG
13. Prehospital intervention for blood pressure is not recommended.
14. Contact Medical Control if SBP > 180 mmHg or DBP > 110 mmHg. Do not make any attempt to lower blood pressure without medical control involvement

Section VI: Pain Control and Chemical Sedation

PAIN CONTROL

Note that this guideline should never be used alone. There always exists a cause for the underlying pain which must be assessed and treated according to another SOG.

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, and Breathing, as per Basic Concepts.
3. Obtain subjective measurement of patient's pain using:
 - a. **Adults:** Scale of 0-10
 - b. **Pediatrics:** Wong-Baker Faces Scale
4. Check patient's allergies and current medications (prescription and over-the-counter).
5. Use available methods to control pain.
 - a. Provide a calm and controlled interaction to relieve anxiety. Ex. Use a calm, soft spoken voice.
 - b. Explain procedures, and provide re-assurance.
 - c. Place the patient in a position of comfort, unless contra-indicated. If spinal motion restriction is necessary, pad the backboard liberally.
 - d. Splint and stabilize fractures or other injuries.

ILS

6. Establish IV of **Isotonic Solution** at TKO.

ALS

7. Consider:

Adult:

KETOROLAC 30mg IV/IM/IN
(IM dosage should be reserved
for longer transport times).
Max 15mg for patient ≥ 65 years
old and/or < 50 kg.

Peds:

KETOROLAC (Peds 2-16 yrs.)
0.5mg/kg IV - Max of 15mg
OR 1mg/kg IM - Max of 30mg

Special Note: Do not give **KETOROLAC** to patients with aspirin or ibuprofen allergies, renal disease, recent GI bleeding, ulcers, bleeding disorders, obvious fractures, or kidney stones.

AND/OR

MORPHINE SULFATE 1-4mg
IV push if indicated.
Maximum 4mg IVP

MORPHINE SULFATE
0.05-0.10 mg/kg IV. Maximum
single dose of 2mg.
Use 0.05 mg/kg dose in infant
younger than six months. Maximum
dose of 0.5 mg IVP.

8. Patients with a head injury, altered mental status, or unstable vital signs *should not receive pain medications.*
9. Following the initial administration of **MORPHINE** contact Medical Control.
10. Obtain vital signs following administration of pain medication and document.
11. Patients who have received narcotic analgesics should remain on oxygen.
12. Discontinue narcotic use if:
 - a. **Adult:** respiratory efforts less than 12 per minute
 - b. **Pediatrics** (< 8 years): respiratory efforts less than 16 per minute.
13. Protect the airway and assist ventilatory efforts as required.
14. Remember if respiratory depression occurs, consider **NALOXONE**:

<u>Adults:</u> 0.4-2mg IV/IO/IM/IN. May repeat to maximum 10mg.	<u>Peds:</u> <20kg-0.1mg/kg IV/IO/IM/IN/ETT >20kg-2mg IV/IO/IM/IN/ETT Maximum 2mg.
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CONSCIOUS SEDATION

Note that this guideline should never be used alone. There always exists a cause for the need for sedation which must be assessed and treated according to another SOG. Patients requiring chemical sedation in the prehospital setting are divided into two categories. The first are those requiring sedation for a brief, painful procedure such as fracture reduction or cardioversion, or to reduce combativeness in mechanically ventilated patients or patients undergoing transcutaneous pacing. The second category includes patients requiring chemical sedation for psychosis with violent behavior.

ALS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.

FOR PROCEDURAL SEDATION:

3. Prepare airway equipment, including suction, BVM, and intubation/King LT equipment.
4. Place the patient on a cardiac monitor and pulse oximeter.
5. Place the patient on 100% FiO₂ by non-rebreather.
6. Administer **MIDAZOLAM**:
 - a. Adult: 2-4mg IV/IO.
 - b. Peds: 0.1 mg/kg IV/IO (Max 5mg).OR
7. **ETOMIDATE**
 - a. Adult: 0.1mg/kg IV/IO (Max 10mg).
8. The goal of procedural sedation in the prehospital setting is to provide minimal to moderate sedation:
 - a. The patient may or may not have depression of consciousness. In spite of this, the amnesic effects of the drugs will still be present.
 - b. Cognitive function and coordination may be impaired.
 - c. *The patient should maintain the ability to respond purposefully to verbal commands.*
 - d. The patient's airway, ventilator, and cardiovascular function should be unaffected.

FOR CHEMICAL RESTRAINT, contact Medical Control to consider **HALOPERIDOL AND DIAZEPAM**. Request law enforcement for assistance.

Adult: **HALOPERIDOL** 5mg and **DIAZEPAM** 5mg. Do not mix together. Administer IM in different syringes and limbs.

HALOPERIDOL and DIAZEPAM are NOT compatible medications and cannot be given in the same site.

9. Peds: Call Medical Control.

FOR PATIENTS UNDER THE INFLUENCE OF STIMULANTS SUCH AS COCAINE OR METHAMPHETAMINE REQUIRING ANXIOLYSIS OR SEDATION:

10. Adults: **DIAZEPAM** 5-10mg IV/IM.

OR

11. **MIDAZOLAM** 2-4mg IV/IM.

12. Peds: Contact Medical Control.

13. Note that sedation is contra-indicated in the head injured or unstable patient without consultation from Medical Control, unless sedation for airway management is indicated. This is the only exception.

FOR CONTINUED SEDATION OF THE INTUBATED PATIENT, administer MIDAZOLAM:

14. Adults: 2-4mg IV.

a. An initial dose of **ETOMIDATE** 10mg IVP may be necessary to quickly achieve initial sedation.

15. Peds: 0.1mg/kg IV.

CCEMT-P

16. Contact Medical Control to consider **PROPOFOL** 5-50 mcg/kg/min. An initial dose of **PROPOFOL** 10mg IVP may be necessary to quickly achieve initial sedation.

Section VII: Medical Emergencies

ANAPHYLACTIC SHOCK

Anaphylaxis is a full-body allergic reaction caused by the release of histamine. Histamine dilates the blood vessels causing swelling throughout the body. The histamine release can cause a number of other effects in the body, the most serious including obstruction of airways, sudden dramatic drop in blood pressure, and shock. **This is a life threatening emergency.**

May be caused by injection (bees, etc.) ingestion (food), absorption and inhalation.

Anaphylaxis may present with the following signs and symptoms:

1. Flushed color
2. Swelling of face and eyes
3. Itching
4. Hives
5. Shortness of breath or stridorous respirations
6. Hoarse Voice
7. Sensation of a lump in the throat
8. Cough
9. Chest tightness
10. Hypotension
11. Tachycardia
12. Nausea & vomiting
13. Abdominal cramping
14. Feeling of impending doom

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. **OXYGEN** 15 L/min via non-re-breather mask or 6 LPM by nasal cannula if the patient cannot tolerate mask. Be prepared to support the patient's respirations with BVM if necessary.
4. Assess Severity:
 - a. Mild – Localized Reaction
 - b. Moderate – Mild wheezing
 - c. Severe (Anaphylaxis) – Multi-system reaction with altered mental status or signs of shock, diffuse wheezing and/or dyspnea, stridor, or swelling.
5. If moderate to severe symptoms are present or the patient has a history of severe reactions and if the patient has in his/her possession a prescribed **Epi-Pen**, assist the patient with administering the **Epi-Pen** and/or contact Medical Control as necessary:

EPINEPHRINE PEN ADULT

- a. 0.3mg into thigh muscle.

EPINEPHRINE PEN PEDIATRIC

- 0.15mg into thigh muscle.

BLS

System Specific/Region

Approved BLS services: when patient experiencing moderate to severe dyspnea, apply CPAP per Protocol page 183.

6. Apply ice or cold pack to bite or injection site if appropriate.

ILS

7. For moderate/severe symptoms, obtain an IV of **Isotonic Solution** at TKO for adults and peds.

ALS

8. For Mild Symptoms – Localized Reactions:

- a. Adult: **DIPHENHYDRAMINE** 25-50mg IV/IM.
b. Peds: **DIPHENHYDRAMINE** 1-2mg/kg IV/IM (Max 50mg).

9. For Moderate Symptoms – Mild wheezing:

- a. Adult: **DIPHENHYDRAMINE** 25-50mg IV/IM.
b. Peds: **DIPHENHYDRAMINE** 2mg/kg IV/IM (Max 50mg).
c. Treat any wheezing or dyspnea with **ALBUTEROL** per the **Asthma SOG**.

10. For Severe Symptoms (Anaphylaxis) – Multi-system reaction with altered mental status or signs of shock, diffuse wheezing and/or dyspnea, stridor, or swelling:

- a. If signs of hypoperfusion, administer **NORMAL SALINE**:
- Adults and Peds: 20ml/kg.
- b. **EPINEPHRINE** 1:1,000 IM
- Adult: 0.3-0.5mg
 - Peds: 0.01mg/kg (Max 0.3mg).
 - May repeat x 1 after 15 minutes if minimal response. (*Not for Neonates.*)
- c. **DIPHENHYDRAMINE**
- Adult: 50mg slow IV/IO. If no IV, give IM.
 - Peds: 1-2mg/kg (Max 50mg) IV/IO. If no IV, give IM.
- d. Administer corticosteroids:
- **DEXAMETHASONE**:
 1. Adult: 10mg IV/IO.
 2. Peds: 0.25 mg/kg IV/IO. (Max 50mg.)
- OR
- e. **SOLUMEDROL**
3. Adult: 125mg IV/IO.
 4. Peds: 2mg/kg IV/IO. (Max 125mg.)

- e. If wheezing, treat per **Asthma** SOG.
- f. For refractory hypotension, contact Medical Control to consider:
 - i. Epinephrine drip 5-15 mcg/min IV/IO.
- g. For moderate to severe dyspnea, initiate CPAP per protocol page 234.

CCEMT-P

- 11. In place of the Boussignac, the Newport HT-50 may be used to initiate CPAP 5cm H2O or BiPAP (I : 12cm H2O & E: 5cm H2O).

SEPTIC AND HYPOVOLEMIC (NON-HEMORRHAGIC) SHOCK

Sepsis is now recognized as a frequent disease among Emergency Department and EMS patients. This is anticipated to increase in incidence as the general population ages. With the advent of Early Goal-Directed Therapy for sepsis (EGDT), we are now aware that rapid identification and aggressive treatment of the septic patient dramatically reduces morbidity and mortality.

Note that this guideline can also be utilized for the treatment of hypovolemic shock.

Indications of a septic patient:

1. A septic patient shall be identified as one having at least two of the Systemic Inflammatory Response Syndrome (SIRS) criteria:
 - a. Temperature greater than 38 C (100.4 F) or lower than 36 C (96 F).
 - b. Heart rate greater than 90.
 - c. Respiratory rate greater than 20.
2. Suspected or documented infection. For patients meeting these criteria:
 - a. Establish routine cardiac care (IV access, pulse oximetry, cardiac monitor, capnography if available).
 - b. Check blood glucose level.
 - c. Check point-of-care lactate level (optional).
3. A patient suffering from severe sepsis shall be identified as having one of the following:
 - a. Altered mental status
 - b. Systolic BP < 90 OR Mean Arterial Pressure (MAP) < 65.
 - c. Lactate level >4 mmol/L.

FR/BLS/ILS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.

ALS

3. IV fluid therapy:
 - a. If the severe sepsis or hypovolemic patient has a normal serum lactate level (or if lactate level is not known) but is hypotensive, administer **NORMAL SALINE** IV in 500mL increments to max 20ml/kg or until the patient becomes normotensive.
 - b. If the severe sepsis or hypovolemic patient has an elevated serum lactate level (>4 mmol/L), administer 20ml/kg **NORMAL SALINE** IV bolus.
4. Reassess vital signs and lung sounds after infusing each 500 increment.
5. If the patient develops dyspnea, stop the IV fluid bolus and contact Medical Control.
6. If the septic patient remains hypotensive after a 20mL/kg **NORMAL SALINE** IV bolus,

begin **DOPAMINE** at 5 mcg/kg/min and titrate to achieve a normal blood pressure (SBP >90 and MAP >65). Note: **DOPAMINE** is NOT appropriate for suspected hypovolemic shock.

7. Minimize scene times as much as possible, and transport emergently.

CCEMT-P

8. If a central line is present in the patient with septic shock, the CCEMT-P may administer **NOREPINEPHRINE** 4-30 mcg/min in lieu of **DOPAMINE**.
9. If a patient with septic shock does not respond favorably to **NOREPINEPHRINE**, contact Medical Control to consider:
PHENYLEPHRINE 0.-0.5mg slow IV push and/or 100-180mcg/min.
AND/OR
VASOPRESSIN 20 units in 100ml infused at 0.04 units/min (12ml/hr)

NOTE: Point-of-care serum lactate measurements can be obtained liberally. We often find patients who have compensated shock (elevated lactate level in the presence of normal blood pressure). Contact Medical Control for direction on these patients.

NOTE: This protocol is *not* for use in the presence of **cardiogenic** or **hemorrhagic** shock. An elevated lactate may be obtained in this patient population. However, this protocol is not to be implemented. Follow the appropriate SOG and contact Medical Control for further direction.

GENERAL ILLNESS
Sick / Unknown / Nausea / Vomiting

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. NOTE: Prehospital personnel must be acutely aware of patients who present with no specific complaints or minor complaints. These patients' history and assessment is to be closely evaluated to determine the most appropriate care required. Female patients do not necessarily have classic symptoms of MI; their symptoms may be diaphoresis and "not feeling right."
4. Obtain blood glucose check. Treat hypoglycemia per **Diabetic/Glucose Emergencies SOG**.

ILS

5. Initiate an IV of **Isotonic Solution** at TKO for adults unless hypotensive, then per appropriate SOG.

ALS

6. Assure that the patient receives nothing by mouth.
7. Obtain orthostatic vital signs if time allows.
8. Consider **ONDANSETRON**:
 - a. For pediatric patients 2-4 years of age: 2mg Orally Disintegrating Tablet PO or IV/IM.
 - b. For pediatric patients 4-11 years of age: 4mg disintegrating tab placed on top of tongue. When dissolved (in seconds), ask patient to swallow saliva, if possible.
 - c. For patients ≥ 12 years of age, give 4mg IV over 2 minutes, IM or 8mg disintegrating tab PO as above.
9. Although a 12 lead EKG is not absolutely required in vomiting patients, be aware that *nausea or vomiting in the elderly or females may be presenting symptom of an MI*.

ACUTE ABDOMINAL PAIN

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.

ILS

3. Obtain large bore IV of **LR** or **NS** at TKO.
4. Treat Hypovolemic Shock per **Septic and Hypovolemic (Non-Hemorrhagic) Shock SOG**. Otherwise, contact Medical Control for additional direction.

ALS

5. Establish cardiac monitor
6. If suspected abdominal aortic aneurysm or ectopic pregnancy, contact Medical Control as soon as possible.
7. Females of childbearing age should be asked a gynecological history.
8. In the stable patient, treat pain per **Pain Control SOG** with **MORPHINE**.

7.05 DIABETIC / GLUCOSE EMERGENCIES

Causes of Low Blood Sugar:

1. Too much insulin or other anti-diabetic agent taken by patient.
2. Patient did not eat enough.
3. Too much exercise.
4. Vomiting.

Assess for the following signs and symptoms of low blood sugar:

1. Sudden onset, deterioration of mental status
2. Cool, clammy skin
3. Headache
4. Dizziness
5. Hunger
6. Hostile, bizarre or aggressive behavior which resembles alcohol intoxication
7. Loss of consciousness
8. Slurred speech
9. Seizures

Causes of High Blood Sugar/Ketoacidosis:

1. Insufficient insulin dose or insulin dose not taken.
2. Undiagnosed elevated blood sugar.
3. Overeating causes a flooding of carbohydrates in the body.
4. Infection or other stressors that disrupt the glucose/insulin balance.

Assess for the following signs and symptoms of high blood sugar:

1. Develops gradually, usually over several days.
2. Altered mental status.
3. Air hunger or deep, sighing respirations.
4. Rapid breathing/hyperventilation.
5. Weak rapid pulse. Note that pulse may initially be bounding depending on fluid loss.
6. Sweet or fruity smelling breath.
7. Intense thirst, frequent urination.
8. Eyes that appear to be sunken.
9. Excessive urination.
10. Excessive thirst.
11. Skin is warm & dry.
12. Abdominal pain, nausea and vomiting.

Disposition

- A. If hyperglycemia, transport to closest appropriate receiving facility
- B. If hypoglycemia with continued symptoms, transport to closest appropriate receiving facility

- C. If hypoglycemia with resolved symptoms, consider release without transport if all of the following are true:
- i. Repeat glucose is > 80 mg/dl
 - ii. Patient takes insulin
 - iii. Patient does NOT use oral medications to control blood glucose
 - iv. Patient returns to normal mental status, with no focal neurologic signs/symptoms after receiving glucose/dextrose
 - v. Patient can promptly obtain and will eat a carbohydrate meal
 - vi. Patient refuses transport or patient and EMS providers agree transport not indicated
 - vii. A reliable adult will be staying with patient
 - viii. No major co-morbid symptoms exist, like chest pain, shortness of breath, seizures, intoxication, also received naloxone
 - ix. Patient or legal guardian refuses transport

Note: Be alert for medic alert tags or bracelets.

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Determine blood glucose level and record.
4. If hypoglycemia is noted, refer to the **Oral Glucose** Procedure. Hypoglycemia is defined as:
 - a. Blood glucose < 80 in the symptomatic adult. Otherwise, < 60 .
 - b. Blood glucose < 60 in a child or infant (for newborns, see the **Neonatal Resuscitation SOG**).

ILS

5. Obtain IV of **Isotonic Solution** at TKO.
6. Draw red or yellow top blood tube for hospital use. Label tubes with: patient's name, date of birth (if available), time of draw and your initials.
7. If blood sugar is greater than > 180 with signs and symptoms of hyperglycemia/ketoacidosis (listed above), administer a fluid bolus of isotonic solution 20ml/kg IV/IO. Reassess the patient after each bolus.

ALS

8. If hypoglycemia is noted, treat with

DEXTROSE A. Dextrose IV

- i. Adult Dosing: 25 gm of 10-50% dextrose IV
 - 1. 50 ml of 50% dextrose
 - 2. 100 ml of 25% dextrose
 - 3. 250 ml of 10% dextrose
- ii. Pediatric Dosing: 0.5-1 gm/kg of 10-25% dextrose IV
 - 1. 2 –4 ml/kg of 25% dextrose
 - 2. 4 –8 ml/kg of 12.5% dextrose
 - 3. 5 –10 ml/kg of 10% dextrose

B. Glucagon IM/IN

- i. Adult Dosing: 1 mg IM or 2 mg IN
- ii. Pediatric Dosing: 1 mg IM/IN if ≥ 20 kg (or ≥ 5 yo)
0.5 mg IM/IN if < 20 kg (or < 5 yo)

9. If hypoglycemia is noted and IV access is not immediately attainable, administer

GLUCAGON:

- a. Adults and children > 8 years of age: 1mg IM or 2mg IN. If the patient remains hypoglycemic after 15 minutes, one additional dose may be given.
- b. Peds: 0.5mg IM for patients weighing < 25 kg or < 8 years of age.

CEMT-P

10. Administer INSULIN via sliding scale:

<u>Blood Glucose</u>	<u>Insulin Dose</u>
200-250 mg/dL	3 units SQ
251-300 mg/dL	5 units SQ
301-350 mg/dL	7 units SQ
351-400 mg/dL	9 units SQ
> 400 mg/dL	12 units SQ

RENAL DIALYSIS PATIENTS **Shunts, Fistulas & Grafts**

A dialysis shunt, also known as a fistula or graft, is a surgically created connection between an artery and a vein. This is done to provide a location for dialysis needle access.

Fistulas: A small opening is made in the side of an artery and in the side of a vein. The two vessels are joined together at these openings under the skin. This connection is called an Arterio-venous Fistula. The usual location for a fistula is near the wrist. As a result of high blood flow from the artery, some of the veins in the forearm will become large and easily seen and felt. A “thrill” will be felt if you gently place your hand over the fistula as a result of the high pressure blood flow into the vein. If bleeding should occur from the fistula, firm pressure is applied over the site for 10-15 minutes.

Grafts: Many dialysis patients have an artificial graft made of Teflon or Gore-tex material connecting an artery and a vein in the arm. The graft is commonly buried under the skin in the forearm but can also be placed in the upper arm or thigh.

Prolonged pressure (e.g. blood pressure cuff) over the graft or above the graft may lead to clotting of the graft. This means the patient loses his/her dialysis access if it clots off. If bleeding occurs from the graft, firm pressure is applied over the site for a minimum of 10-15 minutes.

FR/BLS

1. Do NOT take a blood pressure or in any way occlude or reduce circulation in the arm with the graft or fistula unless attempting to control excessive bleeding.
2. In the event that an external graft or fistula is accidentally damaged at the entrance site, apply direct pressure to the point of bleeding. Control obvious hemorrhage from graft or fistula (arterial bleeding) with direct pressure.

ILS/ALS

3. DO NOT perform vena punctures on the arm with a graft or fistula. Only during lifesaving measure may a vena puncture be performed on the involved arm.

SICKLE CELL EMERGENCIES

Sickle cell anemia is an inherited disorder of red blood cell production, so named because the red blood cells become sickle-shaped when oxygen levels are low. Sickle cell crisis can be life threatening.

Signs and symptoms of sickle cell disease may include, but are not limited to:

1. Increased weakness
2. Generalized aching and Arthralgia (joint pain)
3. Fever
4. Chest pain with shortness of breath
5. Sudden severe abdominal pain
6. Jaundice

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Place on high flow oxygen to saturate hemoglobin.

ILS

4. Initiate an IV of **NS** or **LR** at KVO.

ALS

5. Pain control per **Pain Control** SOG.

BEHAVIORAL EMERGENCIES
Adult / Pediatric

A behavioral emergency occurs when a patient exhibits behavior that is unacceptable or dangerous to the patient, family, or community. Such behavior may be caused by a psychological or physical condition such as:

1. Situational stress
 2. Illness or injury
 3. Low blood sugar
 4. Lack of oxygen
 5. Inadequate blood flow to the brain
 6. Head trauma
 7. Excessive exposure to heat or cold
 8. Abuse of substances such as drugs or alcohol
 9. Psychological panic attacks, agitation or bizarre thinking & behavior
 10. Poor self-esteem
-
1. General principals in assessment of the patient with a behavioral emergency:
 - a. Be prepared to spend time. Do not rush the patient. Convey that you have time to listen to what is bothering them.
 - b. Identify yourself clearly. Tell the patient who you are and what you are trying to do for them. If the patient is confused or delusional, you may have to explain this numerous times.
 - c. Be as calm and direct as possible.
 - d. Conduct the assessment wherever the emergency occurs, if possible. Rushing off to the hospital may frighten the patient or complicate the interview.
 - e. Talk to the patient alone, away from the family members. This allows them to convey their feelings without the family interjecting theirs. Don't direct their discussion. Speak to the family or bystanders away from the patient.
 - f. Set the ground rules. Let the patient know what you expect of them and what they can expect from you. Explain that they can cry or even scream, but you are not going to let them hurt themselves or others.
 - g. Maintain a nonjudgmental attitude. Do not criticize or blame the patient for the way they feel. Reassure as necessary.
 2. Observe the patient's:
 - a. General appearance e.g. clothing, hygiene, etc.
 - b. Is the patient easily directed?
 - c. Posture.
 - d. Appropriate responses to questions.
 - e. Communicates clearly.
 - f. Memory intact.
 - g. General mood.
 - h. Disordered thoughts, i.e. hallucinations or delusions.

3. Always ask before attempting to do something to the patient (vital signs, lung sounds, etc.). This will give them some sense of control over the situation.
4. Stay with the patient at all times, unless you feel that you are in jeopardy.
5. Bring all medications to the hospital.
6. Interviewing Techniques:
 - a. Use an open-ended question that encourages answers other than yes and no.
 - b. Let the patient talk and tell his/her story.
 - a. Listen and show that you are interested. Your facial expressions, posture and an occasional nod lets them know you are paying attention.
 - b. Don't be afraid of silence. Allow him/her time to get his/her emotions or thoughts together.
 - c. Do not argue with the patient. Do not agree with the patient's delusions or hallucinations.
7. Verbal De-Escalation Techniques:
 - a. Remain calm and friendly. Be aware of your own emotions (remain non-judgmental).
 - b. Position yourself between the patient and your exit.
 - c. Keep your hands in front of your body in a non-threatening manner
 - d. Only ONE provider should communicate with the patient.
 - e. Maintain a soothing tone of voice.
 - f. Listen to the patient's concerns.
 - g. Empathize. Use positive feedback.
 - h. Be reassuring. Outline the patient's choices.
 - i. Be willing to slow down and disengage if appropriate.
 - j. Calmly set the boundaries of acceptable behavior.

Depression/Suicide Candidates

1. Common symptoms/signs are sad expression, listlessness, apathy, crying spells, extreme pessimism, guilt, a feeling of worthlessness, fatigue, lack of energy, loss of appetite, etc.
2. Briefly question each patient who presents with depression about any intentions of suicide or suicidal thoughts. It is imperative that every suicidal gesture or action be taken seriously.
3. The patient who is entertaining thoughts of suicide will usually give some type of warning. For example, they may give away their cherished possessions, stop communicating with close friends, drop interest in hobbies, etc. In the adolescent, the warning signs are sometimes more subtle: lack of interest in schoolwork, poor grades in school, declining school grades from a normally bright student, lack of friends or separation from groups of friends, etc.
4. Treatment is largely supportive. DO NOT leave these patients alone. They are very likely to go through with their plans.

Agitated Delirium

While the cause of agitated delirium remains elusive, it is, in fact, a real disorder that can lead to death. Some cases of agitated delirium do NOT involve illicit substances. Victims are almost always males between the ages of 31-44. The patient is usually involved in a struggle during which he/she demonstrated bizarre behavior; death follows.

Characteristics of agitated delirium include:

1. Bizarre behavior before, during, and after law enforcement intervention.
2. Marked restlessness, often running wildly (perhaps into traffic).
3. Screaming for no apparent reason; pressured, loud, incoherent speech; (mumbling), grunting or guttural sounds; or irrational speech.
4. Marked irritability.
5. Demonstrates aggression toward inanimate objects (e.g. glass, mirrors, shiny objects and materials, rotator lights)
6. Apparent superhuman strength and endurance. Resists violently during capture, control, and restraint. Continues to resist violently after being restrained
7. Diminished sense of pain (pepper spray or baton strikes may be ineffective)
8. Self-induced injuries.

Physical exam may demonstrate:

1. High fever. This may be the reason many patients disrobe.
2. Muscle rigidity.
3. Complains of dyspnea.
4. Intense paranoia (e.g., fearful; hiding).
5. Rapid emotional changes (e.g. laughing, crying, sadness, anger, panic, etc.).
6. Disoriented about place, time, purpose.
7. Disoriented about self (delusions of grandeur).
8. Hallucinations (e.g. hears voices, talks to invisible people and/or inanimate objects).
9. Easily distracted (cannot follow commands).

FR/BLS/ILS

1. Assess SCENE AND PERSONAL SAFETY. Call law enforcement personnel to the scene, if needed. Above all, DO NOTHING TO JEOPARDIZE YOUR OWN SAFETY.
2. **General Medical Assessment & Initial Medical Care.**
3. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
4. Determine and document if the patient is a threat to self or others, or if the patient is unable to care or provide for self. Do not leave the patient alone unless responder safety is in jeopardy.
 - a. Protect the patient from harm to self or others.

5. Verbally attempt to calm and reorient the patient to reality. Do not participate in a patient's delusions or hallucinations.
6. If the patient is combative, contact Medical Control to obtain restraint order. Refer to system policy manual for **Restraint Policy**.
7. Always consider medical etiologies of behavioral disorder and treat according to appropriate SOG:
 - a. Hypotension
 - b. Hypoxia
 - c. Substance Abuse/Overdose
 - d. Neurologic disease (Stroke, intracerebral bleed, head injury, etc.)
 - e. Metabolic imbalance (hypoglycemia, thyroid disease, etc.)
 - f. Seizure/postictal
8. Consult Medical Control physician from the scene in ALL instances where a refusal of transport is being considered.
9. Attempt to cool the patient if agitated delirium is suspected.

ALS

10. Consider the need for Chemical Sedation per **Chemical Sedation SOG**.
11. All patients in physical restraints require chemical sedation. Other patients may as well.
12. For cases of agitated delirium, attempt cardiac monitor and IV access.

GUIDELINES ON INTERFACILITY TRANSFERS

BLS

Equipment that may be transported by all levels of providers (BLS, ILS, ALS):

1. Foley catheters
2. Gastric devices (NG tubes, G tubes, ostomy equipment)
3. Saline locks
4. Wound drains
5. Clamped vascular devices (Central lines, Groshong catheters, PICC lines)
6. Approved BLS services: STABLE CPAP patient

ILS

Crystalloid and colloid solutions may be transported by ILS and ALS providers.

ALS

Equipment that may be transported and used by ALS providers only:

1. BiPAP
2. IV infusion pumps-if trained
3. Pain medication pumps-if trained
4. Portable ventilators-if trained
5. Chest tubes attached to suction

A second appropriate provider is required for high complexity patients (respiratory therapist, RN, 2nd EMT-P, etc.). If this requirement cannot be met and emergent transfer is required, contact Medical Control for direction. High complexity patients are:

1. Any patient who acutely requires ventilator assistance, whether manual (BVM) or mechanical (ventilator).
2. Any patient requiring three or more medication drips (including blood products) excluding standard IV Fluids.
3. Any patient whom the transferring facility, transferring crew, or Medical Control feels has a high likelihood of experiencing cardiac arrest or decompensation during transport.
4. A crew will NOT undertake a transfer of an obstetric patient if delivery is deemed likely en route. Contact Medical Control.
5. A crew will NOT undertake a transfer of a critically ill neonate unless the situation is dire. Contact Medical Control.

Transfer Medications

1. Any injectable medications transported with the patient from the sending facility will be turned over to the RN at the receiving facility or wasted with a signed witness at the receiving facility. Disposition of these medications and/or documentation of wasting (with signature) will be included in the Patient Care Report narrative.

2. IV infusion medications will be transported on an IV pump at a constant rate and may be adjusted with orders from Medical Control.
3. Written orders from the transferring physician must be provided for the paramedic/PHRN en route to the receiving hospital. The medications ordered must be within the scope of the paramedic/PHRN training and these transport guidelines.
4. New or worsening medical conditions occurring en route will require notification of Medical Control.
5. Obtain a detailed report from the transferring nursing staff and/or physician including but not limited to:
 - a. Patient's condition, most recent set of vital signs, and any variances.
 - b. All drugs that have been given and those currently infusing. Monitor and document medication infusion rates.
 - c. Transfer orders and/or any orders available including treatment to be administered.
6. Before transporting a patient, the EMTP must be familiar with the specific drug, including its actions and possible side effects. The transferring facility may provide this information.
7. Monitor the infusion during transport, ensuring that the rate is accurate and pump function is intact.
8. Observe the IV site for signs of infiltration. Should this occur, discontinue the IV and apply direct pressure or a pressure dressing. Restart the line as soon as possible, and resume the infusion at the prior rate. Document and inform the receiving facility of the length of time that the IV was not infusing.
9. When transporting a patient receiving Heparin, a Glycoprotein IIb/IIIa Inhibitor (Aggrastat, Integrilin, or ReoPro (tPA)), monitor the patient closely for signs of bleeding. During or after receiving tPA, it is not uncommon for a patient to experience minor bleeding at IV or needle stick sites and from mucous membranes. This is not a contraindication to tPA. However, if evidence of life-threatening bleeding occurs (typically intra-cranial or GI), stop the infusion immediately, and contact Medical Control.
10. When transporting a patient receiving antibiotics, the antibiotic shall have been infusing a minimum of 15 minutes prior to transport of the patient.
11. Antibiotics, particularly the penicillin's, have been associated with serious hypersensitivity and allergic reactions. Allergic reactions are always possible following the first or successive doses of any medication. Monitor the patient for signs/symptoms of an allergic reaction.

12. Administration of a medication should immediately be stopped at the first sign of an allergic reaction, and Medical Control should be notified. Follow the **Anaphylactic Shock** SOG. Document the occurrence on the patient care report.

ALS Transfer Medications

In addition to medications/procedures included in the **Advanced Life Support Standard Operating Guidelines**, the following medications and procedures are approved for ALS transfer. None are to have the dose titrated.

1. Alteplase
2. Aminophylline/Theophylline
3. Amiodarone
4. Antibiotics
5. Benzodiazepines
6. Beta Blockers (atenolol, metoprolol, propranolol, esmolol, labetalol)
7. Blood Products
8. Digibind
9. Diltiazem
10. GP IIb/IIIa Inhibitors (ReoPro, Integrilin, Aggrastat)
11. H1 blockers (Benadryl, promethazine) and H2 blockers (Tagamet, Zantac, Pepcid, Axid)
12. Heparin
13. Ketamine
14. Lidocaine
15. Magnesium sulfate
16. Mannitol
17. Multivitamin preparations for infusion
18. Narcotics, including Patient Controlled Analgesic (PCA) pumps
19. Nitroglycerin Infusion (Tridil)
20. Norepinephrine (Levophed)
21. Phenobarbital
22. Phenytoin/Fosphenytoin
23. Pralidoxime
24. Procainamide
25. Steroids (mineral and glucocorticoid)

Infusions of Insulin, Potassium, Propofol, or Nitroprusside require a CCEMTP, PHRN or RN to accompany the patient.

Any medication not on this list or included in the Standard Operating Guidelines will require an RN or CCEMT-P for transport or contact with Medical Control.

TRANSFER OF BLOOD PRODUCTS

Transfusion therapy is the introduction of whole blood or blood components directly into the bloodstream. Uses include:

1. Restoring and maintaining blood volume
2. Improving the oxygen-carrying capacity of blood
3. Replacing the deficient blood components and improve coagulation

When blood transfusion is contraindicated in a patient, fluid infusions can restore circulatory volume. Unlike blood/blood products, however, fluid infusions cannot improve oxygen carrying capacity or replace deficient components.

Blood and blood products may be administered through a peripheral line or a central line.

Large volumes of blood need to be infused through a central line because the small diameter of the vein and peripheral resistance can slow transfusions.

Freshly donated whole blood can be separated into its component parts:

1. Packed RBCs: To restore/maintain oxygen-carrying capacity, correct anemia/surgical blood loss, increase RBC mass.
2. Plasma: To correct blood deficiencies that result from clotting factor deficiencies or treatment with either heparin or warfarin.
3. Platelets: To control or prevent bleeding or correct an extremely low platelet count in a patient who doesn't have disease that destroys platelets; to increase the number of platelets in a patient receiving platelet-destroying therapy (i.e.-chemotherapy) or who has a hematological disease, such as aplastic anemia or leukemia.
4. Leukocytes: To treat a patient with life-threatening granulocytopenia (count <500/microliter) who is not responding to antibiotic therapy.
5. Plasma proteins, such as immune globulin, albumin and clotting factors: To expand plasma volume, treat shock, correct undetermined coagulation factor deficiency, correct specific clotting factors deficiencies.
6. Or as whole blood: To restore volume in hemorrhage, trauma or burn patients.

ALS

1. The patient must have an IV infusing on an IV pump.
2. When transporting a patient with blood or blood products hanging:
 - a. **NORMAL SALINE** is the fluid of choice. No other IV solution should be given with blood – only **NORMAL SALINE**. (Other isotonic solutions may cause the cells to clump.)
 - b. Blood filters should always be used when transfusing blood/blood products (to avoid infusing fibrin clots or cellular debris that forms in the blood bag).
 - c. A special filter is used when infusing WBCs or platelets – a regular filter will trap them.
3. Assess the patient including vital signs every 10 minutes and document.

4. Monitor for evidence of transfusion reactions.
5. Treat the underlying condition (medical, trauma, etc.) per the appropriate SOG.

COMPLICATIONS OF TRANSFUSION

ALS

Transfusion has stopped:

1. Make sure the IV fluid container is at least 3 feet above the level of the IV site.
2. Make sure the blood flow clamp is open.
3. Make sure the blood completely covers the filter. If it doesn't, squeeze the drip chamber until it does.
4. Gently rock the bag back and forth, agitating any blood cells that may have settled on the bottom.
5. Check the placement of the IV cannula in the vein. Reposition if necessary.
6. Flush the line with saline solution and restart the transfusion. Rehang the bag, open the flow clamp to the patient and reset the flow rate.

If a hematoma develops at the IV site:

1. Immediately stop the infusion.
2. Remove the needle/catheter and cap the tubing with a new needle and guard.
3. Notify receiving facility of the infiltration. (Patient will require ice on the site for 24 hours followed by warm compresses).
4. Initiate an IV of comparable size at an alternate site.
5. Document your observation and actions.

If the blood/blood products bag empties before you arrive at the receiving hospital:

1. Hang a container of NS and infuse it slowly.
2. If using a Y-type set, close the blood line clamp, open the saline clamp and let saline run slowly.

Patients with special needs:

Pediatric and elderly patients need special care. Neither age group is able to tolerate rapid transfusions. The elderly because of age-related slowing of the immune system are at risk for delayed reactions as well as fluid overload.

Transfusion Reactions

Usually attributed to major antigen-antibody reactions, transfusion reactions can occur up to 96 hours after the transfusion begins. Reactions most often occur with the administration of platelets, WBCs, and cryoprecipitate (clotting factors) than with whole blood, RBCs and plasma. Hemolytic reactions can be life-threatening. With as little as 10ml infused, symptoms can occur quickly – including headache, chest pain, chills, back pain, and fever.

Febrile reactions:

Nonhemolytic febrile reactions are characterized by a temperature increase of 1.8°F. Signs and symptoms can include fever, chills, headache, nausea and vomiting, hypotension, chest pain, dyspnea, nonproductive cough, malaise.

Allergic reactions:

The second most common transfusion reaction or allergic reactions, happen due to an allergen in the transfused blood/blood product.

