EMERGENCY MEDICAL SERVICES PRE-HOSPITAL TREATMENT PROTOCOLS

COMPLETE TEXT

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MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
OFFICE OF EMERGENCY MEDICAL SERVICES
99 Chauncy Street, 11th floor
BOSTON, MA 02111
(617) 753-7300

www.ma.gov/dph/oems

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Abdullah Rehayem
Director

Jonathan L. Burstein, M.D.
State EMS Medical Director

INTRODUCTION

INTRODUCTION TO STATEWIDE TREATMENT PROTOCOLS

The goal of any Emergency Medical Services system is to provide the finest out-of- hospital medical care to all the citizens and visitors of its jurisdiction in a timely and efficient manner. The treatment protocols found in this text are designed to immediately manage emergent patient illnesses and injuries such that rapid intervention by all levels of EMT personnel will alleviate patient suffering and ultimately allow the patient to be delivered to a receiving hospital in an already improved clinical state whenever possible.

The Statewide Treatment Protocols establish the acceptable standard of care for managing patient injury and illness by certified EMTs working for ambulance services in Massachusetts. The Protocols also set the scope of practice for Massachusetts certified EMTs. The narrative format allows the protocols to serve as a reference text when needed, while the algorithmic treatment sections provide guidance in the acute situation.

STRUCTURE OF INDIVIDUAL PROTOCOL

Each protocol begins with a brief explanatory preamble that delineates the clinically important parameters for that particular injury or illness being managed in the out of hospital arena. The next section of the protocol emphasizes the assessment and treatment priorities for each illness or injury being addressed. This section states the most important treatment measures relevant to a particular illness or injury and is considered to be part of the treatment protocols themselves.

The treatment section of each protocol is divided into three levels: BASIC PROCEDURES, INTERMEDIATE (ALS) PROCEDURES and PARAMEDIC (ALS-P) PROCEDURES. As with any sequentially designed treatment protocol, the higher-level EMT is expected to perform the relevant parts of each lower level of clinical management. Note that “standing orders” are intended to represent available options for the provider prior to contacting medical control, rather than mandatory interventions; they should of course be performed when clinically appropriate.

RESPONSIBILITIES OF EMS PROVIDERS

Responsibilities of EMS Providers

EMTs working for ambulance services or first responder agencies (whether paid or volunteer), providing prehospital patient care in Massachusetts, have an obligation to understand the statewide EMS system and EMS System regulations (105 CMR 170.000). Proper use of adequate communications equipment is essential to an effective system operation; early, accurate, brief and well-organized radio communication and notification with the receiving facility should be required in each EMS system. In accordance with the EMS System regulations and administrative requirements, a properly completed trip record for each patient management situation is mandatory, and a minimum EMS dataset for each transport must be entered on the trip record. Trip record information is critical, so that systems-wide improvement can be undertaken by identifying issues important to the out of hospital management of patients. EMTs at all levels, Basic to Paramedic, may request medical direction on any call in order to facilitate patient care. Early and concise reporting to the receiving facility is strongly recommended in all EMS systems. Physician medical direction must be obtained for all procedures outside the established standing orders, unless communications failures intervene (in which case regional communications failure protocols should be followed). An estimated time of arrival should be communicated on all calls to the receiving facility.

CATEGORIZATION OF PROTOCOLS

The treatment protocols have been divided into groups for ease of utilization. As new treatment modalities are developed for all levels of EMT (including entirely new curricula for EMT-Basic to Paramedic), additions and deletions will be made and communicated.

The treatment categories are the following:

- Cardiac Emergencies
- Environmental Emergencies
- Medical Emergencies
- Traumatic Emergencies
- Pediatric Emergencies

The development of separate Pediatric Emergencies protocols was deemed necessary due to the unique nature of management of certain pediatric clinical disorders.

TREATMENT FACILITY/POINT OF ENTRY (POE)

Point-of-entry designation for each Region is based on the Department's EMS System regulations and Department-approved POE plans. The EMT must be familiar with the regulations and the Department-approved POE plans when providing patient care services in any particular Region of the Commonwealth.

The Department has approved condition-specific POE plans in each region for stroke, trauma, and STEMI patients. The Department also has a statewide POE plan for appropriate health care facility destination based on a patient's particular condition and need, for other conditions and needs not covered by the condition-specific POE plans. The EMT must be aware of the current Department-approved POE plans affecting his/her service.

The necessity to deviate from the Department-approved POE plans may occur, from time to time, due to mitigating circumstances (such as a disaster or mass-casualty event).

Ambulance services must also be familiar with the process of activating air ambulance resources in their particular region.

GENERAL POLICIES

1. In all circumstances, EMS providers should maintain personal safety. Assure scene safety in all patient encounters. Maintain appropriate body substance isolation precautions. Federal and state laws require the proper management of patients such that the provider and the patient are protected from undue exposure to communicable diseases. A reporting mechanism for infectious-disease exposure has been established under state law and must be adhered to by EMS providers and destination facilities. The following steps should be taken at the scene of every patient encounter:

   a) Body substance isolation.
   b) Assure scene safety of rescuers, bystanders and patient(s).
   c) Determine mechanism of injury/nature of illness.
   d) Determine total number of patients.
   e) Evaluate need for additional resources (ground versus air ambulances, fire rescue/suppression units, law enforcement, ALS, HAZMAT team, other specialized search and/or rescue units.

2. Each protocol emphasizes the importance of rapid transport to the nearest appropriate treatment facility as defined in EMS regulations. In rare circumstances, delayed transport may occur when necessary treatment cannot be performed during transport. Remember that ambulance crashes are a threat to both crew and patients; use lights and sirens only when indicated due to patient condition or circumstances.

3. Each protocol emphasizes the importance of Advanced Life Support backup notification and utilization whenever indicated.

4. Communications, QA/QI, and system familiarity are essential to a good EMS system:

   - Personnel communicating with EMS field providers must have a working knowledge of the statewide EMS system and be fully aware of the skills and capabilities of the EMS providers with whom they are communicating.

   - As required by the Department's Hospital Licensure regulations for medical control service (105 CMR 130.1501-.1504), hospital physicians providing Medical Direction must be familiar with the communication system and its usage and must also know the treatment guidelines established in this document for each level of EMT.

   - Hospital personnel and EMS providers must respect patient confidentiality.

   - Medical directors for provider services must take an active role in reviewing EMT performance in the delivery of patient care, and in overseeing and conducting the service's mandated QA/QI procedures.

5. In developing the protocols, a number of issues regarding statewide EMS service provider variations have been discussed. Many of these issues and topics have been addressed and incorporated directly into the protocols. However, several require special mention to clarify present situations and patient management issues:

   - A number of ALS ambulance services allow for blood drawing in certain patients with particular diagnostic conditions. For example, a blood sample on a patient with chest pain may be indicated in those areas where the receiving facility might feel the blood sample would contribute to the ultimate diagnosis and aid in patient management. A number of institutions would welcome this opportunity; however, other receiving facilities might not see the need and would not test the sample taken. The EMT should be aware of local policy and procedures for their service in this regard.

   - From time to time, there may exist certain diagnostic and treatment modalities and capabilities that will be available to the EMT in certain EMS provider systems, which will be utilized under standard procedure protocols or under approved pilot projects / demonstration projects. For example: transmitting 12-lead EKGs; paralytic agents to aid in the management of the difficult airway patient; thrombolytic eligibility survey of the patient; the use of cetacaine spray, phenylephrine spray and 2% lidocaine jelly to assist with nasotracheal intubation; the use of the Diver Alert Network in certain regions, and so on. The EMT must be aware of these diagnostic and treatment modalities and capabilities in the EMS system in which he/she is working. The Medical Director of these EMS systems must be aware and responsible for the activities of his/her EMTs in such circumstances.

   - **The Comfort Care / DNR (CC/DNR) Order Verification Protocol** was promulgated and implemented in 1997. This verification protocol has been added to the educational curricula for all levels of EMTs. The CC/DNR verification protocol is a program that will aid the EMT in recognizing the patient who is not to receive

resuscitation measures as defined in the protocols, but will clearly allow for palliative care to all those patients deemed appropriate. (Shortly, the MOLST (Massachusetts Orders for Life Sustaining Treatment) protocol may replace CCDNR; OEMS will promulgate instructions when this is to occur.) A separate protocol on Cessation of Resuscitation in the field is part of this text as Appendix C.

- Use of the IV saline lock: Many protocols call for the considered initiation of an IV/ KVO. An acceptable alternative in many situations is the initiation of an IV saline lock when the need for IV medication may arise.

- The Appendix Medication Reference List is extensive and includes those medications that are utilized in both the Statewide Treatment Protocols and the Statewide Interfacility Transfer Guidelines. ***This list is intended as a reference document, and may contain information about a given medication that may not be included in a treatment protocol. Inclusion of such information does not imply approval for any use of that medication other than that specifically described in the treatment protocols.***

- In various protocols the basic or intermediate level EMT will be directed to "treat for shock" when the systolic blood pressure is less than 100 mmHg. The paramedic level EMT may be directed to initiate certain procedures to counteract shock when the systolic pressure is less than 90 mmHg. The EMT should be aware that certain basic measures to prevent / treat for shock should be initiated at a higher blood pressure to attempt to forestall hypoperfusion.

6. Each protocol assumes that the EMT will treat all life threatening conditions, as they become identified. While initial treatment is characterized as "standing orders", these are not intended to be mandatory but are options available to the crew to be used in the best treatment of the patient.

7. ETT confirmation: All Intermediate and Paramedic Protocols require that the EMT "Provide advanced airway management (endotracheal intubation) if indicated." The standard of care in endotracheal intubation requires that EMS providers receive training in the use of specific methods for the verification of ETT placement, in conjunction with advanced airway training. EMS services performing ETT intubation should be issued equipment for confirming proper tube placement. Tube placement verification should be performed by the EMT, based upon accepted standards of practice, while taking into account whether the patient has a perfusing rhythm. ETT Verification methods should include a combination of clinical signs and the use of adjunctive devices such as the presence of exhaled carbon dioxide and esophageal detection devices. Once placement of the ETT has been confirmed, the ETT should be secured. Ongoing patient assessment is a dynamic process and reconfirmation of tube position must be performed utilizing clinical assessment and adjunctive devices any time the patient is moved, or if ETT dislodgment is suspected**. Further, all services that perform endotracheal intubation must have the capability to perform waveform capnography by 1/1/2013, and should keep this requirement in mind when purchasing or upgrading equipment.**

8. Beginning November 1, 2002, the ability to insert NGT / OGT for those unconscious post-intubation patients who need gastric decompression has become a required skill for Intermediates and Paramedics.

9. Use of electronic glucose measuring devices by EMT Basic and Intermediate personnel is considered to be an Optional Skill when the EMT B or I is working under the supervision of a Paramedic in the P-B or P-I staffing configuration. EMT Basic personnel may also be trained in the use of a glucometer at the solo Basic level as a service option.

10. All EMT-Paramedics must be able to acquire and interpret 12-lead electrocardiography when clinically appropriate. All paramedic licensed ambulance services, in conjunction with their affiliate hospital medical directors must ensure that their paramedics are competent in 12-lead acquisition and interpretation at least every two years in order to maintain authorization to practice.

11. AEDs and manual defibrillators utilizing biphasic technology are acceptable for prehospital use, as well as those utilizing pre-existing monophonic technologies. The specific device will vary from service to service; the use of any individual device must be based upon FDA approval and the recommendations of the manufacturer's guidelines. Energy levels for device use are given in this text as "standard" monophasic values. Biphasic technology should be used at manufacturer-specified equivalent levels. **Note that in all protocols where the standard of care is based on the latest recommendations issued by the Emergency Cardiac Care Committee/ American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, providers at all levels are responsible for delivering care in accordance with the most current AHA clinical recommendations and in accordance with these Protocols.**

12. In addition to these Protocols, the Department from time to time issues Advisories and Administrative Requirements relating to EMTs' practice and ambulance services' responsibilities with regard to EMT practice. EMTs and ambulance services are bound to adhere to those Advisories and Administrative Requirements as they do to the Protocols.

13. "Exception Principle" of the Protocols
    - The Statewide Treatment Protocols represent the best efforts of the EMS physicians and pre-hospital providers of the Commonwealth to reflect the current state of out-of-hospital *emergency medical care*, and as such should serve as the basis for such treatment.

    - We recognize, though, that on occasion good medical practice and the needs of patient care may require deviations from these protocols, as no protocol can anticipate every clinical situation. In those circumstances, EMS personnel deviating from the protocols should only take such actions as allowed by their training **and** only in conjunction with their on-line medical control physician.

    - Any such deviations must be reviewed by the appropriate local medical director, but for regulatory purposes are considered to be appropriate actions, and therefore within the scope of the protocols, unless determined otherwise on OEMS review by the State EMS Medical Director.

14. IO Access: **ALL PARAMEDIC-LEVEL SERVICES THAT PERFORM IV ACCESS MUST HAVE APPROPRIATE EQUIPMENT FOR INITIATING IO ACCESS IN BOTH PEDIATRIC AND ADULTS PATIENTS.**

- For IO access in **adults** who may be able to perceive pain, after the IO device's position is confirmed and it is secured, as a standing option, assuming the patient's clinical condition permits:

  i. EMT-Ps may give 20 (twenty) milligrams of lidocaine IO as a slow bolus, wait 30 seconds, flush with at least 10 cc. of NS, then use the IO access for medications.

- For IO access in **pediatric** patients who may be able to perceive pain, after the IO device's position is confirmed and it is secured, as a standing option, assuming the patient's clinical condition permits, CONTRAINDICATED for pediatric patients with acute seizure or a history of non-febrile seizure:

  i. EMT-Ps may give 0.5 mg/kg to a maximum of 20 (twenty) milligrams of lidocaine IO as a slow bolus, wait 30 seconds, flush with at least 10 cc. of NS, then use the IO access for medications.

15. **EMTs are reminded not to allow patients with significant medical or traumatic conditions to walk, or otherwise exert themselves.** All patients, especially children, shall be properly secured to the ambulance cot, using all of the required straps, or in an approved infant/child carrier or seat, or harness*, or in an appropriate immobilization device, in a position of comfort, or in a position appropriate to the chief complaint, and/or the nature of the illness or injury. The federal GSA specifications for ambulance equipment (KKK 1822) require that the patient be secured to the cot to prevent horizontal, latitudinal and rotational movement. A court ruling under the federal "common carrier" statute (U.S. District Court of Rhode Island, C.A. #92-0705 P) has stated that an ambulance service, "…must therefore equip its vehicles with the equipment which would provide the greatest degree of protection…". The state ambulance equipment list requires all stretchers to be equipped with an over the shoulder harness, hip and leg restraining straps. Proper securing of a patient means the use of all required straps, at all times. If patient care requires that a strap be removed, the strap must be re-secured as soon as practical.

16. Please be aware that there is a list of accepted devices put out by the Department's OEMS. You and your service need to be familiar with this list.

17. Please keep in mind that there is a regulatory requirement to keep drugs at appropriate temperatures. This is especially important given that recent research data has shown that the temperature fluctuations in a typical ambulance do indeed affect drug efficacy. Note that temperature variation has been shown to specifically affect lorazepam, diltiazem (mixed), and succinylcholine (for services operating under the medically assisted intubation [MAI] special project waiver from the Department).

18. It is the expectation of the Department that care begins at the side of the patient once you arrive at the location of which there is an emergency or a need to transport a patient to another facility. All equipment and monitoring devices needed to allow you to function to the level of which you are certified, in accordance with the level of service at which the ambulance you are on is operating, must be brought into the patient so that you may gather complete assessment information that will allow you to properly treat patients to the appropriate level. The Department recognizes that there are times or specific situations where it may be in the best interest of you and the patient to extricate the patient first to the ambulance by the appropriate means and then begin treatment in the ambulance;

these situations must be clearly documented in your trip record narrative so that it is clear to a reader why a delay in patient care occurred.

1. CARDIAC EMERGENCIES

1.1 *ASYSTOLE (Cardiac Arrest)*

Asystole is defined as the complete absence of electrical activity in the myocardium. Usually this represents extensive myocardial ischemia or infarct, with a very grim prognosis. Most often, asystole represents a confirmation of death as opposed to a dysrhythmia requiring treatment. However, once asystole has been recognized, unless Appendix C applies, the team leader must consider the differential diagnosis while beginning and maintaining CPR and ALS interventions. Do not defibrillate asystole, as the increased vagal tone may prevent resuscitation. Rescuers should confirm asystole when faced with a "flat line" on the monitor. One should always consider these possible causes of asystole and manage accordingly: drug overdose, hypokalemia, hypoxemia, hypothermia, and pre-existing acidosis.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine unresponsiveness, absence of breathing and pulselessness.
3. Maintain an open airway with appropriate device(s), remove secretions, vomitus, initiate CPR ("push hard, push fast", limit interruptions), and deliver supplemental oxygen, using appropriate oxygen delivery device, as clinically indicated.
4. Continually assess level of consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event, including possible ingestion or overdose of medications, specifically calcium channel blockers, beta-blockers and / or digoxin preparations.
6. Every effort should be made to determine the possible causes of asystole in the patient.
7. Initiate transport as soon as possible, with or without ALS.

TREATMENT
BASIC PROCEDURES

NOTE: Inasmuch as EMT-Basics are unable to confirm the presence of Asystole, check patient for pulselessness and manage according to the following protocol:

1. **Early defibrillation**
   a. Perform CPR until AED device is attached and operable.
   b. Use AED according to the standards of the American Heart Association or as otherwise noted in these protocols and other advisories
   c. Resume CPR when appropriate.
2. Activate ALS intercept, if available.
3. Initiate transport as soon as possible, with or without ALS.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

NOTE: Inasmuch as Intermediate-EMTs are unable to confirm the presence of Asystole, check patient for pulselessness and manage according to the following protocol:

1. **ALS STANDING ORDERS:**
   a. Provide advanced airway management.
   b. Initiate IV **Normal Saline** KVO. Administer 250 cc/ bolus IV NS if clinically appropriate.

2. Notify receiving hospital.

PARAMEDIC PROCEDURES

1 **ALS-P STANDING ORDERS:**
   a. Provide advanced airway management.
   b. Administer a 250 cc bolus of IV Normal Saline if warranted
   c. **Epinephrine** **1:10,000** 1 mg IV/IO push every 3-5 minutes; a paramedic may substitute **Vasopressin** 40 units IV or IO in place of first or second dose of epinephrine 1:10,000.

2. Contact **MEDICAL CONTROL.** The following may be ordered:
   a. Normal Saline fluid bolus(es).
   b. Special Considerations:
      - **Hypothermia management per protocol**.
      - Drug overdose management per protocol.
      - **Sodium Bicarbonate** **1 mEq/kg** IV Push especially if known pre-existing hyperkalemia or known pre-existing bicarbonate-responsive acidosis or if overdose with tricyclic antidepressants.
      - **Cessation of Resuscitation per protocol**.
   c. **Glucagon** 1.0 to 5.0 mg IM, SC, or IV for suspected beta-blocker or calcium-channel blocker toxicity.

1.2 *ATRIAL FIBRILLATION*

Atrial fibrillation is chaotic activity of the atrial muscle fibers manifested by an irregularly irregular heart rate. In addition, since the atria are fibrillating, there is incomplete (or non-existent) emptying of these chambers and a loss of as much as 20% of the cardiac output. The loss of the “atrial kick" may, in and of itself, result in hypotension or other signs of cardiovascular compromise. In this regard, one may differentiate the stable albeit symptomatic patient with a heart rate greater than 150 (palpitations, anxiety, perhaps mild chest discomfort) from the unstable patient with a blood pressure less than 100 mm Hg. In addition to being a primary rhythm abnormality, atrial fibrillation may occur due to acute myocardial infarction, hypoxia, pulmonary embolus, electrolyte abnormalities, toxic effects due to medication (particularly digoxin or quinidine), and thyrotoxicosis.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine patient's hemodynamic stability and symptoms. Assess Level of Consciousness, ABCs, and Vital Signs.
3. Maintain open airway and assist ventilations as needed.
4. Administer **oxygen** using appropriate oxygen delivery device, as clinically indicated.
5. Obtain appropriate assessment, (O-P-Q-R-S-T), related to event.
6. Obtain appropriate, (S-A-M-P-L-E) history, related to event.
7. Monitor and record vital signs and ECG.
8. Most patients tolerate Atrial Fibrillation well; however, some patients may require emergent treatment. Emergent treatment should be administered when the Atrial Fibrillation results in an unstable condition. Signs and symptoms may include: chest pain, shortness of breath, decreased level of consciousness, systolic BLOOD PRESSURE less than 100mm Hg, pulmonary congestion, congestive heart failure and acute myocardial infarction.
9. Initiate transport as soon as possible, with or without Paramedics. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

NOTE: Inasmuch as EMT-Basics are unable to confirm the presence of Atrial Fibrillation, check patient for a rapid and /or irregular pulse and possible complaint of palpitations. If present, treat according to the following protocol.

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible, with or without ALS.
3. If patient’s BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

NOTE: Inasmuch as EMT-Intermediates are unable to confirm the presence of Atrial Fibrillation: check patient for a rapid and/or irregular pulse and possible complaint of palpitations. If present, treat according to the following protocol.

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated (patient's condition deteriorates).
   b. Initiate IV **Normal Saline** (KVO).
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic, treat for shock. Administer a **250 mL** bolus of IV **Normal Saline**, or titrate IV to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management if indicated (patient's condition deteriorates).
   b. Initiate IV **Normal Saline** (KVO).
   c. **Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status**.
   d. If the rhythm appears to be amenable, e.g. "regular narrow SVT", may attempt vagal maneuvers: "Valsalva" and/or cough.
   e. If the patient's systolic blood pressure is **unstable** (less than **100 mm Hg, with signs of hypoperfusion**): **Synchronized cardioversion** at **50 J**, **100 J, 200 J, 300J,** and **360 J** or the equivalent biphasic values as per manufacturer). Check rhythm and pulse between each attempted cardioversion.
   f. If Cardioversion is warranted, consider administration of any of the following for sedation:
      - **Diazepam: if patient < 70 kg: 2.5 mg SLOW IV Push, if patient > 70 kg: 5.0 mg SLOW IV Push or**
      - **Midazolam 0.5 mg-2.5 mg SLOW IV Push or nasal, or,**
      - **Morphine Sulfate 2.0 mg – 10 .0 mg SLOW IV Push or Fentanyl 1 mcg/kg. to max. 150 mcg. slow IV push.**
      - **If no IV access, Morphine Sulfate 2.0 mg – 10.0 mg IM/SQ or Fentanyl nasally**
   g. Administration of **Diltiazem HCL**
      - Heart rate greater than 150 and patient stable but symptomatic:
        - Initial bolus: **0.25 mg/kg slow IV push over two (2) minutes**.
        - If inadequate response after 15 minutes, re-bolus **0.35 mg/kg SLOW IV PUSH over two (2) minutes**.
        - IV Infusion **10.0-15.0 mg/hr**.