Signs and symptoms can include itching, hives, fever, chills, facial swelling, wheezing, throat swelling.

Allergic reactions can progress to anaphylaxis. Severe anaphylactic reactions produce bronchospasm, dyspnea, pulmonary edema and hypotension.

Whenever you detect signs and symptoms of an acute transfusion reaction:

1. Immediately stop the transfusion.
2. Change IV tubing to prevent infusing additional blood/blood product. Save the bag and tubing for analysis at the receiving hospital.
3. Administer **NS** at a keep open rate.
4. Take and record the patient's vital signs.
5. Notify Medical Control.
6. Take a blood sample from opposite arm. Label sample appropriately
7. Document observations and your actions on the patient care report
8. Following discontinuation of the blood/blood products, contact Medical Control for treatment directions. Some minor transfusion reactions may allow for resuming the transfusion after **DIPHENHYDRAMINE** is given.
9. Initiate oxygen, cardiac monitor, and administer **DIPHENHYDRAMINE** as ordered by Medical Control.

REGION IV CHEST TUBE TRANSFER PROCEDURE

Chest tubes are used for the re-expansion of a lung or lungs following the occurrences of a pneumothorax due to trauma, disease, surgery or a spontaneous occurrence. An intact chest tube allows for air or fluid collected in the pleural space to be evacuated and the lung(s) to re-expand.

ALS

1. Obtain a detailed report from the nurse caring for the patient at the transferring facility. Make every effort to acquire the following information:
 - a. The patient's current condition including signs of respiratory distress. Changes in the respiratory status may indicate a malfunction of the chest drainage system.
 - b. Vital signs.
 - c. Type(s) of medication(s) including the required infusion rate(s) if applicable and document.
 - d. Obtain transfer orders, including the action to be taken if the chest tube mal-functions.
 - e. Note the amount, color and consistency of the drainage within the chamber before and after transport. Document on the run sheet.
2. When transferring a patient with the chest tube attached to a "water-seal" type system, observe the system for intermittent bubbling in the water filled chamber. The water in the chamber should rise and fall in synchrony with respiratory efforts.
 - a. Monitor the patient and system for synchrony of respiratory efforts and bubbling of the water within the chamber. Should the bubbling cease, a situation has occurred that requires immediate intervention.
 - b. Check the system for leaks, kinks, or a blockage in the tubing. Notify Medical Control of the situation as soon as possible to obtain direction.
3. Should the system develop a leak, place the chest tube to suction (if not already), and immediately contact Medical Control
4. Monitor the amount and color of the drainage.
5. An alternative to a closed water seal system may be a one-way-valve device. Monitor this system for a consistent flutter motion. Should a change in action be noted, contact Medical Control immediately for direction. This device may have the trade name of "True Close" or "Heimlich Valve".

Section VIII: Obstetric Emergencies and Care of the Newly Born

PREGNANCY COMPLICATIONS

Third Trimester Bleeding/Pre-Eclampsia or Eclampsia/Pre-Term Labor

Hemorrhage

Third trimester bleeding may include placenta previa, placental abruption, or may occur secondary to trauma. Whatever the cause may be, it is a significant cause of anxiety for the pregnant patient and father. Provide reassurance to the patient and father.

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Do not do a vaginal examination unless imminent delivery is anticipated.
4. Palpate abdomen and note presence of tenderness or contractions.
5. The mother should be transported on her left side with high flow **OXYGEN**.
6. Treat for shock as indicated by signs and symptoms.
 - a. Keep patient warm.
 - b. Monitor vital signs at least every 5 minutes.
7. Note type, color and amount of any vaginal discharge or bleeding and document.
8. Retain expelled tissue or large blood clots and give to emergency department personnel.
9. Provide emotional support to parents.

ILS

10. If the patient has evidence of hypoperfusion (e.g. altered mental status, low B/P, Tachycardia, delayed capillary refill), follow the **Hemorrhagic Shock SOG**.
 - a. Caveat: Maintain normotension ($SBP \geq 100$) in the pregnant patient in an attempt to maintain adequate blood flow to the fetus (no permissive hypotension).
11. If no improvement in peripheral perfusion, insert a second IV line and repeat fluid bolus.

ALS

12. Apply cardiac monitor. Rapid transport if > 20 weeks, heavy bleeding, abdominal pain, or evidence of shock.

Pre-Eclampsia and Eclampsia

Eclampsia or pre-eclampsia is a toxic state that develops in the last trimester up to 6 weeks postpartum. It is characterized by increased blood pressure, fluid retention, and possibly seizures (if severe).

Pre-Eclampsia: Characterized by hypertension and edema to the hands and face (and protein in the urine.)

Severe Pre-Eclampsia: Characterized by marked hypertension (160/110 or higher), generalized edema, headache, visual disturbances, pulmonary edema, abdominal pain, and/or dramatic decrease in urine output (along with a significant increase of protein in the urine.) The development of right upper quadrant pain may also indicate severe pre-eclampsia.

Eclampsia: Characterized by generalized toni-clonic seizure activity often preceded by flashing lights or spots before the eyes.

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. **HANDLE PATIENT GENTLY.** Minimize central nervous system stimulation. **DO NOT** check pupillary response.
4. Monitor for potential seizures.
5. Check blood glucose and treat per **Diabetic/Glucose Emergencies SOG** as indicated.
6. ALS intercept.

ILS

7. Insert IV of **NORMAL SALINE** at a rate of TKO.

ALS

8. Apply cardiac monitor.
9. If seizure occurs, treat per **Seizure SOG** AND administer **MAGNESIUM SULFATE** 2g IV over 2 min.
 - a. Draw 4 cc of 50% **MAGNESIUM SULFATE** in a 30 cc syringe and draw 26 cc of Normal Saline and slowly infuse over 2 minutes. May repeat once if seizure is still present. Monitor for respiratory depression (a possible sign of magnesium toxicity – rare with such a low dose).

PRETERM LABOR

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Do not do a vaginal examination unless imminent delivery is anticipated.
4. Palpate abdomen and note presence of tenderness or contractions.
5. The mother should be transported on her left side with high flow **OXYGEN**.
6. Note type, color and amount of any vaginal discharge or bleeding.
7. Retain expelled tissue or large blood clots and give to emergency department personnel.
8. Provide emotional support to parents.

ILS

9. Rapidly infuse **NORMAL SALINE 1 L IV**.

ALS

10. Transport to the closest facility if delivery is imminent.

EMERGENCY CHILDBIRTH

In most circumstances childbirth is a natural, flowing process. There are only a few situations that require rapid intervention and advanced life support transport.

Examples of situation in which emergency transport is necessary:

1. Abdominal pain.
2. Vaginal bleeding.
3. Signs of shock.
4. Signs of Pre-Eclampsia or Eclampsia.
5. Pre-term labor.
6. Imminent delivery.
7. Labor pains, less than 2 minutes apart.
8. Prior labor of short duration.
9. Urge to have bowel movement.

Uncomplicated Labor

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Obtain history and determine if there is adequate time to transport.
 - a. Gravida (# of pregnancies) and Para (#of live births).
 - b. Number of miscarriages, stillbirths, multiple births.
 - c. Due date (EDC) or date of LMP (last menstrual period).
 - d. Onset, duration, and frequency of contractions (time from beginning of one to the beginning of the next).
 - e. Length of previous labors, in hours.
 - f. Status of membranes (intact or ruptured). If ruptured, inspect for prolapsed cord or evidence of meconium. Note time since rupture.
4. **HIGH RISK CONCERNS:** drug abuse in mother, teenage pregnancy, no prenatal care, history of diabetes, HTN, cardiovascular disease, and other pre-existing disease that may compromise mother and/or fetus: preterm labor (< 37 weeks), previous breech, or C-section.
5. Inspect for bulging perineum, crowning, or whether patient is involuntarily pushing with contractions. If contractions are two minutes apart with crowning or any of the above are present, prepare for delivery. If delivery is not imminent, transport on left side. **DO NOT ATTEMPT TO DELAY DELIVERY UNLESS A DELIVERY COMPLICATION IS NOTED.**

If Delivery Is Imminent:

6. If mother is hyperventilating, encourage slow deep breathing.
7. Apply 100% **OXYGEN** by NRB mask.
8. Place personal protective equipment on (gown, mask with eye protection, gloves).
9. Call for ALS intercept.

Delivery:

10. Position mother on her back with folded sheet or blanket under pelvis. Ask mother to bend and separate her knees.
11. Drape the mother for privacy.
12. Prepare the delivery area with the obstetrical kit. Prepare bulb syringe, cord clamps, and towel to receive infant. Have neonatal Bag Valve Mask and oxygen supply ready.
13. Allow head to deliver passively. Control rate of delivery by placing palm of one hand over occiput. Protect perineum with pressure from the other hand.
14. If amniotic sac is still intact, gently twist or tear the membrane. Note presence or absence of meconium.
 - a. If meconium is present in amniotic fluid: See **Meconium-Stained Amniotic Fluid SOG**.
15. Once the head is delivered, allow it to passively turn to one side. This is necessary for the shoulders to deliver. Support the baby's head. Suction the mouth and nose with bulb syringe as soon as head delivers.
16. Feel around the infant's neck for the umbilical cord. If the cord is wrapped around the baby's neck, place your finger under the cord and gently slip the cord over baby's head. If the cord is tightly wrapped, place the middle and index finger into the vagina and push the infant up to relieve pressure on the cord.
17. To facilitate delivery of the upper shoulder, gently guide the head downwards. Once the upper shoulder is delivered, support and lift the head and neck slightly to deliver the lower shoulder. Never pull on the baby or push on the fontanel's.
18. Support the head, trunk, and legs. The rest of the baby should deliver quickly with one contraction. Firmly grasp the infant as it emerges, since baby will be wet and slippery.
19. Keep the infant level with the vagina until the umbilical cord stops pulsating and the umbilical cord is clamped and tied.

20. Document the exact time of the baby's birth.
21. Clamp or tie the umbilical cord.
22. For newborn care, proceed to the **Routine Neonatal Care SOG**.
23. Monitor the mother's vital signs every 5 minutes.
24. Place a sanitary pad over the mother's vagina.
25. If perineum is torn and/or bleeding, apply gentle direct pressure with sanitary pads, and have patient bring her legs together. Apply cold pack (ice bag) to perineum (over pad) for comfort and to reduce swelling.
26. Monitor continued contractions, this signals delivery of the placenta which is to be placed in a bag and given to the ALS unit. The placenta should deliver within 20-30 minutes. If the placenta delivers, collect it in the bag from the OB kit and transport it to the hospital for inspection. Do NOT pull on cord to facilitate delivery of the placenta. DO NOT DELAY TRANSPORT FOR DELIVERY OF PLACENTA.
27. Gently massage the top of the uterus (fundus) until firm.
28. Breast feeding may increase uterine tone. Allow newborn to nurse.

ILS/ALS

29. Establish an IV of **NORMAL SALINE** or **LACTATED RINGERS** at TKO rate.
30. If blood loss is greater than 500ml and/or the mother exhibits signs of shock, administer a bolus of **NS** or **LR** 20ml/kg IV. Treat per **Hemorrhagic Shock SOG**.

DELIVERY COMPLICATIONS

Although most babies are born without difficulty, complications may occur.

FR/BLS/ILS/ALS

1. This SOG is to be used in conjunction with the **Emergency Childbirth** SOG.
2. Delivery complications are to be considered LOAD-AND-GO SITUATION.
3. Transport the mother supine, but with pillows or blankets beneath her right side, tilting her to her left.

Cephalopelvic Disproportion (“CPD”)

4. The fetal head is too large or mother’s pelvis is too small to permit normal birth.
5. The mother is often a primigravida & experiencing strong, frequent contractions for a long time.
6. Risks: uterine rupture, fetal demise.
7. The treatment is rapid transport. This infant must be delivered by C-section.

Shoulder Dystocia

4. The baby’s shoulders are too wide to allow delivery.
5. The head delivers normally, but then pulls back tightly against the mother’s perineum.
6. Risks: Brachial plexus injury, fractured clavicle, fetal death from cord compression
7. Place the mother on her back with her knees pulled up to her shoulders and reattempt delivery.
8. After the head delivers, attempt to rotate the baby’s shoulder girdle to align with the vaginal opening (anterior-posterior long axis). Attempt to *gently* guide the fetal head downward to allow the top (anterior) shoulder to deliver.
 - a. Application of maternal suprapubic pressure may help.
9. The posterior shoulder should then deliver without resistance.
10. If unsuccessful, return to supine position. Support the infant’s head. If the umbilical cord is seen, attempt to minimize pressure on it. (Treat like a prolapsed cord.)

Limb Presentation

4. A shoulder, arm, or leg is the presenting part.
5. The baby is lying “sideways” in the uterus.

6. Rare, except in second twins.
7. Avoid touching the limb (doing so may stimulate the infant to gasp).
8. Do not pull on the extremity, and do not attempt to push the limb back into the vagina.
9. If the umbilical cord is seen, attempt to minimize pressure on it. (Treat like a prolapsed cord.)
10. The treatment is rapid transport. This infant must be delivered by C-section.

Breech Birth

4. Breech birth complication is one in which the fetal buttocks or lower extremities are low in the uterus and are the first to be delivered. The largest part of the fetus (the head) is delivered last.
5. Risk: fetal asphyxia (suffocation).
6. Attempt rapid transport.
7. If field delivery will occur before hospital arrival:
 - a. *Elevate the mother's hips* by placing a pillow or blankets beneath her.
 - b. *Allow the fetus to deliver spontaneously up to the level of the umbilicus.*
 - c. Gently *extract the legs downward* after the buttocks are delivered.
 - d. After the infant's legs are clear, support the baby's body.
 - e. Gently *rotate the fetus* to align the shoulders in the anterior-posterior direction. Continue with gentle traction until the axilla is visible.
 - f. Gently *guide the infant upward to allow delivery of the posterior shoulder.*
 - g. Gently *guide the infant downward to allow delivery of the anterior shoulder.*
 - h. Ensure that the fetal face or abdomen is turned away from the maternal symphysis pubis.
8. The head often delivers without difficulty after shoulder delivery – avoid excessive traction or manipulation of the head or spine. Gentle maternal suprapubic pressure may help.
9. NEVER ATTEMPT TO PULL THE INFANT FROM THE VAGINA BY THE LEGS OR TRUNK.
10. If the head does not deliver immediately, take action to prevent suffocation:
 - a. Place a gloved hand in the vagina, with the palm toward the fetal face.
 - b. Form a “V” with the index and middle fingers on either side of the nose.
 - c. Gently push the vaginal wall away from the fetal face until the head is delivered or the infant can be delivered by emergency C-section.

Prolapsed Cord

4. Prolapsed cord may occur after the amniotic sac has ruptured. The cord slips down into the vagina or presents externally after the amniotic membranes have ruptured. The umbilical cord,

rather than the head may be the first presenting part. In this situation the umbilical cord may get compressed against the walls of the vagina by the pressure of the infants head. As a result the infant's supply of oxygenated blood can be cut off. This is a true emergency.

5. Risk: the umbilical cord is compressed against the presenting fetal part, causing anoxia.
6. Predisposing factors: breech presentation; Premature Rupture Of Membranes; large fetus; multiple gestation; long cord; preterm labor.
7. Place the mother on her back with her knees pulled up to her shoulders. Elevate her hips.
8. Instruct the mother to “pant” with each contraction to prevent bearing down.
9. To prevent fetal asphyxia, if the cord is visible or palpable in the vagina:
 - a. Assess fetal viability by checking for a palpable pulse in the cord.
 - b. With a gloved, hand, gently push the fetus back into the vagina and relieve pressure on the cord. If the cord spontaneously retracts, do not attempt to reposition it.
 - c. This position must be maintained en route and until the infant can be delivered by emergency C-section.
10. DO NOT push the cord back into the vagina.
11. The Treatment is rapid transport. This infant must be delivered by C-section.

Multiple Gestation

4. Increased risk of complications: prematurity, Premature Rupture Of Membranes, placental abruption, postpartum hemorrhage, abnormal presentation (up to 50%).
5. Mothers without prenatal care may be unaware of their multiple pregnancies.
6. 1st twin delivery is identical to that of a single gestation pregnancy with the same presentation.
7. Uterine contractions usually resume within 5-10 minutes, and delivery of the second fetus usually occurs within 30-45 minutes.
8. Both twins usually deliver before the placenta(s) deliver.
9. Infants of multiple births are smaller and more prone to hypothermia, hypoxia, hypoglycemia, sepsis and other illnesses.
10. Postpartum maternal hemorrhage may be severe, requiring vigorous fluid resuscitation and uterine massage.

Uterine Inversion

Uterine Inversion is an uncommon complication of delivery where the uterus turns “inside out”. It is most commonly caused by providers placing excessive traction on the cord or pressure on the

uterine fundus. It may also occur spontaneously with forceful contraction, or after maternal cough or sneeze. The signs and symptoms of uterine inversion are postpartum hemorrhage and sudden, severe lower abdominal pain.

1. Do NOT attempt to remove the placenta.
2. If the uterus is freshly inverted AND the placenta has already separated, apply pressure with gloved fingertips and palm and push the uterine fundus upward through the cervical canal, in the long axis of the vagina.
3. If this is ineffective, or if the placenta has not already separated, cover all protruding tissues with moist, sterile dressings and transport; treatment will require sedation.
4. Do NOT attempt to replace the uterus that has been inverted for a prolonged period of time; if in doubt, cover all tissues with moist, sterile dressings and transport.
5. Treat for hemorrhagic shock, as indicated.

ROUTINE NEONATAL CARE

The majority of newborn infants require no resuscitation beyond maintenance of temperature, mild stimulation, and suctioning of the airway.

FR/BLS/ILS/ALS

1. If meconium is NOT present, suction the infant's mouth and nose after the head is delivered with a bulb syringe.
2. If the infant is born with meconium, proceed immediately to the **Meconium-Stained Amniotic Fluid** SOG below.
3. Document the time of delivery.
4. Hold the infant at the level of the mother's hips in a 15 degree head down position.
5. Dry and warm the neonate; wrap in clean, dry blankets or cloths.
6. Stimulate the infant by gently rubbing the back or feet.
7. One team member should note the 1 minute and 5 minutes APGAR scores. Do NOT interrupt care or resuscitation of the infant to obtain the APGAR score.
8. Wait for cord pulsations to stop. Clamp cord 6-8 inches from infant's body. Cut between clamps with sterile knife or scissors. Check the cord ends for bleeding. If no sterile implement is available, leave cord clamped, but not cut.
9. After delivery, evaluate the baby for:
 - a. ?Full-Term gestation
 - b. ?Crying or breathing
 - c. ?Good muscle tone
10. If the answer to all 3 is "yes", then no resuscitation is needed.
11. If the answer to *any* is "no", then proceed to the **Neonatal Resuscitation** SOG.
12. Place infant on mother's abdomen for transport.

NEONATAL RESUSCITATION

FR/BLS

1. Assess respirations (apnea, gasping or labored or unlabored breathing) AND heart rate (> or < 100 bpm)
2. Is the heart rate < 100, and/or is the baby gasping or apneic?
 - a. If not, is labored breathing or persistent *central* cyanosis present?
 - i. If so, suction the airway, monitor pulse oximetry, and provide blowby oxygen.
 - ii. If not, keep the baby with her mother.
 - b. If yes, assist ventilations with a bag valve mask.
3. After 30 seconds of assisted ventilation, reassess heart rate and respiratory effort.
 - a. If the baby is now breathing normally and the heart rate is > 100bpm, cease assisted ventilations. Provide blowby oxygen.
 - b. If the baby is unchanged, continue assisted ventilations.
4. If the heartrate has further deteriorated and is < 60, begin chest compressions.
 - a. Use a 3:1 compression: ventilation ratio.
 - b. Compress approximately 1/3 the anterior-posterior diameter of the chest.
 - c. The 2 thumb-encircling hands technique is preferred.
5. After 30 seconds, reassess.
 - a. If the heart rate is above 60, continue assisted ventilations until the baby is breathing normally and the heart rate >100. Then provide blowby oxygen.

ILS

6. Note: Intubation may be considered but can be difficult in these newly born patients. Do NOT spend lengthy amounts of time attempting intubation. Continue to support the newborn with a BVM.

ALS

7. If the heart rate remains < 60:
 - a. Continue chest compressions.
 - b. Give **EPINEPHRINE 1:1,000** 0.01-0.03 mg/kg IV or 0.05 – 0.1 mg/kg ET. (Use a Broselow tape or similar device to assist.)
8. Apply the cardiac monitor.
9. Continue to reassess the infant every 30 seconds, and continue care as above.
10. Determine blood glucose level by heel stick.
11. Special Considerations per Medical Control:

- a. For blood glucose level < 40, **DEXTROSE D12.5%** 1-2 ml/kg IV/IO.
- b. Fluid Bolus **NS** or **LR** 10ml/kg for suspected hypovolemia (most often seen in setting of maternal hemorrhage).
- c. **NALOXONE** 0.1 mg/kg IV/IO/ET for suspected or confirmed recent maternal narcotic use.

MECONIUM-STAINED AMNIOTIC FLUID

Meconium stained amniotic fluid indicates fetal distress prior to delivery. It is seen as thin greenish to thick fluid within the amniotic fluid when membranes rupture or the infant delivers.

FR/BLS

1. If the baby is active and vigorous (strong respiratory effort, good muscle tone, heart rate > 100), suction the mouth and nose with a bulb syringe. An 8-10F soft suction catheter may be utilized for deeper suctioning, but attempts should be limited to 5 seconds. Then proceed to the **Neonatal Resuscitation SOG**.
2. If the baby is NOT active and vigorous and if ILS or ALS is not immediately present:
 - a. Suction as directed above.
 - b. Initiate assisted ventilations with BVM at 40-60 breaths per minute.
 - c. Proceed to the **Neonatal Resuscitation SOG**.

ILS/ALS

3. For the active and vigorous baby, direct laryngoscopy is *not* indicated.
4. If the baby is NOT active and vigorous:
 - a. Delay drying and stimulating the baby.
 - b. Intubate the baby with a 3.0-4.0 uncuffed ET tube (2.5 for preemie) and a straight laryngoscope blade. Note the presence or absence of meconium at the level of the vocal cords.
 - c. Attach suction to the endotracheal tube and suction as the endotracheal tube is withdrawn. If a suction attachment for the endotracheal tube is not available, place a soft suction catheter through the endotracheal tube and suction as it is withdrawn.
5. Refer to the **Deep Tracheal Suctioning of the Neonate** Procedure.
6. Monitor the infant's heart rate. IF the heart rate is not deteriorating, this procedure may be repeated once more, as needed. If the endotracheal tube becomes clogged with meconium or is heavily contaminated, replace it.
7. Once the meconium has been satisfactorily suctioned or the baby begins to deteriorate, proceed immediately to the **Neonatal Resuscitation SOG**.
8. If intubation cannot be completed in a rapid manner, suction with an 8-10F soft suction catheter, and initiate assisted ventilations. Do not spend long periods of time attempting to intubate the neonate.

Section IX: Environmental Emergencies

FROSTBITE

Frostbite typically occurs in exposed extremities because these areas are further from the central circulation. Fingers, toes, the face, ears, and nose are frequent frost bite sites.

Mild or superficial frostbite is limited to the skin and subcutaneous tissues, and will appear as:

1. Blanching of the skin (after palpation of the skin, color does not return)
2. Feeling of cold, pain, or loss of feeling and sensation to the injured area.
3. Skin remains soft.
4. If thawed, tingling sensation is present.

Deep frostbite usually involves the hands or feet. The affected area will appear as:

1. White, waxy skin.
2. Firm to frozen feeling upon palpation.
3. Swelling may be present.
4. If thawed, may appear flushed with areas of purple and blanching.

FR/BLS/ILS

1. **General Medical Assessment & Initial Medical Care** and/or **Initial Trauma Care** (as applicable).
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Assess for and treat hypothermia per **Hypothermia SOG**.
4. Remove the patient from the cold.
5. Remove jewelry.
6. Rewarm the injured part with body heat.
 - a. If the ear, nose, or foot is frostbitten, apply firm, steady pressure against the area with a warm hand.
 - b. If the hand is frostbitten, have the patient insert the hand into his/her armpit.
7. Do not use radiant or dry heat to rewarm. Do not use chemical warmers.
8. If available, the involved extremity may be placed in warm water.
9. As thawing occurs, the injured area may:
 - a. Become red.
 - b. Itch.
 - c. Tingle.
 - d. Become painful.

10. **DO NOT** rub or massage a frostbitten area. This can cause further damage.
11. **DO NOT** attempt to rewarm in the field if there is any possibility of refreezing. **LEAVE THE EXTREMITY FROZEN.**
12. Cover loosely with dry sterile dressings. Pad liberally, including between affected fingers or toes to prevent them from rubbing together. Do not rupture blisters, apply ointments or tight bandages.
13. Handle the affected area gently. Do not allow the patient to walk on frostbitten feet/toes.

ALS

14. Consider **DIPHENHYDRAMINE**:
 - a. Adults: 25-50mg IV/IM.
 - b. Peds: 1mg/kg IV/IM.
15. Treat pain per the **Pain Control SOG**.

HYPOTHERMIA

FR/BLS

1. Remove the patient from the cold environment.
2. **General Medical Assessment & Initial Medical Care** or **Initial Trauma Care** (as applicable).
3. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
4. Remove wet clothing, and dry the patient thoroughly.
5. Do not allow the patient to exert themselves.
6. Keep the patient NPO.
7. Transport patient very gently to avoid precipitating Ventricular Fibrillation. Maintain in supine position.
8. Check blood glucose level if available. Treat per **Diabetic/Glucose Emergencies** SOG.
9. Mild Hypothermia (Temperature 93.2 F): Passive rewarming with blankets should suffice.
10. Moderate/Severe Hypothermia (Temperature < 93.2 F): In addition to passive rewarming, begin active external warming by applying hot packs wrapped in towels to axilla, groin, neck, thorax.
11. In the event of cardiac arrest, see **Pulseless Patients** SOG.

ILS

12. Obtain IV of **Normal Saline** TKO.
13. For Severe Hypothermia (Temperature < 86 F), initiate core rewarming with *warmed* **NORMAL SALINE** 20 ml/kg IV bolus.

ALS

14. For cardiac arrest, follow the **Pulseless Patients** SOG and rhythm-specific SOG.
15. Withhold all medications except **EPINEPHRINE** and **VASOPRESSIN** until temperature > 86 F.

HEAT EMERGENCIES

Heat Cramps

Heat cramps are muscle cramps that are usually limited to the patient's legs and abdominal area. The muscle cramps are a result of fluid and salts being lost from the body through sweating.

FR/BLS

1. Move the patient to a cool environment. Remove excess clothing.
2. **General Medical Assessment & Initial Medical Care.**
3. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
4. Assess for the following:
 - a. Cramping of legs and abdomen
 - b. General Weakness
 - c. Muscle cramps
 - d. Respiratory rate may be normal or rapid
 - e. Pulse rate may be normal or rapid
 - f. Profuse sweating
 - g. Dizziness
 - h. Nausea
 - i. Temperature normal
5. Do not massage cramping muscles. This may aggravate pain.
6. If patient is alert and is not nauseated, provide a sports drink, if available. Do not give the patient any caffeinated or alcohol-containing beverages.

ILS

7. Consider initiating an IV of **NORMAL SALINE** and administering 20 ml/kg IV bolus. Contact Medical Control if uncertainty exists about indication.

ALS

8. Treat pain per the **Pain Control SOG**.

Heat Exhaustion

Heat exhaustion is the term used when the circulatory system fails to adequately maintain normal function due to the excessive loss of fluids and salts from the body.

FR/BLS

1. Move the patient to a cool environment. Remove excess clothing.
2. **General Medical Assessment & Initial Medical Care.**
3. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
4. Assess for the following:
 - a. Periods of faintness
 - b. Possible altered level of consciousness
 - c. Headache, dizziness
 - d. Weakness, fatigue
 - e. Nausea
 - f. Abdominal or extremity cramping
 - g. Profuse sweating
 - h. Pale & clammy skin
 - i. Rapid & weak pulse
 - j. Temperature may be normal or elevated (<104)
 - k. Tachycardia (response may be lessened by some heart meds)
 - l. Blood pressure falls when patient sits or stands
5. Give nothing by mouth.
6. Place flat. Place in Trendelenburg if signs of shock are present.
7. Cool patient by fanning, being careful not to chill the patient and induce shivering.

ILS

8. Initiate an IV of **NORMAL SALINE** and administer 20 ml/kg IV bolus.

ALS

9. Treat nausea as needed per the **General Illness SOG**.

Heat Stroke

Heat stroke is a true life-threatening emergency. It is a result of the body's inability to cool itself. This causes the body's core temperature to rise. The body temperature can rise so much that brain damage can occur.

FR/BLS

1. Move the patient to a cool environment. Remove excess clothing.

2. **General Medical Assessment & Initial Medical Care.**
3. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
4. Assess for the following:
 - a. Deep then shallow breathing.
 - b. Rapid strong pulses, followed by rapid weak pulses.
 - c. Skin may be moist and pale or dry and hot.
 - d. Blood pressure is variable.
 - e. Confusion, delirious or comatose: Alterations in level of consciousness are the earliest signs of heat stroke.
 - f. A temperature greater than 104°F is suspicious of heat stroke in association with above symptoms. Note that a temperature this high need not be present. Altered level of consciousness (CNS impairment) signifies heat stroke!
5. Give nothing by mouth.
6. Place flat. Place in Trendelenburg if signs of shock are present.
7. Initiate rapid cooling.
 - a. Apply cold packs to lateral chest wall, groin, axilla, carotid arteries, temples, behind knees.
 - b. Sponge or mist with cool water, and fan or cover body with wet sheet and fan body.
8. Discontinue cooling if shivering occurs.
9. Check blood glucose. Treat per **Diabetic/Glucose Emergencies** SOG as indicated.

ILS

10. Initiate an IV of **NORMAL SALINE** and administer 20 ml/kg IV bolus.

ALS

11. Treat nausea as needed per the **General Illness** SOG.
12. Treat seizures as needed per **Seizure** SOG.
13. Contact Medical Control to consider **DIAZEPAM** for shivering.

NEAR DROWNING

Near drowning results from submersion in water or other liquid for a period of time that does not result in irreversible death. The time interval of submersion that causes irreversible death is dependent on several factors such as: temperature of the water, the health of the victim and any trauma suffered during the event. No good evidence exists to define when providers should switch from a rescue to a recovery mode. In general, patients should be resuscitated if the water temperature is less than 70 F and the victim has been in the water less than 60-90 minutes. Call Medical Control for direction immediately if uncertainty exists about whether to initiate resuscitative efforts.

Initial care of the drowning victim should begin in the water with rescue breathing if safety allows.

FR/BLS

1. Be aware of personal safety if victim is still in water.
2. **General Medical Assessment & Initial Trauma Care.**
3. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
4. Initiate ventilations while patient is still in the water if possible.
5. Remove the patient from the water as soon as possible.
6. Note: Patient is at high risk for vomiting.
7. Assess for hypothermia. Treat per **Hypothermia** SOG.
8. Handle patient gently.
 - a. Remove wet clothing.
 - b. If breathing adequately, provide high flow oxygen by nonrebreather.
9. Transport as soon as possible.

ILS

10. Obtain IV of **NORMAL SALINE** or **LACTATED RINGERS** at TKO.
11. Obtain red or yellow top blood tube for hospital. Label with patient name, date of birth (if available), time drawn and initial.

ALS

Based On IDPH Region IV Standard Operating Guidelines

10. Apply cardiac monitor and pulse oximetry.

11. Follow appropriate SOG, i.e. **Pulseless Patients**, **Respiratory Distress**, Trauma SOGs, etc.

FIREFIGHTER REHABILITATION FLOW CHART

EMS crews will increasingly be called upon to assist with firefighter rehabilitation. It is the responsibility of the Authority Having Jurisdiction (fire department) to assign a rehab sector, send fire personnel to the rehab sector, and supply sports drinks, etc.

FR/BLS/ILS/ALS

1. Log personnel into the rehabilitation sector. Document the firefighter's name and "Time In".
2. Have firefighter remove protective equipment. (Be sensitive to environment and sheltering.)
3. Obtain a baseline assessment:
 - a. Mental status. *
 - b. Skin condition.
 - c. Vital Signs: Pulse, BP, Respirations, Temperature.
 - d. Check Carboxyhemoglobin level if Rad-57 available. Refer to the **HAZARDOUS MATERIALS EXPOSURE – Carbon Monoxide SOG** for direction.
4. Does the firefighter meet the following medical assessment criteria:
 - a. Normal mental status
 - b. Heart rate < 110
 - c. Systolic Blood Pressure < 150
 - d. Diastolic Blood Pressure < 100
 - e. Respiratory Rate < 26
 - f. Temperature < 100.6 F
5. If yes:
 - a. Hydrate orally with 16 oz. of fluid.
 - b. Implement passive cooling measures with sensitivity to environment/shelter.
 - c. Rest for 10 minutes.
 - d. If the medical assessment remains within normal limits, release from rehab after 10-minute rest.
6. If the medical assessment is NOT within normal limits:
 - a. Implement active cooling measures with sensitivity to environment/shelter (cold packs, fans, etc.).
 - b. Hydrate orally with 32oz. of fluid.
 - c. Rest for 20 minutes.
 - d. Reassess the firefighter every 5 minutes until baseline assessment returns to normal.
 - e. If the medical assessment is within normal limits, release from rehab after 20-minute rest.
7. If, after 20-minute rest, the medical assessment is still NOT within normal limits:
 - a. Continue active cooling.
 - b. Continue hydration with a sports drink.
 - c. Rest for 10 additional minutes.

- d. Assess blood glucose level.
 - e. Reassess the firefighter every 5 minutes until baseline assessment returns to normal.
 - f. If the medical assessment is within normal limits, release from rehab after total of 30-minute rest.
8. If the medical assessment is NOT within normal limits:
 - a. Follow the appropriate SOG.
 - b. Transport to the ED for evaluation.
 - c. Notify the Incident Commander with the firefighter's name and agency.
 9. Documentation of firefighter name and time in/time out should be submitted to the Incident Commander at the conclusion of the incident.
 10. Region IV patient report forms should be completed when a firefighter becomes a patient. This includes:
 - a. Any patient transported. The following must be transported unless the patient refuses, in accordance with System Policies:
 - i. Patients with altered mental status. *
 - ii. Chest pain.
 - iii. Dyspnea.
 - iv. Heart rhythm other than Normal Sinus Rhythm or Sinus Tachycardia.
 - v. Syncope.
 - vi. Patient not tolerating clear liquids.
 - vii. Patient request.
 - b. Any patient that EMS providers believe should be transported to the hospital but refuses.
 - c. Any patient with signs or symptoms of carbon monoxide poisoning, heat emergencies, moderate to severe hypothermia, etc.
 - d. Any patient with an abnormal medical assessment after a total of 30 minutes in rehabilitation. (This includes refusal forms for those firefighters refusing transport.)

*Transport to the hospital is mandatory for altered mental status at any point in time.

LIGHTNING STRIKES AND ELECTROCUTION

Household electricity is Alternating Current (AC). It causes tetanic skeletal muscle contractions, “locking” the victim to the source of the electricity. This can lead to prolonged exposure and increase the likelihood of current flow through the heart during the relative refractory period, precipitating ventricular fibrillation.

Lightning is an instantaneous, massive Direct Current (DC) shock, simultaneously depolarizing the entire myocardium. In many cases, intrinsic cardiac automaticity may spontaneously restore organized cardiac activity and a perfusing rhythm. However, concomitant respiratory arrest due to thoracic muscle spasm and suppression of the respiratory center may continue after ROSC. Unless ventilation is supported, a secondary hypoxic cardiac arrest will develop.

Victims are most likely to die of lightning injury if they experience immediate respiratory or cardiac arrest and no treatment is provided. Patients who do not suffer respiratory or cardiac arrest, and those who respond to immediate treatment, have an excellent chance of recovery. Therefore, when multiple victims are struck simultaneously by lightning, rescuers should give the highest priority to patients in respiratory or cardiac arrest.

FR/BLS

1. **Reverse Triage.** In the event of multiple victims, evaluate and treat those in cardiac or respiratory arrest first.
2. **General Medical Assessment & Initial Trauma Care.**
3. Address the patient’s Circulation, Airway, Breathing, and Disability as per Basic Concepts.
4. Implement **Spinal Motion Restriction.**
5. Follow the appropriate SOG(s) (TRAUMA SOGs, **Pulseless Patients**, etc.).

ILS

6. Start an IV of **NORMAL SALINE** TKO.
7. If signs of shock are present, give a bolus of **NORMAL SALINE** 20ml/kg IV/IO.

ALS

8. Cardiac Monitor
9. Consider pain control per the **Pain Control** SOG.

VENOMOUS SNAKE BITE

FR/BLS

1. General Medical Assessment & Initial Medical Care.

NOTE: Take care of any immediate threats. Make sure the offending snake is not close by and remember that dead snakes may still have a bite reflex.

2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.

NOTE: Identify the snake without endangering yourself, like a cell phone photo or two. And if you have that capability, take a picture of the bite site and note the time, then repeat if there is change

3. Determine the time of the bite if possible. Mark a spot above and below the bite and measure the circumference. Mark the leading edge of any bruising and/or swelling and note the time.

4 Provide pressure immobilization to the extremity. Wrap an ACE wrap, if available, *around the entire length* of the bitten extremity. The bandage should be comfortably tight and snug but allow a finger to be slipped under it. If a wrap is unavailable, apply a constricting band above the bite site. Again, the bandage should be comfortably tight and snug but allow a finger to be slipped under it. Splint the extremity. Check for good capillary refill and distal pulse/motor/sensory function after immobilization.

5. Place the extremity below heart level (neutral position).

ILS

6. Initiate an IV of **NORMAL SALINE** at a TKO rate.

7. If signs of shock are present, administer a **NORMAL SALINE** bolus 20ml/kg IV.

ALS

8. Cardiac monitor, pulse oximetry capnography preferred if available.

OTHER BITES

FR/BLS/ILS/ALS

1. **General Medical Assessment & Initial Trauma Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Irrigate animal bite sites with **NORMAL SALINE**. Do not irrigate human bites, particularly those associated with alleged sexual assault where DNA swabs may be needed. **TAKEN FROM page 118**
4. Splint as needed.
5. Control bleeding.
6. For serious bite wounds, follow the appropriate SOG.

ALS

3. Consider pain control per **Pain Control SOG**.

Section X: Trauma

INITIAL TRAUMA ASSESSMENT

FR/BLS/ILS/ALS

1. Scene Survey
 - a. Identify possible hazards.
 - b. Assure safety for patient and responder.
 - c. Observe for mechanism of injury/nature of illness.
 - d. Note anything suspicious at the scene, i.e., medications, household chemicals, other ill family member.
 - e. Assess any discrepancies between the history and the patient presentation.
 - f. Initiate appropriate body substance isolation (BSI) precautions.
 - g. Assess the number of patients. If appropriate, begin triage, and initiate MCI procedures.
 - h. Assess need for additional resources.
2. Initial Assessment – Assess the patient’s Circulation, Airway, Breathing, and Disability.
 - a. Refer to the C, A, B, and D Basic Concepts, and correct life-threatening problems as identified.
 - b. Expose and Examine
 - i. Expose the patient as appropriate based on age and severity of injury.
 - ii. Initiate measures to prevent heat loss, and keep the patient from becoming hypothermic.
 - c. Identify life-threatening hemorrhage. Refer to the **Hemorrhagic Shock** SOG as indicated.
 - d. Check for Medic Alert tags.
3. Form a general impression of the patient’s condition, and identify priority transports.
4. Institute **Spinal Motion Restriction**, as appropriate.
5. Perform a **RAPID TRAUMA SURVEY**:
 - a. Inspect Head and Neck
 - i. Major Facial Injuries, Bruising, Swelling, Penetrations, Subcutaneous Emphysema.
 - ii. Neck Vein Distention Tracheal Deviation.
 - b. Inspect Chest
 - i. Asymmetry, Contusions, Penetrations, Paradoxical Motion, Instability, Crepitation
 - ii. Breath Sounds
 1. If unequal; Percussion (ILS, ALS)
 - iii. Heart Tones (ILS, ALS)
 - c. Abdomen
 - i. Bruising, Penetration/Evisceration, Tenderness, Rigidity, Distention
 - d. Pelvis
 - i. Tenderness, Instability, Crepitation
 - e. Lower/Upper Extremities
 - i. Swelling, Deformity, Instability, Motor and Sensory Function.
 - f. As you place patient on backboard, examine posterior.

- i. Penetrations, Deformity, Presacral Edema
6. Identify Load and Go Patients. Transfer to ambulance to complete exam.
 7. Vital signs:
 - a. Respirations
 - b. Pulse
 - c. Blood pressure
 8. Brief Neuro Exam:
 - a. Pupils
 - b. Glasgow Coma Scale Score
 9. As time allows, perform a **SECONDARY SURVEY**.
 - a. Patient History – Acquire during/incorporate into physical exam.
 - b. Signs & Symptoms as they relate to the chief complaint. Include pertinent positives and negatives.
 - Onset
 - Provocation
 - Quality
 - Radiation
 - Symptoms
 - Time
 - c. Allergies to medications, foods, environment.
 - d. Medications: prescribed, over-the-counter, compliance with prescribed dosing regimen, time, date and amount of last dose.
 - e. Past Medical History
 - Pertinent medical or surgical problems.
 - Preexisting diseases/chronic illness.
 - Previous hospitalizations.
 - Currently under medical care?
 - For infants, obtain a neonatal history (gestation, prematurity, congenital anomalies, was infant discharged home at the same time as the mother).
 - f. Last oral intake of liquid/food ingested, Last menstrual period (when applicable).
 - g. Events leading to present condition.
 - Associated factors such as toxic inhalants, drugs, alcohol.
 - Injury scenario and mechanism of injury.
 - Treatment given by caregiver.
 - h. Assess pain using 0-10 scale or Wong-Baker faces.
 - i. Vital signs:
 - Respirations
 - Pulse
 - Blood pressure
 - Pulse oximetry, if available.

- Cardiac Monitor, if appropriate.
- Blood Glucose, if appropriate.
- j. Head
 - Pupils, Battle's Sign, Raccoon eyes, Drainage; Deformities, Contusions, Abrasions, Penetrations, Burns, Tenderness, Lacerations, Swelling (DCAP-BTLS)
- k. Chest
 - Asymmetry, Paradoxical Motion, DCAP-BTLS; Tenderness, Instability, Crepitation (TIC)
 - Breath Sounds
 - 1. If unequal; Percussion (ALS)
 - Heart Tones (ALS)
- l. Abdomen
 - DCAP-BTLS; Rigidity, Distention
- m. Pelvis
 - DCAP-BTLS
- n. Lower/Upper Extremities
 - DCAP-BTLS; TIC; PMS
- o. Posterior
 - Examine only if not done in ITLS Primary Survey
 - DCAP-BTLS

INITIAL TRAUMA CARE

FR/BLS

1. Conduct an **Initial Trauma Assessment**.
2. Support Circulation, Airway, and Breathing as outlined in the Basic Concepts within the individual provider's scope of practice.
 - a. Keep NPO
 - b. Keep warm.
 - c. Maintain Spinal Motion Restriction, as appropriate.
 - d. Control hemorrhage as per **Hemorrhagic Shock SOG**.
 - e. If evidence of shock, place in Trendelenburg position.
3. If, in the judgment of the provider, the patient is at risk of cardiac or respiratory compromise, administer **OXYGEN**:

Adult:

Stable: 2-6 LPM by nasal cannula.

Unstable: 100% **OXYGEN** by non-rebreather mask.

Pediatric:

Stable: blow-by **OXYGEN** as tolerated.

4. For critical trauma patients, apply high flow oxygen by NRB.
5. Follow the appropriate SOG(s). If none apply, contact Medical Control for further direction.
6. Obtain ALS intercept, as necessary.
7. Contact Medical Control.
8. Complete all documentation as required. Justification for on-scene time >20 minutes for medical patients and >10 minutes for trauma patients should be included in the narrative.

ILS

9. If, in the judgment of the provider, the patient is at risk of cardiac or respiratory compromise:
 - a. Establish an IV of **NORMAL SALINE** or **LACTATED RINGERS** at a TKO rate (30 ml/hr for adults, 20ml/hr for pediatric patients).

ALS

10. If, in the judgment of the provider, the patient is at risk of cardiac or respiratory compromise:
 - a. Monitor cardiac rhythm and pulse oximetry.
 - b. Utilize capnography, if available, on any patient at risk for developing hypoventilation.

CRITICAL TRAUMA/LOAD AND GO

There are certain situations that require hospital treatment within minutes if the victim is to have any chance for survival. The primary survey is designed to identify these situations. When these situations are recognized, the victim should be loaded immediately onto a backboard, transferred to the ambulance, and transported rapidly with lights and sirens.

There are circumstances that demand hospital care to allow stabilization of a patient. It may be necessary for the prehospital provider to abridge certain procedures described in Region 4 Standard Operating Guidelines. When critical circumstances require urgent transport, it is necessary to document thoroughly the rationale for leaving the scene and deviating from Region 4 Standard Operating Guidelines. The emphasis is on rapid patient packaging and limited on-scene times as possible. Prolonged extrication times greater than 10 minutes should be accounted for in the patient documentation.

Critical trauma patients include, but are not limited to:

1. Traumatic Cardiopulmonary Arrest.
2. Airway obstruction
3. Conditions resulting in possible inadequate breathing:
 - a. Respiratory rate <10 or >29 (<20 in infants less than one year of age).
 - b. Large open chest wound e.g., sucking chest wound.
 - c. Flail chest.
 - d. Tension pneumothorax.
 - e. Major blunt chest injury.
4. Conditions resulting in possible inadequate circulation:
 - a. Systolic blood pressure ≤ 90 (Pediatrics ≤ 80).
 - b. Hemorrhagic shock.
 - c. Injuries that may rapidly lead to shock such as:
 - Tender, distended abdomen.
 - Pelvic instability.
 - Two or more proximal long-bone fractures.
5. Impaired neurologic function:
 - a. GCS < 14 Glasgow Coma Scale.
 - b. Decreased level of consciousness.
 - c. Open or depressed skull fracture.
 - d. Limb paralysis and/or sensory deficit above wrist & ankle.
6. Other serious injuries:
 - a. All penetrating injuries to head, neck, torso, groin, and extremities proximal to elbow and knee.
 - b. Two or more body regions with a potential life or limb threat.
 - c. Combination trauma with 20% or greater TBSA burned.

- d. Crushed, degloved or mangled extremity.
 - e. Amputation proximal to wrist and ankle.
7. Concerning Mechanism of Injury, such as:
- a. Falls
 - Adults: > 20 ft. (one story is equal to 10 ft.)
 - Children: > 10 ft. or 2-3 times the height of the child
 - b. High-risk auto crash
 - Intrusion: > 12 in. occupant site; > 18 in. any site
 - Ejection (partial or complete) from automobile
 - Death in same passenger compartment
 - Vehicle telemetry data consistent with high risk of injury
 - c. Auto v. pedestrian/ bicyclist thrown, run over, or with significant (>20 mph) impact
 - d. Motorcycle crash > 20 mph

TRAUMATIC ARREST

FR/BLS

1. Provide Initial Medical and Trauma Care.
2. EMS providers shall withhold CPR on apneic and pulseless patients with:
 - a. Evidence of significant time lapse since pulselessness.
 - Dependent lividity.
 - Rigor mortis.
 - Decomposition.
 - b. Penetrating or blunt trauma with injuries obviously incompatible with life.
 - Decapitation.
 - Incineration.
 - Obvious destruction of brain or intra-thoracic organs.
 - c. All other blunt trauma patients found apneic and pulseless without organized ECG activity.
 - d. All other penetrating trauma patients found apneic and pulseless without organized ECG activity or papillary reflexes.
 - e. Patients submerged greater than 30 minutes in warm water or greater than 90 minutes in cold water. (An exception is a person trapped with a potential air source such as diver.)
 - f. These patients do not require contact with Medical Control.
3. When in doubt, initiate resuscitative efforts. All other patients require contact with Medical Control.
4. Follow the **Pulseless Patients** SOG.
5. Maintain Spinal Motion Restriction.

ILS

6. Obtain 2 large bore IVs of **NORMAL SALINE** or **LACTATED RINGERS**. Infuse wide open.

ALS

7. Follow rhythm-specific SOG.
8. In addition, consider the causes of cardiac arrest, just as you would for a non-traumatic cardiac arrest:
 - a. **Hypovolemia** – For suspected Hypovolemia, administer **NORMAL SALINE** at a wide open rate IV/IO. 2 large bore catheters may be utilized.
 - b. **Hypoxia** – ensure adequate ventilation as per above.
 - c. **Hydrogen ion (acidosis)** – For cases of suspected metabolic acidosis prior to cardiac arrest (DKA, renal failure, salicylate or tricyclic antidepressant overdose etc.), administer **SODIUM BICARBONATE** 1 mEq/kg IV/IO.

- d. **Hypo-/hyperkalemia** – Following **Hyperkalemia** SOG if indicated.
 - e. **Hypoglycemia** – Check blood glucose and treat, or administer **DEXTROSE** 25g D50W IV/IO.
 - f. **Hypothermia** – Actively warm patient.
 - g. **Toxins** – For suspected salicylate or tricyclic antidepressant overdose, administer **SODIUM BICARBONATE** 1mEq/kg IV/IO. For suspected narcotic overdose, administer **NALOXONE** per **Overdose/Poisoning** SOG.
 - h. **Tamponade, cardiac** – Cardiac Tamponade is seen in victims of chest trauma, dialysis patients, and patients with cancer, liver disease, or heart failure. Administer **NORMAL SALINE** at a wide open rate IV/IO. 2 large bore catheters may be utilized. Rapid transport is required.
 - i. **Tension pneumothorax** – For suspected tension pneumothorax, perform needle chest decompression.
 - j. **Thrombosis (coronary or pulmonary)**
9. Rapid transport to the nearest facility is essential.

HEMORRHAGIC SHOCK **Adult / Pediatric**

Note that this SOG is appropriate for not only traumatic hemorrhages, but also for medical hemorrhages such as GI bleeding.

Signs and Symptoms of hemorrhagic shock include:

1. Tachycardia
2. Rapid, shallow respirations.
3. Hypotension
4. Weak, thready, or absent peripheral pulses.
5. Diaphoresis
6. Altered mental status (restlessness, anxiety, confusion, combativeness, unresponsiveness)
7. Thirst
8. Pale, cool skin, mottling.
9. Capillary refill > 2 seconds.

FR/BLS

1. General Trauma Assessment & **Initial Trauma Care**.
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Administer 100% oxygen via nonrebreather mask at 12-15 liters/min. If the patient has COPD be prepared to assist ventilations with bag valve mask and high flow O₂.
4. Assist ventilations, if necessary, with bag-valve mask.
5. Control bleeding via direct pressure.
6. As a last resort, apply a tourniquet as per **Tourniquet Procedure**. It should be placed approximately 2 inches above to the wound and tightened just enough to stop the bleeding and no more.
 - a. As an alternative, a blood pressure cuff may be utilized as a tourniquet. Inflate to 20-30mm Hg above the patient's blood pressure, or just until bleeding stops.
 - b. NOTE: As long as a fracture remains unstable, the bone ends will move and continue to injure partially clotted vessels. Therefore, stabilizing a fracture and decreasing movement is a high priority for bleeding control associated with fractures.
7. Maintain warmth. Cover patient with a blanket.
8. If you do not suspect a spinal injury, elevate the lower extremities approximately 8-12 inches.
9. Check vital signs every 5 minutes and document.
10. Reassure patient. Continue to monitor closely for significant changes.

11. Transport immediately. Maximum of 10-minute scene time. Occurrences of greater than 10 minutes on scene require a documented explanation.

ILS/ALS

Enroute to Hospital:

12. Adult: Obtain 2 large bore IVs of **NORMAL SALINE** or **LACTATED RINGERS**.
 - a. Only if hypotension is present, administer fluid boluses in 250ml increments until systolic blood pressure is between 90-100mm Hg, then KVO.
 - b. If the prehospital provider suspects a closed head injury as well, infuse **NORMAL SALINE** or **LACTATED RINGERS** to until systolic blood pressure is >120mm Hg.
 - c. In the pregnant patient, maintain a systolic blood pressure > 100 mm Hg.
13. Pediatric: Obtain 1-2 large bore IVs (age appropriate) of **NORMAL SALINE** OR **LACTATED RINGERS**.
 - a. If evidence of hypoperfusion (not necessarily hypotension), administer a 20ml/kg fluid bolus.
 - b. Repeat as necessary.

HEAD & SPINAL CORD TRAUMA
Adult / Pediatric

FR/BLS

1. General Trauma Assessment & **Initial Trauma Care**.
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Implement Spinal Motion Restriction. Assess sensory and PMS motor function, distal pulses in all extremities before and after immobilization and document.
4. If the patient is breathing and has a patent airway, provide high flow oxygen by non-rebreather.
5. For patients with ISOLATED head injuries (no significant likelihood of spinal cord injury), elevate the head of the backboard.
6. Be prepared for vomiting. Have suction ready.
7. Monitor for seizure activity.
8. If the patient has an altered mental status, consider non-traumatic etiologies.
 - a. Check blood glucose.
9. In patients with significant head trauma, monitor closely for Cerebral Herniation Syndrome. The classic signs are:
 - a. Decreased level of consciousness, rapidly progressing to coma
 - b. Paralysis of the arm & leg opposite the side of the injury
 - c. Decerebrate posturing (arms and legs extend)
 - d. May also see Non-reactive/unequal pupils
 - e. GCS < 9 with rapid further deterioration; posturing; or asymmetric (or bilateral), dilated, or nonreactive pupils.
 - f. As cerebral herniation is occurring, the vital signs frequently reveal what is known as Cushing's response:
 - Blood pressure increases
 - Pulse decreases
 - Patient may soon stop breathing
 - g. This syndrome often follows an acute epidural or subdural hemorrhage.
 - h. Mild hyperventilation is ONLY 4 ventilations above normal rate. Consider performing mild hyperventilation ONLY IF suspected impending herniation. For all other patients with a severe closed head injury, hyperventilation will make them worse!

ILS

10. If signs of neurogenic shock:
 - a. Adult: Obtain 2 large bore IVs of **NORMAL SALINE** or **LACTATED RINGERS**.
 - i. Only if hypotension is present, administer fluid boluses in 250ml increments until systolic blood pressure is > 120mm Hg, then KVO.
 - b. Pediatric: Obtain 1-2 large bore IVs (age appropriate) of **NORMAL SALINE OR LACTATED RINGERS**.
 - i. If evidence of hypoperfusion (not necessarily hypotension), administer a 20ml/kg fluid bolus.
 - ii. Repeat as necessary.

ALS

11. If seizure activity, treat per **Seizure** SOG.
12. If signs of spinal shock are present:
 - a. Treat bradycardia per **Bradycardia** SOG, in addition to above.
13. Capnography, if available, should be utilized on the intubated head injured patient to ensure appropriate ventilation. Maintain a normal ETCO₂ (35-45).
 - a. If Cerebral Herniation Syndrome is suspected, titrate mild hyperventilation to achieve ETCO₂ 30-35.
14. Contact Medical Control to consider **DOPAMINE** 2-20mcg/kg/min in the hypotensive patient with spinal shock refractory to IV fluids. However, note that most mechanisms that result in spinal shock require the exclusion of hemorrhagic shock prior to starting **DOPAMINE**.

SUSPENSION TRAUMA

Suspension trauma (*Syn. "orthostatic shock while suspended"*), also known as **harness hang syndrome (HHS)**, or **orthostatic intolerance**, is an effect which occurs when the human body is held upright without any movement for a period of time. If the person is strapped into a harness or tied to an upright object they will eventually suffer the central ischemic response (commonly known as fainting). If one faints but remains vertical, one risks death due to one's brain not receiving the oxygen it requires.^[1]

People at risk of suspension trauma include people using industrial harnesses fall arrest systems, rappelling systems, confined space systems, people using harnesses for sporting purposes e.g. caving, climbing, parachuting, etc., stunt performers, circus performers, and so on.

FRD/BLS

1. Check patient for:
 - a. Pain
 - b. Paresthesia
 - c. Paralysis
 - d. Pallor
 - e. Pulselessness

Not always present but are good indicators.

2. Support Airway as necessary.
3. Provide Initial Medical Care.
4. **Do NOT allow patient to lie flat or stand up.**
5. Provide Oxygen at 100% for all patients.
6. Manually stabilize C-Spine if necessary, **BUT** Do Not lie the patient flat.
7. Place the patient in a safe position which is, sitting upright with the legs bent at the waist. (W-position) for 30 minutes.
8. Obtain a glucose check.

ALS

9. Place on cardiac monitor as soon as possible.
10. **IV NORMAL SALINE** 1000 mL bolus.
11. **ALBUTEROL** 5.0 mg via nebulization.

If **hyperkalemia** is suspected:

11. And abnormal EKG rhythm-peaked T-wave or widened QRS → **No** → **Transport**

12. If Yes → administer:

a. **SODIUM BICARBONATE** 50 meq IV followed by 20 mL **NORMAL SALINE**

b. **CALCIUM CHLORIDE** 1.0 gm slow IV followed by 20 mL Normal Saline flush.

13. Transport the patient in the sitting position to the nearest hospital unless in arrest.

OPHTHALMIC EMERGENCIES

FR/BLS/ILS

1. General Trauma Assessment & **Initial Trauma Care**.
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Assess pain on a scale of 0-10.
4. Quickly obtain gross visual acuity in each eye: (light perception/motion/acuity.)
5. Discourage the patient from sneezing, coughing, straining, or bending at waist.
6. Elevate the head of cot or backboard unless contraindicated.
7. Suction must be available for vomiting precautions.
8. Chemical Splash/Burn
 - a. Immediately irrigate the affected eye(s) using copious amounts of **NORMAL SALINE**. Continue irrigation while enroute to hospital. A Morgan lens may be utilized, if available.
 - b. Take care not to contaminate the uninjured eye.
9. Corneal Abrasions
 - a. Irritation due to foreign body, infection, etc.
 - b. Irrigation with **NORMAL SALINE** may relieve irritation and is not harmful.
10. Penetrating Injury/Ruptured or Lacerated Globe
 - a. Do not remove impaled objects. Do NOT irrigate the eye.
 - b. Stabilize any Foreign Body.
 - c. **Avoid any pressure on the injured eye**. Cover with cup, metal or plastic protective shield.
 - d. In the rare event that a patient has a globe out of socket, cover it with saline-soaked gauze.
 - e. Patch both eyes.

ALS

11. Consider pain control as necessary per **Pain Control SOG**.
12. Consider nausea control as necessary, as per **General Illness SOG**.

EAR, NOSE, AND THROAT EMERGENCIES

FR/BLS/ILS

1. Ear
 - a. Transport in a position of comfort.
 - b. Do not irrigate the ear.
 - c. For foreign bodies in the ear, position the patient affected ear-down unless impossible due to impacted foreign body.
 - d. For foreign bodies impacted through the ear, stabilize the foreign body without removing it, contact receiving hospital and transport immediately.

2. Nose
 - a. Transport in a position of comfort.
 - b. Do not irrigate the nose.
 - c. For nosebleed, assist the patient in providing direct bilateral pressure on the nasal fleshy portion of the nose ala. Do not lean the patient's head back – keep it in the neutral or slightly forward position.
 - d. For impacted foreign bodies up the nose, do not attempt to remove unless able to easily grasp. Do not make more than one attempt. Contact Medical Control if this is a pediatric patient.
 - e. For foreign bodies impacted through the nose, stabilize the foreign body without removing it, contact receiving hospital and transport immediately.

3. Dental
 - a. Handle tooth by chewing surface only. Avoid touching the root.
 - b. Rinse with **NORMAL SALINE**. Do not scrub, dry, or wrap tooth in tissue or cloth.
 - c. Place tooth in container of (in order of preference):
 - Milk
 - Normal Saline
 - Water

ALS

4. Consider pain control per **Pain Control SOG**.

NECK, CHEST, ABDOMEN, AND PELVIC INJURIES

FR/BLS

1. General Trauma Assessment & **Initial Trauma Care**.
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. If breathing, provide high flow oxygen by nonrebreather.
4. Cover lacerations or puncture wounds on the neck near the great vessels or trachea with an occlusive dressing.
5. For sucking chest wound/open pneumothorax:
 - a. Apply occlusive dressing taped on three sides to create a flutter valve. Asherman chest seals are also permitted.
 - b. If patient deteriorates, remove dressing temporarily to allow air to escape.
6. For flail chest segments:
 - a. Place a bulky dressing over the flail segment.
 - b. If respiratory distress, appropriately ventilate with 100% oxygen via BVM to provide internal splinting.
7. For open abdominal wounds, apply a saline soaked dressing.
8. For pelvic instability, stabilize the pelvis with a bed sheet or KED if time allows.
9. Stabilize impaled objects. Do not remove unless you cannot establish an airway by using other means or it impedes CPR.

ILS

10. Obtain 1-2 large bore IVs (as appropriate) of **Isotonic Solution** at TKO.

ALS

11. Evaluate for signs & symptoms of tension pneumothorax:
 - a. Severe respiratory distress or difficulty ventilating
 - b. Hypotension
 - c. Distended neck veins
 - d. Absent/diminished breath sounds on the affected side
 - e. Tracheal deviation away from the affected side.
 - f. Sub-cutaneous emphysema
 - g. Respiratory or cardiac arrest

12. If dyspnea is severe or shock is present, perform Needle Decompression. Refer to the **Turkel Chest Decompression System** Procedure.

Chest Decompression Chart

Age (Yr)	Size (kg)	Procedure	
		IV	Needle Decompression
< 1	< 10	20g	20g
1-5	10-20	18g	18g
5-12	20-40	18-16g	16g
> 12	> 40	14-16g	14g

13. Monitor for Pulseless Electrical Activity, if present refer to **Traumatic Arrest** SOG.

14. Pain control per **Pain Control** SOG as indicated.

MUSCULOSKELETAL INJURIES

FR/BLS

1. General Trauma Assessment & **Initial Trauma Care**.
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.

Fractures/Dislocations:

3. Remove jewelry and clothing
4. Whenever possible, splint in position found.
5. Check PMS before and after splinting.
6. If neurovascular status of limb is compromised, gently move extremity to a natural position (if possible) as resistance/pain allows. Reassess PMS frequently.
7. Immobilize and/or splint above and below the injury.
8. Femoral shaft fractures are immobilized utilizing a traction splint unless one of the situations listed below is present:
 - a. Proximal femur fracture
 - b. Injuries proximal to, or involving the knee joint
 - c. Injury to the pelvis
 - d. Partial amputation
 - e. Lower leg or ankle injuries
 - f. If use would delay transport of a patient with a life-threatening condition.
9. Irrigate open fractures with **NORMAL SALINE**. Dress open fractures with saline soaked dressings.
10. Apply cold packs. Limit to ≤ 20 minutes. Place a barrier between the cold pack and the skin.

Amputations:

1. Attempt to control bleeding by direct pressure. Amputations have the potential for massive hemorrhage, but most often the bleeding will control itself quite readily with direct pressure applied to the stump.
2. If bleeding cannot be controlled with direct pressure, apply a tourniquet as per the **Tourniquet** procedure.
3. If amputation is incomplete, stabilize with bulky dressing. Control bleeding with direct pressure.

4. Care of amputated parts:
5. If the amputated extremity can be easily located, rinse it with **NORMAL SALINE**. **DO NOT** pick out embedded particles. Remove large particles from the surface with sterile dressing when possible.
6. Wrap in saline-moistened gauze or towel. Place in plastic bag and seal. **DO NOT** submerge tissue in water or saline without plastic covering.
7. Place plastic bag in second container filled with ice water or cold water **OR** place on cold packs and bring with patient to the hospital if unable to place in plastic and immerse.
8. Label bag with name, date and time.
9. **DO NOT** delay transport of the patient to locate the amputated extremity.

Avulsions:

An avulsion is an injury that separates various layers of soft tissue so that they are completely unattached or hanging as a flap.

1. Control bleeding.
2. Irrigate the wound with **NORMAL SALINE**.
3. If possible, replace the avulsed flap in its original position.
4. If an avulsion is complete, treat it as amputated soft tissue (above).

Crush Injuries:

When a patient suffers a crush injury and remains entrapped for a lengthy period of time, he/she may develop Crush Syndrome.

1. Monitor for tachycardia, restlessness, and increased respiratory rate.
2. Call for ALS assist.

ILS

1. Obtain IV of **Isotonic Solution** at TKO for long bone fractures, amputations, large avulsions, and crush injuries.
2. For suspected Crush Syndrome, administer a fluid bolus of **NORMAL SALINE** or **LACTATED RINGERS** 20ml/kg IV.

ALS

1. For relief of pain, refer to **Pain Control** SOG as indicated.

For suspected crush syndrome:

2. Apply cardiac monitor.

3. Monitor closely for evidence of hyperkalemia. If any evidence of hyperkalemia is noted, treat immediately per the **Hyperkalemia** SOG.

4. For prolonged entrapments, contact Medical Control to consider prophylactic treatment of Crush Syndrome prior to release of entrapment or as soon as possible after.

BURNS
Adult / Pediatric

FR/BLS

1. Assess scene safety.
2. Wear gloves, gown, and mask when treating a severely burned patient.
3. General Trauma Assessment & **Initial Trauma Care**.
4. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
5. Remove any smoldering articles of clothing after extinguishing with water. Clothing should be cut away rather than pulled off when removed.
6. Remove any constrictive jewelry (rings, watches, bracelets).
7. Cooling should be initiated with sterile water < 2 minutes or sterile saline in an effort to extinguish the burning process. Ice is absolutely contraindicated. Discontinue the cooling of the burn area if the patient begins to shiver, and cover the patient with a sterile burn sheet and blanket to conserve body heat.
8. Leave blisters intact.
9. Keep warm. Place a sterile burn sheet on the stretcher. If the patient's posterior is burned, place a sterile burn pad on top of the sheet with the absorbent side toward the patient.
10. In the event of an explosion:
 - a. Institute Spinal Motion Restriction.
 - b. Follow all other appropriate SOGs for traumatic injuries.
11. Continually monitor the airway. Flash burns, enclosed space fires, and steam burns can injure the respiratory system. Be alert for singed nasal hairs, blisters in the mouth, soot in the sputum, wheezing, and stridor, all which are hallmarks of respiratory involvement.
12. Provide high flow **OXYGEN** via a non-rebreather mask, or use a BVM with reservoir and 100 % oxygen if indicated.
13. Evaluate depth of burn and estimate extent using rule-of-nines or palmar method (patient's palm = 1% of BSA). Assess need for transport to Burn Center.

ILS

14. Obtain IV of **Isotonic Solution** at TKO.
 - a. Stick through burned tissue only if necessary.

ALS

15. For pain control refer to **Pain Protocol** SOG.

16. For wheezing, if consider Albuterol:

Adults:

ALBUTEROL 5mg

May repeat x 1

Peds:

ALBUTEROL 2.5 - 5mg

May repeat x 1.

< 20 kg body weight = 2.5 mg

>20 kg body weight = 5.0 mg

17. For Chemical Burns, refer to HAZMAT SOGs.

18. For Electrical Injuries, refer to **Lightning Strikes and Electrocutation** SOG.

RAPE/SEXUAL ASSAULT

FR/BLS/ILS/ALS

Rape or sexual assault is the unwanted sexual contact through use of threat, force, or taking advantage of circumstances such as intoxication that renders a person incapable of giving consent.

1. The initial contact can do a great deal of good or a great deal of harm. Tact, kindness, and sensitivity are essential.
2. **General Medical or Trauma Assessment & Initial Medical or Trauma Care.**
3. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
4. When possible, give the victim the option of being cared for by a provider of the same sex.
5. Remember the prehospital provider is not a law enforcement officer! Your job is to provide medical care, not to determine the details of their story or to pass judgment.
6. Take a medical history, not a history of the assault.
7. Limit the physical exam to a search for injuries and care to address patient complaints.
8. Make every effort to preserve evidence and respect the patient's fragile emotional state.
9. Handle the patient's clothing minimally.
 - a. Isolate any blood stained articles
 - b. Discourage the patient from changing clothes, bathing, brushing teeth, gargling, urinating, or moving bowels (if possible), or drinking fluids before transport. If the patient insists on enacting any of the aforementioned, you cannot prohibit them.
 - c. All linen used by the patient should be left with the patient in the ED.
10. Protect the patient's privacy & respect confidentiality.
11. The medical record is a legal document.
12. Record only objective findings, e.g. patient's mental state, patient's clothing and obvious injuries.
13. Document only the facts. Do not record your opinion or offer any conclusions/assumptions regarding the event. You may be called to court as a witness.
14. Keep documentation concise, and record only what the patient stated in their own words.
15. Do not physically examine the genital area unless there are apparent injuries which need treatment.

TRAUMA IN PREGNANCY

FR/BLS

1. General Trauma Assessment & **Initial Trauma Care**.
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Be aware that the mother may appear stable, but the fetus may be in jeopardy. This can easily be true with very minor trauma, i.e. a minor MVC with no apparent damage/injury.
4. Be aware that the incidence of domestic violence is increased in pregnancy.
5. Visualize externally, as indicated, for vaginal bleeding, leaking amniotic fluid, or crowning. Assess for fetal movements and uterine contractions.
6. Elevate the right side of the backboard 20-30°. This allows placement of the patient on her left side to reduce pressure on the inferior vena cava.
7. If CPR is indicated, place patient flat on back with right hip elevated with blanket or pillows to reduce pressure on the inferior vena cava. Follow appropriate SOG.
 - a. Notify Medical Control ASAP to allow mobilization of appropriate hospital personnel.
8. Administer supplemental oxygen to all injured pregnant patients.

ILS/ALS

9. Obtain IV of **Isotonic Solution** at TKO unless condition indicates need for a fluid bolus.

FIELD TRIAGE

These protocols will be utilized whenever a Mass Casualty Incident occurs or any situation that stresses the local resources. The purpose of triage is to accomplish “The Greatest Good for The Greatest Number”.

FR/BLS/ILS/ALS

1. Assess scene safety.
2. Size-up the scene: quickly walk around the scene and count the patients.
3. Determine what assistance will be needed. Make appropriate request through dispatch.
4. Notify Medical Control.
5. Designate a staging area for responding units and a triage/treatment area.
6. Responding units must report to the staging area, and at least one person must remain with each vehicle.

START and Jump-START Triage Plan

The START plan (Simple Triage & Rapid Treatment) was developed to be used in the event of a mass casualty incident (MCI). This plan allows Rescuers, EMTs & Paramedics to triage a patient at a MCI in 60 seconds or less. The plan is based on three observations of each patient:

1. Respiration
2. Circulation
3. Mental Status

START Principles:

The START plan calls for rescuers to correct the main threats to life, obstructed airways and severe arterial bleeding. The START plan utilizes the METTAG Triage Card which classifies patients into four different areas for treatment. It is a system that quickly and accurately categorizes victims into treatment groups. The plan is simple to learn and simple to retain. It is extremely useful in the MCI setting by maximizing the efficiency of the rescuers.

The Triage Team must evaluate and place the patients into one of four categories.

Deceased (BLACK) – No ventilations present even after attempting to reposition the airway in an adult or after 5 ventilations in a pediatric patient (with a pulse).

Immediate (RED) – Ventilations present only after repositioning the airway. Place into this category if respiratory rate is greater than 30 per minute (adult), <15 or >45 (pediatric).

Delayed capillary refill (greater than two seconds) or the patient is unable to follow simple commands.

Delayed (YELLOW) – Any patient who does not fit into either the immediate or minor categories.

Minor (Green) – Separate from the general group at the beginning of the triage operation. Also known as the “walking wounded”. Direct patients away from the scene to a designated safe area.

START Triage Procedure:

1. It is imperative that triage be performed in a rapid, coordinated, systematic fashion using the START and Jump-START algorithms. If a victim appears to be an adult or young adult, use the START algorithm. If they appear to be a child, use the Jump-START algorithm.
2. The **Triage Officer** (and his/her designated personnel, if any) shall move through the entire scene, rapidly assess each patient, stopping only to open an airway or stop profuse bleeding.
3. A triage tag shall be affixed to each patient. OR:
4. The **Triage Officer** will establish a Casualty Collection Point (depending on the nature of the incident) where other personnel (firefighters, law enforcement officers, etc.) will bring patients for triage.
5. Mobilize all ambulatory patients to the GREEN treatment area. These patients will be assessed last. All ambulatory patients will initially be triaged as GREEN but may be upgraded if they are found to meet YELLOW or RED criteria.
 - a. Children that are not yet ambulatory due to young age may be carried to the GREEN area but **MUST** be the first assessed by treatment personnel in that area.
 - b. Remember to keep the GREEN triaged patients supervised by dedicated EMS personnel.
6. Assess ventilations of remaining patients, beginning with patients who are still or who have obvious life threats:
 - a. If no respiratory effort is present after opening the patient’s airway, tag the adult patient as **BLACK**.
 - b. If the pediatric patient has a pulse, open the patient's airway and give 5 breaths. If no spontaneous respirations are triggered by these rescue breaths, triage the pediatric patient as **BLACK**. If spontaneous respirations resume, tag the patient as **RED**. Provide no further respiratory assistance, and move on.
 - c. If the respiratory rate is > 30 (adults) or <15 or > 45 (pediatrics), tag the patient as **RED**.
7. If the respiratory rate is < 30 (adults) or between 15 and 45 (pediatrics), assess the patient’s perfusion.
 - a. If the patient has no radial pulse present, tag the patient as **RED**.
8. If the patient has a radial pulse, assess the neurological status.

- a. If the patient is Unresponsive or cannot follow simple commands (age appropriate), tag the patient as RED.
- b. If the patient can follow simple commands, tag the patient as YELLOW.

Triage Tags

Triage tags are completed during transportation to the hospital or in the treatment area if there is time. To fill out the tag properly, follow these instructions:

1. Enter time of triage.
2. Enter date.
3. Enter other important information (history, treatment, etc.).
4. Enter vital signs and the time taken in indicated areas.
5. Enter injuries on the diagram.
6. Enter name (if able to obtain).
7. Enter address with city and state (if able to obtain).
8. EMT's rendering treatment will enter IV's, drugs, and other treatments.
9. Tear off all colored areas below the determined priority and retain.
10. Attach tag SECURELY and in a CLEARLY VISIBLE area.

For START Triage Tags:

The corner of the tag marked with a cross is removed in the treatment section prior to moving to a medical facility. These should be given to the Sector Officer in that area.

The corner marked with an ambulance is to be removed prior to the actual removal of the patient from the treatment area to a medical facility. It is to be retained by the crew until the end of the MCI. These are then given to the Sector Officer in charge of Transportation.

REGION IV
NOTICE OF EMERGENCY MEDICAL SERVICES
RESPONSE TO A MINOR

Date: _____

From: Service _____

Address _____

Phone # _____

Name of Child: _____

Members of our Emergency Medical Services agency were called to evaluate your son/daughter/ward today as a result of a bus collision/incident.

After responding to the above incident, we evaluated the child. Based on our assessment and statements made by the child, it was determined that he or she did not require emergency care and/or transportation to an emergency department at that time.

Whereas your child is a minor, it is our duty to inform you of this incident so that an informed decision can be made as to whether follow-up evaluation with a physician is desired.

The child was released to a designated school representative who accepted further responsibility for him or her.

If you wish additional information, please contact our agency at the above phone number.

Section XI: Overdose/Poisoning, HAZMAT, and CBRNE

OVERDOSE/POISONING

This guideline is appropriate not only for accidental or intentional overdoses of medications, plants, etc. but also for patients under the influence of alcohol or recreational drugs.