        NOTE: **5.0 mg/hr may be an appropriate starting infusion for some patients. CONTRAINDICATIONS: Wolff-Parkinson-White Syndrome, second or third degree heart block and sick sinus syndrome (except in the presence of a ventricular pace maker), severe hypotension or cardiogenic shock.**

      - **Heart rate less than 150 and patient stable but symptomatic: Contact Medical Control.**

2. Contact **MEDICAL CONTROL**. The following may be ordered.

   a. Administration of **Diltiazem HCL:**
      - Initial bolus: **0.25 mg/kg SLOW IV PUSH over two (2) minutes**.
      - **If inadequate response after 15 minutes, re-bolus 0.35 mg/kg SLOW IV PUSH over two (2) minutes.**

- **IV Infusion 10.0-15.0 mg/hr.**

NOTE: 5.0 mg/hr may be appropriate starting infusion for some patients.
CONTRAINDICATIONS: Wolff-Parkinson-White Syndrome, second or third degree heart block and sick sinus syndrome (except in the presence of a ventricular pace maker), severe hypotension or cardiogenic shock.

OR

Amiodarone 150.0 mg Slow IV push over 10 minutes.

b. **Administration of Metoprolol:**
Bolus: 2.5 mg to 5 mg SLOW IV PUSH over 2 minutes.
Repeat dosing in 5 minute intervals for a maximum of 15 mg.

NOTE: For rate control in adult patients currently prescribed a beta- blocker.

CAUTION: DO NOT USE IV METOPROLOL WITH IV Ca BLOCKERS

c. **If Systolic BLOOD PRESSURE is unstable (e.g. less than 100mm Hg): Synchronized cardioversion** at **50 J**, **100 J, 200 J, 300J,** and **360 J** or the equivalent biphasic values as per manufacturer. Check rhythm and pulse between each attempted cardioversion.

d. If Cardioversion is warranted, consider administration of any of the following for sedation:
- **Diazepam if patient< 70 kg: 2.5 mg SLOW IV Push, if patient > 70 kg: 5.0 mg SLOW IV Push or**
- **Midazolam 0.5 mg-2.5 mg SLOW IV Push or nasal**
- **Morphine Sulfate 2.0 mg – 10.0 mg SLOW IV Push or Fentanyl 1 mcg/kg. to max. 150 mcg. slow IV push or**
- **If no IV access, Morphine Sulfate 2.0 mg – 10.0 mg IM/SQ or Fentanyl nasally**

1.3 *ATRIAL FLUTTER*

Atrial Flutter is an "unstable" rhythm, which will usually quickly deteriorate into Atrial Fibrillation, or return to sinus rhythm, or another form of supraventricular tachycardia. Atrial Flutter may produce a very rapid ventricular response. The ventricular rate can be variable and may result in hypotension or other signs of cardiovascular compromise. In this regard, one may differentiate the stable but symptomatic patient with a heart rate greater than 150 (such as a patient with a sense of palpitations, anxiety, or mild chest discomfort) from the unstable patient with a blood pressure less than 100mm Hg. Atrial Flutter may be the result of: AMI, hypoxia, pulmonary embolus, electrolyte abnormalities, toxic effects due to medication (particularly digoxin or quinidine), and thyrotoxicosis.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine patient's hemodynamic stability and symptoms. Assess Level of Consciousness, ABCs, and Vital Signs.
3. Maintain open airway and assist ventilations as needed.
4. Administer **oxygen** using appropriate oxygen delivery device, as clinically indicated.
5. Obtain appropriate assessment, (O-P-Q-R-S-T), related to event.
6. Obtain appropriate S-A-M-P-L-E history related to event.
7. Monitor and record vital signs and ECG.
8. Most patients tolerate Atrial Flutter well; however, some patients may require emergent treatment. Emergent treatment should be administered when the Atrial Flutter results in an unstable condition. Signs and symptoms may include: chest pain, shortness of breath, decreased level of consciousness, systolic BLOOD PRESSURE less than 100 mm Hg, shock, pulmonary congestion, congestive heart failure and acute myocardial infarction.
9. Initiate transport as soon as possible, with or without Paramedics. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

NOTE: **Inasmuch as EMT-Basics are unable to confirm the presence of Atrial Flutter: check patient for a rapid and /or irregular pulse and possible complaint of palpitations. If present, treat according to the following protocol.**

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

NOTE: Inasmuch as EMT-Intermediates are unable to confirm the presence of Atrial Flutter: check patient for a rapid and/or irregular pulse and possible complaint of palpitations. If present treat according to the following protocol.

1. **ALS STANDING ORDERS**

   a. Provide advanced airway management if indicated (patient's condition deteriorates).
   b. Initiate IV **Normal Saline (KVO)**.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 **mL** bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management if indicated (patient's condition deteriorates).
   b. Initiate IV **Normal Saline** (KVO).
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic, administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
   d. Vagal Maneuvers: Valsalva and/or cough.
   e. **If the patient's Systolic BLOOD PRESSURE is unstable (e.g. less than 100 mm Hg**):
      - **Synchronized cardioversion** at **50 J, 100 J, 200 J, 300J,** and **360 J** or the equivalent biphasic values as per manufacturer. Check rhythm and pulse between each attempted cardioversion.
   f. If Cardioversion is warranted, consider administration of any of the following for sedation:
      - **Diazepam: if patient < 70 kg: 2.5 mg SLOW IV Push, if patient > 70 kg: 5.0 mg SLOW IV Push or**
      - **Midazolam 0.5 mg - 2.5 mg SLOW IV Push or nasal**
      - **Morphine Sulfate 2.0 mg – 10.0 mg SLOW IV Push or Fentanyl 1 mcg/kg. to max. 150 mcg. slow IV push.**
      - **If no IV access, Morphine Sulfate 2.0 mg – 10.0 mg IM/SQ, or Fentanyl nasally**
   g. Administration of **Diltiazem HCL**

      Heart rate greater than 150 and patient stable but symptomatic:
      - Initial bolus : **0.25 mg/kg slow IV push over two (2) minutes**.
      - If inadequate response after 15 minutes, re-bolus **0.35 mg/kg SLOW IV PUSH over two (2) minutes**.
      - IV Infusion 10-15 mg/hr.

      NOTE: **5.0** mg/hr may be appropriate starting infusion for some patients.
      CONTRAINDICATIONS: Wolff-Parkinson-White Syndrome, second or third degree heart block and sick sinus syndrome (except in the presence of a ventricular pace maker), severe hypotension or cardiogenic shock.

PARAMEDIC PROCEDURES (cont.)

2. Contact **MEDICAL CONTROL**. The following may be ordered.

   a. Administration of **Diltiazem HCL**:
      - Initial bolus: 0.25 mg/kg **SLOW IV PUSH** over two (2) minutes.
      - **If inadequate response after 15 minutes, re-bolus 0.35 mg/kg SLOW IV PUSH over two (2) minutes. IV Infusion 10.0 -15.0 mg/hr.**

   NOTE: 5.0 mg/hr may be appropriate starting infusion for some patients.
   CONTRAINDICATIONS: Wolff-Parkinson-White Syndrome, second or third degree heart block and sick sinus syndrome (except in the presence of a ventricular pace maker), severe hypotension or cardiogenic shock.

   OR

   Based on Service Options: **Amiodarone 150.0 mg IV slowly over 10 minutes.**

   b. **Administration of Metoprolol:**
   Bolus: 2.5 mg to 5 mg SLOW IV PUSH over 2 minutes.
   Repeat dosing in 5 minute intervals for a maximum of 15 mg.

   NOTE: For rate control in adult patients currently prescribed a beta- blocker.

   CAUTION: DO NOT USE IV BETA-BLOCKERS WITH IV Ca BLOCKERS

   c. **If Systolic BLOOD PRESSURE is unstable (less than 100 mm Hg): Synchronized cardioversion** at **50 J**, **100 J, 200 J, 300J,** and **360 J** or the equivalent biphasic values as per manufacturer. Check rhythm and pulse between each attempted cardioversion.

   d. If Cardioversion is warranted, consider administration of any of the following for sedation:
      - **Diazepam: if patient < 70 kg: 2.5 mg SLOW IV Push, if patient > 70 kg: 5.0 mg SLOW IV Push or**
      - **Midazolam 0.5 mg-2.5 mg SLOW IV Push or nasal**
      - **Morphine Sulfate 2.0 mg – 10.0 mg SLOW IV Push, or Fentanyl 1 mcg/kg. to max. 150 mcg. slow IV push.**
      - **If no IV access, Morphine Sulfate 2.0 mg – 10.0 mg IM/SQ or Fentanyl nasally**

1.4 *BRADYDYSRHYTHMIAS*

Pathologically slow heart rates usually result from hypoxemia, acidosis, hypothermia, toxic ingestion or exposure, damage to the cardiac conduction system (e.g. infarct), and late shock. Bradycardia may be a late finding in cases of raised intracranial pressure (ICP) due to head trauma, infection, or CNS tumor. Out of hospital treatment is directed to the symptomatic patient only. In treating bradycardia, as in treating tachycardia the admonition **"treat the patient, not the monitor"** should be emphasized. REMINDER: EMS providers must be aware of the concept of "relative" bradycardia, i.e., the patient's pulse rate in relation to the patient's BLOOD PRESSURE and clinical condition.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway with appropriate device(s), and Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
3. Remove secretions, vomitus, etc., be prepared to initiate CPR and assist ventilations as needed.
4. Determine patient's hemodynamic stability and symptoms. Continually assess level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event, including possible ingestion or overdose of medications, specifically calcium channel blockers, beta-blockers, and digoxin preparations.
6. Monitor and record vital signs and ECG.
7. Symptomatic patients will have abnormally slow heart rates accompanied by decreased level of consciousness, weak and thready pulses or hypotension (systolic BLOOD PRESSURE less than 100mm Hg).
8. Initiate transport as soon as possible, with or without Paramedics. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

NOTE: Inasmuch as EMT-Basics are unable to confirm the presence of Bradydysrhythmias, check patient for a slow and /or irregular pulse. If present, treat according to the following protocol.

1. If pulse <60 and patient is symptomatic, and/or blood pressure falls below 100mm Hg systolic, place the patient supine, treat for shock.
2. Activate ALS intercept, if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

NOTE: Inasmuch as EMT-Intermediates are unable to confirm the presence of Bradydysrhythmias, check patient for a slow and/or an irregular pulse. If present, treat according to the following protocol.

1. **ALS STANDING ORDERS**
   a. Advanced Airway Management if indicated.
   b. Initiate IV Normal Saline (KVO).
   c. If patient's BLOOD PRESSURE drops below 100 mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Advanced Airway Management if indicated.
   b. Initiate IV Normal Saline (KVO).
   c. Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
   d. If patient is symptomatic as defined in Assessment Priorities:
      - **Transcutaneous Pacing (TCP).**
      - **While waiting for pacer set-up, consider Atropine Sulfate 0.5 mg IV/IO push every three (3) to five (5) minutes up to total dose 3 mg.**
      - **NOTE: If Transcutaneous Pacing (TCP) is warranted, consider administration of any of the following for sedation:**
      - **Diazepam: if patient < 70 kg: 2.5 mg SLOW IV Push, if patient > 70 kg: 5.0 mg SLOW IV Push or**
      - **Midazolam 0.5 mg-2.5 mg SLOW IV Push or nasal, or,**
      - **Morphine Sulfate 2.0 mg – 10 .0 mg SLOW IV Push or Fentanyl 1 mcg/kg. to max. 150 mcg. slow IV push.**
      - **If no IV access, Morphine Sulfate 2.0 mg – 10.0 mg IM/SQ or Fentanyl nasally**

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. Additional Fluid Boluses of Normal Saline as indicated.
   b. **Dopamine 2 µg/kg to 20 µg/kg per minute. (Rate determined by physician)**
   c. **Epinephrine Infusion (mix 1 mg in 250 mL Normal Saline). Administer 2 µg to 10 µg per minute IV or IO.**
   d. **Glucagon 1.0 to 5.0 mg IM, SC, IV, IO or nasal** for suspected beta-blocker or calcium-channel blocker toxicity.
   e. **Calcium Chloride 10% 2 - 4 mg/kg maximum of 1 gram IV slowly over five (5) minutes** for suspected calcium channel blocker toxicity.
   f. Sedation for transcutaneous pacing: administer **Midazolam 0.5 mg to 2.5 mg IV push or nasal**

1.5 *ACUTE CORONARY SYNDROME*

Acute Coronary Syndrome (ACS) represents a spectrum of disease. There are at least three conditions identified within the spectrum of ACS: Classic anginal chest pain; atypical chest pain; anginal equivalents; Patients experiencing a myocardial infarction or an ischemic event of unknown etiology may, based on 12-lead interpretation fall into one of three categories, "injury (STEMI)" or "Ischemia" or "Non-Diagnostic."

Classic Anginal Chest Pain	**Atypical Chest Pain**	**Anginal Equivalents**
1. Central anterior pain;	1. epigastric discomfort	1. dypsnea, palpitations
2. Chest Pressure, tightness	2. Musculoskeletal	2. fainting, syncope
3. Crushing, radiates to arms, neck, back	3. often unilateral	3. DKA, generally weak

Additional signs and symptoms of an ACS patient may be;
Sudden onset of diaphoresis (cool, clammy, wet skin often profuse) (significant finding)
Anxiety, restlessness, impending doom, abnormal vital signs such as an irregular pulse rate and nausea / vomiting.

All ACS patients must be carefully monitored until a definitive diagnosis can be made at the hospital and shall have a 12-lead evaluation done by EMT-Paramedics. All patients with ACS-like symptoms of a non-traumatic etiology will be considered to be of cardiac origin until proven otherwise.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed.
3. Administer **oxygen**, using appropriate oxygen delivery device, as clinically indicated.
4. Obtain appropriate assessment, (O-P-Q-R-S-T), related to event.
5. Obtain appropriate (S-A-M-P-L-E) history, related to event.
6. Monitor and record ECG and vital signs.
7. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Activate ALS, if available and deemed necessary.
2. Initiate transport as soon as possible, with or without ALS.
3. **BLS STANDING ORDERS**
   a. Determine patient's history of allergies, and administer **aspirin** (Dose= 162-325 mg., chewable preferred) if not contraindicated and if not already administered.
   b. **If patient complains of chest pain, chest pressure or chest discomfort administer** patient's **nitroglycerin** (NTG), 1 tablet or spray sublingual, If BLOOD PRESSURE is greater than 100mm Hg systolic. May repeat dosage in 5 minute intervals times two (x2), if BLOOD PRESSURE remains greater than 100 mm Hg systolic, to a maximum of three doses**, including any doses the patient may have self administered prior to EMS arrival.**
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic, treat for shock.

Note: For patients, both male and female, who have, within the last 48 hours, taken any medications classified in the phosphodiesterase-type-5 inhibitor category (e.g. sildenafil, vardenafil, tadalafil), nitrates should not be administered unless medical control has been contacted and has provided the Emergency Medical Technician (EMT-B; EMT-I; EMT-P) with a medical control order to administer nitrates.

4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated (i.e., patient's condition deteriorates).
   b. Initiate IV **Normal Saline** (KVO). _
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic, administer a 250 mL bolus of IV **Normal Saline**, or titrate IV to patient's hemodynamic status
   d. Determine patient eligibility for fibrinolytic therapy. (See appendix)

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS:**
   a. Provide advanced airway management if indicated (patient's condition deteriorates).
   b. Initiate IV **Normal Saline** (KVO).
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 **mL** bolus of IV **Normal Saline**, or titrate IV to patient's hemodynamic status.

   NOTE: A second IV line may be indicated for high-risk patient.

   d. If a dysrhythmia is identified, treat per protocol.
   e. **Determine patient's history of allergies, and administer aspirin (Dose= 162-325 mg) if not contraindicated and if not already administered**.
   f. **If the patient is at high risk for Acute Coronary Syndrome, based upon clinical presentation and/or diagnostic 12-lead EKG changes administer Nitroglycerin 0.4 mg (1/150) SL tablet or spray if BLOOD PRESSURE is greater than 100mm Hg systolic; may repeat in 5 minute intervals x two (2) if BLOOD PRESSURE remains greater than 100 mm Hg systolic (total of 3 doses), including any doses the patient may have self-administered prior to EMS arrival.**

      Note: For patients, both male and female, who have, within the last 48 hours, taken any medications classified in the phosphodiesterase-type-5 inhibitor category (e.g. sildenafil, vardenafil, tadalafil), nitrates should not be administered unless medical control has been contacted and has provided the Emergency Medical Technician (EMT-B; EMT-I; EMT-P) with a medical control order to administer nitrates.

   g. If patient has taken his/her **Nitroglycerin** prior to your arrival, and you have determined that the pharmacologic potency of that nitroglycerin was normal (based upon standard side effects of the med, e.g., headache/tingling sensation) without pain relief, contact **Medical Control** for other treatment options.
   h. **Administer Fentanyl** 1 mcg/kg. to max. 150 mcg. slow IV push, or nasally if no IV access.

2. Contact **MEDICAL CONTROL.** The following may be ordered:

   a. **Nitroglycerin 0.3 mg - 0.4 mg SL tablet or spray**.

   b. **Fentanyl 1 mcg/kg. to max. 150 mcg IV, or if no IV access, Fentanyl nasally.**

   c. If patient's BLOOD PRESSURE remains below 100mm Hg systolic in response to **Nitroglycerin** or **Fentanyl** may order further IV Normal Saline.

   d. Determine patient eligibility for fibrinolytic therapy if possible. (See appendix). **If the patient's ECG is consistent with STEMI, and the patient is hypotensive, in congestive heart failure, has contraindications to thrombolytics, or the nearest PCI-capable hospital as identified in a Department-approved STEMI point-of-entry plan is within 30 minutes further transport, medical control may order transport direct to the PCI facility; note that the use of the STEMI POE itself does not require a medical control order if the diagnosis is sufficiently likely based on 12-lead ECG.**

1.6 POST-RESUSCITATION CARE

The immediate goals of post resuscitation care are to (1) provide cardiorespiratory support to optimize tissue perfusion, especially to the brain; (2) transport the patient to an appropriate hospital emergency department and then to an appropriately equipped critical care unit; (3) attempt to identify the precipitating causes of the arrest; and (4) institute measures such as anti-arrhythmic therapy to prevent recurrence.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine patient's hemodynamic stability and symptoms. Assess Level of Consciousness, ABCs and Vital Signs.
3. Maintain an open airway with appropriate device(s). This may include repositioning of the airway, suctioning to remove secretions and/or vomitus, or use of airway adjuncts as indicated. Assist ventilations as needed.
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Obtain appropriate S-A-M-P-L-E history related to event.
6. Monitor and record vital signs and ECG.
7. Identification of complications, such as rib fractures, hemothorax or pneumothorax, pericardial tamponade, intra-abdominal trauma and/or improperly placed endotracheal tube.
8. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible, with or without ALS.
3. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**

   a. Provide advanced airway management if indicated.
   b. Initiate IV Normal Saline (KVO).
   c. If patient's BLOOD PRESSURE drops below 100 mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management if indicated.
   b. Initiate/maintain IV Normal Saline (KVO).
   c. Manage dysrhythmias according to specific protocols.
   d. If the need for resuscitation was the result of Ventricular Fibrillation or Ventricular Tachycardia and no anti-arrhythmic treatment was given, administer **Amiodarone** 150.0 mg in 10 cc Normal Saline, slow IV/IO push over 8-10 minutes then **Amiodarone** 1 mg./min. IV drip.

e. Consider induced hypothermia, such as by application of ice packs to axilla, groin, neck, and head, and/or use of 250-cc. boluses of chilled saline IV. If hemodynamically significant dysrhythmias or bradycardia of any type develop, or if the patient develops significant bleeding, PAIH should be stopped, Medical Control contacted, and active rewarming pursued.

f. **Dopamine 10.0 mcg/kg per minute if BP is < 80 systolic after a fluid bolus**

2. Contact **MEDICAL CONTROL.** The following may be ordered:

Dopamine 2.0 mcg/kg to 20.0 mcg/kg per minute.
Amiodarone 1 mg. /min. IV drip.
Lidocaine 1-1.5 mg/kg IV bolus followed by drip at 2-4 mg/min.

REMEMBER: This is an extremely unstable period. The patient should be monitored closely and frequently. Recurrent dysrhythmias, hypotension and re-arrest are not uncommon occurrences.

Avoid hyperthermia and hyperventilation.

Therapeutic induced hypothermia has been shown to be of significant benefit to select patients; continuation in-hospital is essential to its benefit, and may be a factor in hospital destination decisions by medical control.

If a 12-lead ECG can be performed and is consistent with STEMI, follow the Department-approved STEMI point of entry plan.

1.7 *PREMATURE VENTRICULAR COMPLEXES (PVCs)*

Premature ventricular contractions (PVCs) are depolarizations that arise in either ventricle prior to the next expected sinus beat. The subsequent rhythm is irregular with a shorter than normal R-R interval separating the PVC from the preceding normal beat. P waves are absent before the PVC, and the QRS complex is distorted, wide and often bizarre in appearance. PVCs can lead to ventricular tachycardia and ventricular fibrillation. They are of particular concern in patients with chest pain of cardiac etiology.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Obtain appropriate S-A-M-P-L-E history related to event.
5. Monitor and record vital signs and ECG.
6. Prevent / treat for shock.
7. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

NOTE: Inasmuch as EMT-Basics are unable to confirm the presence of PVCs: check patient for an irregular pulse and possible complaint of palpitations. If present, treat according to the following protocol.

1. If patient's BLOOD PRESSURE drops below 100mm Hg systolic, treat for shock.
2. Notify receiving hospital.

INTERMEDIATE PROCEDURES

NOTE: Inasmuch as EMT-Intermediates are unable to confirm the presence of PVCs: check patient for an irregular pulse and possible complaint of palpitations. If present treat according to the following protocol.

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated (patient's condition deteriorates).
   b. Initiate IV Normal Saline (KVO).
   c. Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. Cardiac monitor and12 lead ECG (avoiding transport delay).
2. Determine if PVCs are present and if patient is severely symptomatic, or if:
   a. related to an ongoing cardiac ischemic event (i.e., chest pain, syncope, coronary artery disease)
   b. frequent (> 6/min.)
   c. multifocal
   d. exhibiting the R on T phenomenon
   e. occurring in patterns (e.g., bigeminy, trigeminy, etc.).

3. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management if indicated (patient's condition deteriorates)
   b. Initiate IV Normal Saline (KVO).

      - If patient's BLOOD PRESSURE drops below 100**mm Hg** systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
      - If the heart rate is **less than 50/min not counting PVCs,** and accompanied by a **systolic BLOOD PRESSURE less than 90mm Hg** and/or other associated signs of shock or ischemia are present, administer **Atropine** **0.5 mg IV** push and refer to Bradydysrhythmias Protocol.
      - If patient is symptomatic and is not bradycardic, consider **Amiodarone, 150 mg. over 10 minutes IV,** which may be repeated to **total dose of 300 mg.**

4. Contact **MEDICAL CONTROL.** The following may be ordered:

   a. **Lidocaine** **0.5 mg/kg-1.0 mg/kg** IV push; may repeat to a total dose of 3 mg/kg.
   b. **Lidocaine** **Infusion 2 mg/min.- 4 mg/min**.
   c. **Atropine** **0.5 mg** IV push, repeat to **maximum dose of 0.04 mg/kg**.
   d. **Amiodarone** if not given under standing orders.