Alcohol is a drug that has a potent effect on the central nervous system. Emergencies arising from the use of alcohol may be due to the effect of alcohol that has just been consumed, or it may be the result of the cumulative effects of years of alcohol abuse. Chronic drinkers have often have derangements in blood sugar levels, poor nutrition, the potential for considerable gastrointestinal bleeding and other significant problems. A person can be intoxicated and suffer from unrelated ailments such as a heart attack or hypoglycemia. Alcohol may mask pain. Always look for mechanism of injury or other illnesses as the cause of a patient's symptoms.

Patient assessment should indicate the following:

1. What was taken?
2. When was it taken?
3. How much of it was taken?
4. Were any other drugs/alcohol taken by any route?
5. Has the patient vomited, if so how many times?
6. Was the overdose intentional or accidental?

In addition, certain smells may give the prehospital provider a clue to the poisoning agent, when known:

- | | |
|------------------|--|
| 1. Almond | = Cyanide |
| 2. Fruit | = Alcohol |
| 3. Garlic | = Arsenic, parathion, DMSO |
| 4. Mothballs | = Camphor |
| 5. Rotten eggs | = Hydrogen sulfide |
| 6. Silver polish | = Cyanide |
| 7. Stove gas | = Think CO (CO & methane are odorless) |
| 8. Wintergreen | = Methyl salicylate |

The number for Poison Control is 1-800-222-1222. Contact with Poison Control is encouraged, but should not delay transport. Anytime a patient wishes to refuse treatment and/or transport after a poisoning or overdose, Poison Control should be contacted by EMS prior to leaving the scene.

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Try to keep the patient alert (keep them talking).

4. **Do not induce vomiting, especially in cases where caustic substance ingestion is suspected.**
5. Be alert for vomiting, and be prepared to suction.
6. Consider placing the patient in the HAINES recovery position while awaiting transport.
7. Treat the patient in a respectful manner, and avoid being judgmental. Acknowledge the patient's concerns and feelings. Explain all treatment interventions before they are performed.
8. Refer to the **Coma of Unknown Origin SOG**, **Seizure SOG**, or any other SOG that is indicated as well.
9. Contact Medical Control for specific information about individual toxic exposures and treatments.
10. Bring container/drug/substance to ED unless risk of secondary contamination exists.

ILS

11. Establish IV access.

ALS

12. Apply cardiac monitor and pulse oximetry.
13. If the patient has respiratory compromise, administer **NALOXONE**:

<u>Adult:</u> NALOXONE 0.4-2mg IV/IO/IM/IN. May repeat after 5 min. Max 2mg.	<u>Peds:</u> < 20kg NALOXONE 0.1mg/kg IV/IO/IM ≥ 20kg NALOXONE 2.0mg IV/IO/IM
--	---
14. For suspected alcohol ingestion or coma of unknown origin, administer **THIAMINE**:

<u>Adult</u> THIAMINE 100mg IVP	<u>Peds</u> N/A
---	--------------------
15. If symptomatic, ALS providers may institute treatment for the following overdoses prior to contact with Medical Control:

Opiate Narcotics:

- | | |
|--|---|
| <u>Adult:</u>
NALOXONE 0.4-2mg IV/IO/IM/IN.
May repeat after 5 min.
Max 2mg. | <u>Peds:</u>
< 20kg NALOXONE 0.1mg/kg IV/IO/IM
≥ 20kg NALOXONE 2.0mg IV/IO/IM |
|--|---|

Stimulants (Cocaine, Amphetamines [Meth, Ecstasy, etc.], LSD, PCP, ketamine)

- | | |
|--------------|-------------|
| <u>Adult</u> | <u>Peds</u> |
|--------------|-------------|

DIAZEPAM 5mg IV/IO/IM.
OR

MIDAZOLAM 2-4mg IV/IO/IM/IN.

DIAZEPAM 0.1mg/kg IV/IO/IM.

MIDAZOLAM 0.1mg/kg IV/IO/IM.

16. Cocaine is also a sodium channel blocker (hence the –aine ending). On rare occasions, it may produce a wide QRS complex (resembles ventricular tachycardia). If this is noted, administer:

Adults

SODIUM BICARBONATE

1mEq/kg IV/IO

Peds

SODIUM BICARBONATE

1mEq/kg IV/IO

17. Ventricular tachycardia may also be produced by stimulants and should be treated per the **Wide Complex Tachycardia with a Pulse** SOG, in addition to the above measures.

18. If hyperthermia is suspected, monitor patient’s temperature frequently. Be prepared to cool patient aggressively but do not allow shivering.

19. Note that for stimulant overdoses, use of benzodiazepines alone (without Haloperidol) is preferred. Higher doses than typically used may be required.

Salicylates (ASA, Oil of Wintergreen)

Adults

SODIUM BICARBONATE

1mEq/kg IV/IO

Peds

SODIUM BICARBONATE

1mEq/kg IV/IO

Tricyclic Antidepressants

Adult

SODIUM BICARBONATE

1 mEq/kg

Peds

SODIUM BICARBONATE

1 mEq/kg

Organophosphate Pesticides

20. The signs and symptoms and treatment of organophosphate poisoning are listed below, in the **Hazardous Materials Exposure** SOG. Treatment is **ONLY** indicated for the symptomatic patient.

Beta-Blockers

21. In addition to treatment per the **Bradycardia** SOG, contact Medical Control to consider:

Adults

GLUCAGON 1-5mg IV/IO/IM/IN

Peds

GLUCAGON 1mg (25-40kg)

GLUCAGON 0.5mg (<25kg)

22. Unlike hypoglycemia, IV administration of **GLUCAGON** is preferred for beta blocker overdose.

23. IV **GLUCAGON** frequently results in nausea and vomiting, the vagal stimulation of which may result in worsening bradycardia. Always administer **ONDANSETRON** as per the **General Illness** SOG when administering IV **GLUCAGON**.

Calcium Channel Blockers

24. In addition to treatment per the **Bradycardia** SOG, contact Medical Control to consider:

Adult

CALCIUM CHLORIDE

1g IV/IO

AND

Adults

GLUCAGON 1-5mg IV/IO/IM/IN

Peds

CALCIUM CHLORIDE

20mg/kg IV/IO (Max 1 g)

Peds

GLUCAGON 1mg IV/IO (25-40kg)

GLUCAGON 0.5mg IV/IO (<25kg)

25. Unlike hypoglycemia, IV administration of **GLUCAGON** is preferred for calcium channel blocker overdose.

26. IV **GLUCAGON** frequently results in nausea and vomiting, the vagal stimulation of which may result in worsening bradycardia. Always administer **ONDANSETRON** as per the **General Illness** SOG when administering IV **GLUCAGON**.

Anti-psychotics

27. Anti-psychotic medications, particularly when new to the patient, may cause dystonic reactions. Administer:

Adult

DIPHENHYDRAMINE

50mg IV/IM.

(IV Preferred.)

Peds

DIPHENHYDRAMINE

1-2mg/kg IV/IM.

(IV preferred Maximum 50mg.)

CCEMT-P

28. Contact Medical Control to consider **ACTIVATED CHARCOAL** 1g/kg PO.

HAZARDOUS MATERIALS EXPOSURE
(Including Smoke Inhalation & Chemical WMD)

Injuries from hazardous materials incidents vary depending on the manner of exposure such as inhalation, ingestion, injection, or absorption. The incident can be impacted by the type of material involved including acids, ammonia, chlorine, hydrocarbon solvents, sulfides and organophosphates as well as the amount of exposure (associated with the time exposed and the concentration of the toxic substance).

Remain uphill, upwind, upstream, and upgrade of the incident if possible (or 90 degrees perpendicular to the wind direction). Stay out of the “Hot Zone” unless trained, equipped, and authorized to enter.

1. Based on information from dispatch of a possible HAZMAT situation, stage several blocks away from the scene. Communicate all actions to dispatch. Remember, the reported location may be inaccurate and response into a contaminated area might occur. Contact the HAZMAT team as necessary.
2. If you arrive before the HAZMAT team, **keep all others away!** This includes unneeded equipment and responders. If the crew or the unit becomes contaminated, stage in an isolated area and notify the proper authorities. Contaminated or exposed personnel may add to the problem and reduce the effectiveness of the response.
3. **When the HAZMAT team is on scene, HAZMAT EMS personnel are in charge of patient care until the patient has been decontaminated and care has been released to the transporting paramedic.**
4. Decontamination will be dictated by the HAZMAT team and may include:
 - a. Removal of patients from the Hot Zone, the size of which varies on the chemical and amount released.
 - b. Gross decontamination: Passage through high-volume water bath (e.g. between two fire apparatus) for patients contaminated with liquids or certain solids.
 - c. Dry chemical powder should be brushed off before applying water.
 - d. Initial triage of patients may occur after gross decontamination. Immediate life threats should be addressed prior to technical decontamination.
 - e. Technical decontamination may include removal of all clothing and gentle cleansing with soap and water. All body areas should be thoroughly cleansed, although overly harsh scrubbing which could break the skin should be avoided.
 - f. Simple removal of clothing (including undergarments).
5. Place triage identification on each patient. Match triage information with each patient's personal belongings which were removed during technical decontamination. Preserve these personal affects for law enforcement.

FR/BLS

1. **General Medical Assessment & Initial Medical Care.**
2. Address the patient's Circulation, Airway, Breathing, and Disability as per Basic Concepts.
3. Try to keep the patient alert (keep them talking)
4. **Do not induce vomiting, especially in cases where caustic substance ingestion is suspected.**
5. Be alert for vomiting, and be prepared to suction.
6. Consider placing the patient in the HAINES recovery position while awaiting transport.
7. Treat the patient in a respectful manner, and avoid being judgmental.
8. Refer to the **Coma of Unknown Origin SOG**, **Seizure SOG**, or any other SOG that is indicated as well.
9. Contact Medical Control for specific information about individual toxic exposures and treatments.
10. Note which chemical agent the patient was exposed to; obtain the MSDS for that chemical (if possible).
11. The patient's clothing should be completely removed to prevent continued exposure and the patient decontaminated prior to being placed in the ambulance for transport.
12. Do NOT transport until decontaminated. Contaminated patients should not be transported by an air ambulance service given the potential risk to the aircrew and the aircraft safety. (A helicopter is an enclosed space. Exposing the crew and pilot could result in tragic consequences.)
13. Early notification of the receiving hospital – and the Resource Hospital if multiple patients are involved – is imperative.
14. Irrigate burns with Sterile Water if the MSDS indicates use of water will not cause an adverse reaction. Body parts should be flushed for at least 1-2 minutes. After irrigation, treat burns as per the **Burn SOG**.
15. Irrigate burns to the eye with Sterile Water for at least 20 minutes. Alkaline burns should receive continuous irrigation throughout transport.

ILS

16. Establish IV access.

ALS

17. Apply cardiac monitor and pulse oximetry.

18. If symptomatic, ALS providers may institute treatment for the following exposures prior to contact with Medical Control:

BLOOD AGENTS (Carbon Monoxide, Cyanide, and Hydrogen Sulfide)

Mechanism of Action: Blood agents interfere with cellular metabolism by either blocking oxygen binding to hemoglobin (carbon monoxide) or by interfering with the use of oxygen within cells (cyanide and hydrogen sulfide). The result is that cells are deprived of oxygen. Cells that depend on oxygen the most (brain and heart) are the most susceptible.

Carbon Monoxide (CO) – Blood Agent

Signs and Symptoms:

The signs and symptoms of carbon monoxide can be quite vague. Misdiagnosis commonly occurs. Symptoms often are attributed to a viral illness in winter months. The diagnosis is based on maintaining a high index of suspicion:

SpCO Level

0-4

5-9

10-19

20-29

30-39

40-49

50-59

60-up

Signs and Symptoms

None, Minor headache

Headache, fatigue

Dyspnea, headache

Headache, nausea, dizziness

Severe headache, vomiting, altered LOC

Confusion, syncope, tachycardia

Seizures, shock, apnea, coma

Coma, death

Death most commonly results from ventricular arrhythmias.

Treatment in addition to above:

FR/BLS

1. If breathing, provide 100% oxygen by nonrebreather mask.
2. Pulse oximetry readings can be falsely elevated. Do not rely on pulse oximetry.
3. If a RAD-57 is available:
 - a. SpCO 0-3% Normal, no treatment required
 - b. SpCO 3-12% PLUS signs & symptoms or history of exposure – TREAT and TRANSPORT.
 - c. SpCO 3-12% no signs of symptoms, no history of exposure – OBSERVE.

- d. SpCO 12% and above: TREAT and TRANSPORT.
4. For patients with serious symptoms, with or without high SpCO levels, contact Medical Control for possible routing to a hyperbaric facility.
5. Fetal hemoglobin has a greater attraction for CO than maternal hemoglobin. Females who are known to be pregnant or who could be pregnant should be advised that EMS-measured SpCO levels reflect the adult's level, and that fetal carboxyhemoglobin levels may be higher. Recommend hospital evaluation for any CO-exposed pregnant person.

ILS

6. Obtain IV access in the severely symptomatic patient or those with SpCO levels > 12%.

ALS

7. 12 lead EKG
8. Measure serum lactate **if available**.

Cyanide – Blood Agent

Cyanide is found in the industrial setting as hydrocyanic acid (AC) or cyanogen chloride (CK). Cyanide is used in fumigation, photography, extraction of metals, electroplating, metal cleaning, tempering of metals, and the synthesis of many compounds. It is released when synthetic fibers and plastics burn. Maintain a high index of suspicion in smoke inhalation patients with severe dyspnea and/or hypotension!

Signs and Symptoms:

The effects of vapor from either form of cyanide appear within seconds to a minute. High concentrations can be almost immediately fatal. Exposure to low concentration may result in flushing, headache, anxiety, agitation, vertigo, feeling of weakness, nausea, muscular trembling and irritation of eyes, nose, and airways. Exposure to a high concentration results in transient hyperpnea, followed by convulsions (30 seconds after exposure), a gradual decrease in respiratory rate and depth to apnea (3-5 minutes), and cessation of cardiac activity (5-8 minutes).

Treatment in addition to above:

FR/BLS/ILS

1. If breathing, provide 100% oxygen by nonrebreather mask.
2. Pulse oximetry readings can be falsely elevated once treatment has begun. Do not rely on pulse oximetry.

ALS

3. Monroe County: Measure serum lactate.
4. (Optional) Institute treatment immediately upon suspecting cyanide poisoning.
 - a. ADULT: Administer **HYDROXOCOBALAMIN** 5g IV over 15 minutes.
Reconstitute with 200mL of LR.
 - b. PEDIATRIC: Administer **HYDROXOCOBALAMIN** 70 mg/kg IV over 15 minutes (Max 5g).
Each 2.5 g vial is to be reconstituted with 100 mL of LR.

HAZMAT Medic

5. If no IV/IO access is available, crush an **AMYL NITRITE** capsule and place it in the reservoir bag of the nonrebreather or bag valve mask, or have the patient inhale the fumes directly from the capsule. **AMYL NITRITE** capsules are only to be used IF no IV/IO access is available.
6. Once IV/IO access is available:
7. Administer **HYDROXOCOBALAMIN** as above.
8. Administer **SODIUM NITRITE**:

<u>Adult</u> 300 mg IV/IO Max 300mg.	<u>Peds</u> 0.33mL/kg IV/IO (9mg/kg)
--	---
9. **SODIUM THIOSULFATE**:

<u>Adult</u> 12.5gms in 50mL IV/IO.	<u>Peds</u> 1.65 mL/kg IV/IO (412.5mg/kg) Max 50ml (12.5g)
--	--
10. The purpose of nitrites is to induce methemoglobinemia, which is more survivable than cyanide poisoning. For this reason, once nitrites are administered, pulse oximetry is not reliable. *Nitrites are contra-indicated in smoke inhalation patients because they are also carbon monoxide-poisoned!* For smoke inhalation patients suspected of cyanide poisoning, administer **HYDROXOCOBALAMIN** and **SODIUM THIOSULFATE** alone.

SODIUM NITRITE dosage chart at 3% (300mg/10 ml)
(Pediatric 0.3 ml/kg, Adult 10 ml)

Estimated age	Estimated weight	Dose in ML
3 months	5 kg (11 lb)	1.5 mL
12 months	10 kg (22 lb)	3 mL
3 years	15 kg (33 lb)	4.5 mL
6 years	20 kg (44 lb)	6 mL
8 years	25 kg (55 lb)	7.5 mL
10 years	30 kg (66 lb)	9 mL
11 years	35 kg (77 lb)	10 mL
12 years	40 kg (88 lb)	10 mL
13 years	45 kg (99 lb)	10 mL
14 years or more	50 kg (110 lb) or more	10 mL
Adult	50 kg (110 lb) or more	10 mL

SODIUM THIOSULFATE dosage chart at 25% concentration
(Pediatric 1.65 ml/kg, Adult 50 ml)

Estimated age	Estimated weight	Dose in ML
3 months	5 kg (11 lb)	8 mL
12 months	10 kg (22 lb)	17 mL
3 years	15 kg (33 lb)	25 mL
6 years	20 kg (44 lb)	33 mL
8 years	25 kg (55 lb)	41 mL
10 years	30 kg (66 lb)	50 mL
11 years	35 kg (77 lb)	50 mL
12 years	40 kg (88 lb)	50 mL
13 years	45 kg (99 lb)	50 mL
14 years or more	50 kg (110 lb) or more	50 mL
Adult	50 kg (110 lb) or more	50 mL

Hydrogen Sulfide (H₂S) – Blood Agent

Hydrogen sulfide is a byproduct of numerous industrial processes and the degradation of manure. Deaths related to hydrogen sulfide are occasionally seen in farmers found unresponsive in manure pits and other confined spaces. It has recently become more common in suicides. Victims are most commonly found confined in vehicles after having mixed together select household chemicals.

Hydrogen sulfide is a gas that has the smell of rotten eggs. However, a classic symptom of hydrogen sulfide is that it results in olfactory fatigue. In other words, victims and responders will soon be unable to smell the gas and assume that it has dissipated, when in fact, the poisoning is worsening.

Signs and Symptoms:

1. Very prominent mucous membrane irritation – nasal, pharyngeal, eye (conjunctivitis).
2. CNS – headache, fatigue/weakness, dizziness, ataxia, seizures, coma.
3. Cardiovascular – Chest pain, bradycardia.
4. GI – Pharyngitis, Nausea/Vomiting.
5. Pulmonary – dyspnea, hyperventilation (compensating for poor oxygen delivery), cyanosis, signs of acute lung injury (hemoptysis, crackles).

Treatment in addition to above:

FR/BLS/ILS

1. Administer high flow oxygen.

ALS

2. Treat seizures per the **Seizure** SOG.

HAZMAT Medic

3. If no IV/IO access is available, crush an **AMYL NITRITE** capsule and place it in the reservoir bag of the nonrebreather or bag valve mask, or have the patient inhale the fumes directly from the capsule. **AMYL NITRITE** capsules are only to be used IF no IV/IO access is available.
4. Once IV/IO access is available, administer **SODIUM NITRITE**:

<u>Adult</u>	<u>Peds</u>
300 mg IV/IO	0.33mL/kg IV/IO (9mg/kg)
Max 300mg.	
5. The purpose of nitrites is to induce methemoglobinemia, which is more survivable than hydrogen sulfide poisoning. For this reason, once nitrites are administered pulse oximetry is not reliable. **HYDROXOCOBALAMIN** and **SODIUM THIOSULFATE** have no role in the treatment of hydrogen sulfide.

CHOKING AGENTS/PULMONARY IRRITANTS

Numerous agents act as pulmonary irritants. They are widely distributed throughout industrial settings.

Signs and Symptoms:

1. Airway: Burning sensation of the mouth, nose and pharynx. Serious exposures can result in swelling of the upper airway and larynx with stridor, muffled voice or aphonia.
2. Pulmonary: Bronchospasm, wheezing, cough, pulmonary edema. In some individuals, particularly those with prior history of asthma, repetitive exposures, even to very low doses, may trigger an asthmatic episode.
3. Cardiovascular: Arrhythmias secondary to hypoxia.
4. CNS: Altered mental status secondary to hypoxia.
5. Dermal: Burning and irritation from concentrated solutions. Frostbite injury from contact from liquefied anhydrous ammonia is possible.
6. GI: Severe mucosal, esophageal and intestinal injury from ingestion.
7. Ocular: Burning, irritation and swelling.

Water-solubility determines whether upper, lower, or both parts of the respiratory tract are damaged and the time of onset of symptoms. Agents that are highly water soluble generally have rapid onset of symptoms. Upper airway symptoms predominate. Agents that have low water solubility generally have slower onset of symptoms, up to several hours later. Lower airway (lung) injury predominates.

Highly water soluble: ammonia, acids, methyl isocyanate.

Intermediate: chlorine.

Low: methyl bromide (bromomethane), phosgene.

Treatment in addition to above:

ALS

1. Obtain a 12 lead EKG. Place on cardiac monitor.
2. If stridorous/hoarse, consider endotracheal intubation since laryngospasm may be imminent (see above).
3. Treat bronchospasm aggressively with bronchodilators.
4. If pulmonary edema is present, remember that it is due to lung injury NOT CONGESTIVE HEART FAILURE. Do not administer **FUROSEMIDE!**
5. CPAP remains beneficial for moderate to severe dyspnea.
6. Treat burns as clinically indicated per the **Burn** SOG once decontamination has taken place.

7. For ocular injury, irrigate the eyes for at least 20-30 minutes. Irrigation may be continued en route to the hospital.
8. Treat seizures per **Seizure** SOG.
9. Consider pain control per **Pain Control** SOG.
10. All patients exposed to low water-soluble irritants should be encouraged to seek evaluation and observation in the ED, regardless of the presence or absence of symptoms.
11. For *chlorine gas* exposure only, administer **SODIUM BICARBONATE** nebulized:
 - a. Adult and Peds: Place 2mL **SODIUM BICARBONATE** into 2mL of sterile water and administer by hand-held nebulizer. May repeat once in 20 minutes.

HAZMAT Medic

12. **PROPARACAINE** hydrochloride one (1) or two (2) drops per eye to assist with eye irrigation.

HYDROFLUORIC ACID

Hydrofluoric acid exposure is a unique exposure. In addition to the above signs/symptoms of pulmonary irritants, hydrofluoric acid may rapidly cause hypocalcemia and resultant cardiac arrest. The time from exposure to onset of symptoms may be delayed, depending on the concentration of the acid:

<20 percent concentration – Erythema and pain may be delayed for 24 hours.

20 to 50 percent concentration – Erythema and pain may be delayed for 8 hours.

>50 percent concentration – Immediate pain and erythema, rapid destruction of tissues and acute systemic toxicity.

FR/BLS/ILS

1. If available on scene, soak burned skin in magnesium hydroxide antacid preparations (milk of magnesia, Mylanta, Maalox) unless **CALCIUM GLUCONATE** is available.
2. In the rare event that hydrofluoric acid is ingested, administer the above antacid preparation orally following directions on the bottle. If an antacid preparation is unavailable, have the patient ingest 8-16 oz of milk or water.
3. If therapy with **CALCIUM GLUCONATE** has been initiated by industrial workers on scene, continue this therapy en route to the ED.

ALS

4. Treat per pulmonary irritants, as above. Cardiac monitoring is essential!
5. Administer **CALCIUM CHLORIDE** 1g IV/IO.

HAZMAT Medic

6. For dermal exposure, prepare a topical solution by mixing 10 mL **CALCIUM GLUCONATE** 10% with 30 grams of water-soluble gel and apply liberally to burned surfaces after decontamination.
7. For severe burns, administer **CALCIUM GLUCONATE** subcutaneously to the burned area.
8. For ocular exposure, mix 10 mL calcium gluconate 10% with 1000 mL of **NORMAL SALINE**. Irrigate affected eye(s) with 500 mL of solution.
9. **PROPARACAINE** hydrochloride one (1) or two (2) drops per eye to assist with eye irrigation.
10. For inhalation exposure, mix 1 mL **CALCIUM GLUCONATE** 10% with 2mL sterile water and administer by nebulizer.

ORGANOPHOSPHATES/NERVE AGENTS

Organophosphates are present in numerous pesticides. Nerve agents are high potency organophosphates. Nerve agents include GA (tabun), GB (sarin), GD (soman), GF, and VX. They cause biological effects by inhibiting acetylcholinesterase, the enzyme that breaks down acetylcholine. The result is an excess of acetylcholine that accumulates and causes hyperactivity in muscles, glands, and nerves. Effects from vapor exposure result in immediate onset of symptoms. Symptoms involving the eyes, nose, and airway (pinpoint pupils, salivation, lacrimation [tearing], and rhinorrhea) are more likely than with liquid exposure. Effects from liquid exposure may be delayed several hours before the onset of symptoms, which begin with sweating and fasciculations at the site of exposure.

Signs and Symptoms:

Mild:

1. Eyes (with vapor exposure): pinpoint pupils, tearing, redness, pain, and dim vision.
2. Nose (with vapor exposure): rhinorrhea.
3. Airways (predominately with vapor exposure): salivation/drooling, dyspnea secondary to bronchoconstriction and increased secretions.
4. GI: nausea, vomiting, stomach cramps, and diarrhea.
5. Skin (with liquid exposure): sweating and fasciculations at site of exposure.
6. General: weakness, headache.

Moderate:

7. Above symptoms (more severe) plus more significant diarrhea, some diffuse fasciculations, excessive sweating.

Severe:

8. Above symptoms plus involuntary urination and/or defecation, sudden loss of consciousness, seizures, copious secretions, apnea, and death.

Numerous mnemonics help healthcare providers recall the symptoms of organophosphate toxicity (cholinergic syndrome):

“DUMBBELS” (Muscarinic toxidrome)

- D** Defecation
- U** Urination
- M** Miosis (pinpoint pupils)
- B** Bronchorrhea (wet lungs, pulmonary edema)
- B** Bronchospasm, Bradycardia
- E** Emesis
- L** Lacrimation (tearing)
- S** Salivation

Less Common Signs and Symptoms = **“MTWtHF”** (Nicotinic toxidrome)

- M** Mydriasis (dilated pupils)
- T** Tachycardia
- W** Weakness
- tH** Hypertension
- F** Fasciculations (muscle twitching)

OR **“SLUDGE BAM”**:

- Salivation (excessive production of saliva)
- Lacrimation (excessive tearing)
- Urination (uncontrolled urine production)
- Defecation (uncontrolled bowel movements)
- Gastrointestinal distress (cramps)
- Emesis (excessive vomiting)

B Breathing Difficulty

A Arrhythmias

M Myosis (pinpoint pupils)

Treatment in addition to above:

In the setting of an exposure to a nerve agent, the most rapid absorption occurs through the respiratory tract. When it is suddenly determined that providers are in the Hot Zone, do not look for the invisible vapor cloud. Providers should hold their breath until they don protective breathing apparatus and clear their mask or evacuate as far as possible.

Do not administer nerve agent antidotes before actual exposure to nerve agents or development of clinical symptoms occurs. Nerve agent antidotes may degrade performance in the hot zone

(creating a heat-stressed provider) and should be administered only when symptoms and signs of nerve agent poisoning are present.

FR/BLS/ILS

1. If a patient is exposed:
 - a. Protect Emergency Responders.
 - b. Utilize ICS.
 - c. Activate Regional EMS Disaster Plan.
 - d. Determine Decontamination Needs.
2. In the Hot Zone:
 - a. Treat severe exposures in adolescents/adults with one **Mark I kit**, if available.
 - b. Remove to warm zone. Label or tag patient to identify dosage given.
 - c. Children < 14yo, remove to warm zone.
3. In the Warm Zone:
 - a. Decontaminate patients.
 - b. Reassess patients and triage.
 - c. Continue treatment in adults severely exposed who received a **Mark I kit** in the Hot Zone.
 - d. Institute treatment in all symptomatic children and those adolescents/adults with mild/moderate symptoms.
4. No signs or symptoms:
 - a. Removal to Safe Zone, decontamination, observation & transport.
5. If only symptoms are pinpoint pupils and/or runny nose, DO NOT TREAT.
6. Assessing efficacy of treatment:
 - a. Adequate treatment is marked by drying of secretions and maintenance of a heartrate above 90 beats per minute (bpm). Pupillary constriction (pinpoint/miosis) usually occurs from direct exposure, will not respond to systemic atropine, and should not be used as a sign of the effect of treatment.
7. The duration of effect of each 2 mg **Atropine Auto-Injector** is approximately 5 to 15 minutes. If secretions return and the pulse drops below 90 bpm, then additional atropine treatment should be given.
8. Advanced Life Support care should be initiated once the patient is adequately decontaminated.

Adult:

EXPOSURE	CLINICAL	TREATMENT
No Signs or Symptoms	None	
Mild Exposure	SOB, wheezing, runny nose	One Mark I Kit
Moderate Exposure	Vomiting, diarrhea, pinpoint pupils, drooling	Two Mark I Kits
Severe Exposure	Unconsciousness, paralysis, cyanosis, seizures	Three Mark I Kits . The first may be given in the Hot Zone.

Pediatric:

Children 3-7 years of age with severe symptoms: one **Mark I kit**.

Children 8-14 years of age with severe symptoms: two **Mark I kits**.

9. Dosages may be repeated in 10 minutes if the patient remains symptomatic.

ALS

Adult:

EXPOSURE	CLINICAL	TREATMENT
No Signs or Symptoms	None	
Mild Exposure	SOB, wheezing, runny nose	One Mark I Kit or Atropine 2mg IM/IV)
Moderate Exposure	Vomiting, diarrhea, pinpoint pupils, drooling	Two Mark I Kits or Atropine 2-4mg IM/IV
Severe Exposure	Unconsciousness, paralysis, cyanosis, seizures	Three Mark I Kits or Atropine 6mg IM/IV. The first Mark I kit may be given in the Hot Zone.

Pediatric:

	PATIENT AGE	ANTIDOTES (IV/IM)	ANTIDOTES (IV/IM)
		MILD/MODERATE	SEVERE
INFANT	0-6 months (< 7 kg)	0.25mg Atropine	0.5mg Atropine
INFANT	7 months – 2 years (7-13 kg)	0.5mg Atropine	1mg Atropine
CHILD	3-7 years (14-25kg)	1mg Atropine	2mg Atropine
CHILD	8-14 years (26-50kg)	2mg Atropine	4mg Atropine
ADOLESCENT/ADULT	>14 years (> 51 kg)	2mg Atropine	4mg Atropine

10. Dosages may be repeated in 10 minutes if the patient remains symptomatic.
11. Treat seizures per the **Seizure SOG**.
12. Contact Medical Control to consider **DIAZEPAM** or **MIDAZOLAM** for muscle rigidity.

HAZMAT Medic

Adult:

EXPOSURE	CLINICAL	TREATMENT
No Signs or Symptoms	None	
Mild Exposure	SOB, wheezing, runny nose	One Mark I Kit or Atropine 2mg IM/IV and 2 PAM 600mg IM (1 gram IV)
Moderate Exposure	Vomiting, diarrhea, Pinpoint pupils, drooling	One-Two Mark I Kits or Atropine 2-4mg IM/IV and 2 PAM 600 – 1200mg IM (1 gram IV)
Severe Exposure	Unconsciousness, paralysis, cyanosis, seizures	Three Mark I Kits or Atropine 6mg IM/IV and 2 PAM 1800mg IM or 1 gram 2 PAM IV repeated twice at hourly intervals. Valium or Versed per Medical Control

Pediatric:

	PATIENT AGE	ANTIDOTES (IV/IM)	ANTIDOTES (IV/IM)
		MILD/MODERATE	SEVERE
INFANT	0-6 months (< 7 kg)	0.25mg Atropine 2 PAM 15 mg/kg	0.5mg Atropine 2 PAM 15 mg/kg
INFANT	7 months – 2 years (7-13 kg)	0.5mg Atropine 2 PAM 15 mg/kg	1mg Atropine 300 mg 2 PAM
CHILD	3-7 years (14-25kg)	1mg Atropine 300 mg 2 PAM	2mg Atropine 600 mg 2 PAM
CHILD	8-14 years (26-50kg)	2mg Atropine 600 mg 2 PAM	4mg Atropine 1200 mg 2 PAM
ADOLESCENT/ADULT	>14 years (> 51 kg)	2mg Atropine 600 mg 2 PAM	4mg Atropine 1200 mg 2 PAM

13. Dosages may be repeated in 10 minutes if the patient remains symptomatic.

METHEMOGLOBINEMIA-INDUCING AGENTS

Many chemicals (and medications in susceptible individuals) can oxidize the iron molecules in hemoglobin, rendering them incapable of carrying oxygen. The list of culprit chemicals and medications is long... too long to list in these guidelines.

Signs and Symptoms:

Patients suffering from methemoglobinemia will be profoundly cyanotic. They often exhibit some level of dyspnea, though not in proportion to the severity of their cyanosis. In severe poisonings, methemoglobinemia can be fatal. Pulse oximetry is unreliable in the setting of methemoglobinemia.

Treatment in addition to above:

HAZMAT Medic

1. Contact Medical Control to consider **METHYLENE BLUE** 1-2mg/kg IV over 3-5 minutes.

HYDRAZINES

Signs and Symptoms:

Symptoms of acute (short-term) exposure to high levels of hydrazine may include those of pulmonary irritants and seizures. Seizures caused by hydrazines can be severe and may not respond to treatment with benzodiazepines.

HAZMAT Medic

1. **PROPARACAINE** hydrochloride one (1) or two (2) drops per eye to assist with eye irrigation.
2. For seizures, administer **PYRIDOXINE**:

<u>Adult</u>	<u>Peds</u>
5g IV	1g IV
3. For all other side effects of hydrazine's, contact Medical Control to consider **PYRIDOXINE**.

VESICANTS

Vesicants, such as mustard gas, have no role in industry. They are included here only to raise awareness of their possibility as a chemical WMD.

Signs and Symptoms:

Mustard damages DNA in cells, which leads to cellular damage and death. Mustard penetrates skin and mucous membranes very quickly, and cellular damage begins within minutes. Despite this, clinical effects do not begin until hours later; the range is 2-24 hours, but usually 4 to 8 hours. The initial effects are in the eyes (itching or burning), the skin (erythema with itching and burning), and airways (epistaxis, hoarseness, sinus pain, cough). After high doses, these may progress to

more severe effects in the eyes (corneal damage), skin (blisters), and damage to the lower airways (dyspnea and productive cough). After absorption of a large amount, there may be damage to the gastrointestinal tract (vomiting, diarrhea) and bone marrow (damage to stem cells).

Treatment in addition to above:

1. Adequate decontamination is essential.
2. Treat as per Pulmonary Irritants and **BURN SOG**.

BIOLOGICAL WMD & PANDEMIC ILLNESSES

Look for the following clues that may suggest a bioterrorism event has occurred:

1. An unusual increase or clustering of patients presenting with unexplained illness and any of the following:
 - a. Sepsis
 - b. Pneumonia
 - c. Flacid muscle paralysis
 - d. GI illness
 - e. Bleeding disorders
 - f. Severe flu-like illness
 - g. Rash
 - h. Encephalitis/meningitis
2. A rapidly increasing disease incidence.
3. An unusual increase in the number of people seeking care, especially with fever, respiratory, or gastrointestinal symptoms.
4. Any suspected or confirmed communicable disease that is not endemic in our area (e.g., plague, anthrax, smallpox or viral hemorrhagic fever).
5. Any unusual age distributions or clustering of disease (e.g., chickenpox or measles in adults).
6. Simultaneous outbreaks in human and animal populations.
7. Any unusual temporal and/or geographic clustering of illness (e.g., persons who attended the same public event).

The signs and symptoms of bioterrorism agents are often nonspecific. EMS providers will likely be among the first personnel to note the above signs of a bioterrorist event!

Unlike chemical WMD, biological WMD may take hours to days to result in signs and symptoms. The identification of the specific pathogen is impossible in the prehospital, and often, the emergency department setting.

Transmission

No person to person transmission:

1. Inhalational Anthrax *Bacillus anthracis*
2. Tularemia *Francisella tularensis*
3. Alphaviruses Eastern/Western/Venezuelan Equine Encephalitis
4. Botulism
5. *Clostridium perfringens* toxin
6. Ricin
7. *Staphylococcus Enterotoxin B*
8. T2 Mycotoxin

Direct Contact:

1. Cutaneous Anthrax *Bacillus anthracis*
2. Brucellosis *Brucella* spp.
3. Glanders *Burkholderia mallei*

- | | |
|----------------------|---------------------------|
| 4. Melioidosis | Burkholderia pseudomallei |
| 5. Plague | Yersinia pestis |
| 6. Q-Fever | Coxiella burnetii |
| 7. Hendra Virus | |
| 8. Nipah Virus | |
| 9. Rift Valley Fever | Phlebovirus |
| 10. Smallpox | Variola major virus |

Respiratory Contact:

- | | |
|---|---------------------|
| 1. Glanders | Burkholderia mallei |
| 2. Plague | Yersinia pestis |
| 3. Smallpox | Variola major virus |
| 4. Viral Hemorrhagic Fever (Ebola, Marburg, etc.) | |

Signs and Symptoms

There is significant overlap amongst Biological WMD agents and common pathogens such as influenza. Thus, maintaining a high index of suspicion based on the above clues is vital. The onset of symptoms and mortality rate also varies widely amongst agents.