1.8 *PULSELESS ELECTRICAL ACTIVITY (Cardiac Arrest)*

The absence of a detectable pulse and the presence of some type of electrical activity other than ventricular tachycardia or ventricular fibrillation define this group of dysrhythmias. These rhythms can represent the last electrical activity of a dying myocardium, or they may indicate specific disturbances. Wide-complex PEA can appear as a result of severe hypovolemia, hypoxia, acidosis, hyper/hypokalemia, hypothermia, or toxic overdose (tricyclic antidepressants, beta-blockers, calcium channel blockers, digitalis). Treatment of PEA may include suspecting and treating other specific possible causes, such as cardiac tamponade, tension pneumothorax, coronary thrombosis (ACS), and pulmonary embolism.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine unresponsiveness, absence of breathing and pulselessness.
3. Maintain an open airway with appropriate device(s), remove secretions and vomitus, initiate CPR ("push hard, push fast", limit interruptions), and administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event, including possible ingestion or overdose of medications, specifically calcium channel blockers, beta-blockers and/or digoxin preparations.
6. Initiate transport as soon as possible, with or without ALS.

TREATMENT

BASIC PROCEDURES

1. **EARLY DEFIBRILLATION**.
   a. Perform CPR until AED device is attached and operable.
   b. Use AED according to the standards of the American Heart Association or as otherwise noted in these protocols and other advisories.
   c. Resume CPR when appropriate.
2. Activate ALS intercept, if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. Activate Paramedic intercept, if deemed necessary and if available.
2. **ALS STANDING ORDERS**

   a. Provide advanced airway management.
   b. Initiate IV Normal Saline (KVO).
   c. Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
   d. Consider underlying causes for PEA

1.8 PULSELESS ELECTRICAL ACTIVITY (Cardiac Arrest) (cont.)

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management
   b. Initiate IV Normal Saline (KVO)._
   c. Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
   d. Consider and treat underlying causes for PEA:
      - **hypothermia: initiate 2 large bore IVs (warm) normal saline**
      - drug overdose: **see specific toxicology protocol**
      - pneumothorax: **perform needle chest decompression**
   e. If cause is unknown and PEA persists:
   f. **Epinephrine 1:10,000** 1 mg IV/IO push every 3-5 minutes; a paramedic may substitute **Vasopressin** 40 UNITS IV or IO in place of first or second dose of epinephrine 1:10,000.

2. Contact **MEDICAL CONTROL.** The following may be ordered:
   a. Additional Normal Saline Fluid bolus(es) as indicated.
   b. **Sodium Bicarbonate 1 mEq/kg** IV push
   c. **Glucagon** 1.0 to 5.0 mg IM, SC, or IV for suspected beta-blocker or calcium-channel blocker toxicity.
   d. **Atropine** 1 mg. IV push, repeated to max dose 3 mg.

1.9 *SUPRAVENTRICULAR TACHYCARDIA*

Supraventricular Tachycardia (SVT) includes all tachydysrhythmias in which the pacemaker impulse is originating above the ventricles. Examples of these are Paroxysmal Supraventricular Tachycardia (PSVT), Atrial Fibrillation, Atrial Flutter, and Junctional Tachycardia with a rapid ventricular response. Generally these groups of tachycardias are narrow complex rhythms and should not be confused with sinus tachycardia, which is treated quite differently. Narrow complex SVT with heart rates greater than 150/min. often requires rapid intervention.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed.
3. Determine patient's hemodynamic stability and symptoms. Assess level of consciousness, ABCs, and vital signs.
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.
6. Obtain appropriate S-A-M-P-L-E history related to event.
7. Monitor and record vital signs and ECG.
8. Most patients tolerate SVT well, however, some patients may require emergent treatment. Emergent treatment should be administered when the SVT results in an unstable condition. Signs and symptoms may include: chest pain, palpitations, shortness of breath, decreased level of consciousness, systolic BLOOD PRESSURE less than 100 **mm Hg**, shock, pulmonary congestion, congestive heart failure and/or acute myocardial infarction.

TREATMENT

BASIC PROCEDURES

NOTE: Inasmuch as EMT-Basics are unable to confirm the presence of SVT: check patient for a rapid and /or irregular pulse and possible complaint of palpitations. If present treat according to the following protocol.

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. Notify receiving hospital.

INTERMEDIATE PROCEDURES

NOTE: Inasmuch as EMT-Intermediates are unable to confirm the presence of SVT: check patient for a rapid and /or irregular pulse and possible complaint of palpitations. If present treat according to the following protocol.

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated (patient's condition deteriorates).
   b. Initiate IV Normal Saline (KVO).
   c. Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient’s hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated (patient's condition deteriorates).
   b. **Initiate IV Normal Saline (KVO).**
   c. **Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.**
   d. Vagal Maneuvers: **Valsalva's and/or cough.**
   e. If Systolic BLOOD PRESSURE is unstable (less than 100mm Hg): **Synchronized cardioversion at 50 J, 100 J, 200 J, 300 J and 360 J** or the equivalent biphasic values as per manufacturer. Check rhythm and pulse between each attempted cardioversion.
   f. If cardioversion is warranted, consider administration of any of the following for sedation:
      - **Diazepam: if patient < 70 kg: 2.5 mg SLOW IV Push, if patient > 70 kg: 5.0 mg SLOW IV Push or**
      - **Midazolam 0.5 mg - 2.5 mg SLOW IV push or nasal**
      - **Morphine Sulfate 2.0 mg – 10.0 mg SLOW IV push or Fentanyl 1 mcg/kg. to max. 150 mcg. slow IV push.**
      - **If no IV access, Morphine Sulfate 2.0 mg – 10.0mg IM/SQ or Fentanyl nasally**
   g. Administer **Adenosine 6.0 mg rapid IV push over 1-3 seconds**. If previous 6.0 mg dose failed to resolve rhythm disturbance: Administer **Adenosine 12.0 mg rapid IV push over 1-3 seconds**. Repeat **Adenosine 12.0 mg rapid IV push over 1-3 seconds** if previous doses failed to resolve rhythm disturbance.

Note: Follow all **Adenosine** with a **20 mL normal saline bolus** and elevate extremity.

2. Contact **MEDICAL CONTROL**. The following may be ordered.

   a. **Administration** of **Diltiazem HCL:**
      - **Initial bolus:** 0.25 mg/kg SLOW IV PUSH over two (2) minutes**.**
      - If inadequate response after 15 minutes, **re-bolus** 0.35 mg/kg SLOW IV PUSH over two (2) minutes.
      - IV Infusion 10.0-15.0 mg/hr

NOTE: 5.0 mg/hr may be appropriate starting infusion for some patients. CONTRAINDICATIONS: Wolff-Parkinson-White Syndrome, second or third degree heart block and sick sinus syndrome (except in the presence of a ventricular pace maker), severe hypotension or cardiogenic shock.

OR

   b. **Amiodarone 150.0 mg IV slowly over 10 minutes**.

   c. **If Systolic BLOOD PRESSURE is unstable (such as less than 100 mm Hg): Synchronized cardioversion at 50 J, 100 J, 200 J, 300 J, and 360 J** or the equivalent biphasic values as per manufacturer. Check rhythm and pulse between each attempted cardioversion.

   d. If Cardioversion is warranted, Medical Control may order any of the following for sedation:
      - **Diazepam: if patient < 70 kg: 2.5 mg SLOW IV Push, if patient > 70 kg: 5.0 mg SLOW IV Push or,**
      - **Midazolam 0.5 mg-2.5 mg SLOW IV Push or nasal**
      - **Morphine Sulfate 2.0 mg – 10.0 mg SLOW IV Push or Fentanyl 1 mcg/kg. to max. 150 mcg. slow IV push.**
      - **If no IV access, Morphine Sulfate 2.0 mg – 10.0mg IM/SQ or fentanyl nasally**

   e. Administer IV Normal Saline 250 **mL** bolus(es) or titrate IV to patient's hemodynamic status.

1.10 VENTRICULAR FIBRILLATION / PULSELESS VENTRICULAR TACHYCARDIA (Cardiac Arrest)

The need for early defibrillation is clear and should have the highest priority. Since these patients will all be in cardiopulmonary arrest, use of adjunctive equipment should not divert attention or effort from Basic Cardiac Life Support (BCLS) resuscitative measures, early defibrillation and Advanced Cardiac Life Support (ACLS). Remember: rapid defibrillation and early ACLS is the major determinant of survival.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine unresponsiveness, absence of breathing and pulselessness.
3. Consider all potential non-cardiac causes (i.e. electric shock and remove from danger).
4. Maintain an open airway with appropriate device(s), remove secretions and vomitus, initiate CPR ("push hard, push fast", limit interruptions), and administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Continually assess Level of Consciousness, ABCs and Vital Signs.
6. Obtain appropriate S-A-M-P-L-E history related to event.
7. Begin CPR and assist ventilations while awaiting defibrillator.
8. Basic and/or Intermediate providers should activate a paramedic intercept system (ACLS) as soon as possible, if available.

TREATMENT
BASIC PROCEDURES

1. a. Perform CPR until defibrillator is attached and operable.
   b. Use AED according to the standards of the American Heart Association or as otherwise noted in these protocols and other advisories
   c. Resume CPR when appropriate.
2. Activate ALS intercept, if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management and continue CPR.
   b. Initiate IV Normal Saline (KVO).
   c. Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS STANDING ORDERS**
   a. **Defibrillate** once at 360 J monophasic equivalent energy, or 120-200 J biphasic.
   b. Provide advanced airway management.
   c. Initiate IV Normal Saline (KVO).
   d. Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

e. **Epinephrine 1:10,000** 1 mg IV/IO push every 3-5 minutes; a paramedic may substitute Vasopressin 40 units IV or IO in place of first or second dose of epinephrine 1:10,000.
f. Continue CPR and defibrillate (each shock at 360J monophasic equivalent) per AHA recommendations if ventricular fibrillation/ventricular tachycardia is persistent.
g. Consider **Amiodarone** 300 mg slow IV/IO push.

2. Contact **MEDICAL CONTROL,** the following may be ordered:

   a. **Sodium Bicarbonate 1 mEq/kg**, IV/IO push.

   b. **Magnesium Sulfate 1 - 2 grams** IV/IO in torsades de pointes or suspected hypomagnesemic state or refractory ventricular fibrillation/ventricular tachycardia.

   c. **Amiodarone 150 mg. slow IV/IO push if one dose already given or 300 mg slow IV/IO push** if not already given**.**

   d. **Lidocaine** 1.5 mg/kg IV/IO; subsequent dosage: 0.5 to 0.75 mg/kg IV/IO every 3 - 5 minutes to a total dose of 3 mg/kg IV/IO

1.11 *VENTRICULAR TACHYCARDIA WITH PULSES*

Ventricular tachycardia represents a grave, life-threatening situation in which the patient requires immediate treatment. The diagnosis is suggested any time three or more premature ventricular beats occur in succession. With ventricular tachycardia, cardiac output may drop dramatically or be absent altogether and progress into ventricular fibrillation. In VENTRICULAR TACHYCARDIA, the patient is considered to be either:

PULSELESS: in essence in Cardiopulmonary Arrest. See the **Ventricular Fibrillation** Protocol.
STABLE: presents with pulses, conscious, without chest pain, systolic BLOOD PRESSURE greater than **100mm Hg.**
UNSTABLE: presents with pulses, but is severely symptomatic: chest pain, palpitations, shortness of breath (SOB), signs and symptoms of congestive heart failure (CHF), hypotension (systolic BLOOD PRESSURE less than **100mm Hg**), decreasing level of consciousness (LOC) or unresponsive.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine patient's hemodynamic stability and symptoms. Assess LOC, ABCs and Vital Signs.
3. Maintain an open airway with appropriate device(s), remove secretions, vomitus, initiate CPR.
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Obtain appropriate S-A-M-P-L-E history related to event.
6. Monitor and record vital signs and ECG.
7. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

Note: Inasmuch as Basic EMTs are unable to confirm the presence of V-Tach, treat patient according to the following protocol:

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

Note: Inasmuch as Intermediate EMTs are unable to confirm the presence of V-Tach, treat patient according to the following protocol:

1. **ALS STANDING ORDERS**

   a. Provide advanced airway management if indicated.
   b. Initiate IV Normal Saline (KVO).
   c. Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management if indicated.
   b. **Initiate IV Normal Saline (KVO).**
   c. **Consider a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.**
   d. If Systolic BLOOD PRESSURE is unstable (less than 100mm Hg): **synchronized cardioversion at 100 J, 200 J, 300 J and 360 J** or the equivalent biphasic values as per manufacturer. Check rhythm and pulse between each attempted cardioversion.
      - If cardioversion is warranted, consider administration of any of the following for sedation:
        - **Diazepam: if patient < 70 kg: 2.5 mg SLOW IV Push, if patient > 70 kg: 5.0 mg SLOW IV Push or,**
        - **Midazolam 0.5 mg - 2.5 mg SLOW IV push or nasal**
        - **Morphine Sulfate 2.0 mg - 10 mg IV or Fentanyl 1 mcg/kg. to max. 150 mcg. slow IV push.**
        - **If no IV access, Morphine Sulfate 2.0 mg – 10.0 mg IM/SQ or Fentanyl nasally**

   e. If systolic BLOOD PRESSURE is stable (greater than or equal to 100mm Hg) administer **Amiodarone** 150.0 mg in 10 cc Normal Saline, slow IV/IO push over 8-10 minutes.

2. Contact **MEDICAL CONTROL,** the following may be ordered:

   a. **Magnesium Sulfate** (for Torsades de Pointes for suspected hypomagnesemic state or severe refractory VENTRICULAR TACHYCARDIA) **1.0 - 2.0 grams IV/IO Push over 1-2 minutes**. **CONTRAINDICATIONS**: Heart Block, renal disease.
   b. Further attempts at cardioversion as indicated.
   c. **Amiodarone 150.0 - 300.0 mg in 10 mL Normal Saline, slow IV/IO push over 8-10 minutes.**
   d. **Amiodarone 1 mg/min. IV drip.**
   e. **Lidocaine** 1.0 - 1.5 mg/kg IV/IO; subsequent dosage: 0.5 - 0.75 mg/kg IV/IO every 3 - 5 minutes to a total dose of 3 mg/kg. If dysrhythmia is successfully converted after administration of **Lidocaine** bolus**,** consider IV infusion of **Lidocaine** 2.0 - 4.0 mg/min**.**
   f. **Adenosine** 6 mg. or 12 mg. IV push; in selected cases ONLY!

2. ENVIRONMENTAL EMERGENCIES

2.1 *DROWNING AND NEAR-DROWNING EMERGENCIES*

Drowning begins with accidental or intentional submersion in any liquid. Fresh-water drowning/near-drowning and salt-water drowning/near-drowning have different physiologic mechanisms leading to asphyxia. However, out of hospital management of these patients is the same: treatment must be directed toward correcting severe hypoxia.

Factors affecting survival include the patient's age, length of time of submersion, general health of the victim, type and cleanliness of liquid medium and water temperature that may contribute to the effectiveness of the **mammalian diving reflex** (decreased respirations, decreased heart rate, and vasoconstriction, with maintenance of blood flow to the brain, heart and kidneys).

SPECIAL CONSIDERATIONS:

a. The **cold-water** drowning/near-drowning victim should be not considered dead until he/she is warm and dead, unless the patient has been submerged for a prolonged period (typically greater than one (1) hour). Near-drowning victims may exhibit delayed pulmonary complications up to 24-36 hours after the submersion incident. This is especially true concerning salt-water exposure. Patients who have had a true near-drowning exposure should seek/receive medical attention and be informed as to the potential delayed complications.

b. All drowning/near-drowning victims with suspected barotrauma/ decompression sickness should be transported in the left lateral Trendelenburg position to prevent any emboli in the ventricles from migrating to the arterial system. These patients also should be considered candidates for hyperbaric chamber therapy.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene and rescuer safety. Call appropriate public safety agencies: fire, rescue, or police teams, including scuba teams to properly stabilize the scene and safely rescue the victim(s) from the source of submersion. Consider need for additional EMS unit(s) for rescuer rehabilitation and/or treatment.
2. Maintain appropriate body substance isolation precautions.
3. Maintain an open airway immediately upon obtaining access to patient. Ensure spinal stabilization and immobilization if indicated (i.e., unwitnessed event, unconscious patient, or mechanism of injury). Assist ventilations as needed.
4. Once the patient is rescued and is placed in a safe environment, rescuers may administer specific emergency care such as: suctioning the airway and use of airway adjuncts and assisted ventilations, and the administration of oxygen.
5. Determine patient's hemodynamic stability and symptoms. Continually assess level of consciousness, ABCs and Vital Signs. Treat all life threatening conditions as they become identified. Initiate CPR when appropriate.
6. Obtain appropriate S-A-M-P-L-E history related to event. (length of exposure, temperature of liquid medium, potential for injury).
7. Monitor and record vital signs and ECG.
8. If suspected hypothermia: see **Hypothermia / Cold Emergencies** protocol.
9. If near drowning incident involves a scuba diver, suggesting barotrauma, consider utilization of **hyperbaric treatment facility** and follow Department approved point-of-entry plan.

10. If the scene time and/or transport time will be prolonged, and a landing site is available, consider transport by air ambulance from the scene to an appropriate Trauma Center. See **Air Ambulance** protocol, in Appendix
11. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Initiate IV Normal Saline (KVO) **en route to the hospital** in non-traumatic drowning/near drowning.
   c. **If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.**

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Initiate IV Normal Saline (KVO) en route to the hospital in non-traumatic drowning/near drowning.
   c. **If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.**
   d. Cardiac monitor, and if feasible 12 lead ECG - dysrhythmia recognition: **manage per protocols.**

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. Additional 250 mL - 500 mL fluid bolus(es), wide open or titrate to patient's hemodynamic status.

2.2 *ELECTROCUTION / LIGHTNING INJURIES*

The manifestations and severity of electrical trauma encompass a wide spectrum, ranging from a transient unpleasant sensation due to brief contact with low-intensity household current to instantaneous death and massive injury from high-voltage electrocution/lightning injury. Unlike thermal burns, electrical injuries commonly involve multiple body systems with the potential to pose difficult challenges regarding accurate assessment and proper management. Injury due to electricity may include burns to the skin and deeper tissues, cardiac rhythm disturbances and associated injuries from falls and other trauma. The amperage, voltage, type of current (AC vs. DC) duration of contact, tissue resistance and current pathway through the body will determine the type and extent of injury. Higher voltage, greater current, longer contact and flow through the heart are associated with worse injury and worse outcome.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety, i.e. by ascertaining that the source of electricity is removed from the patient and the rescue area. Call appropriate public safety agencies for assistance if needed.
2. Maintain appropriate body substance isolation precautions.
3. Maintain open airway and assist ventilations as needed. Assume spinal and other potential traumatic injuries when appropriate and treat accordingly.
4. Maintain an open airway with appropriate device(s); remove secretions, vomitus, initiate CPR.
5. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
6. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs. Treat all life threatening conditions as they become identified.
7. Obtain appropriate S-A-M-P-L-E history related to event, (voltage source, time of contact, path of flow through body and unresponsiveness or seizures). Assess patient for entry and exit wounds, particularly under rings or other metal objects.
8. Monitor and record vital signs and ECG.
9. Prevent / treat for shock.
10. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

2.2 ELECTROCUTION / LIGHTNING INJURIES (cont.)

TREATMENT

BASIC PROCEDURES

1. If patient is in cardiopulmonary arrest:
   a. Initiate CPR with supplemental oxygen.
   b. Use AED according to the standards of the American Heart Association or as otherwise noted in these protocols and other advisories
2. Activate ALS intercept, if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS
4. Manage burn injuries and/or entrance and exit wounds as indicated. (See **Burn Protocol**.)
5. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
6. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. Initiate large bore IV Normal Saline.
   c. Begin fluid resuscitation for treatment of the BURN INJURY if greater than 20% BSA
      - For transport times LESS THAN 1 HOUR use the following pre-hospital rates:
        Over 15 yrs. of age – 500mL/hour
        5 –15 yrs. of age – 250mL/hour
        2 – 5 yrs. of age – 125mL/hour
        Under 2 yrs. of age – 100mL/hour

      - For transport times GREATER THAN 1 HOUR consult medical control regarding the following fluid rates:
        *Adults: 2-4 mL x kg x % burn [Adult = over 15 yrs. of age]
        *Pediatric: 3-4 mL x kg x % burn

*Infusion rate regulated so one-half of estimated volume is given in the first 8 hours post burn

If suspected hypovolemia (consider other injuries), administer 250mL - 500mL fluid bolus and titrate to patient's hemodynamic status.

   d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management, if indicated.
   b. Cardiac Monitor: **12 lead ECG**; **Manage dysrhythmia(s) per protocol**.
   c. Initiate large bore IV Normal Saline. Begin fluid resuscitation for treatment of the BURN INJURY if greater than 20% BSA

   - For transport times LESS THAN 1 HOUR use the following pre-hospital rates:
     Over 15 yrs. of age – 500mL/hour
     5 –15 yrs. of age – 250mL/hour
     2 – 5 yrs. of age – 125mL/hour
     Under 2 yrs. of age – 100mL/hour

   - For transport times GREATER THAN 1 HOUR consult medical control regarding the following fluid rates:
     *Adults: 2-4 mL x kg x % burn [Adult = over 15 yrs. of age]
     *Pediatric: 3-4 mL x kg x % burn

*Infusion rate regulated so one-half of estimated volume is given in the first 8 hours post burn

If suspected hypovolemia (consider other injuries), administer 250mL - 500mL fluid bolus and titrate to patient's hemodynamic status.

2.3 *HYPERTHERMIA / HEAT EMERGENCIES*

Heat emergencies result from one of two primary causes: environmental (exogenous heat load when the temperature exceeds 32º C or 90º F) or excessive exercise in moderate to extreme environmental conditions (endogenous heat load). Regardless of the cause, hyperthermic conditions can lead to the following conditions: Heat Cramps, Heat Exhaustion, or Heat Stroke.

Heat Cramps most commonly occur in the patient who exercises and sweats profusely and subsequently consumes water without adequate salt. Heat cramps most commonly involve the most heavily exercised muscles. These patients may present with normal temperature but hot sweaty skin with mild tachycardia and normal blood pressure.

Heat Exhaustion presents with minor mental status changes, dizziness, nausea, headache, tachycardia and mild hypotension. Temperature is less than 103º F. Rapid recovery generally follows cooling and saline administration.

Heat Stroke occurs when the patient's thermoregulatory mechanisms break down completely. Body temperature is elevated to extreme levels resulting in multi-system tissue damage, including altered mental status and physiological collapse. Heat stroke usually affects the elderly patient with underlying medical disorders. Patients with heat stroke usually have dry skin; however, up to 50% of patients with **exertional heat stroke** may exhibit persistent sweating. Therefore, the presence of sweating **does not** preclude the diagnosis

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway and assist ventilations as needed.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient’s hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event.
6. Monitor and record vital signs and ECG.
7. In general, rapid recognition of heat illness is required and rapid cooling of the patient is the priority.
8. Loosen or remove all nonessential clothing. Move patient to a cool environment.
9. For Heat Cramps and Heat exhaustion, administer water or oral re-hydration-electrolyte solution if patient is alert and swallows easily.
10. If evidence of Heat Stroke, see protocol below.
11. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

2.3 HYPERTHERMIA / HEAT EMERGENCIES (cont.)

TREATMENT

BASIC PROCEDURES

a. Provide rapid cooling as soon as possible.

CAUTION: Do not over-chill patient, observe for shivering. If shivering occurs, discontinue active cooling procedures.