Signs/Symptoms by System

Anthrax

Plague

Tularemia

Brucellosis

Q Fever

Bacterial Diarrhea

Smallpox

Viral Encephalitides

Viral Hemorrhagic Fevers

Botulinum

Enterotoxins

Ricin

Mycotoxins

	Anthrax	Plague	Tularemia	Brucellosis	Q Fever	Bacterial Diarrhea	Smallpox	Viral Encephalitides	Viral Hemorrhagic Fevers	Botulinum	Enterotoxins	Ricin	Mycotoxins
Respiratory	Nonproductive cough	X	X	X	X	X		X			X		
	Cough with bloody sputum		X										
	Chest discomfort	X	X	X	X	X			X				X
	Shortness of breath	X	X	X							X	X	X
	Respiratory failure/distress	X								X	X	X	X
Circulatory	Hypotension								X		X	X	X
	Shock	X							X		X		
	Hemorrhage			X					X				X
GI	Nausea		X		X	X			X		X	X	
	Vomiting		X	X		X	X	X	X	X	X	X	X
	Abdominal pain	X	X	X		X	X		X		X		X
Skin	Diarrhea		X	X		X		X	X	X	X		X
	Skin lesions	X	X	X			X						X
	Skin inflammation						X		X				X
Neuromuscular	Drowsiness							X					
	Weakness/prostration		X	X	X	X	X			X		X	
	Progressive weakness of extremities									X			
	Muscular pain		X	X	X	X			X		X		
	Muscle rigidity						X						
General	Flaccid paralysis, usually neck									X			
	Chills		X	X	X	X	X		X		X		
	Fever	X	X	X	X	X	X	X	X		X	X	
	Fatigue	X											
	Headaches		X	X	X	X	X	X	X		X		
	Sore throat		X	X	X	X		X	X				
	Swollen lymph nodes	X	X	X	X							X	

Differentiating Smallpox From Varicella (Chicken Pox)

	Smallpox	Varicella
Prodrome	High fever (>102°F) and systemic symptoms (prostration, severe headache, backache, abdominal pain, or vomiting) 1-4 days before rash onset	No or mild prodrome before rash onset
Location of First Lesion(s)	Oral mucosa/palate followed by rash on face or forearms	Trunk (occasionally face)
Characteristics of Rash	Deep, firm, well-circumscribed pustules; may be confluent or umbilicated	Typically, superficial vesicles
	Concentrated on face and distal extremities (centrifugal)	Concentrated on trunk and proximal extremities (+/- face, scalp)
	Lesions in same stage of evolution on any one part of the body.	Rash appears in crops so lesions are in different stages of evolution (papules, vesicles, scabs) on any one part of the body
	Lesions on palms and soles (seen in >50% of cases)	Very uncommon for lesions to appear on palms and soles
	Lesions may itch as scabbing takes place	Lesions generally intensely itchy
	Lesions evolve from papule to pustule in days	Lesions generally evolve from macules to papules to vesicles to scabs in <24 hours
Duration of Illness	Illness lasts 14-21 days	Illness lasts 4-7 days

FR/BLS/ILS/ALS

1. Patient decontamination is generally not indicated. The only exception may be T2 mycotoxin, ricin, staph enterotoxin B, and clostridium perfringens toxins.
2. Institute PPE with gowns, gloves, and N95 masks until the etiology can be determined. Await further direction from your Resource Hospital.
3. Follow the appropriate SOG based on patient symptoms. No specific treatment is indicated in the prehospital setting.

RADIATION INJURIES

Radiation is a general term applied to the transmission of electromagnetic or particle energy. This energy can include nuclear energy, ultraviolet light, visible light, infrared and X-ray. Radiation becomes a danger when people are exposed to synthetic sources that greatly increase its intensity. Keep in mind that radiation emergencies should be handled only by those with proper protective equipment and adequate training.

Radiation exposure can occur through two mechanisms:

1. Exposure to a strong radioactive source.
2. Contamination by dust, debris or fluids that contain very small particles of radioactive material.

At no time during or after an incident does an exposed patient carry radioactive material or emit radiation. People who have been exposed to radiation do not become radioactive or contaminated. They present no potential for harm to caregivers.

In contrast, contamination involves not only exposure, but radioactive materials present either externally or internally. As a result, the contaminated patient is continuously exposed to radiation and will give off radiation to responding rescuers until the contaminated material is removed.

Three factors influence radiation exposure:

1. Time: The longer the exposure to the source, the greater the potential for injury.
2. Distance: Radiation strength reduces quickly as distance from the source increases.
3. Shielding: The denser the material, the greater its ability to stop radiation.

A radiological dispersion device, otherwise known as a dirty bomb, is a potential terrorist weapon. It is simply an improvised explosive device with radioactive material. It is not a nuclear device. Initial protocols of the responders would not differ regardless of the isotope in the bomb.

Acute Radiation Exposure

A Local Radiation Injury can cause loss of body hair on exposed parts, erythema, desquamation, blisters and local necrosis.

Acute Radiation Sickness (ARS) is a generalized illness that has four distinct stages. There also are three classic ARS syndromes described.

1. Prodromal stage (N-V-D stage): Nausea, vomiting and possibly diarrhea.
2. Latent stage: Generally looks and feels healthy for a few hours or even up to a few weeks.
3. Manifest illness stage: Symptoms depend on the specific syndrome and last from hours to several months.
 - a. Bone marrow syndrome (also referred to as hematopoietic syndrome): The primary cause of death is the destruction of the bone marrow, resulting in sepsis and hemorrhage.
 - b. Gastrointestinal (GI) syndrome: Destructive and irreparable changes in the GI tract and bone marrow usually cause infection, dehydration and electrolyte imbalance. Death usually occurs within 2 weeks.

- c. Central Nervous System (CNS) syndrome: patients experience confusion, disorientation, seizures, cerebral edema and coma. Death occurs within 3 days.
4. Recovery or death: Patients who do not recover will die within days to several months. The recovery process may last from several weeks up to two years.

For assistance, 24-hour hotline numbers are available:

Argonne National Laboratory – Department of Energy
24-hour call – 630-252-4800

Illinois Department of Nuclear Safety
24-hour call – 217-785-0600

Poison Control Center

FR/BLS/ILS/ALS

1. Scene Safety is of the utmost importance.
 - a. Look for placarding on vehicles.
 - b. Attempt to stay upwind from smoke or fumes.
2. Do not approach the scene unless you are authorized and trained to do so and have the proper protective equipment.
3. **FOLLOW DIRECTIONS OF THE HAZMAT COMMAND ON SCENE.**
4. Notify dispatch of the radiation hazard. Request that the hospitals and ambulances be informed of a radiation incident.
5. Contact Medical Control as soon as possible and indicate the following:
 - a. Number of victims.
 - b. Medical status of victims.
 - c. Source of radiation.
 - d. Amount and kinds of radioactivity present.
6. Caution responders – male and female – of child-bearing age that radiation may cause infertility. If a radiation incident is suspected or confirmed, female personnel who are or might be pregnant should stay away from the scene.
7. Do not eat, drink, or smoke in the area of dust and debris. Responders should not set up a rehab sector in the area of dust and debris.
8. As directed by the HAZMAT Team:
 - a. Don protective equipment, hood, mask, shoe covers, gown or coveralls.
 - b. Clip dosimeter film badge under protective clothing, if available.

9. The high hazard zone is an area inside the Hot Zone of increased danger from radiation. The edge of the high hazard zone should be temporarily set at 500 meters.
 - a. Only rapid, life-saving, mission-critical activities using “scoop and run” techniques for basic airway management, hemorrhage control, and temporary spinal immobilization should be undertaken in the high hazard zone.
10. Once removed from the high hazard zone, it is extremely unlikely that any victim would have a high enough level of contamination to prevent rescuers from tending to high-priority injuries, especially if caregivers are using barrier skin and eye protection and respiratory protection. If a stabilizing intervention can save the life of a patient or prevent acute morbidity, it should be undertaken regardless of environmental or victim contamination.
11. Otherwise, basic triage will not change. Inside the Hot Zone, but outside the high hazard zone, the public should be evacuated and emergency workers’ time in the area should be minimized. A responder may work here for several hours or more without exceeding federal guidelines.
 - a. No one can be dismissed as “well” and allowed to leave the scene without decontamination.
12. The HAZMAT team will need to decontaminate the patient before you provide care other than immediate life-saving care unless a life-threatening emergency exists. Do not attempt to clean or care for radiation patients until they are in a safe area and are decontaminated. **DO NOT TRANSPORT A CONTAMINATED PATIENT FROM THE SCENE PRIOR TO DECONTAMINATION.**
 - a. Individuals contaminated with radioactive liquid or solids will need removal of clothes and irrigation. Simply removing their outer clothing reduces their dose by 90%.
13. The use of standard personal protective equipment (PPE) provides caregivers sufficient protection from contamination.
 - a. At a blast scene, providers should don a gown, gloves, and N95 mask.
 - b. While internally and externally contaminated patients may cross-contaminate or excrete the radioactive material in their body fluids, the universal precautions used for infection control are all that is necessary to protect health care workers from radioactive material uptake.
 - c. In the rare instance that shrapnel from the radioactive source becomes embedded in a patient, the source could present a hazard to the victim and caregivers with prolonged contact.
14. Establish casualty collection points, and proceed with disaster triage and treatment.
15. Attempt to determine time, type, and severity of radiation exposure for the victim(s).
16. All EMS vehicles will be out of service until they have undergone complete decontamination.
17. All EMS personnel must report to a hospital or HAZMAT Team decontamination team following an exposure.

Section XII: Patient Assessment Tools

CPR FOR ADULTS, CHILDREN, AND INFANTS (EXCLUDING NEWLY BORN)

Maneuver	Adult (Adolescent and older)	Child (1 year to adolescent)	Infant Under 1 year of age
CIRCULATION			
Pulse check (≤10 sec)	Carotid		Brachial or femoral
Compression landmarks	Center of chest, between nipples.		Just below nipple line.
Compression method	2 Hands: Heel of 1 hand, other hand on top	2 Hands: heel of 1 hand with second on top OR 1 Hand: Heel of 1 hand only	1 rescuer: 2 fingers
Push hard and fast			2 rescuers: 2 thumb- encircling hands technique
Allow complete recoil.			
Compression depth	At least 2 inches.	Approximately 1/3 to 1/2 the depth of the chest.	
Compression rate	Approximately 100-120/min		
Compression- Ventilation ratio	30:2 (1 or 2 rescuer CPR)	30:2 for 1-rescuer CPR (15:2 for 2-rescuer CPR)	
AIRWAY	Head tilt-chin lift (jaw thrust for suspected trauma)		
BREATHS	2 effective breaths at 1 second/breath		
Rescue breathing without chest compressions.	10 to 12 breaths/min (approximately 1 breath every 5 to 6 seconds)	12 to 20 breaths/min (approximately 1 breath every 3 to 5 seconds)	
Rescue breaths for CPR with advanced airway.	8 to 10 breaths/min (approximately 1 breath every 6 to 8 seconds)		
Foreign-body airway obstruction	Responsive: Abdominal thrusts until unresponsive, then begin CPR.		Responsive: Back slaps and chest thrusts.
	Unresponsive: begin CPR.		
DEFIBRILLATION			
AED	Use adult pads. Do not use child pads/child system.	Use child pads/child system if available. If not, use adult AED and pads.	

Use AED as soon as available for witnessed collapse.
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PEDIATRIC VITAL SIGNS

AGE	ESTIMATED WEIGHT	AVERAGE HEART RATE	AVERAGE RESPIRATORY RATE	AVERAGE SYSTOLIC BP
PREMATURE	Less than 3 kg	160	Greater than 40	60
NEWBORN	3.5 kg	130	40	70
3 mo.	6 kg	130	30	90
6 mo.	8 kg	130	30	90
1 yr.	10 kg	120	26	90
2 yrs.	12 kg	115	26	90
3 yrs.	15 kg	110	24	90
4 yrs.	17 kg	100	24	90
6 yrs.	20 kg	100	20	95
8 yrs.	25 kg	90	20	95
10 yrs.	35 kg	85	20	100
12 yrs.	40 kg	85	20	100
14 yrs.	50 kg	80	18	110
ADULT	Greater than 50 kg	80	18	120

Normal Systolic Blood Pressure is roughly equal to $70 + (2 \times \text{age})$ for children >1 year of age.

PEDIATRIC RESUSCITATION

AGE	DEFINITION OF HYPOTENSION	LARYNGOSCOPE BLADE	ETT SIZE	ETT DEPTH AT LIPS (cm)	SUCTION CATHETER
PREMATURE	60	Miller 0	2.5, 3.0	8	5-6 Fr
NEWBORN	60	Miller 0-1	3.05, 3.5	9 to 10	6-8 Fr
3 mo.	70	Miller 1	3.5	10	
6 mo.	70	Miller 1	3.5, 4.0	10.5-12	6-8 Fr
1 yr.	70	Miller 1	4.0, 4.5	12-13.5	8 Fr
2 yrs.	70	Miller 2, Mac 2	4.0, 4.5	13.5	8 Fr
3 yrs.	75	Miller 2, Mac 2	4.5- 5.0	13-14	
4 yrs.	75	Miller 2, Mac 2	5	15	10 Fr
6 yrs.	80	Miller 2, Mac 2	5.0- 5.5	16.5	10 Fr
8 yrs.	85	Miller 2, Mac 2	6 cuffed	18	12 Fr
10 yrs.	90	Mac 2	6.5	19.5	12 Fr
12 yrs.	90	Mac 3	7	21	12 Fr
14 yrs.	90	Mac 3	7-7.5	21	12 Fr
ADULT	90	Mac 4,5	7.5- 8.0	21-23	12 Fr

Lower limit of Systolic Blood Pressure is roughly equal to $70 + (2 \times \text{age})$ for children > 1 year of age

ET size is equal to $1/4 \text{ age} + 4$.

Note: Select a tube or blade size based on the size of the child, not his or her chronological age. Prepare tubes that are one size larger and one size smaller than the one you select.

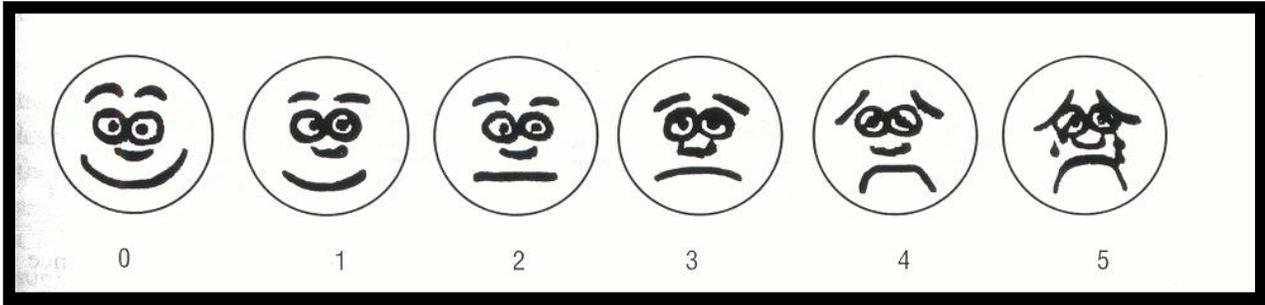
THROMBOLYTIC CHECKLIST FOR STEMI

1. Has the patient experienced chest discomfort for greater than 15 minutes and less than 12 hours?
2. Does ECG show STEMI or new or presumably new LBBB?
3. Are there contraindications to fibrinolysis?
 - a. Systolic BP > 180 to 200 mm Hg or diastolic BP > 100 to 110 mm Hg.
 - b. Right vs left arm systolic BP difference > 15 mm Hg.
 - c. History of structural CNS disease.
 - d. Significant closed head/facial trauma within the previous 3 weeks.
 - e. Stroke > 3 hours or < 3 months.
 - f. Recent (within 2-4 weeks) major trauma, surgery (including laser eye surgery), GI/GU bleed.
 - g. Any history of intracranial hemorrhage.
 - h. Bleeding, clotting problem, or blood thinners.
 - i. Pregnant female (relative).
 - j. Serious systemic disease (i.e. advanced cancer, severe liver or kidney disease).
4. Is the patient at high risk?
 - a. Heart rate \geq 100/min AND systolic BP < 100 mm Hg
 - b. Pulmonary edema
 - c. Signs of shock (cool and clammy)
 - d. Contraindications to fibrinolytic therapy
 - e. Required CPR

GLASGOW COMA SCALE

	Adult	Child	Infant	
Eye opening	Spontaneous			4
	To speech			3
	To pain			2
	None			1
Best verbal response	Oriented, age-appropriate		Coos and babbles	5
	Confused		Irritable, cries	4
	Inappropriate words		Cries in response to pain	3
	Incomprehensible sounds		Moans in response to pain	2
	None			1
Best motor response	Obeys		Moves spontaneously and purposely	6
	Localizes painful stimulus		Withdraws to touch	5
			Withdraws to pain	4
			Decorticate posturing	3
			Decerebrate posturing	2
			None	1
TOTAL GLASGOW COMA SCORE:				
3-15 Points				

WONG BAKER'S FACES SCALE (PAIN SCALE)



A golden rule to follow in pain assessment is:

Whatever is painful to an adult is painful to an infant or child until proven otherwise!

APGAR SCORING FOR THE NEWLY BORN

APGAR SCORING	0	1	2	1 min	5 min
Appearance (color)	BLUE PALE	BLUE HANDS & FEET	ENTIRELY PINK		
Pulse (heart rate)	ABSENT	< 100/min	> 100/min		
Grimace (reflex irritability)	NO RESPONSE	GRIMACE	COUGH OR SNEEZE		
Activity (muscle tone)	LIMP	SOME FLEXION OF EXTREMITY	ACTION/ MOTION		
Respiratory effort	ABSENT	WEAK CRY/ HYPOVENT- ILATION	STRONG CRY		
			TOTALS		

ADULT REVISED TRAUMA SCORE

Glasgow Coma Score Conversion Points	GCS 13-15	4	
	GCS 9-12	3	
	GCS 6-8	2	
	GCS 4-5	1	
	GCS 3	0	
Respiratory Rate	10-29	4	
	> 29	3	
	6-9	2	
	1-5	1	
	0	0	
Systolic Blood Pressure	> 89	4	
	76-89	3	
	50-75	2	
	1-49	1	
	0	0	
TOTAL REVISED TRAUMA SCORE: 0-12 Points			

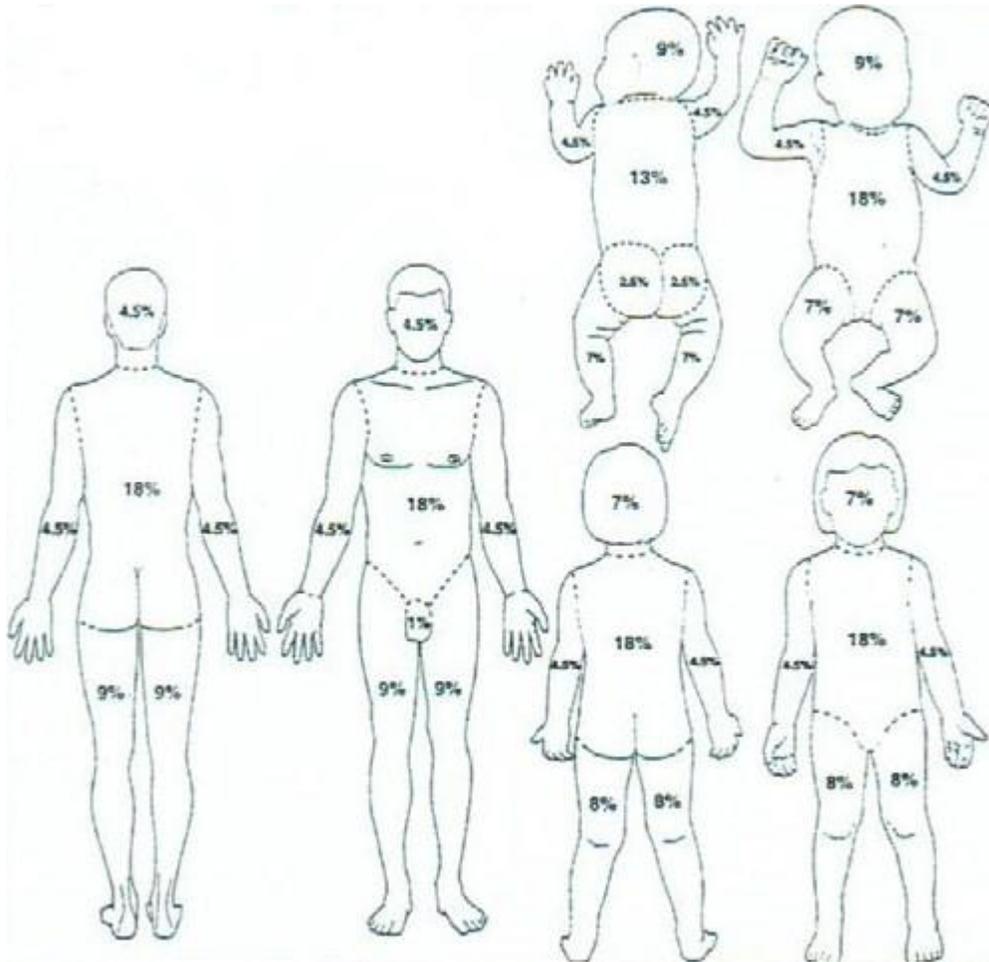
PEDIATRIC TRAUMA SCORE
(16 years or less)

Size of Patient	>20kg	+2	
	10-20kg	+1	
	<10kg	-1	
Airway	Normal	+2	
	Maintainable	+1	
	Unmaintainable or intubated	-1	
Systolic Blood Pressure*	>90	+2	
	50-90	+1	
	<50	-1	
CNS	Alert	+2	
	Altered/Obtunded	+1	
	Unresponsive	-1	
Skeletal Injury	None	+2	
	Closed Fracture	+1	
	Open or Multiple Fracture	-1	
Open Wounds	None	+2	
	Minor	+1	
	Major	-1	
TOTAL PEDIATRIC TRAUMA SCORE:			
-6 to 12 Points			

*If a blood pressure cuff is not available, blood pressure can be rated as:
+2 = radial pulse palpable, + 1 = femoral pulse palpable, -1 = no pulse palpable

A PTS ≤ 8 indicates the need for evaluation at a Pediatric Trauma Center.

BODY SURFACE AREA
The Rule of Nines



Section XIII: Procedures

CAPNOGRAPHY

Indications:

1. Patients with an advanced airway placed (ETT, King Airway, LMA).
2. Non-intubated patients with dyspnea.

Procedure:

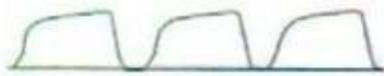
1. Advanced airway patient
 - a. When you have placed an advanced airway, immediately attach the ETT filter line between the airway and the BVM prior to administering your first ventilation. (As an alternative, color capnometry may be utilized initially to confirm placement, followed by waveform capnography utilization.)
 - b. Your first ventilation should be monitored with capnography and auscultated with a stethoscope over the epigastrium.
 - c. Normal capnography levels in the perfusing patient should read between 35-45 mm Hg.
2. Non-intubated patient
 - a. Place the nasal cannula filter line on the patient either under the non-rebreather or with oxygen nasal cannula (combination device is preferred).
 - b. Normal levels should read between 35-45 mm Hg in the perfusing patient.

Interpretation:

1. Capnography levels:
 - a. Less than 35 mm Hg may reveal:
 - Hyperventilation
 - Decreased metabolic rate
 - Hypoperfusion
 - Airway obstruction
 - Air trapping
 - Cardiac arrest
 - b. Greater than 45 mm Hg may reveal:
 - Hypoventilation
 - Increased metabolic rate
 - Hypertension
 - Return of spontaneous circulation post cardiac arrest
 - Acidosis
2. Waveforms
 - a. Normal is a square shape
 - b. Bronchospasm has an increasing alveolar plateau (“shark fin”) and/or a rounded shape
 - c. Pulmonary embolus may have a “notched” alveolar plateau
 - d. ETT cuff is not inflated adequately or the ETT is too small.
 - e. Rebreathing CO₂ will have a rising baseline that doesn’t return to zero. (Give a longer

expiratory phase.)

3. Trending
 - a. Increasing levels may indicate the same conditions causing high levels.
 - b. Decreasing levels may indicate the same conditions causing low levels.
 - c. Sudden drop in the level may indicate a sudden drop in cardiac output.
 - d. Cessation of waveforms may indicate apnea or a dislodged ETT.
4. When no CO₂ is detected, 3 factors must be quickly evaluated for cause:
 - a. Loss of airway function – Improper tube placement, apnea.
 - b. Loss of circulatory function – Massive PE, cardiac arrest, exsanguinations.
 - c. Equipment malfunction – Tube dislodgement or obstruction.



Normal Waveform



Bronchospasm



Notched Waveform
(PE or Paralytic Effect)



Loss of Waveform
(ETT dislodged or Apnea)



Increasing CO₂



Decreasing CO₂

Trending Waveforms

SUCTIONING

Basic Suctioning

1. Explain the procedure to the patient if they are coherent.
2. Examine the oropharynx and remove any potential foreign bodies or material that may occlude the airway if dislodged by the suction device.
3. If applicable, remove ventilation devices from the airway.
4. Use the suction device to remove any secretions, blood, or other substances.
5. The alert patient may assist with this procedure.

Deep Suctioning & Tracheostomy Suctioning

When an intubated patient or a patient with a tracheostomy presents with increased secretions, mucous plugging, hypoxia, or increased work of breathing, deep/tracheostomy suctioning should be performed.

1. Put on gloves and full face protection.
2. For King Airways, suction only from the lumen of the King. Do not attempt to suction beyond the length of the King, as this may promote laryngospasm. For intubated patients, using the suprasternal notch as a guide, measure the depth desired for the catheter (judgment must be used regarding the depth of suctioning with cricothyrotomy and tracheostomy tubes).
3. If applicable, remove ventilation devices (BVM) from the airway.
4. With the thumb port of the catheter uncovered, insert the catheter through the airway device.
5. Once the desired depth has been reached, occlude the thumb port and remove the suction catheter slowly. Limit all suction attempts to less than 10 seconds.
6. A small volume (< 10 ml) of normal saline lavage may be used as needed.
7. Reattach the ventilation device (e.g., bag-valve mask), and ventilate the patient
8. Document time and result in the patient care report.

Deep Tracheal Suctioning of the Neonate

1. Put on gloves and full-face protection.
2. After the head has been delivered, but before the thorax is delivered, the mouth and nose should be cleared of the meconium fluid. Using a bulb aspirator, gently suction mouth, both nostrils and posterior pharynx to remove any blood or amniotic fluid. A piece of gauze wrapped around the index finger may be used to collect tenacious collections of meconium

from the mouth, pharynx and exterior of the nares.

3. Immediately after delivery and prior to inducing respiratory effort, aspirate meconium from the trachea by way of the endotracheal tube:
 - a. Connect suction to the appropriately sized endotracheal tube. If a meconium aspirator is available, place it between the endotracheal tube and the suction tubing.
 - b. Intubate the patient.
 - c. Apply suction directly to the endotracheal tube and withdraw slowly. If a significant amount of meconium is obtained from the initial suctioning attempt, the infant may be reintubated with a clean endotracheal tube and suctioned once more. It may not be possible to clear the trachea of all meconium before the need to initiate positive pressure ventilation.
 - d. If a meconium aspirator is unavailable, intubate the patient and utilize the largest diameter french suction catheter available through the endotracheal tube.

CRICOID PRESSURE

Cricoid pressure is NOT for routine use in the cardiac arrest patient unless needed to visualize the vocal cords. However, cricoid pressure (Sellick's Maneuver) can play a vital role in effectively ventilating a patient and preventing aspiration. Slight pressure directed posteriorly on the cricoid cartilage can significantly limit the possibility of regurgitation by occluding the esophagus. In addition, it may improve visualization of the glottis during laryngoscopy.

Cricoid pressure is not indicated in children less than one year of age, and should be used with caution in all other children. (The cricoid cartilage is softer and more flexible.) Cricoid pressure is NOT routinely indicated in the cardiac arrest patient unless it is necessary to visualize the glottis.

1. Locate the thyroid cartilage (Adam's apple).
2. There is a depression felt just below the thyroid cartilage. This is the cricothyroid membrane.
3. The prominence below the membrane is the cricoid cartilage.
4. Using the thumb and forefinger of one hand, apply straight downward pressure (approximately 5-6 lbs. of pressure) on the cricoid cartilage.

DIRECT LARYNGOSCOPY FOR REMOVAL OF A FOREIGN BODY AIRWAY OBSTRUCTION

1. Visualize the airway via direct laryngoscopy. Discern between anatomical landmarks and the foreign body.
2. When the obstruction is visualized, use the Magill forceps in your right hand to grasp the material and gently remove it from the lower airway.
3. Suction any small particles or liquid from the posterior airways.
4. If the patient is apneic, intubate the trachea and ventilate with 100% oxygen.

BAG VALVE MASK VENTILATION

1. Have suction available since vomiting may occur.
2. Select the correct size mask and bag, attach oxygen and set at 15-25 LPM. Use an appropriate size mask to avoid pressure over the eyes (pediatric patient), which may cause vagal stimulation and to obtain a good seal.
3. Open the patient's airway.
4. If the patient is unresponsive, insert an oropharyngeal or a nasopharyngeal airway.
5. Place the mask onto the patient's face, ensuring a good seal.
6. For single provider BVM use the "E-C clamp" technique to achieve an adequate seal and avoid pressure on the soft tissues of the face or neck: Place the third, fourth, and fifth fingers along the jaw to provide a chin lift (forming an E); use the thumb and index finger to hold the mask on the child's face (forming a C).
7. In the perfusing patient, begin ventilations as soon as possible at the rate of:
 - a. Adults and children – 1 ventilation every 5 seconds.
 - b. Infants – 1 ventilation every 3 seconds.
 - c. Premature neonate – 1 ventilation every 2 seconds.
8. In the non-perfusing patient (full cardiopulmonary arrest), ventilate at a rate of:
 - a. Adults – 1 ventilation every 5 seconds.
 - b. Children and infants – 1 ventilation every 2 seconds.
 - c. Premature neonate – 1 ventilation every 2 seconds.
 - d. Titrate your ventilator rate to keep the ETCO₂ level between 35-45 mmHg.
9. Recheck the oxygen level of the source periodically.
10. If the patient does not have adequate chest rise and breath sounds with BVM, consider the following interventions:
 - a. Use 2-hand jaw lift and oral airway to relieve tongue obstruction. (Most common cause.)
 - b. Use the larger bag to increase the volume of air delivered into the patient.

SUGGESTED SIZE FOR RESUSCITATION MASKS

Age	Mask Size
Premature infants	Neonatal
Newborn to 1 year	Infant
1 – 4 years	Toddler
4 – 10 years	Pediatric
10 – 14 years	Small adult
Adult	Adult

SUGGESTED SIZE FOR RESUSCITATION BAGS

Age/Weight	Bag Size
Newborn to 3 months	Neonatal 450-500 mL
Child less than 30 kg	Pediatric 750 mL
Child over 30 kg	Adult 1000-1200 mL
Adult	Adult 1000-1200 mL

GUIDELINES FOR OROTRACHEAL INTUBATION

Indications:

1. Unable to ventilate an unconscious patient with conventional methods.
2. The patient cannot protect his or her airway. Loss of protective airway reflexes (i.e. coughs, gag).
3. Prolonged artificial ventilation is needed.
4. Excessive work of breathing.
5. Inadequate oxygenation despite administration of oxygen, CPAP.
6. Impaired CNS control of ventilation.
7. Airway obstruction (functional or anatomic).

Prior to Insertion:

1. Preoxygenate the patient for several minutes with 100% oxygen, if possible.
2. Ventilations should never be interrupted for more than 30 seconds for any reason.
3. In trauma patients, orotracheal intubation is accomplished with the patient's head and neck stabilized in a neutral position.
4. In children, orotracheal intubation is best accomplished with the child's head in the sniffing position.
5. Don protective equipment.
6. Prepare equipment including suctioning, cardiac monitor, and pulse oximetry in the patient with a perfusing rhythm.
7. Prepare capnography, if available.

Insertion Procedure:

1. Insert the laryngoscope blade:
 - a. Curved blade
 - Open patient's mouth with the right hand.
 - Remove any dentures that are present.
 - Grasp laryngoscope in left hand and spread the patient's lips, inserting blade between the teeth.
 - Pass blade to the right of the tongue and advance into the hypopharynx, sweeping the tongue to the left.
 - Lift the laryngoscope upward and forward, without changing the angle of the blade.
 - Insert tip of the blade into the vallecula, indirectly lifting the epiglottis and exposing the vocal cords.
 - b. Straight blade
 - Follow steps as outlined for curved blades, but advance blade down the hypopharynx, and lift the epiglottis with the tip of the blade to expose the vocal cords.
 - For patients <2 years old, the straight blade is preferred because it provides greater displacement of the tongue and better visualization of the glottis opening.
2. Apply cricoid pressure as necessary.
3. After identifying the desired landmarks, insert the endotracheal (ET) tube between the patient's vocal cords to the desired depth.
4. In pediatric patients, the tube should be placed only 5 to 10 mm past the vocal cords.
5. The laryngoscope is then removed while holding the ET tube in place; the depth marking on the side of the ET tube is noted.

6. If a stylet has been used (strongly recommended), it should be removed at this time.
7. Inflate the pilot valve with enough air to complete the seal between the patient's trachea and the cuff of the ET tube (usually 8-10mL).
8. Attach a BVM and ventilate while observing for chest rise with each delivered breath.
9. Visualization of the endotracheal tube passing through the cords is essential.
10. To ensure proper ET tube placement bilateral breath sounds and absence of air sounds over the epigastrium should be noted. Endotracheal tube placement must be verified by a secondary device.
11. Continue to manually stabilize and secure the ET tube in the determined proper position and monitor for good oxygenation and ventilation.

Notes/Precautions:

1. Intubation attempts should not exceed 30 seconds.
2. In patients that can be ventilated effectively with a BVM, intubation attempts should be limited to two.
3. Management of the endotracheal tube should be of the highest priority during any movement of an intubated patient.
4. The provider securing the tube is in charge of directing patient movement.
5. BVM is to be disconnected from the tube during any transitional movement including:
 - a. Log-rolling patient onto a backboard.
 - b. Moving patient onto a stretcher.
 - c. Loading and unloading from ambulance or helicopter.
 - d. Transfer to the hospital stretcher.
6. The tube is to be reassessed following any patient movement.
7. Any time the proper placement of the tube cannot be verified, it is to be immediately removed and BVM ventilation started.

GUM-ELASTIC BOUGIE ASSISTED INTUBATION

Indications:

1. Any patient who meets clinical indications for endotracheal intubation. (Appropriate to use with any attempt).
2. Initial intubation attempt unsuccessful.
3. Predicted difficult intubation.

Contra-indications:

1. Two failed orotracheal intubation attempts. (Move to King LT placement.)
2. Introducer larger than ETT internal diameter.

Notes/Precautions:

1. Soft tissue damage or bronchial rupture may occur:
 - a. During blind intubation.
 - b. Positioning past the carina.
 - c. If undue pressure is applied.
 - d. If ET tube is passed over introducer without the use of a laryngoscope.
2. This is a single-use device. Do not attempt to clean or sterilize.
3. For optimal use, store flat in the same shape as packaged. Do not fold or roll up to save space.

Procedure:

1. Prepare and perform an optimal direct laryngoscopy in accordance with the orotracheal intubation procedure.
2. Begin insertion of introducer. Introduce the Bougie with curved tip anteriorly, and visualize the tip passing the vocal cords or above the arytenoids if the cords cannot be visualized.
 - a. Tactile confirmation of tracheal clicking will be felt as the distal tip of the introducer bumps against the tracheal rings.
 - b. If tracheal clicking cannot be felt, continue to gently advance the introducer until “hold up” is felt.
 - c. Tracheal clicking and “hold up” are positive signs that the introducer has entered the trachea.
3. Lack of tracheal clicking or hold-up is indicative of esophageal placement.
4. While holding the introducer securely, and without removing the laryngoscope, advance endotracheal tube over the proximal tip of the introducer.
5. As the tip of the endotracheal tube passes beyond the teeth, rotate the tube 90 degrees counterclockwise (1/4 turn to the left) so tube bevel does not catch on the arytenoids cartilage.
6. Advance endotracheal tube to the proper depth.
7. Holding endotracheal tube securely, remove introducer.
8. Verify correct placement of ET tube in accordance with the orotracheal intubation procedure.

GUIDELINES FOR NASOTRACHEAL INTUBATION

Advantages:

1. Protects the airway from aspiration
2. Provides access to the tracheobronchial tree for suctioning
3. Permits intermittent positive pressure ventilation with 100% oxygen
4. Does not contribute to gastric distention
5. Maintains a patent airway

Hazards:

1. Accidental intubation of the esophagus instead of the trachea
2. Excessive nasal bleeding
3. Aspiration of blood or vomitus while being intubated
4. Bradycardia

Indications:

1. The primary indication for blind nasotracheal intubation is a patient with a supraglottic airway obstruction (obstruction above the level of the vocal cords) such as angioedema, etc.
2. The patient must be breathing spontaneously.
3. Patient requiring endotracheal intubation but has potential for cervical spine injury.
4. Patient requiring endotracheal intubation but has clenched jaws (trismus) or severe trauma to the mouth.
5. Patient requiring endotracheal intubation but has an intact gag reflex, e.g. respiratory distress secondary to ETOH/drug overdose, stroke, chest or neck trauma, trauma etc.
6. Patient requiring endotracheal intubation but is trapped in a position that renders placement of a laryngoscope impossible.

Contraindications:

Apneic patients.

1. Patients who have midfacial fractures or are suspected of having basal skull fractures.
2. Patient who have bleeding disorders, or who are taking anticoagulant or are likely to receive heparin or thrombolytics.
3. Severe nasal trauma, pharyngeal hemorrhage, acute epiglottitis, suspected laryngeal fracture and suspected increased intracranial pressure.
4. Children under the age of 16.
5. Nasal polyps or obvious abnormalities.

Prior to Insertion:

1. Hyperventilate the patient for several minutes with 100% oxygen prior to insertion attempt.
2. Don protective equipment
3. Prepare equipment, including two (2) appropriate size endotracheal tubes 0.5 to 1.0 mm smaller than would have been used for oral intubation.
4. Check cuff integrity.
5. Insert the distal end of the tube into the proximal opening, thus molding it into a circular form. (Stylets are NOT to be utilized.)
6. Have **ATROPINE** available in case of sustained bradycardia.

Insertion Procedure:

7. Displace the tongue and jaw forward considering the potential for spinal injury.

8. Lubricate the tip and cuff of the tube with a water-soluble jelly.
9. With the bevel against the floor or septum of the nasal cavity, insert the tube into the largest nare directed posteriorly (not up).
10. Slowly advance the tube with a slight rotating motion.
11. Once the tube has successfully advanced through the nose and into the pharynx, listen closely to the breath sounds at the proximal end of the tube and observe tube for condensation.
12. If patient is conscious:
 - a. Ask him/her to take a deep breath.
 - b. Gently advance the tube 1-1.5 inches during inhalation.
13. If patient is unconscious:
 - a. Use Cricoid Pressure.
 - b. When the patient inhales, quickly but gently, advance tube 1-1.5 inches.
 - c. Continue to advance the tube. As the patient inhales, advance the tube gently and swiftly toward the glottic opening.
14. Note: Frequently once the tube has been inserted into the trachea the patient will cough violently. Do not withdraw the tube; hold the tube securely until the coughing has subsided.
15. Inflate the cuff.
16. Confirm placement and secure.

KING LT-D AIRWAY

The King Airway will be used by EMT-B/I/P and PHRNs for airway management in a critical patient's care.

Indications:

1. Intubation is impossible due to patient access or difficult airway anatomy.
2. Patient is greater than 4 feet in height.
3. Failed intubation attempt.

Contraindications:

1. Patient with intact gag reflex.
2. Ingestion of caustic substances.
3. Anatomy deforming facial trauma.
4. Patient height less than approved for King LT-D size being used.
5. Children who are below the age of 15 and of average height and weight.

Procedure:

1. Select the correct size KING LT-D airway:

Size	Height	Connector Color	Inflation Volume
3	4-5 feet	Yellow	45-60 mL
4	5-6 feet	Red	60-80 mL
5	>6 feet	Purple	70-90 mL

2. Test the cuff inflation system for air leaks.
3. Apply water soluble lubricant to the distal tip and posterior aspect of the tube, using caution not to allow lubricant to enter ventilator openings.
4. Pre-oxygenate.
5. Hold the airway at the connector with your dominant hand. With your non-dominant hand, hold the patient's mouth open and apply a chin lift. Using a lateral approach, introduce the tip into the mouth.
6. Advance the tip behind the base of the tongue while rotating the tube back to the midline so that the blue orientation line faces the chin of the patient.
7. Without exerting excessive force, advance the tube until the base of the connector is aligned with the teeth and gums.
8. Inflate the cuff of the King-LTD with air according to the correct size requirement minimum to seal the airway.
9. Attach the resuscitator bag to the airway. While bagging the patient, gently withdraw the tube until ventilation becomes easy and free flowing. If necessary, adjust cuff inflation to obtain a seal to obtain peak ventilator pressure.
 - a. You must see the chest rise, hear breath sounds, feel good compliance and hear no breath sounds over the epigastrium to be certain that the King LT is correctly placed
10. Attach waveform Capnography if available.
11. If the patient becomes conscious, you must remove the airway. Extubation may cause vomiting; be prepared to suction the pharynx and turn the backboard.

Note: Medications may not be administered through the King airway.

SEDATIVE-ASSISTED INTUBATION & RAPID SEQUENCE INTUBATION

Indications:

1. Patients \geq 10 years old.
2. When advanced airway management is required, but the patient is unable to tolerate laryngoscopy or airway placement.
3. When prolonged artificial ventilation is indicated.
4. Patient cannot protect his/her own airway e.g. respiratory distress, imminent respiratory arrest or no gag reflex.
5. Glasgow Coma Score <8 .
6. Severe chest injury with cyanosis and a respiratory rate >30 or <10 .
7. Imminent tracheal/laryngeal closure due to severe edema secondary to trauma, burns, or allergic process.
8. Altered mental status with significant risk of vomiting and aspiration, as in head injury, drug or alcohol intoxication and status epilepticus.

Contraindications:

1. Patient for whom intubation and ventilation are predicted to be difficult.

Procedure:

1. Place the patient on high flow oxygen delivered by NRB mask. If necessary, assist ventilations during preparation for intubation.
2. Prepare equipment, including rescue airway device (King LT).
3. Do not allow the patient to become hypoxic, proceed immediately with intubation.
4. Administer:
 - a. **ETOMIDATE** 0.3mg/kg rapid IVP OR
 - b. **MIDAZOLAM** 5mg IVP.
5. Apply cricoid pressure.
6. Attempt oral or oral in-line intubation as is case appropriate.
7. If proper muscle tone relaxation has not been achieved, may repeat:
 - a. **ETOMIDATE** 0.3mg/kg rapid IV after 60 seconds OR
 - b. **MIDAZOLAM** 5mg IVP after 2 minutes.
8. Intubation must be confirmed using cord visualization and auscultation.
9. Confirm endotracheal tube placement.
10. Secure ETT, and reassess breath sounds.
11. When available, place the patient on an approved transport ventilator.

12. If unable to intubate after two attempts and/or the patient suffers significant desaturation, attempt King LT placement.
13. If additional sedation is necessary to reduce or eliminate a recurrent state of agitation following intubation, refer to the **Chemical Sedation SOG**.

CCEMT-P

14. If no contraindications exist, administer **SUCCINYLBCHOLINE** 0.6-1.1 mg/kg IVP immediately after chosen sedative. (At this point, fasciculations may be noted.) Do not administer **SUCCINYLBCHOLINE** if untreated hyperkalemia is suspected, if there was a recent burn or crush injury, or if there is a history of myasthenia gravis.
15. IF CONTRAINDICATIONS TO **SUCCINYLBCHOLINE** EXIST, administer **ROCURONIUM** 0.6-1.2 mg/kg IVP.
16. Continue oxygenation until paralysis is noted (usually 1-3 minutes after **SUCCINYLBCHOLINE**).
17. When the patient appears adequately sedated and paralyzed, hyperventilate. Then, interrupt mask ventilation to intubate the trachea. In general, do NOT hyperventilate once placement is confirmed. Following successful intubation, print and include End-Tidal waveform with ECG strips including immediate post intubation AND immediately prior to transfer of care. Use of waveform capnography is mandatory after RSI.
18. If intubation is successful, administer **ROCURONIUM** 0.2mg/kg IVP to maintain paralysis.
 - a. If **ROCURONIUM** was initially used as the PRIMARY paralytic (in place of **SUCCINYLBCHOLINE**) withhold this maintenance dose of **ROCURONIUM** and proceed to sedation.
19. If sedation is unsuccessful, suction as needed and transport holding a secure mask seal and ventilate using the Newport Ventilator or BVM. No more than two attempts at endotracheal intubation are authorized at which point an alternative airway such as the King LT is to be utilized.
20. Administer **MIDAZOLAM** 2-4mg IVP for sedation following successful intubation.

CONFIRMATION OF ENDOTRACHEAL TUBE PLACEMENT

After intubation:

1. Immediately assess lung sounds over the epigastrium and both lung fields.
2. Assess for condensation in the endotracheal tube AND ADEQUATE CHEST RISE AND FALL.
3. Utilize waveform capnography when it is available.
4. When waveform capnography is not available, utilize color capnometry or esophageal detection device.

Utilization of a secondary device such as waveform capnography (preferred), color capnometry, or an esophageal detection device is MANDATORY.

GUIDELINES FOR TRANSTRACHEAL CATHETER VENTILATION (Pediatrics)

Indications:

1. Patients ≤ 8 years old for whom you are unable to intubate or ventilate by any other means:
 - a. Secondary to foreign body, tumor, infectious process, trauma causing a mechanical airway obstruction.
 - b. Laryngospasm or stenosis preventing ETT insertion.

Contraindications:

1. Loss of well-defined landmarks.
2. Bleeding disorders/diseases.
3. Overlying tumors or masses, especially hematomas.
4. Preexisting tracheostomy or tracheostomy scar.
5. Anytime a less invasive maneuver would allow ventilation of the patient.

Equipment Needed:

1. Disposable 12 or 14 gauge over the needle catheter with a 10ml syringe attached that contains 2ml of **NORMAL SALINE**.
2. High flow Oxygen.
3. Betadine solution for cleansing.
4. Hand resuscitator bag with Oxygen.
5. Proximal adapter from 3.0 or 3.5 ETT.

Procedure:

1. Locate the small depression immediately below the "V" shaped thyroid cartilage (Adam's apple). This corresponds to the cricothyroid membrane, where the procedure is accomplished.
2. Cleanse the area with Betadine.
3. Puncture the cricothyroid membrane with the catheter-needle in the midline and with the 10ml syringe firmly attached. Apply negative pressure to the syringe plunger as you slowly insert. Watch for the **NORMAL SALINE** to bubble.
4. Direct the cannula downward toward lungs at a 45-degree angle. Entrance of air bubbles into the syringe indicates that the needle is in the trachea and advancement should stop.
5. Slide the cannula off needle while holding it in place.
6. Attach BVM, and ventilate the patient.
7. Secure catheter in place with tape and hold secure with hands at all times constantly during transport.
8. Observe the chest carefully during passive chest exhalation: If the chest remains inflated, a proximal complete airway obstruction may be present. In this case, a second large bore catheter is inserted next to the first catheter to allow for exhalation.

Possible Complications:

1. Subcutaneous or mediastinal emphysema
2. Hemorrhage
3. Cough
4. Infection
5. Hypercapnia
6. Arterial perforation
7. Laryngospasm
8. Pneumocystitis
9. Esophageal Perforation
10. Broken needle aspiration
11. Improper placement
12. Aspiration

SURGICAL CRICOTHYROIDOTOMY

Indications:

1. Patients over 8 years of age and over 40 kg
2. Patients for whom you are unable to intubate or ventilate by any other means.
 - a. Secondary to foreign body, tumor, infectious process, trauma causing a mechanical airway obstruction.
 - b. Laryngospasm or stenosis preventing ETT insertion.

Contra-Indications:

1. Anytime a less invasive maneuver would allow ventilation of the patient.
2. Patient less than or equal to 8 years of age or less than or equal to 40 kg.
3. Tracheal transection.
4. Fractured larynx or significant damage to the cricoid cartilage or larynx.
5. Coagulopathy.
6. Neck deformity – tumor/mass, hematoma, unable to identify landmarks.

Procedure:

1. Position patient supine with head slightly extended (if not a trauma patient).
2. Locate the small depression immediately below the "V" shaped thyroid cartilage (Adam's apple). This corresponds to the cricothyroid membrane, where the procedure is accomplished.
3. Cleanse the area with Betadine.
4. Place thumb and index finger of non-dominant hand on either side of the tracheal cartilage to stabilize the trachea and to anchor and stretch the skin slightly.
5. Holding the scalpel between the thumb and index finger in such a way that only the tip of the blade can enter the trachea to the depth desired; make a vertical skin incision 3 to 4 cm. (1 to 1.5 inches) in length over the cricothyroid membrane.
6. Once the cricothyroid membrane is visualized, carefully incise through the membrane transversely (horizontally).
7. Do not stop to control bleeding; only remove blood if needed to visualize the incision site.
8. Bluntly dissect the opening by inserting a small gloved finger into the incision and rotating it 90 degrees to enlarge the incision site.
9. Immediately insert a tracheal hook, nasal speculum, or continue with the gloved finger to maintain the surgical opening.
10. Insert appropriately sized 6.0 cuffed ET tube through the incision to just beyond the cuff.
11. Attach BVM, and ventilate the patient.

12. Secure in place with tape and hold secure with hands at all times constantly during transport.
13. Confirm proper placement.
14. Secure tube. Hold with hand throughout transport.

USE OF MECHANICAL VENTILATORS

1. Ventilators utilized in the prehospital setting should be specifically designed for transport use. If utilizing a hospital ventilator, a Respiratory Therapist must accompany the patient.
2. If a patient on a mechanical ventilator presents in acute distress, the patient should be removed from the ventilator and ventilated with a BVM.
3. Prehospital providers must follow the manufacturer's recommendations at all times.
4. Use of mechanical ventilators in the cardiac arrest patient is contra-indicated, with the exception of interfacility transfers.
5. As a guide, the following averages are useful:
 - a. Average ventilator rate for an adult is 12-14 breaths per minute.
 - b. The average tidal volume for an adult is 6-8 ml/kg ideal body weight, roughly 500-600 ml.

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

NOTE: ALS and BLS may utilize CPAP as indicated

Continuous Positive Airway Pressure has been shown to rapidly improve vital signs and gas exchange, reduce the work of breathing, decrease the sense of dyspnea and decrease the need for endotracheal intubation in patients who suffer from shortness of breath related to asthma, pulmonary edema, Chronic Obstructive Pulmonary Disease (COPD), and pneumonia. In patients with CHF, CPAP improves hemodynamics by reducing left ventricular *preload and *afterload: *(Preload: the stretch of ventricular muscle fibers at end diastole. It is reflected by the ventricular pressure and volume at that part of the cardiac cycle. Cardiac output increases with preload. *Afterload: in the intact heart, the pressure against which the ventricle ejects blood.).

Limitations of CPAP:

1. CPAP in the prehospital setting is only indicated for adults (16 years and older).
2. CPAP is not mechanical ventilation.
3. Increases intrathoracic pressure; *can produce hypotension*.
4. Psychological effects.
5. Potential pneumothorax.
6. Possible corneal drying.

Indications:

1. Any patient complaining of moderate to severe respiratory distress for reasons other than pneumothorax AND
2. Is awake and oriented and able to cooperate.
3. Has the ability to maintain an open airway (GCS > 10).
4. Has a respiratory rate greater than 25 breaths per minute.
5. Has a systolic blood pressure greater than 100 mmHg.
6. Retractions or uses accessory muscles during respirations.
7. Pulse Ox < 94%.
8. CPAP may be used on patients with a Do-Not-Resuscitate order

Contraindications:

1. Patient is in respiratory arrest/apneic.
2. Patient experiencing agonal respirations. (Intubation is immediately indicated.)
3. Penetrating chest trauma.
4. Patient suspected of having pneumothorax or is suspected to have significant trauma to the chest.
5. Patient has a tracheostomy.
6. The patient has altered mental status and/or cannot follow commands.
7. Patient complains of nausea or vomiting.
8. Patient has active upper GI bleeding or recent gastric surgery.

Procedure:

1. Ensure that the patient is on continuous cardiac monitor & pulse oximetry/capnography.

2. Assess patient for signs & symptoms of a pneumothorax e.g. pleuritic chest pain with inspiration, decreased breath sounds on affected side, and/or hypertympy to percussion.
NOTE: If a history of recent chest trauma exists do not apply CPAP, consult Medical Control.
3. Place patient in sitting position.
4. Ensure adequate **OXYGEN** supply and assemble CPAP mask circuit and device.
5. Assess vital signs and SpO₂ prior to CPAP application and document.
6. If Systolic blood pressure <100 call Medical Control prior to initiating CPAP.
7. Explain the procedure to the patient:
 - a. “You are going to feel some pressure from the mask but this will help you breathe easier.”
 - b. Instruct the patient to breathe through their nose and exhale through their mouth as long as possible.
8. Place the delivery device over the mouth and nose.
9. Secure the mask.
10. For CHF & Pulmonary Edema, titrate the pressure up until either improvement or maximum of 10cm/H₂O. For all other causes of dyspnea, titrate to 5cm/H₂O.
11. Check for air leaks and adjust mask as necessary.
12. *Reassure and coach the patient to keep the mask in place* and readjust as necessary.
13. Check and document vital signs every 5 minutes.
14. Notify receiving hospital ASAP that CPAP is being utilized.
15. If the patient’s status improves continue CPAP until patient care is transferred to the receiving hospital and:
 - a. Respiratory therapy is present and ready to transfer the patient to their equipment or
 - b. The ED physician is present and requests that the CPAP be discontinued.
16. If the patient’s status deteriorates discontinue CPAP and consider BVM and/or intubation.
DNR would dictate if intubation is to be considered.
17. Albuterol may be administered via inline nebulizer, if indicated.

Management of Hypotension on CPAP:

1. CPAP may introduce transient hypotension via decreased venous return.
2. If Systolic BP < 80 mmHg, remove CPAP and any nitro paste.

3. If systolic BP 80-90 mmHg consider a 250ml Normal Saline bolus (unless pulmonary edema is present -- then refer to Medical Control). If BP remains <90 mmHg after fluid bolus, remove CPAP and any nitro paste.
4. Attempted reapplication of CPAP requires a Medical Control order.

Minutes of Oxygen Cylinder Size

Flow (LPM)	D Cylinder (EMS Portable)	E Cylinder (EMS Portable)	M Cylinder (EMS Ambulance)
5	70	123	703
6	58	102	598
8	44	77	498
10	35	61	374
12	29	51	299
15	23	41	199
20	16	29	175
25	14	23	140

AUTOMATIC EXTERNAL DEFIBRILLATION (AED)

1. Initiate CPR and continue until Automatic External Defibrillator (AED) has been made ready.
2. Turn on the AED power (some devices will “power on” automatically when lid is opened) and stop CPR when advised to do so (or that the machine is analyzing the cardiac rhythm).
3. Choose the correct pads (adult vs. child) for size/age of victim. Child pads are preferred for children 1-8 years of age. If not available, adult pads may be used as long as the pads do not touch. If AED has a key that will deliver a child shock dose, turn the key/switch on.
4. **Do not use child pads or child system for victims 8 years and older.** Attach AED electrodes to the pulseless, non-breathing patient.
5. If a patient has an automated internal defibrillator (AICD) or pacemaker, do not place the electrodes over the implanted device.
6. Assure that all rescuers have cleared the patient, and allow the AED to analyze the patient's rhythm.
7. If the AED advises “shock”, have all rescuers clear the patient and deliver 1 shock.
8. Immediately resume CPR beginning with chest compressions. Do not delay CPR to recheck the rhythm or pulse.
9. After 2 minutes (5 cycles) of CPR repeat steps 5 and 6 until the advanced care providers take over or the victim starts to move.

MANUAL DEFIBRILLATION

Defibrillation is the process by which a surge of electric energy is delivered to the heart that is contracting erratically. The purpose of defibrillation is to depolarize the muscle cells, allowing the heart's natural automaticity to then produce an organized rhythm.

Indications:

1. Ventricular Fibrillation
2. Pulseless Ventricular Tachycardia

Procedure:

1. Place the patient in a safe environment if initially in contact with electrical conductive material such as water or metal.
2. Initiate or continue CPR.
3. May perform CPR for 2 minutes before delivering the first shock if downtime is >4-5 minutes.
4. Attach the adhesive defibrillation pads or apply gel to the paddles.
5. Turn on and charge the defibrillator to 360 joules (monophasic) or biphasic equivalent per manufacturer guidelines for adults, 2-4J/kg (approximate) for pediatric patients.
6. Ensure that the electrodes are appropriately placed on the patient's thorax (sternum-apex) with proper pressure. If using paddles, apply approximately 25 pounds pressure.
7. Visually check the monitor display and assure the rhythm.
8. Turn oxygen off or direct the flow away from the patient's chest.
9. Ensure that no one else is in contact with the patient.
10. Verbally and visually clear everybody, including you before any defibrillation attempts.
11. Press the "shock" button on the defibrillator or press the two paddle "discharge" buttons simultaneously after confirming that all personnel are clear of the patient.
12. Resume CPR immediately after the shock.
13. Administer appropriate medications.
14. After five cycles (2 minutes) of CPR, check the rhythm again. If a shockable rhythm, continue CPR (if defibrillator takes longer than 10 seconds to charge) while defibrillator is charging and administer second and consecutive shocks as necessary.

Considerations:

1. Minimize the number of times that chest compressions are interrupted.
2. Rhythm checks should be brief, and pulse checks should generally be performed only if an organized rhythm is observed.
3. For pediatrics, use the largest paddles or self-adhering electrodes that will fit on the chest wall without touching (leave about 2 cm between the paddles). The best paddle size is:
 - a. Adult paddles (8 to 10 cm) for children greater than or equal to 10 kg (more than approximately 1 year of age).
 - b. Infant paddles for infants weighing less than 10 kg.

ELECTRICAL CARIOVERSION

Indications:

Rapid ventricular and supraventricular rhythms associated with severely compromised cardiac output.

Procedure:

1. Consider sedation.
2. Turn on defibrillator (monophasic or biphasic).
3. Attach monitor leads to the patient and ensure proper display of the patient's rhythm.
4. Engage the synchronization mode by pressing the "sync" control button.
5. Look for markers on R waves indicating sync mode (if necessary adjust monitor gain until sync markers occur with each R wave).
6. Select appropriate energy level:
 - a. ADULTS:
 - SVT: 100 J, 200 J, 300 J, and 360 J monophasic or biphasic equivalent per manufacturer guidelines.
 - AFib/Flutter: 200J, 300J, 360J monophasic or 120-200J biphasic per manufacturer guidelines.
 - Monomorphic Ventricular Tachycardia: 100 J, 200 J, 300 J, and 360 J regardless if monophasic or biphasic.
 - b. PEDIATRICS:
 - Begin with 0.5-1 J/kg, then 2 J/kg, 4 J/kg.
7. Select appropriate energy level.
8. Position conductor pads on patient, or apply gel to paddles and position paddles on patient (sternum-apex).
9. Announce to team members "stand clear – charging for Cardioversion".
10. Announce to team members "I'm going to shock", visually check to ensure that no one is touching the patient.
11. Turn oxygen off or direct the flow away from the patient's chest.
12. Adhesive electrodes are preferred; if paddles used, apply 25 lb pressure on both paddles.
13. Press the "discharge" buttons simultaneously on paddles or shock button on the unit.
14. Check the monitor. If tachycardia persists, increase the joules according to the energy levels listed above.

Note: Reset the sync mode after each synchronized Cardioversion. Most defibrillators default back to unsynchronized mode.

NON-INVASIVE EXTERNAL CARDIAC PACING

(Transcutaneous Cardiac Pacing)

Indications:

1. Symptomatic bradycardic patients.
2. Pulseless idioventricular rhythms.

Contraindications:

1. Hypothermia.
2. Asymptomatic/Stable bradycardia.
3. Asystole.

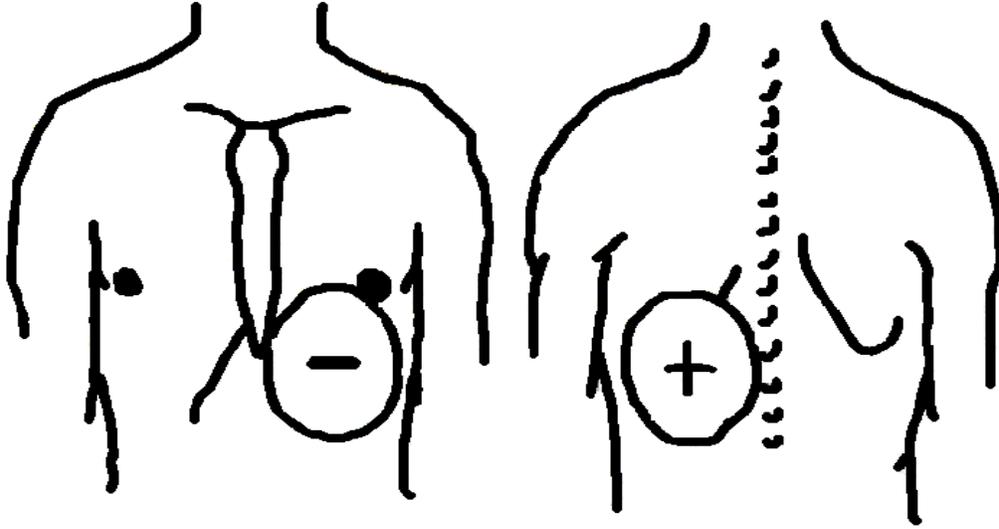
Procedure:

1. If the patient is conscious or family members are present, explain procedure.
2. Prepare the skin by cleaning it, clipping excess hair with scissors.
3. Apply cardiac monitor.
4. Apply pacer electrodes in the anterior-posterior locations (see diagrams).
5. Set pacer at approximately 60 stimuli per minute or to maintain BP of 90mmHg.
6. Increase the mA from lowest setting until electrical AND MECHANICAL capture occurs.
 - a. If electric capture occurs without mechanical capture, increase mA until mechanical capture (palpable pulse) is verified.
7. Run a continuous strip during initial pacing attempts.
8. Once capture is noted, reassess your patient.
9. Assure patient's palpable pulse is synchronous to pacer.
10. Obtain a blood pressure.
11. Note LOC and peripheral perfusion.
12. If the patient is in great discomfort, consider pain control per **Pain Control SOG**.
13. Avoid using the carotid pulse to confirm pacer capture (electrical stimulation may cause muscle contraction and may simulate a pulse).
14. If mechanical capture is unsuccessful (no palpable pulse), resume CPR and contact Medical Control. Follow appropriate SOG for displayed cardiac rhythm.

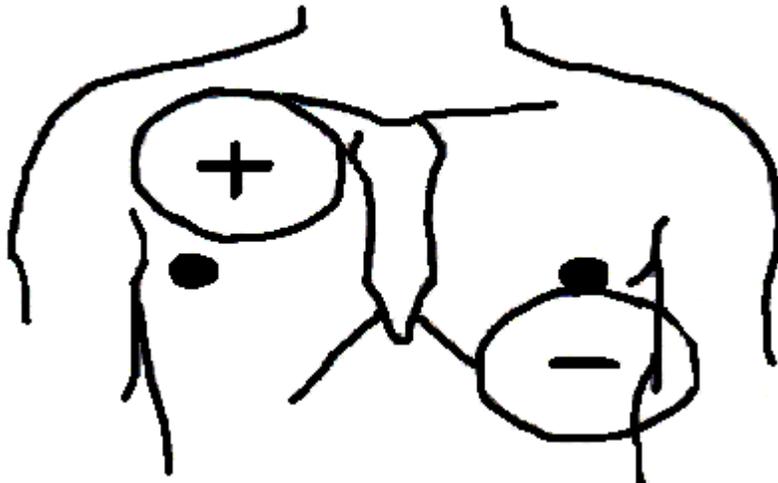
15. If ventricular fibrillation or ventricular tachycardia occurs at any time, turn TCP off immediately and treat per appropriate SOG.
16. Documentation of TCP must include:
 - a. Vital signs.
 - b. Time pacing initiated.
 - c. Current mA that accomplished capture.
 - d. Rate required to maintain 90mmHg of Blood Pressure.
 - e. Medications given.

PACEMAKER ELECTRODE PLACEMENT
ANTERIOR – POSTERIOR

ELECTRODE POSITIONS
Preferred



ANTERIOR - LATERAL ELECTRODE POSITIONS



ZOLL POWER INFUSER

The Zoll Power Infuser is an IV pump specifically designed to bolus large quantities of IV fluids in short periods of time. It has adjustable flow rates from 200ml/hr to 1L in 10 minutes. In addition, the Zoll Power Infuser has the capability to provide an automated 250ml bolus in 2.5 minutes.

Indications & Dosing of IV Normal Saline or Lactated Ringers Boluses:

1. Hypovolemia (medical causes) such as DKA, Heat Exhaustion, Dehydration, etc.
 With Hypotension:
 - a. Adult: 1-2L IV bolus as needed to establish normotension. Once normotensive, decrease rate to 200ml/hr.
 - b. Peds (>10kg): 20mL/kg bolus
 - c. Normotensive:
 - d. Adult: 200mL/hr. Contact Medical Control for additional direction.
 - e. Peds: Not indicated
- *Use caution in patients with a history of renal disease or congestive heart failure.
2. Hypotension secondary to trauma (hypovolemia, mechanical shock)
 - a. Adult: 500mL bolus over 5 minutes until SBP > 90
 - b. Peds (>10kg): 20mL/kg bolus
3. Distributive Shock (Septic, Anaphylactic, Neurogenic)
 - a. Adult: 1-2L IV bolus as needed to establish normotension. Once normotensive, decrease rate to 200ml/hr.
 - b. Peds (>10kg): 20mL/kg bolus
4. Cardiogenic Shock
 - a. Adult: 250mL bolus over 2.5 minutes. If hypotension persists after fluid bolus and initial treatment of any arrhythmias, contact Medical Control for additional direction.
 - b. Peds: Contact Medical Control.
5. PEA arrest (medical and traumatic)
 - a. Adult: 2L IV bolus. Additional boluses may be given if hypovolemia is strongly suspected.
 - b. Peds (>10kg): 20mL/kg bolus. Additional boluses may be given if hypovolemia is strongly suspected.

Procedure:

1. Set-up all fluid lines with the *fluid pump cartridge* in-line with standard or blood type intravenous tubing. Use warm intravenous fluids when possible. (Note: At this time blood cannot be delivered through the Power Infuser.)
2. Place the *fluid pump cartridge* into the pump assembly per manufacturer's directions.
3. Turn pump on or switch direction on battery to activate the pump.

4. Prime the tubing by eliminating all the air in the tubing line by depressing and holding the START button.
5. If intravenous tubing is in place, attempt to disconnect at extension set junctions and connect the *fluid pump cartridge*. If no extension set is in use, set-up an additional fluid line with the *fluid pump cartridge* and piggyback this set into the existing fluid line.
6. Connect the extension set from the fluid pump to the IV site or the injection port of another tubing set.
7. Set the desired fluid flow rate (200cc/hr to 6000cc/hr) or 250cc bolus setting based on the medical crew's assessment of patient needs and as recommended above by adjusting the control knob on the side of the pump.
8. Begin the pump by pressing the START button.
9. Secure the pump unit to the patient or near the patient so that the control face is visible. Do not cover the pump with a blanket or other coverings.
10. The intravenous solution may be placed at any level – it does not require elevation.
11. Monitor the pump periodically to check for alarms and monitor the intravenous bag volume and replace as needed.
12. In the event of an alarm, check the IV site for signs of infiltration or tubing occlusion.

12 LEAD ELECTROCARDIOGRAM GUIDELINE (EKG)

Indications:

1. Suspected Acute Coronary Syndrome or anginal equivalent (dyspnea, syncope, weakness, diaphoresis and palpitations)
2. DKA
3. Pre and post cardioversion of patients
4. Patients experiencing dysrhythmias
5. HR < 50 or > 150
6. Patients experiencing heart failure

Procedure:

1. Prepare the patient.
 - a. Explain the procedure.
 - b. Place patient supine with the head of stretcher no higher than 30 degrees.
 - c. Make sure patient does not chill, shivering causes artifact.
 - d. Offer reassurance to the patient as tense muscles may cause artifact.
 - e. Prepare the chest. Make sure it is dry, free of debris and oil. Clip excessive chest hair with scissors; do not shave.
2. Place the limb electrodes in the proper area according to the diagram on the following page.
3. Place chest electrodes in proper place according to the following diagram.
4. Do not remove EKG electrodes once they have been placed.
5. Upon completion of the 12-Lead EKG, transmit to the receiving facility if possible.
6. Attach a copy of the 12-Lead EKG to EMS run sheets.

With the positive electrode on the left arm & the negative electrode on the right arm, the **Lead I** provides a view of the left side of the heart looking toward the left.

With the positive electrode on the left leg & the negative electrode on the right arm, **Lead II** provides a view of the bottom (inferior aspect) of the heart, looking toward the left leg.

With the positive electrode on the left leg & the negative electrode on the left arm, **Lead III** provides another inferior aspect of the heart, looking toward the left leg.



Lead V₁ The electrode is at the fourth intercostal space just to the right of the sternum.

Lead V₂ The electrode is at the fourth intercostal space just to the left of the sternum.

Lead V₃ The electrode is at the line midway between leads V₂ and V₄

Lead V₄ The electrode is at the midclavicular line in the fifth interspace.

Lead V₅ The electrode is at the anterior axillary line at the same level as lead V₄

Lead V₆ The electrode is at the midaxillary line at the same level as lead V₄

I <i>Lateral</i>	AVR	V1 <i>Septal</i>	V4 <i>Anterior</i>
II <i>Inferior</i>	AVL <i>Lateral</i>	V2 <i>Septal</i>	V5 <i>Lateral</i>
III <i>Inferior</i>	AVF <i>Inferior</i>	V3 <i>Anterior</i>	V6 <i>Lateral</i>

BLOOD SAMPLES

The EMT-I/P/PHRN will follow appropriate procedures and protocols to obtain blood samples in the prehospital setting.

The following blood sample collection tubes will be provided and carried on all ILS/ALS units:

1. Red Top Tubes – 2 (for blood glucose level)
2. Purple Top Tubes – 2 (for hemoglobin level)
3. Green Top Tubes – 2 (for carbon monoxide level)

Procedure:

1. Ensure BSI precaution.
2. The venipuncture will be performed with over-the-needle catheter or needle and syringe.
3. Prior to administering D50W or D5W or a drug, blood from the patient will be withdrawn into a 6cc or 12cc syringe.
 - a. 3mL of blood should be drawn for the small tubes.
 - b. 6-10mL of blood should be drawn for the large tubes.
4. **Do not recap needles!**
5. Green top tubes should be wrapped in a cold pack for transport times greater than 20 minutes.
6. The following data **MUST** be written legibly on the tube label:
 - a. Patient's name
 - b. Date
 - c. Time blood was drawn
 - d. Signature of drawer
 - e. Run record number
7. Acceptance and handling of blood at the receiving hospital will be determined by policy at that hospital.
8. The EMT-I/P/PHRN should always hand the blood sample personally to the Emergency RN in charge of that patient.
9. All hospitals have the right to reject the blood sample due to their laboratory policies.
10. No blood sample tube should be used past the expiration date found on their label.

EXTERNAL JUGULAR VEIN CANNULATION

External Jugular (EJ) access can be utilized only if traditional extremity cannulation cannot be established and the patient requires immediate stabilizing fluid replacement and/or drug administration route.

Procedure:

1. Position the patient supine with feet elevated in Trendelenburg position unless contra-indicated.
2. Turn the patient's head away from the side of the access site. This maneuver makes the site easier to see and reach. Do not perform this maneuver if the patient has traumatic head and/or neck injuries.
3. Cleanse the site with a prep pad using a circular motion moving away from the site.
4. Stabilize the vein by applying traction just above the clavicle.
5. Align the catheter and point the tip of it toward the patient's feet.
6. Enter the vein midway between the angle of the jaw and the clavicle. With the bevel of the needle upward, puncture the skin using a 30 degree angle and aim toward the shoulder on the same side.
7. As you enter the vein, if blood returns through the flash chamber and syringe, proceed with insertion. Slightly occlude the vein proximal to the catheter with gentle finger pressure. Connect the administration set to the catheter and secure the site.

GUIDELINES FOR USE OF VASCULAR ACCESS DEVICES

Indications:

1. Critical situations where immediate and life-saving venous access is necessary.
2. Standard methods of venous access, such as peripheral IVs and intraosseous access have been unsuccessful.

Contraindications:

1. Redness, swelling, pain or tenderness at the VAD insertion site.
2. Complaint of burning sensation with solution infusion.
3. Sluggish flow or inability to infuse a solution.

Complications:

1. Infection
2. Thrombosis
3. Displacement
4. Air embolism
5. Catheter tear or leak

Types of Venous Access Devices:

TUNNELED LINE (ie Hickman®, Goshong®, Brovia®, Cook®)

A tunneled central line is a catheter that is inserted under the skin of the chest, and the tip of the catheter is in a large vein just above the heart. A tunneled catheter has a cuff below the skin that the soft tissue grows into, reducing the risk of dislodgement and infection. These can be single or multiple-lumen catheters.

NON-TUNNELLED LINES: PICC and MLC (i.e. Cook®, New-PICC®)

A PICC (peripherally inserted central catheter) line is a thin catheter which is inserted into one of the large veins, usually in the arm near the bend of the elbow, but may be in the neck or a lower extremity, and is threaded in a large vein just above the heart. A MLC (Mid-line catheter) is a thin peripheral catheter that is inserted into a large vein in the elbow, and ends in the vein before the shoulder. Both of these catheters have a very small lumen and are considered “low volume lines” and not appropriate for volume resuscitation.

Procedure:

1. Obtain information regarding type of VAD.
2. Disconnect or discontinue any pumps or medications if permissible (speak with Medical Control).
3. Clamp the VAD closed to prevent air embolus by using the existing clamp or folding catheter over while maintaining asepsis.
4. If multi-lumen, identify the lumen to be used.
5. Don sterile gloves.

6. Using aseptic technique remove the infusion cap and place syringe hub into port, release clamp & withdraw 3 to 5 ml of blood from the port (confirms placement & clears line of heparin).
7. Re-clamp the port before opening to air (after each aspiration or flush).
8. Aspirate any necessary blood sample.
9. Using 10 ml of **NORMAL SALINE** flush the catheter of blood.
10. Maintaining asepsis connect the IV tubing and tape to prevent disconnection.
11. Open clamp and observe for appropriate infusion rate.
12. Reassess the infusion site and patient condition.

Patients with an AV Fistula or Graft:

IF PATIENT HAS A FISTULA OR GRAFT THAT HAS BEEN ACCESSED

Disconnect the two small tubes, apply copper clip or any clamp on the arterial line (usually on radial side of wrist). Attach IV line or syringe directly to venous line.

IF PATIENT HAS A FISTULA OR GRAFT THAT HAS NOT BEEN ACCESSED

1. Prior to access, check site for bruit and thrills in the patient with a pulse. If none are present do not use.
2. Access a graft or fistula on venous side (side with weaker thrill in patient with a pulse) using a. 20 gauge angiocath in the same manner as intravenous access.
 - b. If patient does not have a pulse, either side may be accessed.
3. Inflate BP cuff around IV bag to maintain flow of IV fluids.
4. If unsuccessful in accessing site (no obvious blood return or flow of fluids), hold direct pressure over site for 5-15 minutes to prevent hemorrhaging. Do not continue attempting to access.

Access of an AV Graft or Fistula is reserved only for actual or impending cardiac arrest. Use of the EZ-IO is STRONGLY encouraged over accessing a graft/fistula.

JAMSHIDI-STYLE INTRAOSSEOUS ACCESS

Indications:

Primary – Vascular access for the administration of fluids and medications in children age six and under who are in cardiac arrest.