- Remove patient to cool area and place patient in a supine position.
- Loosen or remove all unnecessary clothing, while protecting privacy.
- Apply cool packs to armpits, neck and groin.
- Use evaporation techniques if possible (fans, open windows).
- Keep skin wet by applying water with wet towels or sponges.

b. For Heat Cramps and/or Heat Exhaustion: administer water or oral re-hydration-electrolyte solution if patient is alert and has a normal gag reflex and can swallow easily. Elevate legs of supine patient with heat exhaustion.

c. Activate ALS intercept, if deemed necessary and if available.

d. Initiate transport as soon as possible with or without ALS.

e. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**

   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL**. The following may be ordered:

   a. Additional IV Normal Saline 250 mL- 500 mL bolus (es), wide open or titrated to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management (if indicated).
   b. Cardiac monitor and (if feasible) 12 lead ECG; manage dysrhythmia(s) per protocol
   c. Initiate IV Normal Saline (KVO) en route to the hospital.
   d. If patient's BLOOD PRESSURE drops below 100 mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL**. Medical control may order:

   a. Additional IV Normal Saline 250 mL - 500 mL bolus(es), wide open or titrated to patient's hemodynamic status.

2.4 HYPOTHERMIA / COLD EMERGENCIES

Cold Emergencies include conditions from mild frostbite to severe accidental hypothermia. Frostbite is defined as a localized injury resulting from freezing of body tissues and can be categorized from mild (frost-nip) to severe (deep frostbite). Hypothermia is the result of a decrease in heat production (often seen in patients with metabolic, neurologic and infectious illnesses), increased heat loss (traumatic, environmental and toxic), or a combination of the two factors. Hypothermia is defined as a core temperature below 95ºF (35ºC). Mild hypothermia often presents as altered mental status. Shivering may or may not be present. Moderate to severe hypothermia will not only have altered mental status, but may show decreased pulse, respiratory rate and blood pressure. Failure to recognize and properly treat hypothermia can lead to significant morbidity and mortality. **REMEMBER:** A patient in cardiopulmonary arrest with suspected severe hypothermia is not considered dead until all attempts at active re-warming have been completed in a hospital setting and resuscitation efforts remain unsuccessful.

ASSESSMENT / TREATMENT PRIORITIES

NOTE: Hypothermic patients must be handled gently as jarring movements may cause cardiac arrest.

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event.
6. Monitor and record vital signs and ECG.
7. Remove wet clothing (by cutting clothing to limit patient movement).
8. Prevent heat loss with use of blankets. If available, place heat sources at patient's neck, armpits, flanks and groin.
9. Handle patient gently. Do not allow patients to walk or exert themselves.
10. Do **not** allow patient to eat or drink stimulants.
11. Do **not** massage extremities.
12. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

2.4 HYPOTHERMIA / COLD EMERGENCIES (cont.)

TREATMENT

BASIC PROCEDURES

1. Determine patient's hemodynamic status: Assess pulse and respiratory rates for a period of 60 seconds to determine pulselessness or profound bradycardia, for which CPR would be required.
2. If patient is in cardiopulmonary arrest:
   a. Initiate CPR and administer oxygen using appropriate oxygen delivery device, as clinically indicated.
   b. Use AED according to the standards of the American Heart Association or as otherwise noted in these protocols and other advisories
3. Whenever possible, use warmed, humidified oxygen (104°F - 107°F, 40°C - 42°C) by **non-rebreather mask,** during resuscitation procedures for hypothermic patients.
4. Contact **MEDICAL CONTROL:** Medical Control may order:
   a. Further defibrillations with AED as patient rewarms.
   b. If patient is known diabetic who is conscious and can speak and swallow: oral glucose or other sugar source as tolerated.

   CAUTION: Do NOT administer anything orally if patient does not have a reasonable level of consciousness and normal gag reflex.
5. Activate ALS intercept, if deemed necessary and if available.
6. Initiate transport as soon as possible with or without ALS.
7. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
8. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management, if indicated. Administer oxygen, using warmed humidified oxygen whenever possible, (104°F - 107°F, 40°C - 42°C) by non-rebreather mask, or an appropriate oxygen delivery device, as clinically indicated, during resuscitation procedures for hypothermic patients.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

2. Contact **MEDICAL CONTROL:** the following may be ordered:
   a. Further defibrillations with AED as patient rewarms.
   b. Administer warmed Normal Saline IV Solution (104°F - 107°F, 40°C - 42°C) whenever possible.
   c. If patient is known diabetic who is conscious and can speak and swallow: oral glucose or other sugar source as tolerated.

CAUTION: Do NOT administer anything orally if patient does not have a reasonable level of consciousness and normal gag reflex.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management, if indicated. Apply Oxygen, using warmed humidified oxygen whenever possible, (104°F - 107°F, 40°C - 42°C) by non-rebreather mask, or an appropriate oxygen delivery device, as clinically indicated, during resuscitation procedures for hypothermic patients.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
   d. Apply Cardiac monitor: 12 lead ECG, Manage dysrhythmia(s) per protocol.
   e. Determine Blood Glucose level:
      - If glucose is less than **70**mg/dL, administer 12.5 to 25 gm of **Dextrose** **50%** solution IV push.
   f. Administer **Naloxone** 0.4 - 2.0 mg IV Push, IM or Nasal via atomizer if suspected narcotic overdose.

2. Contact **MEDICAL CONTROL:** Medical Control may order:
   a. Warmed Normal Saline IV Solution (104°F - 107°F, 40°C - 42°C) whenever possible.
   b. **Thiamine** 100 mg IV Push or IM

COLD EMERGENCY / FROSTBITE

1. Follow Hypothermia protocol as indicated above.
2. Avoid trauma to injured areas (do not rub; do not break blisters)
3. Apply dry sterile dressings as padding over injured areas and splint as needed; avoid pressure or constriction. Do not allow victim to use injured part(s).
4. Do not attempt rapid re-warming of the frozen part in out of hospital setting. Keep frozen part(s) from direct heat while warming the patient.

2.5 *RADIATION INJURIES*

Exposure to radiation can occur through two mechanisms: the first mechanism is from a strong radioactive source such as uranium; the second mechanism is contamination by dust, debris and fluid that contain radioactive material. Factors that determine severity of exposure include: duration of time exposure, distance from radioactive source, and shielding from radioactive exposure. The three types of radiation exposure include alpha, beta and gamma. The most severe exposure is gamma (x-ray radiation).

In general, radiation exposure does not present with any immediate side effects unless exposure is severe. Most commonly, serious medical problems occur years after the exposure. Acute symptoms include nausea, vomiting and malaise. Severe exposure may present with burns, severe illness and death (beta or gamma).

Scene safety is of utmost importance for the patient(s), bystander(s) and rescuers.

NOTE: In the event of a radiation emergency contact the Nuclear Incident Advisory Team (NIAT) at either:

(617) 727-9710 (business hours - Monday-Friday) - Mass. Dept. of Public Health
(617) 566-4500 x237 (Other hours) - Massachusetts State Police

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety, i.e. by ascertaining that the source of radiation is removed from the patient and the rescue area. Call appropriate public safety agencies in order to properly stabilize the scene and rescue any victims that may be in the "hot zone". The patient will need to be removed from scene and properly decontaminated (radioactive liquid and/or dust). Note that immediately life-threatening injuries (e.g. airway, exsanguination) may require stabilization by appropriately trained personnel prior to decontamination, while minimizing rescuer exposure to the lowest achievable level. Rescuers will then need to place the patient in a safe environment for further care.
2. Maintain appropriate body substance isolation precautions.
3. Maintain open airway and assist ventilations as needed. Assume spinal and other potential traumatic injuries when appropriate and treat accordingly.
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs. Treat all life threatening conditions as they become identified.
6. Obtain appropriate S-A-M-P-L-E history related to event including information such as: (alpha, beta and gamma exposure, duration of time exposed, distance from radioactive source, and shielding from radioactive exposure).
7. Monitor and record vital signs and ECG.
8. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

2.5 RADIATION INJURIES (cont.)

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
4. Notify receiving hospital. If severe radiation burns are noted, consider appropriate Point-of-Entry as defined by the Department-approved point-of-entry plan and facility capabilities, i.e., Burn Center.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2.6 *NERVE AGENT EXPOSURE PROTOCOL*

An intentional release of chemical weapons may result in a large number of ill and contaminated patients presenting to EMS services in a very short period of time. If the event is a mass casualty incident (MCI), it will require the use of the Incident Command System to properly coordinate all responding agencies.

Critical to safe and effective operation will be the strict observance of scene safety. It is expected that your agency will implement its hazardous materials response policy. -

Any person involved in patient care should, in addition, take precautions to prevent contamination by residual agent that may be present on casualties, even after they have been decontaminated.

EMS providers must wear PPE appropriate for the zone in which they are operating (hot, warm or cold), and should use PPE that they have been trained to use safely.

EMS providers with prior training in the proper use of personal protective equipment (PPE) may be able to provide medical care, including the administering of antidotes, in the warm zone or in the decontamination line.

Nerve agents will present with Cholinergic Syndrome symptoms. **The syndrome of Cholinergic Symptoms can be remembered by the mnemonic SLUDGE (Salivation, Lacrimation, Urination, Diarrhea, Gastrointestinal cramping and Emesis) or DUMBBELS (Diarrhea, Urination, Miosis (Constricted Pupils), Bronchorrhea, Bradycardia, Emesis, Lacrimation and Salivation).**

The effects produced by nerve agent inhalation exposure (Vapor) begin in seconds to minutes after the onset of exposure, depending on the concentration of vapor. Dermal exposure (Liquid) effects may manifest many hours between exposure and the appearance of signs and symptoms of up to 18 hours. The treatment of nerve agent exposure is based on the degree of the presenting symptoms.

- **NOTE 1. Ambulance services opting to carry and use autoinjectors must do so in compliance with the regulations of the Division of Food and Drug Control.**

- **NOTE 2. EMT-Basic can now carry and use autoinjector antidote kits as long as they are issued by the hospital where the ambulance service has a current drug replacement agreement and or affiliation agreement.**

- **NOTE 3. To administer the autoinjector to patients, the ambulance service's EMTs certified at each level, must complete a State approved autoinjector course and work for a Massachusetts licensed ambulance service that maintains a valid Medical Control Agreement with an affiliate hospital medical director, or be operating at an MCI/disaster scene.**

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions for toxic chemicals and blood and body fluids EMS providers must wear PPE appropriate for the zone in which they are operating (hot, warm or cold)"
2. Observe strict adherence to hot, warm and cold zone areas. Activate HAZMAT Response if necessary.
3. Attempt identification of offending agent, if possible.
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated
5. Activate ALS intercept if necessary and available.
6. Initiate mass casualty/ disaster plan if necessary.

7. Administer autoinjector kit to adult patient if evidence of nerve agent exposure and if kit is available.
    a. Administer 1 to 3 kits based on the degree of symptoms.

- **NOTE: Do not administer adult kit to a child less than 15 years of age or less than 50 kg, use pediatric autoinjector kit. (See Appendix)**

- **NOTE: If no pediatric autoinjector kit or Pralidoxime/atropine vials are available, see Appendix for pediatric dosing with adult kit**

TREATMENT (FIRST RESPONDERS)

PROCEDURES FOR SELF-CARE AND CARE OF AUTHORIZED PUBLIC EMPLOYEES[1]

Remove self **or fellow authorized public employee** from area if possible.

1. Assess degree of symptoms: Mild, Moderate or Severe (see Appendix)
2. Administer 1 to 3 autoinjector kits IM (each kit with Atropine 2 mg IM and **Pralidoxime Chloride** 600 mg IM) as guided by degree of symptoms.
3. Seek additional medical support for further monitoring and transport of anyone receiving therapy.
4. Disrobing will significantly enhance the decontamination process. Perform decontamination, and seek assistance in further decontamination measures.

TREATMENT

BASIC PROCEDURES

1. If approved and trained to do so, administer autoinjector kit to adult patient if evidence of nerve agent exposure and if kit is available.
    a. Administer 1 to 3 autoinjector kits based on the degree of symptoms.
2. Notify receiving hospital, unless disaster plan otherwise instructs.

INTERMEDIATE PROCEDURES

1. Administer autoinjector kit to adult patient if evidence of nerve agent exposure and if kit is available.
    a. Administer 1 to 3 kits based on the degree of symptoms.

2. Activate Paramedic intercept if necessary and available.

ALS STANDING ORDERS

a. Provide advanced airway management (if indicated).
b. Obtain IV access if situation permits.

[1] **Under 105 CMR 700.003 of the Department of Public Health's Drug Control Program regulations, an authorized public employee in this context is "a public employee or volunteer to a municipality, agency, department or authority of the Commonwealth ("agency") whose function includes emergency preparedness and response and is designated by a municipality's or agency's medical director" to administer nerve agents.**

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
    a. Provide advanced airway management (if indicated).
    b. Obtain IV access if situation permits (low priority in disaster situation).
    c. Treat for shock as needed (blood pressure below 100mm Hg systolic).
    d. Initiate cardiac monitoring if situation permits (low priority in disaster situation).
    e. Treatment using autoinjector antidote kits: Administer kit to adult patient if evidence of nerve agent exposure and if kit is available. (If not previously administered)
        i. Administer 1 to 3 kits based on degree of symptoms,

        OR

        ii. For multi-dose vial (See appendix)

2. **Contact MEDICAL CONTROL**. Medical Control may order:

    a. Additional **Pralidoxime Chloride** 1 gm by IV infusion
    b. **Midazolam** 2.5-5.0 mg IV or nasal for seizure or cardiac arrest
    c. **Albuterol** **2.5-3.0 mg** via nebulizer (for bronchospasm management)

2.6 NERVE AGENT EXPOSURE PROTOCOL (cont.)

MILD SYMPTOMS:

BLS / ALS STANDING ORDERS :

i. Administer One kit IM **OR**

ALS STANDING ORDERS

ii. 2 mg **atropine** IM only **& either**:

iii. 600 mg IM **Pralidoxime Chloride** **OR**
1 gm IV **Pralidoxime Chloride**

MODERATE SYMPTOMS:

BLS/ALS STANDING ORDERS

i. Administer Two to Three kits IM **OR**

ALS STANDING ORDERS

ii. 4 mg **atropine** IM only & **either**:

iii. 600-1200 mg IM **Pralidoxime Chloride** **OR**
1 gm IV **Pralidoxime Chloride** Medical Control may order an additional 1 gram IV **OR** 600 mg IM.

SEVERE SYMPTOMS:

BLS/ALS STANDING ORDERS

i. Administer **Three** kits IM **OR,**

ALS STANDING ORDERS

ii. 6 mg atropine IM only **& either**:

iii. 1200-1800 mg IM **Pralidoxime Chloride** **OR**,
1gm IV **Pralidoxime Chloride** Medical Control may order an additional 1 gram IV **OR** 600 mg IM.

&

one of the following:

iv.
a. **Diazepam** 10 mg IM Autoinjector (CANA kit) **OR**,
b. **Diazepam** 10 mg IM/IV **OR,**
c. **Lorazepam** 2-4 mg IM/IV **OR,**
d. **Midazolam** 2.5-5.0 MG IM/IV/nasal; **Contact Medical Control for** additional 2.5-5.0 mg if required**.**

3. MEDICAL EMERGENCIES

3.1 *ABDOMINAL PAIN (non-traumatic)*

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway. This may include repositioning of the airway, suctioning or use of airway adjuncts (oropharyngeal airway / nasopharyngeal airway) as indicated. Assist ventilations as needed.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs. Treat all life threatening conditions as they become identified.
5. Obtain appropriate assessment, (O-P-Q-R-S-T), related to event.
6. Obtain appropriate S-A-M-P-L-E history related to event, including: surgery, LMP, prior episodes.
7. Allow the patient to assume a comfortable position, unless contraindicated. Flexion of the knees and hips may help reduce pain.
8. Monitor and record vital signs and ECG.
9. Prevent / treat for shock.
10. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL**: the following may be ordered:
   a. administration of additional fluid

3.1 ABDOMINAL PAIN (non-traumatic) (cont.)

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Cardiac monitor, and **12-lead ECG** - dysrhythmia recognition. Treat dysrhythmias per protocol.
   c. Initiate 1-2 IVs Normal Saline, en route to the hospital.
   d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL**. **Medical Control** may order:
   a. administration of additional IV Saline 250 mL -500 mL or wide open titrated to patient's condition.
   b. If patient in severe pain and is stable with a BP > 110 systolic consider usage of Adult pain management protocol.

3.2 *ALLERGIC REACTION / ANAPHYLAXIS*

Anaphylaxis is an acute, generalized, and violent antigen-antibody reaction that can be rapidly fatal. An Anaphylactic Reaction may present as a mild to severe response; and management is based upon severity. There are multiple causes of anaphylaxis: most commonly these causes are injected substances or drugs such as: penicillin, cephalosporins, sulfonamides, iron, and thiamine. Other causes include food sensitivities, vaccines, contrast dyes, insect sting(s) and other environmental allergens. Most reactions occur within thirty minutes following allergen exposure, although the onset of symptoms can vary from several seconds to hours.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway and assist ventilations as needed.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess level of consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event.
6. Determine if patient is in mild or severe distress:
   a. **Mild Distress**: itching, urticaria, nausea, no respiratory distress.
   b. **Severe Distress**: stridor, bronchospasm, severe abdominal pain, respiratory distress, tachycardia, shock, edema of lips, tongue or face.
7. Monitor and record ECG and vital signs.
8. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept if deemed necessary and available.
2. **BLS STANDING ORDERS**
   a. If patient presents in Severe Distress, as defined in Assessment Priorities, and if patient age is between 5 and 65 years: administer epinephrine by auto-injection.
   b. A second auto injection may be administered, if available, in 5 minutes if necessary.

NOTE: Adult autoinjectors should be used on patients greater than 30 kg (66 lbs). Pediatric autoinjectors should be used on patients less than 30 kg (66 lbs).

NOTE: EMTs must contact Medical Control prior to administration of epinephrine by auto-injector when patient is under age 5 or over age 65.

3. If patient's BLOOD PRESSURE drops below 100 systolic: treat for shock.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **INTERMEDIATE STANDING ORDERS**
   a. If patient presents in Severe Distress, as defined in Assessment Priorities, and if patient age is between 5 and 65 years: administer epinephrine by auto-injection.

b. A second dose by auto-injection may be administered, if available, in 5 minutes if necessary.

2. Provide advanced airway management, if indicated.
3. Initiate IV Normal Saline (KVO) en route to the hospital.
    - If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
    a. Provide advanced airway management (if indicated)
    b. Initiate IV Normal Saline (KVO) en route to the hospital.
    c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
    d. Mild Distress:
        - monitor for signs of severe distress.
        - **Diphenhydramine**: 25 mg- 50 mg IV push or IM.
    e. Severe Distress:
        - **Epinephrine** 0.15 or 0.3 mg IM **BY AUTOINJECTOR ONLY**; a second dose may be given by autoinjector in 5 minutes if necessary.
        - Large Bore IV normal saline, titrate to BLOOD PRESSURE >90.
        - **Diphenhydramine**: 25 mg- 50 mg IV push or IM.
        - **Albuterol** 2.5-3.0 mg. via nebulizer or MDI.

2. Contact **MEDICAL CONTROL**. The following may be ordered:
    a. **Epinephrine** **1:1,000**: 0.15 or 0.3 mg IM.
    b. **Epinephrine** **1:10,000**: 0.1 mg - 0.5 mg IV Push.
    c. Epinephrine Infusion 1-10 µg/minute. Mix Epinephrine (1:1000) 1 mg in 250 mL Normal Saline. (30 micro drops/minute = 2 µg / min.)
    d. **Albuterol** 2.5-3.0 mg via nebulizer or MDI.
    e. **Diphenhydramine**: 25 mg- 50 mg IV Push or deep IM.
    f. **Dopamine** **infusion**: 2 - 20 µg/Kg minute (Rate determined by physician)

3.3 *ALTERED MENTAL/NEUROLOGICAL STATUS*

An alteration in mental/**neurological** status is the hallmark of central nervous system (CNS) injury or illness. Any alteration in mental/**neurological** status is abnormal and warrants further examination. Altered mental/**neurological** status may be due to many factors. A common grouping of causes for altered mental/**neurological** status is the following: **A E I O U – T I P S**; **A**lcoholism, **E**pilepsy, **I**nsulin, **O**verdose, **U**nderdose, **T**rauma, **I**nfection, **P**sychiatric and **S**troke.

Altered mental/**neurological** status may present as mild confusion or complete unconsciousness (coma). Altered mental status may be a result of a medical condition, traumatic event, or both. EMS agencies should use the Glasgow Coma Scale (GCS) or AVPU for their ongoing neurological assessment, as appropriate for the possible causes of the patient's condition. Note that GCS has been validated as a predictor of outcome specifically for trauma.

NOTE: See also Protocols for Diabetic Emergencies; Toxicology/Poisoning; Seizures; Shock; Syncope; and/or Head Trauma/Injury.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event.
6. Monitor and record vital signs and ECG.
7. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

1. **BLS STANDING ORDERS**

   a. If authorized and trained to do so perform Glucometry reading.
   b. If patient is a known diabetic who is conscious and can speak and swallow, administer oral glucose or other sugar source as tolerated. One dose equals one tube. A second dose may be necessary. **(**SEE Diabetic Protocol)

CAUTION: Do NOT administer anything orally if the patient does not have a reasonable level of Consciousness and normal gag reflex.

CAUTION: If cerebrovascular accident is suspected, contact Medical Control

   c. If patient is unconscious or seizing, transport on left side (coma position).
   d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
   e. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**

   a. **If authorized and trained to do so perform obtain Glucometry reading**

b. If patient is a known diabetic who is conscious and can speak and swallow, administer oral glucose or other sugar source as tolerated. One dose equals one tube. A second dose (tube) may be necessary. **(**SEE Diabetic Protocol)
c. Provide advanced airway management (if indicated).
d. Initiate IV Normal Saline (KVO) en route to the hospital.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

a. Provide advanced airway management (if indicated).
b. Initiate IV Normal Saline (KVO) en route to the hospital.
c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
d. Apply Cardiac Monitor: If clinically appropriate, also obtain 12 lead ECG - Manage dysrhythmias per protocol.
e. If obvious narcotic overdose:
   - **Naloxone 0.4-2.0 mg** IV Push, IM, SC, or Nasal via atomizer. Additional **Naloxone** (0.4-2.0 mg) may be administered as necessary.
f. **Thiamine 100 mg** IV or IM
g. Determine Blood Glucose level:
   - If glucose is less than 70 mg/dL, administer **Dextrose 50%**, 12.5 to 25 grams IV Push. Additional Dextrose 50% may be administered as necessary.
   - CAUTION: If cerebrovascular accident is suspected, contact Medical Control prior to administration.
h. If no IV access, administer **Glucagon 1-2 mg** IM or nasal for suspected hypoglycemia.
i. For patients with confirmed adrenal insufficiency, give **Hydrocortisone 100 mg. IV, IM or IO, or Methylprednisolone 125 mg. IV, IM or IO.**

2. Contact **MEDICAL CONTROL:** the following may be ordered:

a. **Dextrose 50%**, 12.5 to 25 gm IV Push
b. **Naloxone 0.4-2.0 mg** IV Push, IM or Nasal via atomizer
c. Further Normal Saline bolus.
d. Dependent upon conditions for suspected substance abuse, overdose, or toxic exposure: refer to specific protocols.