Secondary – May be useful for children six or under who are in status epilepticus or massive hypovolemic shock where peripheral IV attempts have been unsuccessful or the physician orders intraosseous IV infusion.

If IV access cannot be accomplished within 3 sticks or 90 seconds, intraosseous (IO) route should be considered, as appropriate, for children age 6 or less.

Complications:

1. Fluid overload (a concern with any pediatric infusion)
2. Subperiosteal infusion (due to improper placement)
3. Marrow clotting in needle
4. Osteomyelitis
5. Sepsis
6. Fat embolism
7. Bone marrow damage

Equipment:

1. Disposable 18 gauge intraosseous (IO) needle
2. Appropriate IV solution and tubing
3. Betadine solution for cleansing

Procedure:

1. Select the site: One to two fingerbreaths (1-3cm) below the tibial tuberosity on the antero-medial surface.
2. Cleanse the area well with Betadine.
3. Insert the needle and stylet with a boring motion perpendicularly or slightly inferiorly (avoid angling the point of the needle superiorly) in order to avoid the epiphyseal plate.
4. Successful entrance into the bone marrow will be indicated by any of the following:
 - a. Lack of resistance after the needle passes through the bony cortex.
 - b. The needle standing upright without support.
 - c. Ability to aspirate bone marrow into the syringe connected to the needle.
 - d. Free flow of infusion without significant subcutaneous infiltration.
5. Flush the needle with 3ml of **NORMAL SALINE** and attach needle to appropriate drip set/tubing.
6. Fluids may be administered by gravity or under pressure.

EZ-IO INTRAOSSEOUS ACCESS

Paramedics who have successfully completed an approved training program may perform intraosseous infusion (IO) administration using the method described in the accompanying procedure.

Indications:

1. Consider for use in any unconscious or seriously ill or injured patient in whom IV access cannot be established in 2 attempts or 90 seconds.
 - a. Cardiac arrest (medical or traumatic).
 - b. Respiratory compromise (SpO₂ 80% or less after appropriate **OXYGEN** &/or respiratory rate less than 10 or greater than 40).
 - c. Hemodynamic instability /Patient in extremis with immediate need for delivery of medications and or fluids.
 - d. IV cannot be established in 2 attempts or 90 seconds and the patient exhibits one or more of the following:
 - e. An altered mental status (GCS of 8 or less).
 - f. Respiratory compromise (SpO₂ 80% after appropriate oxygen).
 - g. Hemodynamic instability.
2. EZ-IO may be considered PRIOR to peripheral IV attempts in the following situations:
 - a. Cardiac arrest (medical or traumatic)
 - b. Profound hypovolemia with alteration of mental status e.g. BP less than 60/Systolic, profuse GI bleed or other bleeding.

Contraindications:

1. Fracture in area to be utilized (consider alternate site).
2. Previous orthopedic procedure (look for surgical scars, consider alternate site).
3. Infection at or near insertion site (move to alternate site).
4. Inability to identify landmarks.
5. Excess tissue at insertion site (consider alternate site).

Considerations:

1. Needle selection:
 - a. 15 mm needle: 3 – 39 kilograms with minimal tissue over insertion site.
 - b. 25 mm needle: 39 kilograms & over or for pts with too much tissue for the 15mm needle.
 - c. 45 mm needle: > 39 kg's with excess tissue over targeted insertion site e.g., edema, large musculature, obesity). Ideal for insertion in humerus site.
2. Flow rate:
 - a. Due to the anatomy of the IO space, flow rates will be slower than those achieved with IV catheters.
 - b. Ensure the administration of an appropriate rapid syringe
 - c. Rapid syringe bolus (flush) the EZ-IO Adults with 10 ml of normal saline
 - d. Rapid syringe bolus (flush) the EZ-IO Pedi with 5 ml of normal saline
 - e. ** Repeat syringe bolus (flush) as necessary.
 - f. To improve continuous infusion rates, always use a pressure bag or an infusion pump.

3. Pain:
 - a. IO infusion can cause severe discomfort for conscious patients
 - b. Administer **LIDOCAINE** 2% prior to IO infusion:
 - i. Adults: 20-50mg.
 - ii. Pediatric: 0.5 mg/kg (Max 20mg).
 - c. Following the IO push, flush with 10 ml bolus of **NORMAL SALINE**.
4. Use a pressure bag for continuous infusion.

Recommended Equipment:

1. EZ-IO DRIVER
2. EZ-IO Needle
3. Alcohol or Betadine Swab
4. EZ-Connect or Standard Extension Set
5. 10 ml Syringe
6. Normal Saline (or acceptable sterile fluid)
7. Pressure Bag or Infusion Pump

Procedure:

1. No more than 2 attempts should be made by the paramedic.
2. Locate the appropriate insertion site:
 - a. **Adult proximal tibial insertion:** There are three anatomical landmarks of the insertion site that the **MUST** be identified before using the device. The first landmark is the patella or kneecap. To locate it, feel the front surface of the leg just below the femur or thigh bone for a “floating” bony structure. The second landmark is approximately 2 finger widths below the patella. It is the tibial tuberosity, a round oval elevation or “bump” on the front surface of the tibia or lower leg. Now, 1 finger width medial (toward the inside) of the tibial tuberosity is the final landmark. This is the insertion site for the EZ-IO.
 - b. **Adult humeral insertion:** Expose shoulder and adduct humerus (place the patient’s arm against the patient’s body) resting the elbow on the stretcher or ground and the forearm resting on the abdomen. With the patient in this position you may immediately note the humeral head on the anterior-superior aspect of the upper arm or anterior-lateral shoulder. Palpate and identify the mid-shaft humerus and continue palpating toward the proximal aspect or humeral head. As you near the shoulder you will note a small protrusion. This is the base of the greater tubercle insertion site. With the opposite hand you may consider “pinching” the anterior and inferior aspects of the humeral head while confirming the identification of the greater tubercle. This will ensure that you have identified the midline of the humerus itself.
 - c. **Pediatric proximal tibial insertion:** If the tibial tuberosity **CANNOT** be palpated, the insertion site is two finger widths below the patella and then medial along the flat aspect of the tibia. If the tibial tuberosity **CAN** be palpated, the insertion site is one finger width below the tuberosity and then medial along the flat aspect of the tibia.
 - d. **Adult distal tibial insertion:** The insertion site is approximately two finger widths proximal to the medial malleolus and midline along the tibia.

- e. **Pediatric distal tibial insertion:** The insertion site is approximately one finger width (patients less than 12 kg) and one to two finger widths (patients between 12 and 39 kg) proximal to the medial malleolus along the tibia.
3. Prepare insertion site using aseptic technique.
4. Prepare the EZ-IO driver & appropriate needle set.
5. Stabilize site & insert appropriate needle set.
6. Use gentle-steady pressure. Do not use excessive force. Allow the needle set rotation and gentle downward pressure to provide the penetrating action.
7. Remove EZ-IO driver from needle set while stabilizing catheter hub.
8. Remove stylet from catheter, place stylet in sharps container.
9. Confirm placement. Sometimes marrow cannot be aspirated and does not necessarily indicate improper placement.
10. Connect primed EZ-Connect.
11. Administer **LIDOCAINE** 2% prior to IO infusion:
 - a. Adults: 20-50mg.
 - b. Pediatric: 0.5 mg/kg (Max 20mg).
 - c. Following the IO push, flush with 10 ml bolus of **NORMAL SALINE**.
12. Syringe bolus (flush) the EZ-IO catheter with the appropriate amount of normal saline.
13. Utilize pressure (pressure bay or infusion pump) for continuous infusion where applicable.
14. Begin infusion.
15. Dress site, secure tubing & apply wristband as directed.
16. Monitor EZ-IO & patient condition.

Note: If the driver stalls and will not penetrate the bone, you may be applying too much downward pressure.

Note: In the unlikely event of a driver failure, remove the Power Driver, grasp the Needle Set by hand and advance the needle set into the medullary space while twisting the Needle Set.

NASAL ATOMIZER

NOTE: Basic Service EMT's may administer Narcan nasally, per this guideline. If System approved to utilize a 12-lead monitor, apply and run a strip or 12-lead as indicated.

For the Intra Nasal (IN) route to be effective, medications should be highly concentrated and have low volume dosages (no more than 1.0 mL per adult nostril). Studies have shown that the most effective method to deliver a medication through the IN route is to atomize it across the nasal mucosa. Atomized particles (10 to 50 microns) adhere to the nasal mucosa over a large surface area, preventing waste and improving absorption of the medication. It is also appropriate to administer half the dose in each nostril to increase the surface area, and further improve absorption.

Medications currently approved for this route:

1. Fentanyl
2. Glucagon
3. Ketorolac
4. Midazolam (Versed)
5. Naloxone (Narcan) The following are some of the benefits of IN drug delivery for the patient and provider:
 1. Eliminate the risk of a contaminated needle stick to the EMS Provider.
 2. Simple and convenient for the EMS Provider.
 3. Discomfort is minimized for the patient.
 4. Serum levels of many IN administered medications are comparable to injected medications.
 5. Works in any position.

Procedure:

1. Load the appropriate size syringe with the selected medication.
2. Attach the nasal atomizer on the syringe.
3. Place atomizer 1.5 cm into the selected nostril. Direct the syringe posteriorly (not "up" towards the top of the patient's head).
4. Briskly compress the syringe to administer the loading dose of medication
5. Remove and repeat into the other nostril, if necessary, until all of the medication has been administered.

AEROSOL UPDRAFT TREATMENT

Indications:

1. **ALBUTEROL** Inhalant Solution is indicated as a bronchodilator for reversible bronchospasm which may occur in association with asthma, bronchitis, pneumonia, and emphysema.
2. Nebulized **NORMAL SALINE** is indicated for treatment of croup.
3. Nebulized **SODIUM BICARBONATE** is indicated for treatment of chlorine inhalation.

Equipment Needed:

1. Updraft (small volume) nebulizer
2. Supply tubing
3. Oxygen flowmeter with nipple adapter
4. Tee and mouthpiece

Procedure:

1. Assemble nebulizer.
2. Plug in flowmeter or connect to oxygen source.
3. Connect supply tubing to nipple adapter and nebulizer.
4. Place medications in nebulizer.
5. Place the patient in the seated position.
6. Place tee with mouthpiece on outlet of nebulizer. Treatments should be given via mouthpiece unless the patient cannot tolerate the treatment or cooperate properly. In this case utilize an aerosol mask or provide via a “blow-by” method.
7. Adjust the oxygen flow to a rate of approximately 5 L/min and visualize “mist output”. Administer the treatment until all the medication has been nebulized.

Nebulized **ALBUTEROL** may be provided to the intubated patient, when appropriate, by connecting the nebulizer in-line with the endotracheal tube.

**ASSISTED ADMINISTRATION OF ALBUTEROL FOR PATIENTS WITH
PRESCRIPTION ALBUTEROL**

Indication:

Patient's with a history of asthma or COPD with prescription albuterol exhibiting signs of difficulty breathing.

Procedure:

1. Ensure that the **ALBUTEROL** is not expired.
2. Remove protective cap from MDI mouthpiece.
3. Insert MDI mouthpiece into MDI adapter at end of aerochamber (spacer), if available.
4. Shake up MDI.
5. Have patient breathe out as long as possible.
6. Immediately place the aerochamber in the patient's mouth, and instruct them to close their lips around the mouthpiece.
7. Squeeze the canister down to release the medicine.
8. Instruct the patient to take a slow, deep breath in and hold it for 10 seconds.
9. Remove the aerochamber from the patient's mouth.
10. Instruct them to breathe out as slowly as possible.
11. Wait 30-60 seconds and repeat steps 6-11.

RECTAL DIAZEPAM ADMINISTRATION

In the emergency setting you may give **DIAZEPAM** rectally if you cannot establish an intravenous line. Rectal administration of **DIAZEPAM** may prove advantageous with the unconscious or pediatric patient or when IV access is impractical or not possible.

Procedure:

1. Compute dosage.
2. Confirm the indication for administration and dose.
3. Remove the needle from the TB syringe for children or the 3ml syringe for adults.
4. Pull the plunger back to the desired amount.
5. Insert the **DIAZEPAM** needles into the hub (the part the needle connects with) of the TB syringe for children or the 3ml syringe for adult dosing.
6. Inject the desired amount of **DIAZEPAM** into the appropriate syringe(s) e.g. an older child may exceed greater than the 1ml TB syringe can hold, a second TB syringe may be required to accurately measure a dose of greater than 1ml.
7. Lubricate the tip of the syringe to be used for rectal administration.
8. Insert the syringe without the needle into the rectum.

NOTE: A 3-5ml syringe may be used for dosage greater than the 1mL that a tuberculin syringe allows. It is acceptable in this circumstance to attach an over-the-needle catheter (plastic portion only) and lubricate the catheter prior to rectal insertion. Administration of diazepam too high into the rectum may decrease its anticonvulsant effect, because the drug may be absorbed differently and broken down more quickly in the liver.

9. Push the plunger to expel the **DIAZEPAM** into the rectum.
10. Withdraw the catheter and hold the patient's buttocks together thus permitting retention and absorption.

ORAL GLUCOSE GUIDELINE

Indications:

Hypoglycemia in the patient with an intact gag reflex.

Contraindications:

Inability to swallow safely, including loss of gag reflex.

Side Effects:

None, however the risk for aspiration in a patient who does not have a gag reflex is a significant danger.

Procedure:

1. Wear gloves.
2. Confirm that the patient is alert, has a gag reflex and the ability to swallow.
3. Examine the tube for intactness.
4. Check the expiration date.
5. Squeeze the entire tube onto the bottom third of a bite stick or tongue depressor.
6. Open the patient's mouth.
7. Place the tongue depressor on the mucous membranes between the cheek and gum, gel side next to cheek.
8. NOTE: Once the gel is dissolved, if the patient loses consciousness, or has a seizure, remove the tongue depressor.
9. Following administration, reassess the patient frequently for:
 - a. airway problems
 - b. sudden loss of consciousness
 - c. seizures

**ASSISTED ADMINISTRATION of NITROGLYCERINE For PATIENTS WITH
PRESCRIPTION NITROGLYCERINE**

Indications:

The patient is to be assisted with their **NITROGLYCERINE** when they complain of *cardiac-related* chest pain or angina provided they have not taken the maximum dose prior to your arrival.

Contraindications:

1. Hypotension/Systolic blood pressure less than 100 mm systolic.
2. Head injury.
3. Patients less than 16 years of age, call Medical Control.
4. Patient has taken three **NITROGLYCERINES** prior to your arrival or is prescribed less than 3 as a normal dose.
5. Patient takes sexual enhancement medication such as Viagra, Levitra, etc.; these medications will increase the effects of the **NITROGLYCERINE** and may result in life-threatening hypotension. Note that these medications are also prescribed for the treatment of pulmonary hypertension in men and women.
 - a. With these details in mind it is important to carefully inquire of patient use of sildenafil (Viagra & Revatio), tadalafil (Cialis), vardenafil (Levitra), or udenafil (Zydena).

Procedure:

1. Verify that the patient's medication is their own and is not expired. Always assure that you have the right patient, right medication, right route and right dose for this patient.
2. While wearing gloves, ask the patient to lift their tongue and place the tablet or spray the dose under the tongue, or have the patient do so. The First Responder assisting the patient with administration of their **NITROGLYCERINE** should always wear gloves to avoid unnecessary exposure to and potential side effects of **NITROGLYCERINE**.
3. Ask the patient to keep their mouth closed with the tablet or spray under the tongue without swallowing until dissolved.
4. Document the **NITROGLYCERINE** that was taken by the patient or the assisted administration.
5. Repeat the blood pressure 5 minutes after the **NITROGLYCERINE** or if the patient complains of weakness, nausea or vomiting and document. Do Not administer additional doses if the systolic B/P is less than 100 mm.
6. Question the patient regarding pain using the 0-10 pain scale as a reference and document. Record any additional side effects, e.g. headache, hypotension, pulse rate changes.
7. For continued angina, the First Responder may repeat steps 2-7 until the patient has received a total of 3 doses (including any doses the patient may have taken prior to First Responder arrival).

STATE OF ILLINOIS NERVE GAS AUTO-INJECTOR GUIDELINES

Note that signs and symptoms and dosing are included in the HAZMAT SOGs.

Purpose:

To provide Illinois EMS agencies with guidelines on appropriate use of **Mark 1** kits. The kit contains antidotes to be used in instances of exposure to nerve agents (Sarin, Soman, Tabun, VX) or to organophosphate agents (Lorsban, Cygon, Delnav, malathion, Supracide parathion, Carbopenthion).

Equipment:

Each Duodote consists of two auto injectors containing:

1. Atropine Sulfate 2 mg in 0.7 mL
2. Pralidoxime Chloride (2 PAM) 600 mg in 2 mL

Key Provisions:

Only those licensed EMS providers that are governed by the State of Illinois EMS Act (210 ICLS 50) are authorized by any EMS Medical Director to utilize the special equipment and medications needed in WMD incidents, including **Mark 1** auto-injectors. When appropriate conditions warrant, contact Medical Control. Other organized response teams not governed by the EMS Act may use the **Mark 1** auto-injectors on themselves or other team member when acting under the Illinois Emergency Management Agency Act (20 ILCS 3305).

Guidelines:

The guidelines for the use of the **Mark 1** kits were developed by the EMS Committee of the Illinois College of Emergency Physicians (ICEP). They were then adopted by the Illinois Medical Directors, Illinois Department of Public Health and the Mutual Aid Box Alarm System (MABAS) in the Illinois Terrorism Task Force to provide guidance to EMS agencies and providers who are part of an EMS system.

There are 10 provisions in the guidelines:

1. To utilize these kits you must be an EMS agency or provider within an Illinois EMS system and participate within an EMS disaster preparedness plan.
2. The decision to utilize the **Mark 1** antidote is authorized by this State protocol.
3. At a minimum, an EMS provider must be an Illinois EMT at any level including First Responder with additional training in the use of the auto-injector.
4. The **Mark 1 kit** is not to be used for prophylaxis. The injectors are antidotes, not a preventative device. The **Mark 1 kit** may be self-administered if you become exposed and are symptomatic. Exit immediately to the Safe Zone for further medical attention.
5. Use of the **Mark 1 kit** is to be based on signs and symptoms of the patient. The suspicion or identified presence of a nerve agent is not sufficient reason to administer these medications.
6. Atropine may be administered IV or IM in situations where **Mark 1 kits** are not available.
7. Auto-injectors are not to be used on children under 88 pounds (40 kg). Pediatric Mark 1 injectors are currently being reviewed by the FDA.
8. If available, **DIAZEPAM** (Valium) or **MIDAZOLAM** (Versed) may be cautiously given under Medical Control direction or by Standard Operating Guidelines if convulsions are not

controlled.

9. When the nerve agents have been ingested exposure may continue for some time due to slow absorption from the lower bowel. Fatal relapses have been reported after initial improvement. Continuous medical monitoring is mandatory.
10. If dermal exposure has occurred, decontamination is critical and should be done with standard decontamination procedures. Patient monitoring should be directed to the signs and symptoms as with all nerve organophosphate exposures. Continual medical monitoring and transport is mandatory.

Personal Protection:

The first priority when encountering a potential nerve-agent victim is self-protection. Personal protective equipment (PPE) and decontamination are key elements in the successful management of exposed casualties. All people entering a Hot Zone or working a decontamination station must wear full protective ensembles including full-body and respiratory protection. Do not cross contaminate yourself when handling patients in triage, treatment and staging areas or if have begun treatment in the Hot Zone.

Prehospital Management:

Prehospital management for nerve agent or organophosphate poisoning is a two pronged attack focusing on countering the poison with antidotes and preventing death by supporting respirations and controlling seizures. Because the primary cause of death from these agents is respiratory failure, aggressive airway control and ventilation are top priorities. With antidotal therapy, spontaneous respirations should resume within a short period of time.

Please notify the receiving hospitals prior to transport so they can prepare their facilities for your arrival, and also consider activating local mass casualty protocols. Use prudent judgment in transferring patients to the hospitals.

Attached to this guideline is the State of Illinois “Mark I Protocol” based upon various federal agency recommendations for administration. **This Protocol is intended for EMS licensed health care professionals.** It may be used also with medical authorization and participation of the agency in the EMS disaster preparedness plan.

Introduction:

Mark I kits are auto-injectors antidotes to be used when first responders are exposed to nerve agents and have signs or symptoms of nerve agent or organophosphate exposure, or when first responders treat victims in an MCI situation in the hot zone.

Indications for use of the Mark I auto-injectors:

NOTE: The Mark I kit is not to be used for prophylaxis. The injectors are antidotes, not a preventative device. **Mark I** kits may be self-administered if you become exposed and are symptomatic. Medical treatment is directed to relieving respiratory distress and alleviating seizures.

It is a concern that the use of auto-injectors could lead to administration of inappropriate and harmful **Mark I** doses during a non-chemical agent or minimal exposure situations. The auto-

injectors are to be used only if the patient presents with signs and symptoms consistent with exposure to nerve or organophosphate agents.

For symptoms of Nerve Gas Exposure, see the HAZMAT - Organophosphate SOG.

Procedure:

If you experience any or all of the nerve agent poisoning symptoms, you must IMMEDIATELY self-administer the nerve gas antidote.

Injection Site Selection:

1. The injection site for administration is normally the **outer thigh muscle**. It is important that the injections be given into a large muscle area.
2. If the individual is thinly-built, then the injections should be administered into the **upper outer quadrant of the buttocks**.

Arming the Auto-injector:

1. Immediately put on your protective mask.
2. Remove the antidote kit.
3. With your non-dominant hand, hold the auto-injectors by the plastic clip so that the larger auto-injector is on top and both are positioned at eye level.
4. With your dominant hand grasp the atropine auto-injector (the smaller of the two) with the thumb and first two fingers. **DO NOT** cover or hold the needle end with your hand, thumb or fingers – you might accidentally inject yourself. An accidental injection into the hand **WILL NOT** deliver an effective dose of the antidote, especially if the needle goes through the hand.
5. Pull the injector out of the clip with a smooth motion. **The auto-injector is now armed.**

Self-Administration of the Antidote:

1. Hold the auto-injector with your thumb and two fingers (pencil writing position). Be careful not to inject yourself in the hand!
2. Position the green (needle) end of the injector against the injection site (thigh or buttock). **DO NOT** inject into areas close to the hip, knee or thigh bone.
3. Apply firm, even pressure (not jabbing motion) to the injector until it pushes the needle into your thigh (or buttocks). Using a jabbing motion may result in an improper injection or injury to the thigh or buttocks.
4. Hold the injector firmly in place for at least 10 seconds. Firm pressure automatically triggers the coiled spring mechanism. This plunges the needle through the clothing into the muscle and at the same time injects the antidote into the muscle tissue.

5. Carefully remove the auto-injector from your injection site.
6. Next pull the **2 PAM** auto-injector (the larger of the two) out of the clip.
7. Inject yourself in the same manner as the steps above, holding the black (needle) end against your outer thigh (or buttocks).
8. Massage the injection site, if time permits.
9. After administering the first set of injections, wait 5 to 10 minutes. After administering one set of injections, you should initiate decontamination procedures, as necessary, and put on any additional protective clothing.
10. Once stabilized with **Mark 1** dosages, Atropine only may be repeated every 10-15 minutes as patient condition warrants.
(Note: multiple doses of atropine may be needed.)

Administering The Antidote To Another In The Hot Zone:

1. Squat, DO NOT kneel, when masking the casualty or administering the nerve agent antidotes to the casualty. Kneeling may force the chemical agent into or through your protective clothing.
2. Mask the casualty.
3. Position the casualty on his or her side (swimmer's position).
4. Position yourself near the casualty's thigh.
5. The procedure for site selection and medication administration is the same as above.
6. Atropine only should be administered as needed.
7. Mark, label or tag victims who have been given **Mark 1** injector antidote kits in a way that rescuers in the Warm Zone or triage areas can identify medication and dosage amounts give to the victims.

EPI-PEN ADMINISTRATION

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

13.35 SPINAL MOTION RESTRICTION DECISION ALGORITHM

SMR: If indicated maintain in-line stabilization of the C-spine and move along central axis

1. Does the patient have a concerning mechanism of injury, including but not limited to:
 - a. High speed MVC, ejection
 - b. Motorcycle
 - c. Falls > 3 times patient's height
 - d. Axial Load
 - e. Diving Accidents
 - f. Penetrating Wound in or Near Spinal Column
 - g. Sports Injuries to Head or Neck
 - h. Head and facial injuries with the loss of consciousness

If Yes, institute spinal motion restriction.

2. Is the patient unreliable?
 - a. Is he/she not calm, cooperative, sober, and alert?
 - b. Is there:
 - i. A language barrier/communication barrier
 - ii. A distracting injury (clinically apparent painful injury that is diverting the patient's focus from the provider's assessment)
 - iii. An acute stress reaction
 - iv. Intoxication
 - v. Abnormal mental status
 - vi. A distracting injuries

If Yes, institute spinal motion restriction.

3. Abnormal motor/sensory exam (weakness, sensory abnormality or a history of a temporary deficit)?

If Yes, institute spinal motion restriction.

4. Spinal pain or tenderness?
 - a. On palpation of each vertebral body, look for evidence of pain and ask the patient if they are experiencing pain. If evidence of pain along the spinal column is encountered, the patient should be immobilized.

If Yes, institute spinal motion restriction.

5. If the capable patient is found to be pain free, ask the patient to turn their head first to one side (so that the chin is pointing toward the shoulder on the same side as the head is rotating) then, if pain free, to the other. Is there evidence of pain?

If the answer to any of the above is Yes, then institute spinal motion restriction.

If the answer to all of the above is No, then the EMS provider may choose to forego spinal motion restriction.

Maintain a higher index of suspicion if the patient has significant injuries to the trunk or head, the patient is < 5 years old or > 65 years old, a language barrier is present, comorbid illness that places patients at risk for fractures (ankylosing spondylitis, osteoporosis, etc.). If any doubt exists, institute spinal motion restriction.

Supervised Extrication:

In cases where a patient has suffered trauma where c-spine immobilization criteria are met but is awake, alert, and able to follow commands, the patient may be allowed to self-extricate (if able), with EMT or paramedic supervision and guidance, in the following manner:

- A. Place a properly sized and fitted cervical collar,
- B. Ask the patient to maintain spinal neutrality as much as possible and methodically guide them out of the vehicle/circumstance to the stretcher placed as closely as possible to their point of egress.
- C. If the patient is not able to self-extricate due to pain or other circumstances, then standard extrication techniques should be utilized.

If the mechanism of injury may not have been sufficient to injure the cervical spine, the decision will be based on the reliability of the patient and the examination.

Other Extrication Situations

In most cases, the cervical spine will be immobilized using standard methods typically taught in EMT training, including a properly sized/fitted cervical collar.

The long spine board is an extrication device; whose purpose is to allow transfer of a patient to a transport stretcher. The patient will be carefully log-rolled off of the LSB and properly secured to the stretcher for transport.

Patients should not routinely be transported while lying on the LSB.

It is appropriate to immobilize the patient in a neutral position on the stretcher or scoop stretcher. It is appropriate to pad voids if using a scoop stretcher.

All trauma patients should be treated with careful attention to history and physical exam documentation and maintaining spine neutrality by using excellent teamwork and log-rolling techniques.

TURKEL CHEST DECOMPRESSION SYSTEM

A tension pneumothorax is an injury that occurs when a one-way valve is created from either blunt or penetrating trauma. Air can enter but not leave the pleural space. This causes an increase in the intrathoracic pressure, which will collapse the affected lung and will exert pressure on the mediastinum. This pressure will eventually collapse the superior and inferior vena cava, resulting in a loss of venous return to the heart.

Indications:

1. Symptoms of a tension pneumothorax (dyspnea, anxiety, tachypnea, distended neck veins, possibly tracheal deviation away from the affected side, diminished breath sounds on the affect side, possibly shock)

AND

2. A mechanism of injury compatible with a tension pneumothorax.

OR

A history of asthma/COPD.

Procedure:

1. Provide high flow oxygen and ventilator assistance.
2. Determine that indications for emergency decompression are present. Then obtain medical direction to perform the procedure.
3. Identifying point of entry
 - a. Palpate the sternomanubrial junction (Angle of Louis) located at the junction of the upper and middle thirds of the breastbone.
 - b. Move the fingers laterally to palpate the second intercostal space.
 - c. With the index finger on the Angle of the Louis and the middle finger in the 2nd intercostals space, palpate the upper edge of the third rib in the midclavicular line. This is the point of entry.
4. Identify the site as the 2nd intercostal space above the 3rd rib on the anterior chest at the midclavicular line on the same side as the pneumothorax. This is preferred site. However, if there is significant anterior chest trauma, the alternate site may be used: the midaxillary line, fourth or fifth intercostal space directly above the fifth or sixth rib. (The nipple is typically over the fifth rib.)
5. Quickly prepare the area on the affected side with antiseptic.
6. Utilizing a scalpel, make a small incision at the identified site.
7. Remove the plastic cap from the Turkel needle.
8. Hold the Turkel needle between the thumb and middle finger with the index finger supporting the rest of the handle.

9. Introduce the Turkel needle through the chest wall at the small incision site into the pleural space. The color indicator should change from green and a click may be heard as the needle enters the pleural space. If the color indicator does not change to green the needle and catheter should be removed simultaneously and reinserted. Failure of the indicator to return to green indicates that the needle tip is exposed. If the function of the needle is in doubt, the device should be discarded.

NOTE: Do not attempt to insert the needle if the pink/green safety indicator in the handle does not move with the initial pressure on the outer chest wall.

10. The needle is to be secured.

11. As an alternate, a 14 gauge angiocath may be utilized in adults.

Chest Decompression Chart

Age (Yr)	Size (kg)	Procedure	
		IV	Needle Decompression
< 1	< 10	20g	20g
1-5	10-20	18g	18g
5-12	20-40	18-16g	16g
> 12	> 40	14-16g	14g

TOURNIQUETS

Introduction:

Tourniquets have long been a source of controversy because of the problems associated with their use (ischemia, nerve injury, etc.). Recent advances in military medicine have improved the design and allowed for increased use for civilian EMS.

Indications:

1. Penetrating trauma from firearms and stabbings involving severe hemorrhage.
2. Incidents involving blast injuries to extremities.
3. Incidents resulting from industrial or farm accidents involving severe hemorrhage.
4. Multiple casualty injuries and lack of resources to handle hemorrhage control.

Contra-Indications:

1. Any bleeding that can be managed by direct pressure.
2. Major bleeding to a non-extremity.

Procedure:

The CAT (Combat Application Tourniquet) is the recommended tourniquet of choice.

1. Recognition that bleeding is uncontrollable with direct pressure.
2. Wrap CAT around extremity 2-3 inches proximal to bleeding site, do not cover joints.
3. Pass Self Adhering Band through inside slit of the Friction Adapter Buckle.
4. Pass Band through outside slit of Buckle.
5. Pull Self Adhering Band tight and Secure back onto itself.
6. Twist Tension Rod until bleeding stops.
7. Lock Tension Rod in the Windlass Clip.
8. Secure Tension Rod with the Windlass Clip Strap.
9. Make note of Application Time.
10. Continuously reassess for hemostasis.

Following tourniquet application, never cover or hide the tourniquet from view.

In clear view e.g. chest, down arm, etc. label the patient.

If applicable label the medical or triage tag.

If the patient is conscious tell him/her to tell his/her caregivers of the tourniquet.

Transport patient per System Guidelines, and report time of placement.

Special Note:

If transport to trauma center will be greater than 30 minutes, reassess tourniquet for possible removal.

TASER REMOVAL

Evaluate the anatomical location of the barb's puncture zone(s). High-risk/sensitive zones will require transport to a medical facility for removal. Do NOT attempt to remove the barb(s) if they are lodged in the:

1. Eyes, ears, nose, mouth, face or neck
2. Genitals
3. Spine
4. Hands, feet, or joints.

Procedure:

1. Ask Law Enforcement to eject cartridge from taser prior to patient contact.
2. Utilize appropriate PPE (gloves). Inform all caregivers of the intent to remove the contaminated sharp.
3. Remove one barb at a time. Stabilize the skin surrounding the TASER barb. Firmly grasp the barb and with one smooth hard jerk, remove barb from patient's skin.
4. Visually examine the barb tip to ensure it is fully intact. If any part of the barb remains in the subject, transport the patient to a medical facility for removal.
5. The TASER barb is considered some sharp and EMS personnel should take all precautions to avoid accidental needle sticks when removing barbs.
6. Assess for any secondary causes of the patient's behavior which lead to law enforcement subduing the patient. These secondary causes include:
 - a. Alcohol intoxication
 - b. Trauma
 - c. Drug abuse
 - d. Hypoglycemia or other medical disorder
 - e. Psychotic disorder
7. Ask law enforcement if they need the barbs returned.

Section XIV: Pharmacology

GENERAL PRINCIPLES

1. Known allergies must be assessed prior to administration of a medication.
2. Verify right patient, right drug, right dose, right route, right time of administration.
3. The maximum dose of any pediatric medication is equal to the adult dose.
4. A Broselow tape or similar device is highly encouraged when calculating pediatric drug dosages, particularly for the unstable child.
5. Any medications given IV should be inserted into the tubing port closest to the needle insertion site. Immediately following medication administration, a saline flush of 5-10 mL should be given.
6. IV fluids will be at keep open (TKO) rate (30ml/hr for adults, 20ml/hr for pediatrics) unless patient condition indicates a need for higher flow rates. A saline lock may be utilized on stable patients.
7. In the unstable patient, if IV access is delayed or cannot be achieved, IO access should be strongly considered, even in adults. Endotracheal administration of medications should be utilized only as a last resort when IV or IO access is not readily obtainable.
8. Endotracheal medications should be administered at twice the regular dose. No further dilution is required.
9. Naloxone, Atropine, and Epinephrine are approved for endotracheal administration.
10. An allergy to a medication or another of its class is a contra-indication for administration of a medication.

Furosemide

Thiamine

Glucagon

Vasopressin

CCEMT-P

Activated Charcoal

Procainamide

Dobutamine

Propofol

Insulin, Regular

Rocuronium

Norepinephrine

Succinylcholine

Phenylephrine

2-PAM

Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	ORGANOPHOSPHATES/NERVE AGENTS

ACTIVATED CHARCOAL

Adult Dose:	1g/kg PO
Pediatric Dose:	1g/kg PO
Onset:	N/A
Indication:	Selective poisonings
Contra-Indication:	Inability to swallow safely/loss of gag reflex. Gastrointestinal perforation or small bowel obstruction.
Mechanism:	Activated charcoal is useful in absorbing gases and toxins from mineral, bacterial, viral and plant sources
Side Effect:	Diarrhea, vomiting. Aspiration of activated charcoal results in very high morbidity and mortality.
Protocols:	

ADENOSINE (Adenocard)

Adult Dose:	6 mg rapid IVP. May repeat twice at 12 mg rapid IVP.
Pediatric Dose:	0.1mg/kg IV/IO (Max 6mg). May repeat twice at 0.2mg/kg IV/IO (Max 12mg).
Onset:	Immediate
Indication:	Symptomatic narrow complex tachycardia, including WPW, unresponsive to vagal maneuvers. Wide complex tachycardia when SVT with aberrancy suspected, as long as rhythm is regular and not polymorphic.
Contra-Indication:	Asthma, heart block, sick sinus syndrome. Not effective in Atrial fibrillation or Atrial flutter. Should not be used when rhythm is known or thought to be ventricular tachycardia, Torsades de Pointes, or Atrial Fibrillation with or without a Wide Complex.
Mechanism:	Briefly slows AV node conduction to interrupt reentry pathways.
Side Effect:	Transient dysrhythmias (including asystole), chest pressure, flushing, vertigo, bronchospasm, nausea & vomiting, metallic taste, and throat tightness.
Protocols:	WIDE COMPLEX TACHYCARDIA WITH A PULSE, SUPRAVENTRICULAR TACHYCARDIA

ALBUTEROL (Proventil, Ventolin)

Adult Dose:	5mg via nebulizer
Pediatric Dose:	<20 kg body weight = 2.5mg > 20 kg body weight = 5mg
Onset:	5-15 minutes
Indication:	Bronchospasm associated with asthma, COPD, bronchitis, emphysema, cystic fibrosis, etc.

Contra-Indication:	Caution in pregnancy, cardiovascular disease, CHF.
Mechanism:	β_2 stimulant causes selective bronchial smooth muscle relaxation / bronchodilation
Side Effect:	Palpitations, increased heart rate and blood pressure, tremors or nervousness, dizziness.
Protocols:	HYPERKALEMIA , RESPIRATORY DISTRESS , ASTHMA/ COPD/ REACTIVE AIRWAY DISEASE , UNCERTAIN OR OTHER CAUSE , ANAPHYLACTIC SHOCK , BURNS,
<u>AMIODARONE (Cordarone)</u>	
Adult Dose:	Pulseless arrest: 300mg rapid IVP/IO. Wide-complex tachycardia: 150mg IV/IO over 10 minutes.
Pediatric Dose:	5mg/kg rapid IV bolus (Max 300 mg)
Onset:	Within Minutes
Indication:	Ventricular fibrillation or hemodynamically unstable ventricular tachycardia. Can be used for rate control of atrial fibrillation, but may convert rhythm to NSR.
Contra-Indication:	Cardiogenic shock, sinus bradycardia, second or third degree AV blocks.
Mechanism:	Antiarrhythmic action results from blockade of multiple channel types (Sodium channels, Potassium channels, Calcium channels, beta blockade).
Side Effect:	Hypotension, bradycardia, AV block, HA, dizziness, pulmonary fibrosis (with chronic use).
Protocols:	VENTRICULAR FIBRILLATION/ PULSELESS VENTRICULAR TACHYCARDIA , VENTRICULAR ECTOPY , WIDE COMPLEX TACHYCARDIA WITH A PULSE , SUPRAVENTRICULAR TACHYCARDIA , ATRIAL FIBRILLATION OR ATRIAL FLUTTER
<u>AMYL NITRITE</u>	
Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	HAZMAT MEDIC ONLY: BLOOD AGENTS
<u>ASPIRIN (ASA)</u>	
Adult Dose:	324 mg PO (four 81mg tablets) chewed and swallowed.
Pediatric Dose:	N/A
Onset:	5-30 minutes.
Indication:	Suspected myocardial ischemia.
Contra-Indication:	Vomiting, allergy, decreased gag reflex, clotting/bleeding disorders, ulcers, third trimester pregnancy.
Mechanism:	Inhibits platelet function for the life of the platelet.
Side Effect:	Minimal unless allergic to ASA
Protocols:	PULMONARY EDEMA (DUE TO HEART FAILURE) , ACUTE CORONARY SYNDROME , CHEST PAIN (NOT SUSPECTED ACUTE CORONARY SYNDROME)

<u>ATROPINE SULFATE</u>	
Adult Dose:	Bradycardia: 0.5 mg rapid IVP/IO every 3 minutes (Max 3mg). Organophosphate poisoning: 2mg rapid IVP every 3 minutes as needed (No Max).
Pediatric Dose:	Bradycardia: 0.02 mg/kg IV/IO <8 years of age: Minimum single dose 0.1mg. Max single dose 0.5mg. Total max 1mg. 8-16 years of age: Max single dose 1mg. Total max 2mg. Organophosphate poisoning: 0.05 mg/kg IV/IO every 3 minutes (No Max).
Onset:	2 – 4 Minutes
Indication:	Symptomatic bradycardia including heart blocks, organophosphate poisoning.
Contra-Indication:	Caution with glaucoma or COPD.
Mechanism:	Parasympatholytic: blocks vagal impulses, thereby increasing SA node discharge. Anticholinergic: potent anti-secretory effects caused by the blocking of acetylcholine at the muscarinic site.
Side Effect:	
Protocols:	SINUS BRADYCARDIA AND SECOND DEGREE HEART BLOCK MOBITZ TYPE I, ORGANOPHOSPHATES/NERVE AGENTS, STATE OF ILLINOIS NERVE GAS AUTO-INJECTOR GUIDELINES
<u>CALCIUM CHLORIDE 10%</u>	
Adult Dose:	1gm slow IVP. Give over 10-20 seconds during cardiac arrest, over 5-10 minutes in patients with a pulse.
Pediatric Dose:	20mg/kg (0.2ml/kg) slow IVP. Give over 10-20 seconds during cardiac arrest, over 5-10 minutes in patients with a pulse.
Onset:	Immediate
Indication:	Hypocalcemia, hyperkalemia (renal emergencies, crush syndrome), calcium channel blocker or beta blocker overdose. May give IV for hydrofluoric acid exposure.
Contra-Indication:	Do not give routinely in cardiac arrest unless the patient meets an indication listed above. Do not give to patients taking Digoxin.
Mechanism:	Calcium is essential for myocardial contraction and regulates cell permeability to sodium and potassium.
Side Effect:	Flushing, syncope, cardiac arrest, hypotension, bradycardia, shortened QT interval, arrhythmia. May cause spasm of coronary arteries. If infiltrates, will cause tissue necrosis at injection site.
Protocols:	PULSELESS PATIENTS, HYPERKALEMIA, OVERDOSE/POISONING
<u>CALCIUM GLUCONATE</u>	
Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	

Protocols:	
<u>DEXAMETHASONE (Decadron)</u>	
Adult Dose:	10 mg IVP
Pediatric Dose:	0.25 mg/kg IV/IO
Onset:	Varies, several hours up to 1 day.
Indication:	Asthma, COPD, anaphylaxis
Contra-Indication:	Hypersensitivity. Use with caution in-patients with GI bleeding, diabetes or severe infection.
Mechanism:	Suppresses acute & chronic inflammation.
Side Effect:	Hypertension, GI bleeding, headache, irritability, seizure, psychosis, hallucinations, weakness, HTN, tachycardia, edema, nausea, flushing, hyperglycemia, hemorrhage, thrombocytopenia, hypokalemia.
Protocols:	ASTHMA / COPD/ REACTIVE AIRWAY DISEASE , ANAPHYLACTIC SHOCK ,
<u>DEXTROSE 10%</u>	
Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	PULSELESS PATIENTS , HYPERKALEMIA , DIABETIC / GLUCOSE EMERGENCIES , NEONATAL RESUSCITATION , TRAUMATIC ARREST
<u>DEXTROSE 50%</u>	
Adult Dose:	25 gm / 50ml IVP
Pediatric Dose:	> 2 months of age : 2-4ml/kg D25 IV/IO, 50% diluted 1:1 with NORMAL SALINE < 2 months of age : 2-4ml/kg D12.5 IV/IO, dilute above 25% again 1:1 with NORMAL SALINE to make 12.5%
Onset:	Within minutes
Indication:	Hypoglycemia
Contra-Indication:	Hyperglycemia
Mechanism:	Increases blood sugar level.
Side Effect:	Diuresis, will slough skin if given SQ or infiltrates.
Protocols:	PULSELESS PATIENTS , HYPERKALEMIA , DIABETIC / GLUCOSE EMERGENCIES , NEONATAL RESUSCITATION , TRAUMATIC ARREST
<u>DIAZEPAM (Valium)</u>	
Adult Dose:	5mg slow IVP. May repeat once.
Pediatric Dose:	0.1mg/kg IV/IO or 0.5 mg/kg per rectum < 5yrs Max 5mg > 5yrs Max 10mg
Onset:	1 – 5 Minutes

Indication:	Treat anxiety/agitation, seizures, alcohol withdrawal, cocaine-related chest pain, and premedication for cardioversion or transcutaneous pacing
Contra-Indication:	Respiratory depression, CNS depression (drowsiness, confusion, etc.), hypotension.
Mechanism:	Enhances the action of GABA (an inhibitory neurotransmitter in the brain) which slows transmissions and suppresses the spread of seizure activity. Potent skeletal muscle relaxant.
Side Effect:	Hypotension, respiratory depression, psychomotor impairment, and confusion. Caution if ETOH/drug use is suspected or with elderly patients.
Protocols:	ACUTE CORONARY SYNDROME , SEIZURE , CONSCIOUS SEDATION , HEAT STROKE , OVERDOSE/ POISONING , ORGANOPHOSPHATES/NERVE AGENTS , STATE OF ILLINOIS NERVE GAS AUTO-INJECTOR GUIDELINES

DIPHENHYDRAMINE (Benadryl)

Adult Dose:	50 mg slow IVP or deep IM.
Pediatric Dose:	1-2mg/kg IV/IO/IM
Onset:	15 Minutes (Half Life 2-10 hours)
Indication:	Allergic reactions, anaphylaxis, Extra-Pyramidal Symptoms
Contra-Indication:	Caution in presence of drugs or alcohol
Mechanism:	Antihistamine
Side Effect:	Drowsiness, increased blood pressure or heart rate, H/A, palpitations, thickens bronchial secretions, dry mouth, dilated pupils, paradoxical excitation in children.
Protocols:	ANAPHYLACTIC SHOCK , COMPLICATIONS OF TRANSFUSION

DOBUTAMINE (Dobutrex)

Adult Dose:	2-20 mcg/kg/min
Pediatric Dose:	N/A
Onset:	Within 1-2 minutes.
Indication:	Decreased cardiac output.
Contra-Indication:	Idiopathic hypertrophic subaortic stenosis (hypertrophic cardiomyopathy). Hypotension not due to decreased cardiac output.
Mechanism:	Dobutamine is a synthetic catecholamine and a direct-acting inotropic agent. It stimulates the beta 1 receptors of the heart which produces increased cardiac output and heart rate.
Side Effect:	Tachycardia, cardiac arrhythmias, angina, headache. Also results in dilation of blood vessels in skeletal muscle which may actually produce hypotension.
Protocols:	(CCEMT-P, PHRN, RN ONLY)

DOPAMINE

Adult Dose:	2-20 mcg/kg/min
Pediatric Dose:	2-20 mcg/kg/min
Onset:	2 – 4 Minutes
Indication:	Symptomatic bradycardia not responsive to atropine, cardiogenic shock, neurogenic shock, septic shock.
Contra-Indication:	Hypovolemia, hypotension due to tachydysrhythmia, pheochromocytoma.
Mechanism:	Alpha 1 & Beta 1, 2 stimulant. Increases cardiac output/stroke volume at lower doses. Increases systemic vascular resistance at higher doses.

Dopamine Drip 400mg/250mL																	
Weight (lbs)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300		
Weight (kg)	73	77	82	86	91	95	100	105	109	114	118	123	127	132	136		
mcg/kg/minute	2	5	6	6	6	7	7	8	8	8	9	9	9	10	10	10	
	3	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	
	4	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	
	5	14	14	15	16	17	18	19	20	20	21	22	23	24	25	26	
	6	16	17	18	19	20	21	23	24	25	26	27	28	29	30	31	
	7	19	20	21	23	24	25	26	27	29	30	31	32	33	35	36	
	8	22	23	25	26	27	29	30	31	33	34	35	37	38	40	41	
	9	25	26	28	29	31	32	34	35	37	38	40	41	43	44	46	
	10	27	29	31	32	34	36	38	39	41	43	44	46	48	49	51	
	11	30	32	34	36	38	39	41	43	45	47	49	51	53	54	56	
	12	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	
	13	35	38	40	42	44	47	49	51	53	55	58	60	61	64	66	
	14	38	41	43	45	48	50	53	55	57	60	62	64	67	69	72	
	15	41	43	46	49	51	54	56	59	61	64	66	69	72	74	77	
	16	44	46	49	51	55	57	60	63	65	68	71	74	76	79	82	
	17	46	49	52	55	58	61	64	67	70	72	75	78	81	84	87	
	18	49	52	55	58	61	64	68	71	74	77	80	83	86	89	92	
	19	52	55	58	62	65	68	71	74	78	81	84	87	91	94	97	
	20	55	58	61	65	68	72	75	78	82	85	89	92	95	99	102	
<u>EPI-PEN</u>																	
Adult Dose:	Anaphylaxis: 0.5mg IM.																
Pediatric Dose:	Anaphylaxis: 0.3mg IM.																
Onset:	3-10 minutes																
Indication:	Asthma/ Anaphylaxis																
Contra-Indication:	Caution if history of hypertension, angina, CAD, hyperthyroidism, age > 50. None in anaphylaxis.																
Mechanism:	Alpha: constricts bronchiole arterioles, inhibits histamine release, constricts arterioles in the skin, mucous membranes, and kidneys but dilates those in the skeletal muscle.																
Side Effect:	Palpitations, HTN, angina, anxiety, tremors, H/A, dizziness, dyspnea, arrhythmias (especially tachyarrhythmias, i.e... SVT & VT), ST segment elevations, Nausea & Vomiting, hyperglycemia																
Protocols:	RESPIRTORY DISTRESS, ANAPHYLACTIC SHOCK																
<u>EPINEPHRINE</u>																	
Adult Dose:	Cardiac arrest: 1mg IVP every 3 minutes.																

	Anaphylaxis/Asthma: 0.3-0.5mg IM. May repeat every 3-5 minutes. Refractory bradycardia, anaphylaxis: 2-10mcg/min (NOT mcg/kg/min)
Pediatric Dose:	Cardiac arrest: IV/IO 0.01mg/kg (0.1ml)/kg 1:10,000 (Max 1mg). ETT 0.1mg/kg (0,1ml)/kg 1:1,000 (Max 1 mg). Anaphylaxis/Asthma: 0.01 mg/kg (0.01ml/kg) 1:1000 IM (Max 0.5mg) May utilize 0.01 mg/kg (0.1 ml/kg) 1:10000 IV/IO every 3-5 minutes (Max 1mg) if hypotension is present. Refractory bradycardia, anaphylaxis: 0.1-1mcg/kg/min Toxins/OD: 0.01 mg/kg (0.1 ml/kg) 1:10,000 IV/IO (Max 1mg)
Onset:	<2min IV, 3-10min SQ.
Indication:	Asthma, anaphylaxis, cardiac arrest.
Contra-Indication:	Caution if history of hypertension, angina, CAD, hyperthyroidism, age > 50. None in cardiac arrest or anaphylaxis.
Mechanism:	Alpha & Beta stimulant. Beta 1: strengthens myocardial contraction, increases systolic blood pressure, heart rate, and cardiac output. Beta 2: dilates bronchial smooth muscle and inhibits mucous secretion. Alpha: constricts bronchiole arterioles, inhibits histamine release, constricts arterioles in the skin, mucous membranes, and kidneys but dilates those in the skeletal muscle.
Side Effect:	Palpitations, HTN, angina, anxiety, tremors, H/A, dizziness, dyspnea, arrhythmias (especially tachyarrhythmias, i.e... SVT & VT), ST segment elevations, Nausea & Vomiting, hyperglycemia.
Protocols:	PULSELESS PATIENTS , SINUS BRADYCARDIA AND SECOND DEGREE HEART BLOCK MOBITZ TYPE I , SECOND DEGREE MOBITZ TYPE II OR THIRD DEGREE HEART BLOCK (COMPLETE HEART BLOCK) , NON-FOREIGN BODY AIRWAY OBSTRUCTION , ASTHMA /COPD/REACTIVE AIRWAY DISEASE , ANAPHYLACTIC SHOCK , NEONATAL RESUSCITATION , HYPOTHERMIA

Epinephrine Infusion

Mix 1mg Epinephrine 1:1000 in 250mL

Adult Dose:	2-10 mcg/min
Pediatric Dose:	0.1-1mcg/kg/min

		mcg/min								
		2	3	4	5	6	7	8	9	10
Drops/ Minute		30	45	60	75	90	105	120	135	150

EPINEPHRINE DRIP

Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	

Mechanism:	
Side Effect:	
Protocols:	SINUS BRADYCARDIA AND SECOND DEGREE HEART BLOCK MOBITZ TYPE I, SECOND DEGREE MOBITZ TYPE II OR THIRD DEGREE HEART BLOCK (COMPLETE HEART BLOCK), ANAPHYLACTIC SHOCK
<u>ETOMIDATE (Amidate)</u>	
Adult Dose:	0.3 mg/kg rapid IVP
Pediatric Dose:	Not Indicated
Onset:	1-2 minutes Duration: 3-5 minutes
Indication:	Prolonged ventilation needed in a patient unable to protect his/her airway.
Contra-Indication:	None, unless difficult ventilation/intubation is predicted.
Mechanism:	Non-barbituate hypnotic & general anesthetic. When dosed properly, etomidate has minimal effects on myocardial activity, blood pressure, and respirations.
Side Effect:	Myoclonus (jerking of skeletal muscle), nausea & vomiting, transient pain at IV site, hiccoughs, respiratory depression or apnea, hypotension. The effects of etomidate can be accentuated by CNS depressants, such as narcotics and alcohol.
Protocols:	CONSCIOUS SEDATION, SEDATIVE-ASSISTED INTUBATION & RAPID SEQUENCE INTUBATION
<u>FUROSEMIDE (Lasix)</u>	
Adult Dose:	0.5-1mg/kg IVP (or the patient's daily dose). Max 120mg. For patients who are not on daily diuretics, give FUROSEMIDE 20-40mg IV.
Pediatric Dose:	1mg/kg IV/IM
Onset:	5 – 10 minutes
Indication:	Volume Overload
Contra-Indication:	Hypovolemia, hypokalemia, pregnancy, hypotension.
Mechanism:	Diuretic, vasodilator.
Side Effect:	Orthostatic hypotension, nausea & vomiting, dysrhythmias, dehydration & electrolyte depletion (hypokalemia, hypomagnesemia, hypocalcemia), headache, hearing loss, tinnitus, blurred vision, dry mouth.
Protocols:	PULMONARY EDEMA (DUE TO HEART FAILURE)
<u>GLUCAGON</u>	
Adult Dose:	Hypoglycemia: 1mg IM/IN. May repeat once in 15 minutes. Beta Blocker Overdose: 1mg IV every 5 minutes as needed.
Pediatric Dose:	Hypoglycemia: Patients weighing <25kg or <6-8yo = 0.5mg IM Patients weighing >25kg or >6-8yo = 1mg IM Beta Blocker Overdose: Same dosing as above IV every 5 minutes as needed.
Onset:	1 minute

Indication:	Hypoglycemia when the patient cannot safely swallow and IV access is not available. Beta blocker overdose.
Contra-Indication:	Allergy to proteins. Pheochromocytoma or insulinoma. Will be ineffective in the poorly nourished.
Mechanism:	Increases blood glucose by stimulating the breakdown of glycogen in the liver. Produces beta-stimulation.
Side Effect:	Generally, well tolerated. Nausea and vomiting (particularly with higher doses used for beta blocker overdose), tachycardia, hypertension.
Protocols:	PULSELESS PATIENTS, DIABETIC / GLUCOSE EMERGENCIES, OVERDOSE/POISONING

HALOPERIDOL

Adult Dose:	Up to 69 years of age: 5mg IM. >69 years of age: 2.5mg IM.
Pediatric Dose:	N/A
Onset:	Onset within 10 minutes. Peak 20 minutes after IM administration.
Indication:	Indicated in the management of acute and chronic psychosis, including schizophrenia and manic states. Chemical restraint for violent, agitated, and aggressive patients who present a danger to themselves or to others and who cannot be safely managed otherwise.
Contra-Indication:	CNS depression due to any cause, including alcohol and other depressant drugs. Acute head injury. Severe depressive states. Parkinson's Disease. QT prolonging conditions (long QT syndrome, hypokalemia, drugs known to prolong QT interval)
Mechanism:	Neuroleptic with antipsychotic properties.
Side Effect:	QT Prolongation which may lead to Torsades de Pointes. Extrapyrarnidal reactions, akithisia (restlessness). Hypotension may occur but typically responds to IV fluid bolus. A rare by serious syndrome called Neuroleptic Malignant Syndrome (NMS) includes high fever, generalized muscle rigidity, altered mental status, and evidence of autonomic instability (tachycardia, hypertension).
Protocols:	CONSCIOUS SEDATION

HYDROCOBALAMIN

Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	BLOOD AGENT

INSULIN, HUMAN REGULAR (Humulin-R, Novolin-R)

Adult Dose:	Hyperglycemia: SQ dose varies. Hyperkalemia: 10units IVP with adequate amounts of dextrose to prevent hypoglycemia (typically 25-50g D50W).
Pediatric Dose:	N/A

Onset:	IV: minutes; SQ: 1 – 3 hours.
Indication:	Hyperglycemia, hyperkalemia.
Contra-Indication:	Hypoglycemia
Mechanism:	Insulin stimulates carbohydrate metabolism and facilitates transfer of glucose into cardiac muscle, skeletal muscle and adipose tissue, and glucose is converted to glycogen. Also facilitates potassium entry into cells, thereby lowering serum potassium levels.
Side Effect:	Hypoglycemia, hypokalemia.
Protocols:	CCEMT-P, PHRN, or RN ONLY: HYPERKALEMIA , DIABETIC / GLUCOSE EMERGENCIES
<u>KETOROLAC (Toradol)</u>	
Adult Dose:	< 65yo: one dose 60mg IM/IN or 30mg IV. ≥ 65yo, renally impaired and/or < 50kg of body weight: one dose 30mg IM/IN or 15mg IV.
Pediatric Dose:	1mg/kg IM (Max 30mg) 0.5mg/kg IV (Max 15 mg)
Onset:	Within minutes
Indication:	Mild to moderate pain.
Contra-Indication:	Hypersensitivity to ketorolac, aspirin, ibuprofen, or other NSAIDS. Pregnant or nursing mother. Cerebrovascular bleed. Active peptic ulcer disease, recent GI bleeding or perforation, advanced renal impairment, risk of renal failure due to volume depletion. Obvious fractures. Kidney stones.
Mechanism:	Anti-inflammatory analgesic.
Side Effect:	GI bleeding, bronchospasm, edema, rash, heart burn, acute renal failure, hypertension
Protocols:	CHEST PAIN (NOT SUSPECTED ACUTE CORONARY SYNDROME) , PAIN CONTROL
<u>LABETALOL</u>	
Adult Dose:	10-20mg IVP
Pediatric Dose:	N/A
Onset:	5-10 minutes.
Indication:	Hypertension
Contra-Indication:	Moderate to severe asthma or COPD, hypotension, congestive heart failure, second and third degree AV block, sinus bradycardia.
Mechanism:	Labetalol blocks beta-1 and beta-2 receptors. Thus, it slows heart rate, but may result in bronchoconstriction. Labetalol is also an alpha blocker, lower systemic vascular resistance, and hence, blood pressure.
Side Effect:	Bronchospasm, congestive heart failure, orthostatic hypotension, nausea, dizziness, fatigue.
Protocols:	HYPERTENSIVE EMERGENCIES
<u>LACTATED RINGERS</u>	
Adult Dose:	See SOGs
Pediatric Dose:	See SOGs
Onset:	

Indication:	Lactated Ringers is an isotonic IV fluid used for volume resuscitation of the hypovolemic patient. It is composed of: Sodium 130 mEq/L Potassium 4 mEq/L Calcium 3 mEq/L Chloride 109 mEq/L Lactate 28 mEq/L In theory, lactated ringers can limit the development of metabolic acidosis.
Contra-Indication:	
Mechanism:	Replace intravascular volume.
Side Effect:	Volume overload.
Protocols:	
<u>LIDOCAINE (Xylocaine)</u>	
Adult Dose:	20-50mg IO
Pediatric Dose:	0.5 mg/kg IO
Onset:	30-90 seconds
Indication:	Pain control after IO insertion.
Contra-Indication:	Hypersensitivity to -caines or -amides, AV blocks, Torsades de Pointes, PVC's in bradycardia, IVR, life-sustaining escape rhythms associated with bradycardia or second/third degree heart blocks
Mechanism:	Na channel blockade
Side Effect:	Drowsiness altered LOC, agitation, seizures, lightheadedness, tinnitus, blurred vision, vertigo, muscle twitching/tremor, nausea, hypotension, cardiovascular collapse, bradycardia.
Protocols:	EZ-IO INTRAOSSEOUS ACCESS
<u>MAGNESIUM SULFATE</u>	
Adult Dose:	Pulseless Torsades: 2g IVP. Torsades with pulse, asthma: 2g over 10-20 minutes
Pediatric Dose:	Pulseless Torsades: 25-50 mg/kg IV/IO Torsades with pulse, asthma: 25-50 mg/kg over 10-20 minutes
Onset:	Immediate
Indication:	Torsades de Pointes, suspected hypomagnesemia, asthma, eclamptic seizures.
Contra-Indication:	None in the presence of an above indication.
Mechanism:	Decreases acetylcholine release at neuromuscular junctions resulting in smooth muscle relaxation.
Side Effect:	Diaphoresis, facial flushing, nausea & vomiting, depressed reflexes, weakness progressing to respiratory depression and failure, flaccid paralysis, hypotension, bradycardia, heart block, cardiac arrest. (Severe side effects typically are seen with continuous infusions or higher doses used for treating pre-eclampsia and eclampsia.)
Protocols:	VENTRICULAR FIBRILLATION/ PULSELESS VENTRICULAR TACHYCARDIA, WIDE COMPLEX TACHYCARDIA WITH A PULSE, ASTHMA /COPD/REACTIVE AIRWAY DISEASE, PREGNANCY COMPLICATIONS

<u>MARK 1 KIT</u>	
Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	HAZMAT MEDIC ONLY
<u>METHYLENE BLUE</u>	
Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	HAZMAT MEDIC ONLY: METHEMOGLOBINEMIA-INDUCING AGENTS
<u>METHYLPREDNISOLONE (SOLU-MEDROL)</u>	
Adult Dose:	Adult 125mg IV
Pediatric Dose:	1-2mg/kg IV
Onset:	
Indication:	Asthma, COPD, anaphylaxis.
Contra-Indication:	Hypersensitivity. Use with caution in patients with GI bleeding, diabetes, or severe infection.
Mechanism:	Suppresses acute & chronic inflammation.
Side Effect:	Hypertension, GI bleeding, headache, irritability, seizure, psychosis, hallucinations, weakness, HTN, tachycardia, edema, nausea, flushing, hyperglycemia, hemorrhage, thrombocytopenia, Hypokalemia
Protocols:	ASTHMA /COPD/REACTIVE AIRWAY DISEASE
<u>MIDAZOLAM (Versed)</u>	
Adult Dose:	Chemical Sedation: 2-4mg IV/IO/IM/IN. Seizure: 4mg IVP as initial dose. May be repeated in 2mg increments to maximum of 10mg. Sedation for intubation: 5mg IVP. May repeat in 2 minutes.
Pediatric Dose:	0.1-0.2mg/kg IV/IM Maximum single dose 4mg
Onset:	3 – 5 minutes
Indication:	Treat anxiety/agitation, seizures, alcohol withdrawal, cocaine-related chest pain, and premedication for cardioversion or transcutaneous pacing.

Contra-Indication:	Respiratory depression, CNS depression (drowsiness, confusion, etc.), hypotension.
Mechanism:	Enhances the action of GABA (an inhibitory neurotransmitter in the brain) which slows transmissions and suppresses the spread of seizure activity. Potent skeletal muscle relaxant.
Side Effect:	Hypotension, respiratory depression, psychomotor impairment, and confusion. Caution if ETOH/drug use is suspected or with elderly patients.
Protocols:	SUPRAVENTRICULAR TACHYCARDIA (NARROW COMPLEX TACHYCARDIA, RATE > 150) , ACUTE CORNARY SYNDROME, SEIZURE, CONSCIOUS SEDATION, OVERDOSE/POISONING, SEDATIVE-ASSISTED INTUBATION & RAPID SEQUENCE INTUBATION

MORPHINE SULFATE

Adult Dose:	2 to 4 mg IVP (Max 10 mg).
Pediatric Dose:	< 6 months 0.05mg/kg IV/IO > 6 months 0.05-0.1mg/kg
Onset:	Immediate
Indication:	Moderate to severe acute pain.
Contra-Indication:	Hypovolemia, hypotension, head injury, or severe respiratory depression.
Mechanism:	Binds to opioid receptors in the brain to produce analgesia.
Side Effect:	Hypotension, tachycardia, bradycardia, respiratory depression, euphoria, syncope.
Protocols:	ACUTE CORNARY SYNDROME, PAIN CONTROL, ACUTE ABDOMINAL PAIN

NALOXONE (Narcan)

Adult Dose:	0.4-2mg IVP, may repeat every 5 minutes IV/IO/IN/IM.
Pediatric Dose:	If < 20kg 0.1mg/kg IV/IO/ETT If > 20kg 2mg IV/IO/IM/SQ/ETT
Onset:	< 2 minutes
Indication:	Known overdose of synthetic or natural narcotic or opiate
Contra-Indication:	None
Mechanism:	Narcotic antagonist which reverses effects of opioid drugs.
Side Effect:	Withdrawal symptoms, increased heart rate and blood pressure, seizures, anxiety, pulmonary edema, VF/VT, tachycardia, hypertension, asystole, nausea & vomiting, diarrhea.
Protocols:	PULSELESS PATIENTS, PULESLESS ELECTRICAL ACTIVITY (PEA)/ ASYSTOLE, COMA OF UNKOWN ORGIN, PAIN CONTROL, NEONATAL RESUSCITATION, OVERDOSING/ POISONING

NITROGLYCERIN

Adult Dose:	0.4mg SL tabs (1/150gr) 1 inch transdermal
Pediatric Dose:	N/A
Onset:	1-3min SL, 30 min Transdermal
Indication:	Ischemic chest pain (angina, AMI), pulmonary edema.
Contra-Indication:	Use of PDE5 inhibitors such as sildenafil (Viagra & Revatio), tadalafil (Cialis), vardenafil (Levitra), or udenafil (Zydena); hypotension; hypovolemia.

Mechanism:	Smooth muscle relaxant resulting in peripheral vasodilation
Side Effect:	Headache, decreased blood pressure, nausea & vomiting, flushing, orthostatic hypotension/syncope.
Protocols:	PULMONARY EDEMA (DUE TO HEART FAILURE) , ACUTE CORONARY SYNDROME ,
<u>NITROPRUSSIDE</u>	
Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	Transfer CCEMT-P, PHRN, RN ONLY
<u>NOREPINEPHRINE (Levophed)</u>	
Adult Dose:	4-30mcg/min
Pediatric Dose:	N/A
Onset:	2 – 3 minutes
Indication:	Hypotension associated with septic shock.
Contra-Indication:	Hypotension due to hypovolemia (including hemorrhage).
Mechanism:	Norepinephrine is an alpha and beta agonist, but it is a much more potent alpha agonist. It produces significant peripheral vasoconstriction, but also some increase in heart rate and cardiac output (much less).
Side Effect:	Tissue necrosis with extravasation. Use only through a central line. If the patient is not sufficiently hydrated, ischemic necrosis of digits is common. Reflex bradyarrhythmia and other dysrhythmias, hypertension, nausea & vomiting, headache, tremor, anxiety, restlessness.
Protocols:	
<u>NORMAL SALINE</u>	
Adult Dose:	See SOGs
Pediatric Dose:	See SOGs
Onset:	
Indication:	Normal Saline is an isotonic IV fluid used for volume resuscitation of the hypovolemic patient. It is composed of: Sodium 154 mEq/L Chloride 154 mEq/L Normal saline may be administered in a nebulized form to pediatric patients with suspected croup or to loosen secretions in the tracheostomy patient.
Contra-Indication:	None, in the presence of hypovolemia.
Mechanism:	Replace intravascular volume.
Side Effect:	Volume overload
Protocols:	

<u>ONDANSETRON (Zofran)</u>	
Adult Dose:	4mg IV or 8mg disintegrating tab on tongue then swallow saliva.
Pediatric Dose:	Age 4 to 11 yrs: 4mg disintegrating tab on tongue then swallow saliva. 0.1mg/kg IV
Onset:	Within minutes
Indication:	Nausea and Vomiting.
Contra-Indication:	Known hypersensitivity to ondansetron.
Mechanism:	Antiemetic
Side Effect:	Very rare but include diarrhea, constipation, abdominal pain, headache, dizziness, sedation, anxiety, tachycardia, chest pain.
Protocols:	ACUTE CORONARY SYNDROME , GENERAL ILLNESS , OVERDOSE/ POISONING ,
<u>ORAL GLUCOSE</u>	
Adult Dose:	One tube
Pediatric Dose:	One tube
Onset:	Varies, but typically within minutes
Indication:	Hypoglycemia
Contra-Indication:	Hyperglycemia or patients unable to swallow.
Mechanism:	Provides glucose to cells
Side Effect:	None
Protocols:	DIABETIC / GLUCOSE EMERGENCIES
<u>OXYGEN</u>	
Adult Dose:	See SOGs
Pediatric Dose:	See SOGs
Onset:	Almost immediate
Indication:	All medical and trauma patients.
Contra-Indication:	No contraindications in the hypoxic patient. High concentrations of oxygen will reduce the respiratory drive in some COPD patients. These patients should be carefully monitored.
Mechanism:	Increases dissolved oxygen and oxygen bound to hemoglobin in the blood.
Side Effect:	None
Protocols:	INITIAL MEDICAL CARE
<u>PHENYLEPHRINE (Neo-Synephrine)</u>	
Adult Dose:	0.1-0.5mg IV every 10-15 minutes. 100-180 mcg/min
Pediatric Dose:	N/A
Onset:	1 – 2 minutes
Indication:	Hypotension associated with septic shock or other conditions that produce peripheral vasodilatation.
Contra-Indication:	HTN, Ventricular Tachycardia.
Mechanism:	Norepinephrine is a potent alpha agonist that produces vasoconstriction. It has no beta

	effects.
Side Effect:	Tissue necrosis with extravasation. Use only through a central line, if possible. Hypertension, myocardial infarction, tachyarrhythmias including ventricular arrhythmia, pulmonary edema.
Protocols:	CCEMT-P, PHRN, RN ONLY
<u>POTASSIUM</u>	
Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	CCEMT-P, PHRN, RN ONLY
<u>PROCAINAMIDE</u>	
Adult Dose:	20mg/min until the arrhythmia is suppressed, hypotension ensues, or the QRS is prolonged by 50% from its original duration, or to maximum dose of 17mg/kg.
Pediatric Dose:	N/A
Onset:	Begins within minutes, but since procainamide is NOT given rapid IV push, may require a longer period of time to see results.
Indication:	Ventricular arrhythmias, Atrial fibrillation/flutter, SVT associated with Wolff-Parkinson-White syndrome.
Contra-Indication:	Second or third degree AV block, hypersensitivity to ester-type local anesthetics, systemic lupus erythematosus, Torsades de Pointes.
Mechanism:	Procainamide is a sodium channel blocker. It increases the fibrillation threshold and reduces impulse conduction velocity and excitability in the atria, His-Purkinje fibers and ventricular muscle of the heart. Procainamide does not usually affect cardiac contractility.
Side Effect:	Hypotension, dysrhythmias, Torsades de Pointes.
Protocols:	CCEMT-P, PHRN, RN ONLY
<u>PROPOFOL (Diprivan)</u>	
Adult Dose:	5-50 mcg/kg/min. Titrate in increments of 5mcg/kg/min every 5 minutes as needed.
Pediatric Dose:	N/A
Onset:	Within 40 seconds.
Indication:	Sedation in intubated patients.
Contra-Indication:	Allergies to eggs, egg products, soybeans or soy products, or peanuts.
Mechanism:	Short-acting sedative-hypnotic.
Side Effect:	Hypotension due to peripheral vasodilatation, decreased cardiac output, respiratory depression, decreased cerebral blood flow, pancreatitis.
Protocols:	CCEMT-P, PHRN, RN ONLY
<u>PYRIDOXINE</u>	
Adult Dose:	

Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	HAZMAT MEDIC ONLY
<u>ROCURONIUM (Zemuron, Esmeron)</u>	
Adult Dose:	RSI: 0.6-1.2 mg/kg Maintenance: 0.2 mg/kg
Pediatric Dose:	N/A
Onset:	2-3 minutes. Duration is approximately 30 minutes.
Indication:	Induce paralysis for rapid sequence intubation or to maintain paralysis in the intubated patient.
Contra-Indication:	Predicted inability to intubate and ventilate.
Mechanism:	Rocuronium is a nondepolarizing neuromuscular blocking agent that competes for cholinergic receptors at the motor end-plate.
Side Effect:	Administration MUST be accompanied by adequate anesthesia/sedation. Cardiac dysrhythmia (rare), hypertension, hypotension.
Protocols:	CCEMT-P, PHRN, RN ONLY
<u>SODIUM BICARBONATE</u>	
Adult Dose:	1mEq/kg IV/IO For chlorine gas exposure only: 2ml sodium bicarb with 2ml sterile water and nebulized.
Pediatric Dose:	1mEq/kg IV/IO
Onset:	Immediate
Indication:	Altered level of consciousness and wide complex tachycardia resulting from tricyclic antidepressant overdose or ingestion. Cardiac arrest associated with hyperkalemia (renal failure, dialysis, crush injuries) or metabolic acidosis (renal failure, DKA, methanol ingestion, ASA overdose, crush injuries, etc.). Chlorine gas inhalation (nebulized).
Contra-Indication:	None when used as indicated. Can inhibit the release of oxygen from hemoglobin to the tissues. Should only be given after airway has been secured and ventilations achieved.
Mechanism:	Drives potassium back into cells. Raises the pH of blood plasma by buffering excess hydrogen ions. In tricyclic overdoses, the sodium ion also attempts to overcome the sodium channel blockade that tricyclics can produce.
Side Effect:	Minimal when used as indicated.
Protocols:	PULSELESS PATIENTS , HYPERKALEMIA , TRAUMATIC ARREST , OVERDOSE/POISONING ,
<u>SODIUM NITRITE</u>	
Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	

Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	HAZMAT MEDIC ONLY
<u>SODIUM THIOSULFATE</u>	
Adult Dose:	
Pediatric Dose:	
Onset:	
Indication:	
Contra-Indication:	
Mechanism:	
Side Effect:	
Protocols:	HAZMAT MEDIC ONLY
<u>SUCCINYLCHOLINE</u>	
Adult Dose:	0.6-1.1 mg/kg IV
Pediatric Dose:	N/A
Onset:	Less than 60 seconds. Duration is 4-6 minutes.
Indication:	Paralysis to facilitate endotracheal intubation during RSI.
Contra-Indication:	Predicted inability to intubate and ventilate. Myasthenia gravis, Duchenne's muscular dystrophy or other muscular myopathy, major burns, extensive denervation of skeletal muscle, or upper motor neuron disease such as ALS (Lou Gehrig's disease).
Mechanism:	Succinylcholine mimics acetylcholine as it binds with the cholinergic receptors on the motor end plate. This produces fasciculations that deplete motor end plates of acetylcholine, which results in paralysis.
Side Effect:	Administration MUST be accompanied by adequate anesthesia/sedation. Also stimulates autonomic ganglia and muscarinic receptors which can cause cardiac arrhythmias. May produce potentially lethal hyperkalemia. Malignant hyperthermia is a very rare side effect, but one the CCEMT-P must be familiar with. It is marked by sudden onset of markedly elevated temperature, blood pressure, and heart rate. Early recognition of malignant hyperthermia is critical for patient survival.
Protocols:	CCEMT-P, PHRN, RN ONLY
<u>THIAMINE (Vitamin B1)</u>	
Adult Dose:	100mg slow IVP or IM.
Pediatric Dose:	N/A
Onset:	
Indication:	Prophylaxis and treatment of thiamine deficiency states and associated neurological and cardiovascular symptoms including coma of unknown origin, chronic alcoholism and malnutrition.
Contra-Indication:	None significant (use with caution during lactation).
Mechanism:	Vitamin B1 is necessary to convert glucose into energy. It is not manufactured by the body and must be replaced through diet. The brain is extremely sensitive to thiamine deficiency.

Based On IDPH Region IV Standard Operating Guidelines

Side Effect:	Hypotension (from rapid injection or large dose), anxiety, nausea & vomiting, diaphoresis, allergic reaction (usually from IV injection – very rare).
Protocols:	COMA OF UNKNOWN ORIGIN , OVERDOSE/POISONING

9/1/14, 5/15, 11/16