3.4 *BRONCHOSPASM / RESPIRATORY DISTRESS*

Bronchospasm is defined as spasmodic narrowing (contraction) of the lumen (bronchial muscle) of a bronchus for whatever reason resulting in restricted airflow. This results in hypoventilation of the alveoli leading to hypoxemia. The causes of acute bronchospasm may not always be easily discernible. Asthma is the most common disorder to present with bronchospasm. However, there are many other conditions that may present with bronchospasm. Other causes include: allergic reaction, respiratory infection, changes in environmental conditions (humidity or temperature), inhalation of caustic gases (smoke, chlorine gas etc.), emotional stress, exercise, and medications (aspirin or similar non-steroidal anti-inflammatory agents). Patients may present with mild to severe distress and management is based upon severity.

Respiratory Distress is defined as inadequate breathing in terms of any of_: rate, rhythm, quality, and/or depth of breathing. Persons who are breathing too fast or slow may not be receiving enough oxygen to support bodily functions and may suffer an increase in blood carbon dioxide to dangerous levels. Irregular breathing (e.g. Cheyne-Stokes respiration) can be a sign of a serious medical problem and needs to be evaluated by a physician. Quality of breathing in terms of either unequal breath sounds, "noisy" breathing (rales, rhonchi, wheezes, snoring, stridor), use of accessory muscles, and/or nasal flaring (especially in children) can also be valuable signs. Cyanosis is usually a late sign and requires immediate treatment.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilation as needed.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and vital signs.
5. Obtain appropriate (O-P-Q-R-S-T) assessment, related to event
6. Obtain appropriate (S-A-M-P-L-E) history related to event, including prior asthma, anaphylaxis, and allergies. **NOTE:** exposures to foreign body, foods, medicines, chemicals or envenomation should be ascertained.
7. Determine if patient is in mild or severe distress:
   a. **Mild Distress:** Slight wheezing and/or mild cough. Able to move air without difficulty.
   b. **Severe Distress:** Evidenced by poor air movement, speech dyspnea, use of accessory muscles, tachypnea and/or tachycardia.

   NOTE: Severe bronchospasm may present without wheezes, indicating minimal air movement.
8. Monitor and record vital signs and ECG.
9. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

1. Activate ALS intercept, if available.
2. Initiate transport as soon as possible with or without ALS.
3. BLS STANDING ORDERS

   MILD DISTRESS

   a. The following may be considered if the patient has not taken the prescribed maximum dose of their own **inhaler** prior to the arrival of EMS: **and the inhaler is present:**

- Encourage and/or assist patent to self-administer their own prescribed **inhaler** medication if indicated or if not already done.
- If patient is unable to self-administer their prescribed inhaler, administer patient's prescribed **inhaler**.
- Reassess vital signs.

4. **Contact MEDICAL CONTROL. The following may be ordered**
   a. Repeat a second dose if required, and if prescribed maximum dose has not been administered,

NOTE: EMT-B administration of an inhaler is CONTRAINDICATED, if:
- the maximum dose has been administered prior to the arrival of the EMT.
- the patient cannot physically use the device properly. (Patient cannot receive inhalation properly.)
- the device has not specifically been prescribed for the patient.

****If properly trained and authorized, use the EMS Assisted Albuterol Program Protocol to treat the patient.**

NOTE: YOUR MEDICAL DIRECTOR MUST HAVE AUTHORIZED YOU AS AN EMT TO UTILIZE THIS PORTION OF THE PROTOCOL.

INTERMEDIATE PROCEDURES

1. ALS STANDING ORDERS

MILD DISTRESS

a. The following may be considered if the patient has not taken the prescribed maximum dose of their own inhaler prior to the arrival of EMS: **and the inhaler is present**:
   - Encourage and/or assist patent to self-administer their own prescribed inhaler medication if indicated or if not already done.
   - If patient is unable to self-administer their prescribed inhaler, administer patient's prescribed inhaler.
   - Reassess vital signs.

2. **Contact MEDICAL CONTROL. The following may be ordered**
   a. Repeat a second dose if required, and if prescribed maximum dose has not been administered.

NOTE: EMT-I (with EMT-B training) administration of an inhaler is CONTRAINDICATED, if:
   a. the maximum dose has been administered prior to the arrival of the EMT.
   b. the patient cannot physically use the device properly. (Patient cannot receive inhalation properly.)
   c. the device has not specifically been prescribed for the patient.

****If properly trained and authorized, use the EMS Assisted 45 Program Protocol to treat the patient.**

NOTE: YOUR MEDICAL DIRECTOR MUST HAVE AUTHORIZED YOU AS AN EMT TO UTILIZE THIS PORTION OF THE PROTOCOL.

3. Provide advanced airway management if indicated.
4. Initiate IV Normal Saline (KVO) en route to the hospital.
5. If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. **MILD DISTRESS**:
      - Administer **Albuterol**, **2.5-3.0** mg by nebulizer. Additional Albuterol treatments may be administered as necessary.

   b. **SEVERE DISTRESS**:
      - Advanced Airway management if indicated.
      - Administer **Albuterol 2.5-3.0 mg** via nebulizer. **Ipratropium, 500 mcg.** may be combined with the **Albuterol** treatment**.** Additional Albuterol treatments may be administered as necessary with or without **Ipratropium Bromide.** Consider **Magnesium Sulfate 2-4 gm. IV** over 5 minutes**.**

      Note that a multi-dose inhaler may be used to give albuterol or ipratropium (instead of nebulizer) if infection control is an issue (e.g. influenza-like-illness).

   c. Initiate IV Normal Saline (KVO) en route to the hospital.
   d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
   e. Continuous positive airway pressure (CPAP) assistance, if not contraindicated, and if nebulizer therapy can be continued with the CPAP device.

   NOTE: Contraindications for CPAP include the need for emergent intubation or a patient with an unstable blood pressure. Any patient with a severely impaired level of consciousness who cannot follow commands, including patients with a cardiac arrest, agonal respirations or a respiratory arrest. Any patient with an inability to clear secretions or a high aspiration risk, or a patient with a brisk upper GI hemorrhage or persistent vomiting should not get a trial of CPAP. Additionally any patient with recent facial trauma or facial surgery that would prevent a tight fit for the mask should not get CPAP. A patient with an active tracheostomy should not get CPAP because the mask will not be effective. A patient with chest trauma or a suspected pneumothorax should not get a trial of CPAP.

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. Repeat **Albuterol 2.5-3.0 mg** by nebulizer.
   b. **Ipratropium** (2 puffs) via metered dose inhaler with or without spacer device (e.g. - aerochamber).
   c. **Ipratropium** 500 mcg by nebulizer (may be combined with **Albuterol** treatment)
   d. **Epinephrine** 0.15 mg-0.3 mg IM* (may be repeated q 15 min.)
   e. **Epinephrine 1:10,000,** 0.1 mg- 0. 5 mg IV very slow push*
   f. **Magnesium Sulfate 2-4 gm**. IV over 5 minutes.

***CAUTION: The use of Epinephrine in patients over the age of 40 or with known cardiac disease and patients who have already taken high dosage of inhalant bronchodilator medications may result in cardiac complications.**

DO NOT USE Epinephrine 1:1000 solution for IV push!!!!!

3.5 *CONGESTIVE HEART FAILURE / PULMONARY EDEMA*

Severe congestive heart failure (CHF) and/or acute pulmonary edema are caused by acute left ventricular failure, resulting in pulmonary congestion. Most commonly these conditions are the result of myocardial infarction, diffuse infection, opiate poisoning, inhalation of toxic gases, and severe over-hydration. Pulmonary edema is typically characterized by shortness of breath, cough, anxiety, cyanosis, diaphoresis, rales and/or wheezing.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions
2. Maintain open airway and assist ventilations as needed.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Place patient in full sitting position as tolerated.
5. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
6. Obtain appropriate S-A-M-P-L-E history related to event, including any Trauma (recent head injury/fracture).
7. Monitor and record vital signs and ECG.
8. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management (endotracheal intubation), if indicated.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100 systolic: administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management (**endotracheal intubation** or **CPAP** as appropriate), if indicated.__

   Note: Contraindications for CPAP include the need for emergent intubation or a patient with an unstable blood pressure. Any patient with a severely impaired level of consciousness who cannot follow commands, including patients with a cardiac arrest, agonal respirations or a respiratory arrest, should not get CPAP. Any patient with an inability to clear secretions or a high aspiration risk, or a patient with a brisk upper GI hemorrhage or persistent vomiting should not get CPAP. Additionally any patient with recent facial trauma or facial surgery that would prevent a tight fit for the mask should not get CPAP. A patient with an active tracheostomy should not get CPAP because the mask

will not be effective. A patient with chest trauma or a suspected pneumothorax should not get a trial of CPAP.

b. Initiate IV Normal Saline (KVO) en route to the hospital.
c. If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

d. Administer **Nitroglycerin** **SL tablet; 0.4 mg (1/150 gr.) or NTG spray** if systolic BLOOD PRESSURE is greater than 100 mm Hg. **Nitroglycerin** may be repeated in five (5) minute intervals times two (2) as dictated by patient's Blood Pressure.

Note: For patients, both male and female, who have, within the last 48 hours, taken any medications classified in the phosphodiesterase-type-5 inhibitor category (e.g. sildenafil, vardenafil, tadalafil), nitrates should not be administered unless medical control has been contacted and has provided the Emergency Medical Technician (EMT-B; EMT-I; EMT-P) with a medical control order to administer nitrates.

e. **Nitropaste** 1 inch to chest wall if systolic BP is greater than 100 mm Hg.
f. Contact **Medical Control** before giving Nitroglycerin or applying Nitropaste if systolic blood pressure is less than 100 mmHg.

2. Contact **MEDICAL CONTROL**.
   - In patients who require emergent intubation
   - Cannot be intubated by conventional means
   - The treating paramedic has been duly authorized by the Service's Medical Director in use of an alternative airway (LMA or Combitube)
   - To facilitate intubation: **Medical Control** may order **Midazolam** **2.5 mg** SLOW IV PUSH or nasal. Repeat if necessary to a total dose of 5.0 mg**.**

   a. Repeat doses of **Nitroglycerin**.
   b. **Nitropaste** 1 inch to anterior chest wall
   c. **Furosemide** **20.0- 40.0 mg** IV PUSH, or 40-80 mg. IV PUSH if patient is already on diuretics.
   d. **Dopamine** 2.0 – 20.0 µg/kg/minute.

3.6 EYE EMERGENCIES

Eye emergencies can be either medical or traumatic. In general they are not life threatening. However, they present serious potential difficulties for the patient. The primary medical emergency involving the eye are glaucoma, or sudden painless loss of vision secondary to arterial embolus. Eye injuries can be caused by chemical or thermal burns, penetrating or blunt trauma, which can result in permanent disfigurement and/or blindness. In addition small foreign particles landing on the surface of the eye can also result in ocular emergencies. Established Department-approved point-of-entry plans may determine transport to an appropriate facility.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway and assist ventilations as needed. This may include repositioning of the airway, suctioning, or use of airway adjuncts as indicated.
3. If eye injury is the result of blunt and/or penetrating trauma, assume spinal injury and manage appropriately.
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Obtain appropriate S-A-M-P-L-E history related to incident, including any trauma (i.e. recent head trauma).
6. Depending upon mechanism of injury, the following procedures should be followed:
   a. **Chemical irritants:** Eye(s) should be flushed as soon as possible using copious amounts of water for a period of fifteen (15) minutes with a controlled stream of Sterile Normal Saline, Sterile water or tap water.
   b. **Blunt Trauma:** Both eyes should be patched and protected.
   c. **Penetrating Trauma:** Puncture wound with no impaled object: Both eyes should be patched and protected.
      NOTE: *If object is impaled in the eye, the object must be immobilized and both eyes should be patched and protected. (Objects penetrating the eye globe should only be removed in-hospital.)
   d. **Thermal Burns:** Both eyes should be patched and protected.

7. If patient is unable to close eyelids, moisten eyes with sterile Normal Saline (exception: chemical irritants which need continuous irrigation) to maintain eye integrity. The eye(s) may then be irrigated and covered with moistened gauze pads.
8. Obtain visual history, including use of contact lenses, corrective lenses (glass/plastic), safety goggles.

   NOTE: As a general rule, EMTs should not attempt to remove contact lenses of patients with eye injuries. However, in certain chemical burn cases, MEDICAL CONTROL may instruct in removal of the lenses, if patient is unable to do so.**

9. Monitor and record vital signs and ECG. **/ TREATMENT PRIORITIES (continued)**

10. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

3.6. EYE EMERGENCIES

TREATMENT
BASIC AND INTERMEDIATE PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. Notify receiving hospital.

PARAMEDIC PROCEDURES

1. Contact **MEDICAL CONTROL**. The following may be ordered::
   a. Topical anesthetic: **Tetracaine** 1-2 eye drops as needed.
   b. Use of Morgan lens for eye irrigation.
   c. **Special consideration: Sudden painless loss of vision: If suspect central retinal artery occlusion in patient with acute non-traumatic, painless loss of vision in one eye (most common in elderly patient): apply vigorous pressure using heel of hand (massage) to affected eye for three(3) to five(5) seconds, then release. The patient may perform this procedure. Repeat as necessary. NOTE: Cardiac (EKG) monitor (12 lead ECG) is required for this procedure (i.e., vagal stimulus: bradycardia). CAUTION: If tetracaine has been administered, do not apply pressure to eye.**

***GUIDELINES FOR SECURING IMPALED OBJECT IN AN EYE**

1. Place a roll of gauze bandage or folded gauze pads on either side of the impaled object, along the vertical axis of the head. These rolls or pads should be placed so they stabilize the object.
2. Fit a paper or styrofoam cup or other protective cup/cone etc. over the impaled object. The protective cup should not touch the impaled object and it must rest upon the rolls of gauze or gauze pads.
3. Secure the dressings and cup in place with self adherent roller bandage or wrapping of gauze. **DO NOT** secure bandage over the top of the cup.
4. Patch and bandage the uninjured eye to reduce eye movements.

**** GUIDELINES FOR REMOVAL OF CONTACT LENSES**

CATEGORY A: Removal of soft contact lenses.
1. Pull down the lower eyelid.
2. Gently slide the lens down onto the conjunctiva.
3. Compress the lens between the thumb and index finger using a pinching motion.
4. Remove the lens.
5. Store lens in a container with water or normal saline and label appropriately (i.e., left/right eye and patient's name).

CATEGORY B: Removal of rigid and hard gas permeable lenses.
1. Separate the eyelids such that the lid margins are beyond the top and bottom edges of the lens.
2. Gently press the eyelids down and forward to the edges of the lens.
3. Move the eyelids toward each other, thereby forcing the lens to slide out between them.
4. Store lens in a container with water or normal saline and label appropriately (i.e., left/right eye and patient's name).
5. If lens removal proves difficult: gently move the lens downward from the cornea to the conjunctiva overlying the sclera until arrival in the ED.

3.7 *HYPERTENSIVE EMERGENCIES*

A hypertensive emergency is characterized by a rapid and severe elevation of a patient's diastolic BLOOD PRESSURE (greater than 115mm Hg - 130mm Hg), which will lead to significant, irreversible end-organ damage within hours if not treated. The brain, heart and kidneys are at risk. The patient may also present with restlessness, confusion, blurred vision, nausea and/or vomiting.

Hypertensive encephalopathy is a true emergency and is the direct result of untreated hypertension. It is characterized by severe headache, vomiting, visual disturbances (including transient blindness), paralysis, seizures, stupor, and coma. This condition may lead to pulmonary edema, left ventricular failure or cardiovascular accident (CVA).

The goal of therapy for hypertensive emergencies is to reduce the BLOOD PRESSURE, on average, approximately 10% - 20% or until patient's clinical presentation is improved. Caution should be taken to reduce the BLOOD PRESSURE in a controlled fashion as opposed to rapid reduction.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway and assist ventilations as needed.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Place patient in position of comfort.
5. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
6. Obtain appropriate S-A-M-P-L-E history related to event, including any Trauma (recent head injury).
7. Monitor and record vital signs and ECG.
8. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management (endotracheal intubation), if indicated.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient’s BLOOD PRESSURE drops below 100 systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient’s hemodynamic status

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management (endotracheal intubation), if indicated.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
   d. Cardiac monitor and, as clinically appropriate, 12 lead ECG - Manage dysrhythmias per protocol

2. Contact **MEDICAL CONTROL**. The following may be ordered:

   a. Administer **Nitroglycerin** **0.4 mg (1/150 gr.)** tablet or spray SL if **diastolic** BLOOD PRESSURE is **greater** than 115mm Hg to 130mmHg. **Nitroglycerin** may be repeated in five (5) minute intervals x two (2) as dictated by patient's BLOOD PRESSURE. May also administer **Nitropaste** 1" to anterior chest wall.

   Note: For patients, both male and female, who have, within the last 48 hours, taken any medications classified in the phosphodiesterase-type-5 inhibitor category (e.g. sildenafil, vardenafil, tadalafil), nitrates should not be administered unless medical control has been contacted and has provided the Emergency Medical Technician (EMT-B; EMT-I; EMT-P) with a medical control order to administer nitrates.

   b. **Morphine Sulfate** **2.0 mg to 10.0 mg** IV push or **Fentanyl 1 mcg/kg**. to max. 150 mcg. slow IV push, or if no IV access, Morphine Sulfate 2.0 mg – 10.0 mg IM/SQ or Fentanyl nasally
   c. **Furosemide** **0.5 mg/kg - 1.0 mg/kg** IV push (SLOWLY) for patients presenting with congestive heart failure (CHF) or pulmonary edema.
   d. Other vasoactive medications in the STP, e.g. **Metoprolol** or calcium channel blockers.

3.8 *OBSTETRICAL EMERGENCIES*

These emergencies include, but are not limited to the following: **abortion**, (spontaneous, threatened, inevitable, incomplete), **trauma**, **ectopic pregnancy**, **pre-eclampsia**, **eclampsia**, **abnormal deliveries** (breech, prolapsed cord, limb presentation, and multiple births), **bleeding during any trimester**, **complications of labor and delivery** (antepartum hemorrhage, abruptio placenta, placenta previa, uterine rupture, uterine inversion, toxemia of pregnancy, pulmonary embolism and post-partum hemorrhage).

Pre-existing medical conditions can lead to obstetrical complications. The primary concerns are diabetes, hypertension, heart disease and substance abuse. All of these conditions may adversely affect the developing fetus and therefore, may complicate the delivery of the fetus and compromise the health of the mother and child.

All obstetrical emergencies should be managed as though the patient is at risk for hypovolemic shock and should be considered an acute emergency requiring efficient management and transport per the Shock Protocol. The Obstetrical Emergencies protocol relates to complications of birth and their out of hospital management.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway and assist ventilations as needed. This may include repositioning of the airway, suctioning or use of airway adjuncts (oropharyngeal airway / nasopharyngeal airway) as indicated.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs. Treat all life threatening conditions as they become identified.
5. Obtain appropriate S-A-M-P-L-E history related to event, (gravidity, parity, length of gestation, estimated date of delivery, prior C-sections, prior obstetrical or gynecological complications, bleeding, pain, vaginal discharge, LMP).
6. Management of unscheduled field delivery with or without obstetrical complications as they are identified: **(see appropriate procedures in this protocol)**
   - **Vaginal Bleeding**
   - **Supine-Hypotensive Syndrome**
   - **Abruptio Placenta**
   - **Pre-eclampsia and Eclampsia**
   - **Placenta Previa**
   - **Uterine Inversion**
   - **Postpartum Hemorrhage**
7. Obstetrical emergencies that result in shock should be managed according to the Shock Protocol.
8. Obstetrical emergencies due to trauma should be managed according to the Abdominal Trauma Protocol: Special Considerations.
9. Monitor and record vital signs and ECG.
10. Transport patient(s) to the nearest appropriate facility as defined by the Department-approved point-of-entry plans.
11. Record exact time and location (especially if in transit) of birth.
12. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

NOTE: EMTs should be prepared to handle a minimum of two patients (mother and infant), with a possibility of additional patients (twins, triplets, etc.).

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL:** the following may be ordered:

   a. administration of additional IV Normal Saline

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
   d. Cardiac monitor, and if clinically appropriate 12 lead ECG - Manage dysrhythmias per protocol
   e. Eclamptic Seizures
      Lorazepam **2mg-4mg** slow IV push or Intramuscularly (IM) or **Diazepam** **5-10 mg** slow IV push or Intramuscularly (IM)

2. Contact **MEDICAL CONTROL**. **Medical Control** may order:

   a. Administration of additional IV Normal Saline.
   b. **Magnesium Sulfate** **1- 4 gm** IV over 3 minutes (i.e., for eclampsia).
      Calcium Chloride **10% 2 mg-4 mg/kg slow IV push over 5 minutes. (Antidote for Magnesium Sulfate).**
   c. Further anticonvulsant therapy.

SPECIAL CONSIDERATIONS FOR OBSTETRICAL EMERGENCIES

VAGINAL BLEEDING:

Vaginal bleeding at any given time during pregnancy is not normal and is always of concern. Though the exact etiology of the bleeding cannot be determined in the out of hospital setting, the onset of bleeding may provide clues to indicate the etiology. For example, bleeding early in the pregnancy may suggest an ectopic pregnancy or spontaneous abortion. Third-trimester bleeding is often the result of abruptio placentae or placenta previa but it also may be the result of trauma. Due to the variable mechanisms for bleeding, the amount of blood loss will vary anywhere from spotting to extensive hemorrhage that will require aggressive resuscitation measures.

NOTE: The amount of visualized vaginal blood loss is NOT a reliable indicator as to the actual amount of blood loss occurring. Visualized blood loss will most likely be out of proportion to the degree of shock, inasmuch as several of the bleeding etiologies may conceal the actual blood loss.

ABRUPTIO PLACENTA:

This presentation is usually during the third trimester or after twenty (20) weeks of gestation and is a partial or complete separation of the placenta from the wall of the uterus. This condition may present with blood loss ranging from none at all to severe. The patient will most likely complain of severe pain characterized as a severe "**tearing"** sensation. The more extensive the abruption (tear), the more likely there will be a greater severity of pain and blood loss.

- Advanced procedures should include Initiate 1-2 IVs Normal Saline (KVO) en route to the hospital.

PLACENTA PREVIA:

Condition when the placenta attaches to the lower portion of the uterus such that it partially or completely covers the cervical opening. The implantation of the placenta occurs early in the pregnancy. However, it is usually not discovered or manifests complications until the third trimester. Common signs and symptoms include: **"painless"** bright red vaginal bleeding. As a general rule, all incidents of painless vaginal bleeding during pregnancy are considered to be placenta previa until proven otherwise. Another complication of a placenta previa is that the placenta may be the presenting part during delivery, thus will require an emergency cesarean delivery in hospital.

NOTE: Vaginal examinations should never be performed since it may cause a rupture in the placenta resulting in severe life threatening hemorrhage and may precipitate labor.

SUPINE-HYPOTENSION SYNDROME:

This condition usually occurs during the third trimester of pregnancy and while the pregnant patient is in a supine position. The increased mass and weight of the fetus and the uterus compress the inferior vena cava resulting in a marked decrease in blood return to the heart reducing cardiac output which results in a drop in BLOOD PRESSURE: hypotension. Precipitating factors to this syndrome may be the result of dehydration or a reduced circulating blood volume. Therefore, an attempt should be made to determine whether or not there is any evidence of dehydration and/or blood loss.

HYPERTENSIVE DISORDERS OF PREGNANCY: PRE-ECLAMPSIA and ECLAMPSIA

These disorders occur in approximately 3%-5% of pregnancies. Formerly known as "toxemia of pregnancy," these disorders are characterized by hypertension, weight gain, edema, protein in urine, and in late stages, seizures. **Pre-eclampsia**, in addition to the signs and symptoms just noted, is characterized by headaches and visual disturbances. **Eclampsia** is further complicated by seizure disorders with resultant high morbidity/mortality for both mother and child.

NORMAL DELIVERY / COMPLICATIONS OF LABOR:

Labor is divided into three (3) stages: The **first stage** begins with the onset of uterine contractions and ends with complete dilation of the cervix. The **second stage** begins with the complete dilation of the cervix and ends with delivery of the fetus. The **third stage** begins with the delivery of the fetus and ends with delivery of the placenta.

In general, the most important decision to be made with a patient in labor is whether to attempt delivery of the infant at the scene or transport the patient to the hospital. Factors that effect this decision include: frequency of contractions, prior vaginal deliveries, maternal urge to push, and the presence of crowning. The maternal urge to push and/or the presence of crowning indicate that delivery is imminent. In such cases, the infant should be delivered at the scene or in the ambulance.

Those conditions that prompt immediate transport, despite the threat of delivery, include: prolonged membrane rupture, breech presentation, cord presentation, extremity presentation, evidence of meconium staining, and nuchal cord (cord around infants neck).

UNSCHEDULED NORMAL FIELD DELIVERY

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Follow general treatment guidelines as indicated in Obstetrical Emergencies protocol.
3. Document pertinent gestational/labor history:
   - history of hypertension, diabetes, edema or other pertinent medical/surgical history
   - history of previous obstetrical complications.
   - history of previous pregnancies/deliveries.
   - identify expected date of delivery.
   - identify possibility of multiple births.
   - identify length of time between contractions.
   - identify presence/absence of membrane rupture.
   - identify presence/absence of vaginal bleeding.
4. Determine need for imminent delivery or need for immediate transport.
5. Position mother for delivery. Have mother lie back, if tolerated, with knees drawn up and spread apart. Elevate buttocks with pillow or blankets.
6. Whenever possible, use sterile or aseptic technique.
7. Coach mother to breathe deeply between contractions and to **push with** contractions.
8. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
9. As the head crowns control with gentle pressure and support the head during delivery and examine neck for the presence of a looped (nuchal) umbilical cord. **If cord is looped around neck, gently slip it over the infant's head. If unable to do so, clamp and cut the cord.**
10. Suction mouth, then nose of the infant as soon as possible.
11. Support the infant's head as it rotates for shoulder presentation.
12. With gentle pressure, guide the infant's head downward to deliver the anterior shoulder and then upward to release the posterior shoulder. Complete the delivery of the infant.

13. Hold infant firmly with head dependent to facilitate drainage of secretions. Clear infant's airway of any secretions with sterile gauze and repeat suction of infant's mouth, then nose using bulb syringe.
14. Apply two clamps to umbilical cord (if not already done due to Nuchal cord): the first one is placed approximately ten (10) inches from the infant and the second is placed 2"-3" proximal to the first clamp (7"-8" from infant's abdomen). Cut cord between clamps and check for umbilical cord bleeding. If umbilical cord bleeding is evident apply additional clamp(s) as needed.
15. Dry infant and wrap in warm towels/blanket (cover infant's head).
16. Place infant on mother's abdomen for mother to hold and support.
17. Note and record infant's gender, time and geographical location (especially if in transit) of birth.
18. If infant resuscitation **is not** necessary, record **APGAR** score at 1 minute and 5 minutes post-delivery.
19. If infant resuscitation is necessary, **follow** neonatal resuscitation protocol**.**
20. Delivery of the Placenta: (do not delay transport)
    - As the placenta delivers, the mother should be encouraged to push with contractions.
    - Hold placenta with both hands, place in plastic bag or other container and transport with mother to receiving hospital. NEVER "pull on" umbilical cord to assist placenta delivery.
    - Evaluate perineum for tears. If present, apply sanitary napkins to the area while maintaining direct pressure.
21. Initiate transport as soon as possible.
22. Monitor and record vital signs every 5 minutes at a minimum if unstable, or every 15 minutes if stable.
23. Notify receiving hospital.

COMPLICATIONS OF LABOR

BREECH PRESENTATION

In general, breech presentations include buttocks presentation and/or extremity presentation. An infant in a breech presentation is best delivered in the hospital setting since an emergency cesarean section is often necessary. However, if it is necessary to perform a breech delivery in an out of hospital setting, the following procedures should be performed:

1. Allow the fetus to deliver spontaneously up to the level of the umbilicus. If the fetus is in a front presentation, gently, extract the legs downward after the buttocks are delivered.
2. After the infant's legs are clear, support the baby's body with the palm of the hand and the volar surface of the arm.
3. After the umbilicus is visualized, gently extract a 4"-6" loop of umbilical cord to allow for delivery without excessive traction on the cord. Gently rotate the fetus to align the shoulder in an anterior-posterior position. Continue with gentle traction until the axilla is visible.
4. Gently guide the infant upward to allow delivery of the posterior shoulder.
5. Gently guide the infant downward to deliver the anterior shoulder.
6. During a breech delivery, avoid having the fetal face or abdomen toward the maternal symphysis.
7. The head is often delivered without difficulty. However, be careful to avoid excessive head and spine manipulation or traction.
8. If the head does not deliver immediately, action must be taken to prevent suffocation of the infant.
    a. Place a gloved hand in the vagina with the palm toward the babies face.
    b. With the index and middle fingers, form a "V" on either side of the infant's nose.
    c. Gently push the vaginal wall away from the infant's face until the head is delivered.
    d. If unable to deliver infant's head within three (3) minutes, maintain the infant's airway with the "V" formation and rapidly transport to the hospital.

COMPLICATIONS OF LABOR (cont.)

SHOULDER DYSTOCIA

This occurs when the fetal shoulders impact against the maternal symphysis, blocking shoulder delivery. Delivery entails dislodging one shoulder and rotating the fetal shoulder girdle into the wider oblique pelvic diameter. The anterior shoulder should be delivered immediately after the head:

1. Attempt to guide the infant's head downward to allow the anterior shoulder to slip under the symphysis pubis.
2. Gently rotate the fetal shoulder girdle into the wider oblique pelvic diameter. The posterior shoulder usually delivers without resistance.

PROLAPSED UMBILICAL CORD

This occurs when the cord slips down into the vagina or presents externally after the amniotic membranes have ruptured. Fetal asphyxia may rapidly ensue if circulation through the cord is not re-established and maintained until delivery. If umbilical cord is seen in the vagina, insert two fingers of a gloved hand to raise the presenting part of the fetus off of the cord.

1. Position the mother in Trendelenburg or knee-chest-position to relieve pressure on the cord.
2. Instruct the mother to "pant" with each contraction to prevent her from bearing down.
3. Insert two gloved fingers into the vagina and gently elevate the presenting part to relieve pressure on the cord and restore umbilical pulse. DO NOT attempt to reposition or push the cord back into the uterus.
4. If assistance is available, apply moist sterile dressings to the exposed cord.
5. Maintain hand position during rapid transport to the receiving hospital. The definitive treatment is an emergency cesarean section.

UTERINE INVERSION

This is a turning **"inside out"** of the uterus. Signs and symptoms include postpartum hemorrhage with sudden and severe abdominal pain. Hypovolemic shock may develop rapidly.

1. Follow standard hemorrhagic shock protocol.
2. Do not attempt to detach the placenta or pull on the cord.
3. Make one (1) attempt to reposition the uterus:
    - Apply pressure with the fingertips and palm of a gloved hand and push the uterine fundus upward and through the vaginal canal.
    - If procedure is ineffective, cover all protruding tissues with moist sterile dressings and rapidly transport to hospital.

POSTPARTUM HEMORRHAGE

This is defined as the loss of 500 mL or more of blood in the first twenty-four (24) hours following delivery. The most common cause is the lack of uterine muscle tone and is most frequently seen in the multigravida and/or multiple birth mother. However, any other obstetrical malady may cause hemorrhage.

Follow general treatment guidelines as indicated in protocols. Treat for shock; administer oxygen using appropriate oxygen delivery device, as clinically indicated. Advanced procedures should include **1-2 IVs of Normal Saline** (recommended during transport) followed by a 250 **mL** - 500 **mL** fluid bolus of **Normal Saline**. Titrate IV flow rate to patient's hemodynamic status.

3.9 *SEIZURES*

A seizure is a temporary alteration in behavior due to large-scale electrical discharge of one or more groups of neurons in the brain. Seizures can present in several different forms: generalized absence or tonic/clonic seizure, partial/ simple, or partial/complex. The single most common cause of seizure disorder is idiopathic epilepsy. However, there are multiple other causes: alcohol abuse, hypoglycemia, head trauma, vascular disorders, cerebrovascular accidents, overdose, infection, psychiatric, electrolyte abnormalities, eclampsia, hypoxemia, toxic exposure, drug withdrawal and structural brain disorders such as tumors. The seizure may be followed by a post-ictal state or complete coma depending upon cause.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway and assist ventilations as needed. Consider nasopharyngeal airway. Protect patient from injury and secure airway as opportunity arises.
3. Administer oxygen, using appropriate oxygen delivery device, as clinically indicated. Be certain that the oropharynx is clear of secretions and/or vomitus.
4. Obtain appropriate (S-A-M-P-L-E) history related to event. Question witnesses or bystanders as to actual event if possible.
5. The majority of seizures are self-limiting, followed by a gradual awakening. However, prolonged or recurrent seizures may indicate status epilepticus. (see below)
6. Monitor and record vital signs and ECG.
7. Prevent / treat for shock.
8. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

NOTE: Status epilepticus is considered to be occurring when it has been reported, or is known that, a patient has been seizing for 10 minutes or greater.

TREATMENT
BASIC PROCEDURES

1. If patient is a known diabetic who is conscious and can speak and swallow, administer oral glucose or other sugar source as tolerated. One dose equals one tube. A second dose may be necessary.

   CAUTION: Do NOT administer anything orally if the patient does not have a reasonable level of consciousness and normal gag reflex.

2. Activate ALS intercept, if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**:
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO).
   c. Cardiac Monitor and if feasible 12 lead ECG - Manage dysrhythmias per protocol
   d. If obvious narcotic overdose:
      - **Naloxone 0.4-2.0 mg** IV Push, IM, SC or Nasal via atomizer
   e. **Thiamine 100 mg** IV or IM (in patient with obvious alcohol abuse, malnourished state).
   f. Determine Blood Glucose level:
      - If glucose is less than **70**mg/dL, **Administer Dextrose 50%,12.5 to 25 grams IV Push**.

   CAUTION: If cerebrovascular accident is suspected, contact Medical Control prior to administration.

   g. If patient is in **Status Epilepticus**, administer one of the following:

      - **Diazepam 5 mg - 10 mg slow IV push or Intramuscularly (IM).**

      - **Lorazepam 2 mg - 4 mg slow IV push or IM.**

      CAUTION: Benzodiazepines may be contraindicated in head injury or hypotension; discuss with medical control.

   h. If no IV access, administer **Glucagon 1-2 mg** IM or nasal for suspected/known hypoglycemia.

2. Contact **MEDICAL CONTROL**. The following may be ordered:

   a. Additional **Dextrose 50%** IV push.
   b. **Naloxone 0.4 - 2.0 mg** IV push, IM, ET, or Nasal via atomizer
   c. **Magnesium Sulfate 1-4 grams** IV over three (3) minutes if suspect eclampsia of pregnancy.
   d. Further doses of anticonvulsants

3.10 *SHOCK (HYPOPERFUSION) OF UNKNOWN ETIOLOGY*

Shock is defined as inadequate tissue perfusion and oxygenation resulting in abnormal tissue metabolism at the cellular level. Multiple causes of shock exist and include: **hypovolemia** (hemorrhage, burns, dehydration, anaphylaxis); **cardiogenic** (myocardial infarction, congestive heart failure, dysrhythmias); **obstructive** (pericardial tamponade, pulmonary embolism, aortic dissection); **distributive** (infection, sepsis, poisonings, spinal cord injuries).

The patient with severe decompensated shock will typically present with hypotension and changes in mental/neurological status (agitation, restlessness) eventually leading to confusion and coma.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate (S-A-M-P-L-E) history related to event.
6. Monitor and record vital signs and ECG.
7. Treat for shock (maintain body temperature).
8. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Control/stop hemorrhage (direct pressure, pressure points, etc.).
2. Place patient in supine position with legs elevated, unless suspected respiratory compromise.
3. Activate ALS intercept, if deemed necessary and if available.
4. Initiate transport as soon as possible with or without ALS.
5. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL** who may order:

   a. administration of additional fluid

PARAMEDIC PROCEDURES

1. ALS-P STANDING ORDERS

a. Provide advanced airway management (if indicated).
b. Initiate IV Normal Saline (KVO) en route to the hospital.
c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
d. Cardiac Monitor and if feasible 12 lead ECG - Manage dysrhythmias per protocol Initiate transport as soon as possible.
e. For patients with confirmed adrenal insufficiency, give **Hydrocortisone** 100 mg. IV, IM or IO or **Methylprednisolone** 125 mg. IV, IM or IO.

2. Contact **MEDICAL CONTROL**, who may order**:**

a. Repeat fluid bolus(es).
b. **Dopamine 2-20 µg/kg/minute**

3.11 *ACUTE STROKE*

The American Heart Association notes that stroke is the third leading cause of death In the United States and the leading cause of brain injury in adults. With the advent of organized systems for stroke management and many new urgent care options, it is imperative that pre-hospital care providers recognize, treat and appropriately transport stroke victims.

The American Heart Association further recommends the use of the Cincinnati Stroke Scale by pre-hospital care providers to easily identify, properly treat and ensure transport to an appropriate facility of suspected acute stroke patients. A modification of this scale, the Massachusetts Stroke Scale (MASS; see appendix Q) should be used. The scale evaluates three major physical findings; facial droop, arm weakness and speech difficulties.

Once the diagnosis of acute stoke is suspected, pre-hospital care providers should make every effort to determine the time of onset of symptoms and to minimize time in the field. The suspicion of acute stroke mandates rapid transport because there is a small window of opportunity to institute therapies that can only be provided within the hospital.

ASSESSMENT/TREATMENT PRIORITIES

1. Maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess level of consciousness, ABCs and vital signs.
5. Obtain S-A-M-P-L-E history related to event. If possible, establish the time of onset of stroke signs and symptoms.
6. Monitor and record vital signs and ECG.
7. Initiate transport ASAP, with or without ALS. Do not allow the patient to exert themselves.
8. Properly secure patient to cot in position of comfort or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and available.
2. Determine blood glucose level if trained and allowed.
3. If patient is known diabetic who is conscious and can speak and swallow, do not administer oral glucose without contacting medical control.
4. If patient is unconscious or seizing, transport on left side (coma position)
5. If patient blood pressure drops below 100mm Hg systolic, treat for shock.
6. Initiate transport as soon as possible, with or without ALS, to nearest appropriate facility.
7. If patient is possible ischemic stroke victim and time permits, use appropriate Thrombolytic Checklist to determine if patient is candidate for ischemic stroke reperfusion.
8. Notify receiving facility.

INTERMEDIATE PROCEDURES

1. ALS-I Standing Orders

a. Provide advanced airway management (if indicated).
b. Initiate IV **Normal Saline** (KVO) en route to the hospital.
c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. ALS-P Standing Orders

a. Provide advanced airway management (if indicated).
b. Initiate IV Normal Saline (KVO) en route to the hospital.
c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
d. Determine Blood Glucose level:
    - If glucose is less than **70** mg/dl, contact Medical control prior to administration of D50%.

3.12 *SYNCOPE OF UNKNOWN ETIOLOGY*

Syncope is a brief loss of consciousness caused by inadequate perfusion of the brain. If the patient remains unconscious, they should be treated according to the "Altered Mental/Neurological Status" protocol. Syncope may be caused by any mechanism that results in decreased blood flow to the brain, such as: **vasovagal hypovolemia** (orthostatic), **cerebrovascular disease** (TIA/CVA), **cardiac dysrhythmia**, **pulmonary embolism, carotid sinus sensitivity**, **metabolic causes** (intoxication, COPD, suffocation, hypoglycemia), **neuropsychologic** (seizure, hyperventilation), and **medications** (e.g. nitroglycerin, thorazine, quinidine, isosorbide dinitrate, captopril).

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer **oxygen** using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate (S-A-M-P-L-E) history related to event. Question witnesses or bystanders as to the actual event.
6. Monitor and record ECG and vital signs.
7. Prevent / treat for shock.
8. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. If suspected hypovolemia etiology (i.e. GI bleed, ectopic pregnancy) place patient supine, cover to prevent heat loss and elevate legs.
2. Activate ALS intercept, if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. Fluid bolus of Normal Saline.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.

c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
d. Cardiac monitoring and if feasible 12 lead ECG - manage dysrhythmias per protocol
e. Determine Blood Glucose level.
   - If glucose is less than 70mg/dL: administer **Thiamine** 100 mg IV Push or IM, followed by **50% Dextrose** (12.5 to 25 gm)* IV Push. A second dose of 50% Dextrose may be necessary.

* NOTE: If cerebrovascular accident is suspected, contact Medical Control prior to administration.

* NOTE: If no IV access, administer **Glucagon** 1 mg-2 mg IM or nasal for suspected/known hypoglycemia.

f. If suspected/known narcotic overdose: **Naloxone** **0.4-2.0 mg**. IV Push, IM, or Nasal via atomizer. May repeat as necessary.

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. additional **Dextrose** **50%** IV Push.
   b. **Naloxone** **0.4-2.0 mg** IV Push, IM or Nasal via atomizer
   c. Further Normal Saline bolus.
   d. **Calcium Chloride** **10% 2-4 mg/Kg** IV **slowly** over 5 minutes for suspected calcium channel blocker toxicity.
   e. **Sodium Bicarbonate** **0.5 - 1.0 mEq/Kg** IV Push.
   f. **Atropine** **0.5 - 1.0 mg** IV Push for bradycardia to **total dose of 0.0 4 mg/kg.**
   g. **Glucagon** **1.0 to 5.0 mg IM, SC, IV or Nasal** for suspected beta-blocker or calcium channel blocker toxicity.

3.13 *TOXICOLOGY / POISONING / SUBSTANCE ABUSE / OVERDOSE*

Poisoning may be the result of exposure to toxic substances from **ingestion**, **inhalation**, **injection** or **skin absorption**. The most common poisoning emergencies include, but are not limited to: corrosive agents (acids/alkalis), hydrocarbons (gasoline, oil, pesticides, paints, turpentine, kerosene, lighter fluids, benzene, and pine-oil products), methanol (wood alcohol), ethylene glycol (anti-freeze), isopropyl alcohol, cyanide, food poisonings (bacterial, viral, and non-infectious) and plant poisonings. Envenomations are also managed as clinical poisonings. The primary goal of physical assessment of the poisoned patient is to identify effects on the three vital organ systems most likely to produce immediate morbidity and/or mortality: respiratory system, cardiovascular system, and central nervous system. An **"overdose"** is the result of an individual's intentional/accidental exposure to a pharmacological substance(s). The most common drugs of abuse resulting in overdose are: narcotics, central nervous system depressants, central nervous system stimulants and hallucinogens.

General management principles should be directed towards patient's clinical status and suspected cause for their clinical condition. ALS personnel must constantly be aware of immediate need for potential antidote (e.g., Naloxone for narcotic overdose). Due to the complex nature of poisonings and substance abuse emergencies, it is strongly recommended that Medical Control be utilized in the initial management of these patients**.**

The Regional Poison Control may be reached at: 1- 800- 222- 1222

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation, i.e. by ascertaining the source and type of poisoning. This is especially important when responding to industrial and/or farm accidents. Call appropriate public safety agencies: fire, rescue, or HAZMAT teams to properly stabilize the scene and rescue the victim(s) from the source of contamination. The patient will need to be removed from point of exposure and must be properly decontaminated. Rescuers will need to place patient in a safe environment such that the EMTs and/or Paramedics may administer emergency care.
2. Maintain open airway and assist ventilations as needed. Ensure spinal stabilization/immobilization if indicated. Airway may include repositioning of the airway, suctioning or use of airway adjuncts (oropharyngeal airway / nasopharyngeal airway) as indicated.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate (S-A-M-P-L-E) history related to event.
6. General management principles should be directed towards patient's clinical status and suspected cause for their clinical condition.
7. Envenomations: immobilize the extremity in a dependent position. May utilize cold packs and/or constricting bands, as indicated.
8. Monitor and record ECG and vital signs.
9. Prevent / treat for shock.
10. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. Contact **MEDICAL CONTROL**. Medical Control may order:
   a. Administration of **activated charcoal** 1 gram per kg by mouth mixed with water or sorbitol **ONLY** if the patient is fully conscious and has **NOT** ingested hydrocarbon, petroleum distillate, corrosive substances or heavy metals.
   (i.e. Iron, Lithium, Lead, Mercury, Cadmium)
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100 mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL**. Medical Control may order:
   a. Administration of **activated charcoal** 1 gram per kg by mouth mixed with water or sorbitol **ONLY** if the patient is fully conscious and has **NOT** ingested hydrocarbon, petroleum distillate, corrosive substances or heavy metals.
   (i.e. Iron, Lithium, Lead, Mercury, Cadmium)

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
   d. Apply cardiac monitor and if clinically feasible, obtain 12 lead ECG - Manage dysrhythmias per protocol.
   e. Administer **Naloxone** **0.4-2.0 mg** IV Push or IM, SC or Nasal via atomizer. May be repeated as indicated.
   f. Administer **Thiamine** **100 mg** IV or IM if appropriate.
   g. Determine **Blood Glucose** level:
      - If glucose is **less** than **70**mg/dL, administer **Dextrose** **50%,12.5 to 25 grams** IV Push. May be repeated as indicated.

CAUTION: If cerebrovascular accident is suspected, contact Medical Control prior to administration.

   h. If no IV access, administer **Glucagon 1-2 mg** IM or nasal for suspected/known hypoglycemia.

2. Contact **MEDICAL CONTROL**. Medical Control may order:
   a. Administration of **activated charcoal** 1 gram per kg by mouth mixed with water or sorbitol **ONLY** if the patient is fully conscious and has **NOT** ingested hydrocarbon, petroleum distillate, corrosive substances or heavy metals.
   (i.e. Iron, Lithium, Lead, Mercury, Cadmium)

b. **Dextrose** **50%, 25 gm** IV Push.
c. **Naloxone** **0.4-2.0 mg** IV Push, IM, or Nasal via atomizer
d. Further Normal Saline bolus.
e. **Calcium Chloride** **10%, 2-4 mg/kg** IV Push **SLOWLY OVER FIVE (5) MINUTES** (i.e., for calcium blocker toxicity).
f. **Sodium Bicarbonate** **0.5 - 1.0 mEq/Kg** IV Push.
g. **Atropine** **2.0- 5.0 mg** I V Push (e.g., organophosphate poisoning management).
h. **Albuterol** **2.5-3.0 mg** by nebulizer (e.g., bronchospasm management).
i. **Furosemide** **40 mg** IV bolus (e.g., pulmonary edema management).
j. **Diazepam** **5 mg-10 mg** slow IV push or **Lorazepam 2mg-4mg** slow IV push. (e.g. seizures)
k. If Atropine is ineffective in patient(s) with known organophosphate poisoning and if available: **Pralidoxime Chloride** (2-PAM Chloride): **Adult: 1 gram IV over 15-30 minutes;** Pedi**: 20-50 mg/kg IV over 15-30 minutes.**
l. **Amyl nitrite**: administer vapors of a crushed inhalant or pearl under the patients nose for 15 out of every 30 thirty seconds with intermittent 100% oxygen administration.
m. **CYANIDE ANTIDOTE KIT** **if available by EMS service and/or industrial site:**
   - Two (2) **Amyl Nitrite** inhalants.
   - **3% Sodium Nitrite** (stop Amyl nitrite):
   - ADULT: 10 mL slow IV administration over 2-4 minutes.
   - PEDI: 0.2 mL/kg (up to 10 mL) slow IV administration over 5 minutes.
   - **Sodium Thiosulfate 25%:**
   - ADULT: 50 mL IV bolus.
   - PEDI: 5 mL Sodium Thiosulfate per 1 mL Sodium Nitrate given. **NOTE**: If hypotension develops, STOP all nitrites, treat for shock, and consider administration of Dopamine.
n. **Hydroxocobalamin** 5 gm. IV for cyanide toxicity.
o. **Glucagon** 1.0 - 5.0 mg IM, SC, IV for beta-blocker or calcium-channel blocker overdose

3.14 *ADULT PAIN AND NAUSEA MANAGEMENT*

Pain management with analgesics, and nausea management with anti-emetics, should be considered utilizing the following protocol. (Note that treatment for nausea *can* be given even if the nausea is not due to narcotic administration!)
The purpose of this protocol is to:

- Attempt to decrease and/or alleviate pain or nausea and minimize patient anxiety
- Facilitate positioning and splinting techniques

NOTE: Narcotics may be relatively contraindicated in patients with Head Injury, Altered Mental Status, Respiratory Distress, Cardiac Emergencies, and otherwise unstable conditions. Medical control should be contacted prior to administration of morphine or fentanyl if this is a concern.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway and assist ventilations as needed.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event, including any Trauma (recent head injury/fracture.)
6. Monitor and record vital signs and ECG.
7. Treat all life threatening conditions as they become identified.
8. Prevent / treat for shock.
9. Multiple patients need to be appropriately triaged.
10. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.
11. Transport to the nearest appropriate facility.

TREATMENT

BASIC PROCEDURES

INTERMEDIATE PROCEDURES

1. ALS STANDING ORDERS

a. Provide advanced airway management, if indicated.
b. Initiate IV Normal Saline (KVO) en route to the hospital.
c. If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 **mL** bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL:** Medical Control may order:

a. Fluid bolus of Normal Saline (expected fluid bolus of 20 mL/kg). This order may be repeated at the discretion of Medical Control.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
    a. Provide advanced airway management, if indicated.
    b. Initiate IV Normal Saline (KVO) en route to the hospital.
    c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
    d. Administer **Morphine Sulfate** 0.1mg/kg to a maximum of 10mg IV, or **Fentanyl** 1 mcg/kg. to max. 150 mcg. slow IV push or nasally.
    e. **Ondansetron** 4 mg. IV/IM.

2. **Contact MEDICAL CONTROL: Medical Control may order:**
    a. Fluid bolus of Normal Saline.
    b. **Naloxone HCL 0.4 – 2 mg** IV/IM/SC or nasal via atomizer.
    c. **Morphine** 0.1mg/kg to a maximum of 10mg IV/IM/SC, or **Fentanyl** 1 mcg/kg. to max. 150 mcg. slow IV push, or if no IV access, nasally.
    d. **Ondansetron** 4 mg. IV/IM.

3.15 *ADULT UPPER AIRWAY OBSTRUCTION*

Causes of airway obstruction include prolapse of tongue in the unconscious patient; foreign bodies in the oropharynx, trachea, or esophagus (commonly chunks of meat or food); allergic swelling of upper airway structures ("angioedema"); chemical burns; inhalation injuries; altered mental/Neurological status and congenital abnormalities (patients with small jaws or large tongues). Infectious causes are pertussis, epiglottitis, and retropharyngeal or peritonsillar abscess. Trauma resulting in upper tracheal or laryngeal injury may also result in airway obstruction.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine presence of upper airway obstruction (stridor):
   a. If the obstruction due to a foreign body is complete or is partial with inadequate air exchange: follow the American Heart Association (AHA) BCLS age appropriate guidelines for foreign body obstruction. Maintain an open airway, remove secretions, vomitus and assist ventilations as needed.
   b. If partial obstruction due to a foreign body is suspected and the patient has adequate air exchange: transport to appropriate medical facility. Do not attempt to remove foreign body in the field.
   c. If suspected epiglottitis (stridor, drooling), maintain an open airway and place patient in position of comfort. Avoid upper airway stimulation.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess level of consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event, including recent infectious history (fever, cough, etc.) or exposure to allergens.
6. Monitor and record vital signs and ECG.
7. Prevent / treat for shock.
8. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, immobilization device, in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. If tracheostomy tube exists and there is evidence of obstruction resulting in inadequate air exchange;

   CONTACT Medical Control for further instructions. Medical control may provide instructions for emergent removal of the tracheostomy tube to establish an airway.*

2. Activate ALS intercept, if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. Notify receiving hospital.

*** See Tracheostomy Tube Obstruction Management in this Protocol.**

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated for **mechanical obstruction**: Perform direct laryngoscopy if foreign body suspected. If foreign body is visible and readily accessible, attempt removal with Magill forceps.
   b. Provide positive pressure ventilations if needed.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management if indicated for **mechanical obstruction**: Perform direct laryngoscopy if foreign body suspected. If foreign body is visible and readily accessible, attempt removal with Magill forceps. If unable to remove obstructing foreign body, continue BLS airway management by providing positive pressure ventilations.
   b. If foreign body is removed proceed with endotracheal intubation if necessary.
   c. If unable to clear airway obstruction, unable to intubate as needed or unable to perform positive pressure ventilations, perform a **needle cricothyroidotomy**.
   d. Contact **MEDICAL CONTROL** for further orders.
   e. IV Normal Saline titrated to appropriate BLOOD PRESSURE en route.

*** Tracheostomy tube obstruction management:**

In the patient with an obstructed tracheostomy tube, in whom no effective ventilation/oxygenation is possible, the following are to be considered **Standing Orders**:

- wipe neck opening with gauze
- attempt to suction tracheostomy tube
- remove tracheostomy tube if necessary
- once airway is open, begin ventilations as necessary/possible
- Intermediates and Paramedics may attempt intubation of the patient if no other means of ventilating/oxygenating the patient are possible

Medical Control may order:

- in patients in whom the removed tracheostomy tube is noted to be plugged, on-line medical control may order clearing of the tube and re-insertion.

In patients who are being oxygenated or ventilated by the above criteria, Medical Control may order:

- wipe neck opening with gauze
- attempt to suction tracheostomy tube
- remove tracheostomy tube as necessary
- once airway is open, begin ventilations as possible/necessary
- Attempt to intubate the patient

Signs of inadequate oxygenation/ventilation are:

- falling pulse oximetry
- patient's color
- patient's vital signs
- inability to deliver oxygenation by all other means

3.16 *DIABETIC EMERGENCIES*

The patient presenting with a potential diabetic emergency in the prehospital environment may be difficult to assess without the capability of measuring a blood sugar. An alteration in mental/neurological status may be related or unrelated to their diabetes mellitus. Other potential reasons for altered mental/neurological status include ethanol, epilepsy, overdose, trauma, infection, stroke, and psychiatric causes. See these protocols if hypo or hyperglycemia is not the reason for their presentation. Altered Mental/Neurological Status; Shock Toxicology/ Poisoning; Seizures; Syncope; and/or Head Trauma/Injury**.**

Hypoglycemia: Hypoglycemia (**low blood sugar**) is the most common type of diabetic emergency and may be life threatening. The diabetic may have taken too much insulin or oral diabetic medication, reduced their food intake, or increased their level of physical activity acutely. Typically, the **hypoglycemia** patient may present with a change in mental status, an appearance of intoxication, unsteady gait, slurred speech, unconscious, elevated heart rate, cold clammy skin, seizures, or combativeness.

Hyperglycemia: Hyperglycemia **(overly high blood sugar)** although not as common as an emergency presentation, may still be life threatening to the patient. Typically, though, it the underlying cause that is the issue (e.g. sepsis, injury, myocardial infarction). Hyperglycemia occurs because the diabetic does not produce enough natural insulin to move sugar from the blood into cells. The diabetic may not have taken enough or skipped an insulin dose. The diabetic may have overeaten or has an infection altering his blood sugar. In physical stress situations, endogenous catecholamines and cortisol will raise blood glucose; severe dehydration may do so as well. Typically, the **hyperglycemic** patient may present with confusion, weakness, tachycardia, and hypotension.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer **oxygen** using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Obtain appropriate S-A-M-P-L-E history related to event.
6. Obtain blood glucose level.
7. Treat hypoglycemia or hyperglycemia per protocol.
8. Monitor and record vital signs and ECG.
9. Initiate transport as soon as possible, with or without ALS.
10. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.

3. **BLS STANDING ORDERS**
   a. If patient is a known diabetic who is conscious and can speak and swallow, administer oral glucose or other sugar source as tolerated. One dose equals one tube. A second dose may be necessary.
   b. If authorized and trained to do so, and prior to administering oral glucose, obtain a blood sugar reading.
   c. If glucose is **less than 70** mg/dl and the patient is conscious and can speak and swallow, administer oral glucose or other sugar source as tolerated.

CAUTION: Do NOT administer anything orally if the patient does not have a reasonable level of consciousness and normal gag reflex.

NOTE: One dose equals one tube.

   d. If after 10 minutes the patient continues to be symptomatic, re-determine Blood Glucose level and administer a second dose of oral glucose if glucose is still below **70** mg/dl.

CAUTION: If cerebrovascular accident is suspected, follow stroke protocols and notify Medical Control

4. If patient is unconscious or seizing, transport on left side (coma position).
5. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
6. Monitor and record vital signs every 5 minutes at a minimum if unstable, or every 15 minutes if stable.
7. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. ALS STANDING ORDERS

   a. Provide advanced airway management (if indicated)
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient is a known diabetic who is conscious and can speak and swallow, administer oral glucose or other sugar source as tolerated. One dose equals one tube. A second dose may be necessary.
   d. If authorized and trained to do so, and prior to administering oral glucose, obtain a blood sugar reading.
   e. If blood sugar **is less than 70** mg/dl and the patient is conscious and can speak and swallow, administer oral glucose or other sugar source as tolerated.

CAUTION: Do NOT administer anything orally if the patient does not have a reasonable level of Consciousness and normal gag reflex.

NOTE: One dose equals one tube.

f. If after 10 minutes and the patient continues to be symptomatic re-determine Blood Glucose level and administer a second dose of glucose if glucose is still below **70** mg/dl.

CAUTION: If cerebrovascular accident is suspected, follow stroke protocols and notify Medical Control

g. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
   d. Apply cardiac monitor and if feasible 12 lead ECG - Manage dysrhythmias per protocol.
   e. If obvious narcotic overdose:
      - **Naloxone** **0.4-2.0 mg** IV Push or IM, SC or Nasal via atomizer. Additional **Naloxone** (0.4-2.0 mg) may be administered as necessary.
   f. **THIAMINE** **100 mg** IV or IM
   g. Determine Blood Glucose level:
      - If glucose is less than 70 mg/dL, administer **Dextrose** **50%,** 12.5-25 grams IV Push. Additional **Dextrose** 50% may be administered as necessary.
   h. If no IV access, administer **Glucagon** **1-2 mg** IM or nasal for suspected hypoglycemia.

2. Contact **MEDICAL CONTROL,** the following may be ordered:

   a. **Dextrose** 50%, 25 gm IV Push
   b. **Naloxone** 0.4-2.0 mg IV Push, IM or Nasal via atomizer
   c. Further Normal Saline bolus.
   d. Dependent upon conditions for suspected substance abuse, overdose, or toxic exposure: refer to specific protocols.

4. TRAUMA EMERGENCIES

The Department-approved trauma point-of-entry plans will determine trauma transport destinations.

4.1 *ABDOMINAL/PELVIC TRAUMA*

Abdominal injuries can result from blunt or penetrating trauma, and most commonly result from motor vehicle crashes, blast injuries, falls from heights, blows to the abdomen, abdominal compression, gunshot and stab wounds. Injuries include skeletal, renal, splenic, hepatic, bladder, gastrointestinal, vascular, pancreatic and diaphragmatic.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Treat all life threatening conditions as they become identified.
6. When multiple patients are involved, they need to be appropriately triaged.
7. Obtain appropriate S-A-M-P-L-E history related to event.
8. Prevent / treat for shock.
9. Patient care activities must not unnecessarily delay patient transport to an appropriate facility.
10. If the scene time and/or transport time will be prolonged, and a landing site is available, consider transport by air ambulance from the scene to an appropriate **Trauma Center**. See Air Ambulance protocol.
11. Monitor and record vital signs and ECG.
12. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Cover eviscerations with sterile non-adherent material (saline or sterile water moistened).
2. If applicable, stabilize any impaled object(s).
3. Activate ALS intercept, if deemed necessary and if available.
4. Initiate transport as soon as possible with or without ALS.
5. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
6. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL**, the following may be ordered:
   a. Additional IV Normal Saline bolus(es) 250 mL - 500 mL bolus or wide open titrated to patient's condition.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL,** the following may be ordered:
   a. Additional IV Normal Saline bolus(es) 250 mL- 500 mL bolus or wide open titrated to patient's condition.

NOTE: SPECIAL CONSIDERATION: THE PREGNANT PATIENT

Pregnant victims involved in major trauma to the abdomen are more susceptible to life-threatening injuries. In general, the fluid-filled gravid uterus protects the fetus from blunt trauma. However, direct trauma may result in premature separation of the placenta from the uterine wall, premature labor, uterine rupture, abortion and fetal death. Therefore, immediate transport to the appropriate emergency facility is of highest priority.

Abdominal trauma during pregnancy:
- Follow all procedures identified above.
- Place patient in left lateral recumbent position (non-spinal injured patient).
- If suspected spinal injury: completely immobilize the patient on a long board and place the patient on her left side (while immobilized).
- Notify appropriate facility immediately.

4.2 *BURNS / INHALATION INJURIES*

A burn injury is caused by an interaction between energy (thermal, chemical, electrical,* or radiation*) and biological matter. Thermal burns (flames, scolds, contact with hot substances or objects, including steam) account for the majority of burns. Chemical burns are caused by acids, alkalis and organic compounds (phenols, creosote, and petroleum products) commonly found in industrial and household environments.

*** NOTE: see specific protocols.**

Burn severity should be assessed and classified by degree. The **first-degree** burn involves only the upper layers of the epidermis and dermis. The **second-degree** burn penetrates slightly deeper and produces blistering of the skin. First- and second- degree burns are considered **partial thickness** burns. **Third-degree** or **full thickness** burns penetrate the entire dermis. These burns may involve injury to blood vessels, nerves, muscle tissue, bone, or internal organs. Burn surface area should be assessed by the rule of nines.

Inhalation injury and **fire toxicology** (Carbon Monoxide, Hydrogen Chloride, Phosgene, Nitrogen Dioxide, Ammonia, Cyanide, Sulfur Dioxide, Methane, and/or Argon) frequently accompany burn injuries. This is especially true if injury occurred in a closed space and/or patient presents with facial burns, singed nasal hairs, beard or mustache, sooty or bloody sputum, difficulty breathing, or brassy cough. The signs and symptoms of inhalation injuries may not be noted until several hours after inhalation.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety, including safety for the patient(s) and rescuer(s). Call appropriate public safety agencies for assistance if needed. Take appropriate personal protective measures against airborne dust or toxic fumes and any other potential chemical agents.
2. Maintain appropriate body substance isolation precautions.
3. Maintain open airway and assist ventilations as needed. Assume spinal and other potential traumatic injuries when appropriate and treat accordingly.
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Early endotracheal intubation must be considered for all patients with suspected inhalation injuries and/or who present in respiratory distress.
6. Determine patient's hemodynamic stability and symptoms. Continually assess, level of consciousness, ABCs and Vital Signs.
7. Treat all life threatening conditions as they become identified**.**
8. Obtain appropriate S-A-M-P-L-E history related to event (determine mechanism and time of exposure, assess patient for evidence of inhalation injury including potential for toxic inhalation exposure).
9. If suspected severe Carbon Monoxide Poisoning, consider Department-approved point-of-entry plans, i.e., Burn Center and/or Hyperbaric chamber availability.
10. Monitor and record vital signs and ECG.
11. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Appropriately manage Thermal vs. Chemical burns.
   a. **THERMAL**
      - Stop burning process with water or saline for up to 10 minutes.
      - Remove smoldering, non-adherent clothing and jewelry. DO NOT pull off skin or tissue.
      - Cover burns with a CLEAN, DRY DRESSING

   b. **CHEMICAL**
      - Determine offending agent(s) if possible. Consider HAZMAT intervention if indicated.
      - Wash with copious amounts of clean water and/or sterile normal saline for 10-15 minutes, unless contraindicated by chemical agent (i.e., Sodium, Potassium and/or Lithium metals). **CAUTION**: Dry Lime/Lye and/or Phenol exposure: water irrigation is not recommended as primary treatment since water exposure may produce further chemical reactions. Dry powders should be brushed off prior to flushing with large amounts of water. It is advised to contact **MEDICAL CONTROL** for further advice.

2. Activate ALS intercept if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. Notify receiving hospital.**

**** See Burn Center Guidelines in this protocol.**

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management, if indicated.

   b. Initiate large bore IV Normal Saline. Begin fluid resuscitation for treatment of the BURN INJURY if greater than 20% BSA

   For transport times LESS THAN 1 HOUR use the following pre-hospital rates:
   Over 15 yrs. of age – 500mL/hour
   5 –15 yrs. of age – 250mL/hour
   2 – 5 yrs. of age – 125mL/hour
   Under 2 yrs. of age – 100mL/hour

For transport times GREATER THAN 1 HOUR consult medical control regarding the following fluid rates:

*Adults: 2-4 mL x kg x % burn [Adult = over 15 yrs. of age]
*Pediatric: 3-4 mL x kg x % burn

*Infusion rate regulated so one-half of estimated volume is given in the first 8 hours post burn
If suspected hypovolemia (consider other injuries), administer 250mL - 500mL fluid bolus and titrate to patient's hemodynamic status.

2. Contact **MEDICAL CONTROL**. Medical Control may order:
   a. Additional IV NS 250 mL - 500 mL bolus(es), wide open or titrated to patient's hemodynamic status

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management, if indicated.
   b. Cardiac monitor, and if feasible, 12 lead ECG - Manage dysrhythmias per protocol.
   c. Initiate large bore IV Normal Saline. Begin fluid resuscitation for treatment of the BURN INJURY if greater than 20% BSA___

_____

For transport times LESS THAN 1 HOUR use the following pre-hospital rates:

Over 15 yrs. of age – 500mL/hour
5 –15 yrs. of age – 250mL/hour
2 – 5 yrs. of age – 125mL/hour
Under 2 yrs. of age – 100mL/hour

For transport times GREATER THAN 1 HOUR consult medical control regarding the following fluid rates:

*Adults: 2-4 mL x kg x % burn [Adult = over 15 yrs. of age]
*Pediatric: 3-4 mL x kg x % burn

*Infusion rate regulated so one-half of estimated volume is given in the first 8 hours post burn

If suspected hypovolemia (consider other injuries), administer 250mL - 500mL fluid bolus and titrate to patient's hemodynamic status**.**

   d. After a complete patient assessment consider using the pain management protocol**.**

2. Contact **MEDICAL CONTROL**, the following may be ordered:

   a. Additional Normal Saline 250 mL - 500 mL bolus(es), wide open or titrated to patient's hemodynamic status
   b. **Morphine Sulfate** **2.0- 10.0 mg** SLOW IV PUSH or **Fentanyl** **1 mcg/kg**. to max. 150 mcg. slow IV push or,
   c. If no IV access, **Morphine Sulfate** **2.0 mg – 10.0 mg** IM/SQ or **Fentanyl** nasally

**Burn Center Guidelines

The committee on Trauma of the American College of Surgeons (ACS) and the American Burn Association (ABA) have identified certain injuries as those which generally require referral to a burn center.

The following injuries generally require referral to a burn unit:

1. Partial thickness burns greater than 10% total body surface area (TBSA)
2. Burns that involve the face, hands, feet, genitalia, perineum, or major joints
3. Third-degree burns in any age group
4. Electrical burns, including lightning injury
5. Chemical burns
6. Inhalation injury
7. Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality. Burns in any patients with concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality. In such cases, if the trauma poses a greater immediate risk than the burns, it may be necessary to stabilize the patient in a trauma center before being transferred to a burn unit. Physician judgment is necessary in such situations and should be in concert with **established** triage protocols.
8. Burns in children being cared for in hospitals without qualified personnel or equipment for the care of children
9. Burn injury in patients who will require special social, emotional, or long-term rehabilitative intervention.__

AMERICAN BURN ASSOCIATION CATEGORIZATION OF BURNS

(SEE BURN CHARTS IN APPENDIX F)

MAJOR BURN

- 25% of BSA or greater
- Functionally significant involvement of hands, face, feet, or perineum
- Electrical or Inhalation Injury
- Concomitant Injury or severe pre-existing medical problems

MODERATE BURN

- 15-25% BSA
- No complications or involvement of hands, face, feet, or perineum
- No electrical injury, inhalation injury, concomitant injury
- No severe pre-existing medical problem

MINOR BURN

- 5% or less BSA
- No involvement of hands, face, feet, or perineum.
- No electrical burns, inhalation injury, severe pre-existing medical problems, or complications

4.3 *HEAD TRAUMA / INJURIES*

Head trauma can be categorized into the following elements: Superficial injury involving scalp, fascia, and skull, internal injury involving brain and spinal cord, and sensory organ injury involving the eye and the ear. Neck injury involves skeletal and soft tissue structures. All these conditions must be considered when managing patients with head injury. Therefore, cervical spine injury may accompany head injury; intubation may be required to secure the airway as protective gag reflexes may be lost; sudden death may result from brain herniation; severe bleeding from scalp wounds may occur; severe facial trauma may make airway management difficult, etc. Hyperventilation **may** help brain injury by reducing intracranial pressure. Hyperventilate the patient in suspected cases of herniation syndrome (e.g. - decorticate posturing; decerebrate posturing; fixed, dilated pupils, etc.).

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway with appropriate device(s) and assist ventilations as needed. Administer oxygen, using appropriate oxygen delivery device, as clinically indicated. Ensure cervical spine stabilization and immobilization.
3. Consider hyperventilation if clinically appropriate with a significant closed head injury and signs of herniation syndrome.
4. Determine patient's hemodynamic stability and symptoms. Continually assess, level of consciousness (Glasgow Coma Scale), ABCs, disability and Vital Signs. Examine head for presence of lacerations, depressions, swelling, Battle Sign, Cerebrospinal Fluid (CSF) from ears/nose, and foreign (impaled) objects.
5. Treat all life threatening conditions as they become identified.
6. When multiple patients are involved, they need to be appropriately triaged.
7. Obtain appropriate S-A-M-P-L-E history related to event, and mechanism of injury. **NOTE: Family and friends may be useful during the assessment to determine normal or abnormal mental status.**
8. Patient care activities must not unnecessarily delay transport to an appropriate facility.
9. Prevent / treat for shock.
10. If the scene time and/or transport time will be prolonged, and a landing site is available, consider transport by air ambulance from the scene to an appropriate **Trauma Center**. (See Air Ambulance protocol.)
11. Monitor and record vital signs and ECG.
12. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Ensure cervical spine stabilization and immobilization
2. Consider hyperventilation if clinically appropriate.
3. Control/stop any identified life threatening hemorrhage (direct pressure, pressure points, etc.).
4. Activate ALS intercept, if deemed necessary and if available.
5. Initiate transport as soon as possible with or without ALS.
6. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
7. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Ventilate with 100% oxygen.
   c. Initiate IV Normal Saline (KVO) en route to the hospital.
   d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Ventilation with 100% oxygen.
   c. Initiate IV Normal Saline (KVO) en route to the hospital.
   d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
   e. Consider 75-100 mg **Lidocaine** IV push prior to intubation, if intubation is indicated.

2. Contact **MEDICAL CONTROL**
   - In patients who require emergent intubation, and cannot be intubated by conventional means, and the treating paramedic has been duly authorized by the Service's Medical Director in use of an alternative airway (LMA or Combitube)

   Medical Control may order:

   a. Use of 2.5-5.0 mg IV or nasal of **Midazolam** to facilitate intubation.

2.4 *MUSCULOSKELETAL INJURIES*

Musculoskeletal injuries can occur from both blunt and penetrating trauma. Injuries may include contusions, cramps, dislocations, fractures, spasm, sprains, strains and/or subluxations. Early proper treatment of these injuries may prevent long term morbidity and disability. Major injuries to the musculoskeletal system (e.g., pelvic fractures and hip dislocations) may cause shock due to hemorrhage, injury to adjacent nerves and blood vessels and infection due to the presence of an open fracture. Fractures of the humerus, pelvis or femur take priority over other musculoskeletal injuries, as do fractures or dislocations involving circulatory or neurologic deficits.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. If indicated, continually assess level of consciousness, ABCs and Vital Signs.
5. Assess the neurovascular status (motor, sensory and circulation) distal to the injury before and after proper immobilization.
6. If no palpable, distal pulse is present, apply gentle traction along the axis of the extremity distal to the injury until the distal pulse is palpable and immobilize in place. **Note: This does not apply to dislocations**.
7. Immobilize all painful, swollen and/or deformed extremity injuries (e.g. fractures, sprains, strains and/or dislocations) involving joints, in the position found.
8. All jewelry should be removed from an injured extremity.
9. Obtain appropriate S-A-M-P-L-E history related to event. Determine if patient is experiencing severe pain using numerical scale or visual analog scale as appropriate
10. Prevent / treat for shock.
11. Monitor and record vital signs.
12. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

4.4 MUSCULOSKELETAL INJURIES (cont.)

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL.** Medical Control may order:
   a. Administer additional IV Normal Saline 250 mL bolus(es) wide open or titrated to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
   d. Determine if patient is experiencing severe pain using numerical scale or visual analog scale as appropriate. (See Appendix) After thorough patient assessment consider using the pain management protocol (which includes standing-order pain medications) if clinically appropriate.

2. Contact **MEDICAL CONTROL,** the following may be ordered:
   a. Administer additional IV Normal Saline 250 mL bolus(es) wide open or titrated to patient's hemodynamic status.
   b. Pain medications, as per pain management protocol.

4.5 *MULTI-SYSTEM TRAUMA*

Multi-system trauma is a leading cause of death and disability. Trauma victims require definitive surgical intervention to repair and/or stabilize their injuries in order to enhance survival and reduce complications. Successful management of trauma victims will require rapid assessment, stabilization and transportation to an appropriate trauma center as defined by the Department-approved point-of-entry plans. Activate air transport services as appropriate.

Multiple trauma victims are identified by the history of the incident in which serious injury can occur as well as the physiologic alterations that an individual suffers. Many injuries are occult and one must be careful not to be fooled by obvious external injuries, which ultimately prove to be less serious than hidden internal disorders. Physiologic alterations may not occur immediately post-injury. However, once they develop, they may lead to shock and death within a few minutes. About one liter of further blood loss converts a stage II hemorrhage with minimal abnormalities of vital signs to a stage IV hemorrhage with refractory shock and inevitable death. Proper, timely interventions may well prevent this occurrence.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Ensure cervical spine stabilization and immobilization, when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs. Treat all life threatening conditions as they become identified.
5. When multiple patients are involved, they need to be appropriately triaged.
6. Obtain appropriate S-A-M-P-L-E history related to event.
7. Prevent / treat for shock.
8. Patient care activities must not unnecessarily delay patient transport to an appropriate facility.
9. If the scene time and/or transport time will be prolonged, and a landing site is available, consider transport by air ambulance from the scene to an appropriate **Trauma Center**. See Air Ambulance protocol.
10. Monitor and record vital signs and ECG.
11. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

4.5 MULTI-SYSTEM TRAUMA, continued

TREATMENT

BASIC PROCEDURES

1. Control/stop any identified life threatening hemorrhage (direct pressure, pressure points, etc.).
2. Activate ALS intercept, if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. If patient's BLOOD PRESSURE drops below 100 systolic: treat for shock.
5. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Initiate 1-2 IV(s) Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. IV Normal Saline 250 mL - 500 mL- bolus or wide open titrated to patient's condition.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Initiate 1-2 IV(s) Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.
   d. For patients with confirmed adrenal insufficiency, give **Hydrocortisone** 100 mg. IV, IM or IO or **Methylprednisolone** 125 mg. IV, IM or IO.

2. Contact **MEDICAL CONTROL**. Medical control may order:
   a. Additional IV Normal Saline 250 mL - 500 mL bolus or wide open titrated to patient's condition.
   b. In patients who require emergent intubation who cannot be intubated by conventional means and the treating paramedic has been duly authorized by the Service's Medical Director in use of an alternative airway (e.g. LMA or Combitube) -- Use of 2.5-5.0 mg IV or nasal **Midazolam** to facilitate intubation.

4.6 *SOFT TISSUE / CRUSH INJURIES*

Trauma to the skin may include abrasions, lacerations, hematomas, punctures, avulsions, contusions, incisions, amputations, crush injuries and compartment syndromes. In general, such injuries rarely threaten life. However, soft tissue injuries may damage blood vessels, nerves, connective tissue and other internal structures. Crush and compartment syndromes can be devastating to the patient. Early recognition and prompt therapy are essential to achieve a favorable outcome. Delay in diagnosis and treatment can result in permanent and severe disability.

Crush injury is associated with severe trauma and most commonly occur in multiple casualty disasters, such as bombings, earthquakes, building collapse, train accidents and mining accidents. It is the result of prolonged compression or pressure on various parts or all of the human body. Crush injuries may result in fatal injury or severe metabolic abnormalities that may result in death. Careful monitoring of these patients is essential.

Compartment syndrome is usually due to a crush injury and is a surgical emergency. It occurs most commonly in the forearm and leg, gluteal region, thigh, and lumbar paraspinous muscles. Compartment syndrome may result in ischemic swelling, muscle infarction, nerve injury and permanent loss of extremity function.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety, including safety for the patient(s) and rescuer(s), if indicated.
2. Maintain appropriate body substance isolation precautions.
3. Maintain an open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Determine patient's hemodynamic stability and symptoms using O-P-Q-R-S-T model. Continually assess Level of Consciousness, ABCs and Vital Signs.
6. Treat all life threatening conditions as they become identified**.**
7. Assess the function of the injured area above and below the injury site: check pulses, sensation, and motor function distal to the injury. Splint/immobilize injured areas as indicated. Determine if patient is experiencing severe pain using numerical scale or visual analog scale as appropriate.
8. Prevent / treat for shock.
9. When multiple patients are involved, they need to be appropriately triaged.
10. Obtain appropriate S-A-M-P-L-E history related to event.
11. Monitor and record vital signs and ECG.
12. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Control/stop any identified life threatening hemorrhage (direct pressure, pressure points, etc.).
2. Place dry sterile dressing on all open wounds and bandage as needed:
    - If wound is grossly contaminated, irrigate with sterile water or normal saline.
    - Stabilize all protruding foreign bodies (impaled objects) if noted.
3. If suspect severe crushing injury/compartment syndrome:
    - Remove all restrictive dressings.
    - Close monitoring of distal pulse, sensation, and motor function (CSM).
4 Splint/immobilize injured areas as indicated.
5. Activate ALS intercept, if deemed necessary and if available.
6. Initiate transport as soon as possible with or without ALS.
7. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
8. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1 **ALS STANDING ORDERS**

a. Provide advanced airway management if indicated.
b. Initiate IV Normal Saline (KVO) en route to the hospital.
c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus(es) of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL.** Medical control may order:

a. Administer additional IV Normal Saline 250 mL bolus(es) wide open or titrated to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

a. Provide advanced airway management if indicated.
b. After patient assessment consider using the pain management protocol.
c. Initiate IV Normal Saline if indicated and titrate to patient condition.

2. Contact **MEDICAL CONTROL.** Medical control may order:

a. IV Normal Saline 250 mL - 500 mL bolus(es), wide open or titrate to patient's hemodynamic status.

4.7 *SPINAL COLUMN / CORD INJURIES*

Spinal cord injury may be the result of direct blunt and/or penetrating trauma, compression forces (axial loading), abnormal motion (hyper-flexion, hyperextension, hyper-rotation, lateral bending and distraction, i.e., hanging). Most spinal injuries result from motor vehicle crashes, falls, firearms, and recreational activities.

Spinal injuries may be classified into sprains, strains, fractures, dislocations and/or actual cord injuries. Spinal cord injuries are classified as complete or incomplete and may be the result of pressure, contusion or laceration of the cord.

When evaluating for possible spinal injury and the need for immobilization, consider the following factors as high-risk:

- altered mental status due to injury, intoxication, or other causes;
- history of cervical spine injury or abnormality;
- evidence of *significant* trauma above the clavicles;
- posterior neck pain;
- paresthesias or loss of sensation in extremities;
- weakness or paralysis of extremities;
- distracting injury (such as long-bone fracture);
- age under 8 years or over 65 years;
- concerning mechanism
    - fall from over 3 feet, including adult fall from standing, or 5+ stair steps
    - MVC at 30+ mph, or rollover or ejection
    - Motorcycle, bicycle, or pedestrian-vehicle accident
    - Diving or axial load
    - Electric shock

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway using spinal precautions and assist ventilations as needed. Assume spinal injury and provide spinal immobilize accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms using O-P-Q-R-S-T model. Continually assess Level of Consciousness (AVPU/Glasgow Coma Scale), ABCs, disability and Vital Signs. Examine head for presence of lacerations, depressions, swelling, Battle's Sign, Cerebrospinal Fluid (CSF) from ears/nose, and foreign (impaled) objects. Treat all life threatening conditions as they become identified.

4.7 SPINAL COLUMN / CORD INJURIES (con't)

5. Obtain appropriate S-A-M-P-L-E history related to event, including mechanism of injury. NOTE: Family and friends may be useful during the assessment to determine normal or abnormal mental status.
6. Prevent / treat for shock.
7. Patient care activities must not unnecessarily delay patient transport to an appropriate facility.
8. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.
9. If the scene time and/or transport time will be prolonged, and a landing site is available, consider transport by air ambulance from the scene to an appropriate **Trauma Center**. See Air Ambulance protocol.
10. Monitor and record vital signs.

TREATMENT

BASIC PROCEDURES

1. Hyperventilation with 100% oxygen with B-V-M *if* associated with a significant closed head injury and signs of herniation syndrome.
2. Control/stop any identified life-threatening hemorrhage (direct pressure, pressure points, etc.).
3. Determine presence or absence of significant neurologic signs and symptoms: motor function, sensory function, reflex responses, visual inspection, bradycardia, priapism, hypotension, loss of sweating or shivering and loss of bladder/bowel control.
4. Activate ALS intercept, if deemed necessary and if available.
5. Initiate transport as soon as possible with or without ALS.
6. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
7. Notify receiving hospital of patient's status.

* See Spinal Stabilization/Immobilization Summary in this protocol.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Hyperventilation with 100% oxygen with BVM if associated with a significant closed head injury and signs of herniation syndrome.
   c. Initiate IV Normal Saline (KVO) en route to the hospital.
   d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
   CAUTION: DO NOT over-hydrate patient with suspected neurogenic shock.

2. Contact **MEDICAL CONTROL**. Medical Control may order:
   a. Additional Normal Saline 250 mL - 500 mL bolus(es), wide open or titrated to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Cardiac monitor and if feasible 12 lead ECG - manage dysrhythmias per protocol.
      NOTE: Bradydysrhythmias are commonly seen in high level spinal injuries.
   c. Initiate IV Normal Saline (KVO) en route to the hospital.
   d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
      CAUTION: DO NOT over-hydrate patient with suspected neurogenic shock.

2. Contact **MEDICAL CONTROL.** Medical Control may order:
   a. Additional Normal Saline 250 mL - 500 mL bolus(es), wide open or titrated to patient's hemodynamic status.
   b. For suspected neurogenic shock (without hypovolemia):
      - Dopamine 2-20 μg/kg/minute**.**

*SPINAL STABILIZATION / IMMOBILIZATION SUMMARY

General principles:

- Provide manual in-line immobilization.
- Evaluate patient's responsiveness, ABCs, need for immediate resuscitation and check motor, sensory and distal pulses in all four extremities.
- Examine the patient's neck and apply cervical collar.
- Immobilize the patient's torso to the selected immobilization device such that the torso cannot move up, down, left or right.
- Evaluate torso straps and adjust as needed.
- Place an appropriate amount of padding behind head and/or neck and small of back, if needed for adult patients and under the thorax and/or neck for pediatric patients (age 7 yrs. or under) to maintain in-line spinal immobilization.
- Immobilize the patient's head.
- Once patient is immobilized, secure patient's arms and legs to the board or immobilization device.
- Reevaluate patient's responsiveness, ABCs, need for immediate resuscitation and check motor, sensory and distal pulses in all four extremities.
- Reminder: seated patients **MUST** be immobilized using a short spineboard or commercial equivalent (KED, LSP, Greene, etc.), before being moved onto a long spineboard. The only circumstances in which the use of a short spineboard may be omitted include:*
- You or the patient are in imminent danger;
- You need to gain immediate access to other patient(s);
- The patient's injuries justify urgent removal.

*See AAOS, "Emergency Care & Transportation", 7th Edition.
Mosby, "Paramedic Textbook, 2nd Edition
Mosby, "PHTLS: Basic & Advanced", 4th Edition

4.8 *THORACIC TRAUMA*

Chest injuries are the result of blunt trauma, penetrating trauma or both and most commonly result from motor vehicle crashes (e.g. deployed air bags), blast injuries, falls from heights, blows to the chest, chest compression, gunshot and stab wounds. Thoracic injuries include skeletal, pulmonary, heart, great vessels and/or diaphragm. A number of potentially lethal injuries can occur with significant chest trauma. These include flail chest, hemothorax, pneumothorax, tension pneumothorax, myocardial contusion, sucking chest wound, cardiac tamponade, aortic rupture and/or diaphragmatic rupture. In general these patients are managed under the multisystem trauma protocol in most circumstances. However, specific interventions may be life saving for the conditions noted above.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess Level of Consciousness, ABCs and Vital Signs. Treat all life threatening conditions (tension pneumothorax, open pneumothorax, flail chest) as they become identified.
5. When multiple patients are involved, they need to be appropriately triaged.
6. Obtain appropriate S-A-M-P-L-E history related to event.
7. Prevent / treat for shock.
8. Patient care activities must not unnecessarily delay patient transport to an appropriate facility.
9. If the scene time and/or transport time will be prolonged, and a landing site is available, consider transport by air ambulance from the scene to an appropriate **Trauma Center**. See Air Ambulance protocol.
10. Monitor and record vital signs and ECG.
11. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Provide appropriate management for identified thoracic injuries:
   a. **open pneumothorax:**
      - immediately apply an occlusive dressing sealing 3 sides.
      - monitor patient closely for evidence of developing tension pneumothorax.

   b. **tension pneumothorax:** (increasing ventilatory impairment, distended neck veins, unilateral decreased breath sounds, tracheal deviation away from the side without breath sounds.)
      - if present following closure of open pneumothorax, release occlusive dressing temporarily, then reseal.
      - Activate paramedic level ALS intercept if available for pleural decompression.

c. **flail chest:** (paradoxical movement of portion of chest wall)
   - position patient with injured side down, unless contraindicated.
   - provide manual stabilization of the flail segment; or splint as needed.

   NOTE: **Assisted positive pressure ventilations using a bag-valve-mask device may be indicated and may also serve as an "internal splinting" of the flail segment due to lung expansion.**

2. Control/stop any identified life threatening hemorrhage (direct pressure, pressure points, etc.).
3. Activate ALS intercept, if deemed necessary and if available.
4. Initiate transport as soon as possible with or without ALS.
5. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
6. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. Provide appropriate management for identified thoracic injuries:
   a. **open pneumothorax:**
      - immediately apply an occlusive dressing sealing 3 sides.
      - monitor patient closely for evidence of developing tension pneumothorax.

   b. **tension pneumothorax:** (increasing ventilatory impairment, distended neck veins, unilateral decreased breath sounds, tracheal deviation away from the side without breath sounds.)
      - if present following closure of open pneumothorax, release occlusive dressing temporarily, then reseal.
      - Activate Paramedic intercept if deemed necessary and if available for pleural decompression.

   c. **flail chest:** (paradoxical movement of portion of chest wall)
      - position patient with injured side down, unless contraindicated.
      - provide manual stabilization of the flail segment; or splint as needed.

   NOTE: **Assisted positive pressure ventilations using a bag-valve-mask device may be indicated and may also serve as an "internal splinting" of the flail segment due to lung expansion. Endotracheal intubation is the preferred method to provide assisted positive pressure ventilations.**

2. ALS STANDING ORDERS

a. Provide advanced airway management (if indicated).

b. Initiate 1-2 IV(s) Normal Saline (KVO) en route to the hospital.
   - If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status.

3. Contact MEDICAL CONTROL, who may order:

a. Additional IV Normal Saline 250 mL - 500 mL bolus(es), wide open or titrated to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. Provide appropriate management for identified thoracic injuries:
   a. **open pneumothorax:**
      - immediately apply an occlusive dressing sealing 3 sides
      - monitor patient closely for evidence of developing tension pneumothorax
   b. **tension pneumothorax:** (increasing ventilatory impairment, distended neck veins, unilateral decreased breath sounds, tracheal deviation away from the side without breath sounds.)
      - if present following closure of open pneumothorax, release occlusive dressing temporarily, then reseal.
      - Perform needle chest decompression, if indicated.
   c. **flail chest:** (paradoxical movement of portion of chest wall)
      - position patient with injured side down, unless contraindicated.
      - provide manual stabilization of the flail segment; or splint as needed.

   NOTE: Assisted positive pressure ventilations using a bag-valve-mask device may be indicated and may also serve as an "internal splinting" of the flail segment due to lung expansion. Endotracheal intubation is the preferred method to provide assisted positive pressure ventilations.

2. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

3. Contact **MEDICAL CONTROL** who may order:

   a. Needle chest decompression if indicated and if not already performed.
   b. Additional Normal Saline 250 mL - 500 mL bolus(es), wide open or titrate to patient's hemodynamic status.

4.9 *TRAUMATIC CARDIOPULMONARY ARREST (and POST-RESUSC CARE)*

Cardiopulmonary arrest due to trauma, especially penetrating trauma, may occasionally be reversible with prompt aggressive therapy. Patients found in arrest, without any signs of life (i.e. pulseless), by first-arriving EMS personnel have little probability of survival. Therefore, resuscitation of these patients should be considered only in situations where witnessed signs of life shortly before EMS arrival were noted or in exceptional circumstances (penetrating chest trauma, hypothermia, etc.). Management of the few potentially salvageable patients will require rapid assessment, stabilization and transportation. Activate air transport services only in the rare circumstances that they are appropriate (usually only the resuscitated arrest). NOTE: The use of a cardiac monitor and/or AED device should be considered in those situations of traumatic arrest wherein time allows for this procedure without compromising patient care and time of transport. (Rare instances do exist of cardiac arrest secondary to trauma to the chest wall (commotio cordis), and should be appropriately managed per VF or V-Tach protocol).

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine unresponsiveness, absence of breathing and pulselessness.
3. Initiate cardiopulmonary resuscitation (CPR).
4. Consider all potential non-traumatic causes (hypothermia, overdose, underlying medical conditions etc.).
5. Maintain an open airway and ventilate the patient. Assume spinal injury and treat accordingly.
6. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
7. As patient's condition suggests, continually assess Level of Consciousness, ABCs and Vital Signs.
8. When multiple patients are involved, they need to be appropriately triaged.
9. Obtain appropriate S-A-M-P-L-E history related to event.
10. Treat for shock.
11. Patient care activities must not unnecessarily delay patient transport to the nearest appropriate facility.
12. Monitor and record vital signs and ECG.
13. Initiate transport as soon as possible, with or without ALS.

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Patient care activities must not unnecessarily delay patient transport to the nearest appropriate facility.
3. Initiate transport as soon as possible, with or without ALS.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management.
   b. Initiate 1-2 IV (s) Normal Saline (KVO) **en route** to the hospital.
   c. If patient's BLOOD PRESSURE remains below or drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL**. Medical control may order:
   a. Additional IV Normal Saline 250 **mL** - 500 **mL** bolus or wide open titrated to patient's condition.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide appropriate management for identified injuries:
      - Head Injuries (see protocol).
      - Thoracic Injuries (see protocol).
      - Abdominal Injuries (see protocol).

   b. Manage dysrhythmias per appropriate protocol en route.

2. Contact **MEDICAL CONTROL**. Medical control may order:

   a. Use of 2.5-5.0 mg IV or nasal **Midazolam** to facilitate intubation
   b. Specific procedures as indicated (i.e. chest decompression, needle cricothyroidotomy).

4.10 *TRAUMATIC AMPUTATIONS*

The partial or complete severance of a digit or limb is most commonly the result of an industrial/machine operation accident. The amputated part, or the skin of the amputated part, may be utilized by the re-implantation surgical team. Careful management of the patient and their amputated part(s) will reduce the possibility of infection and increase the likelihood of successful re-implantation.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms, using O-P-Q-R-S-T model. Continually assess Level of Consciousness, ABCs and Vital Signs.
5. Treat all life threatening conditions as they become identified.
6. Obtain appropriate S-A-M-P-L-E history related to event. Assess and treat pain.
7. Prevent / treat for shock.
8. Patient transport must not be unnecessarily delayed in an effort to find avulsed tissue and/or body parts, if they are not readily available. Other EMS/law enforcement providers may transport these tissues and/or body parts to the receiving facility at a later time.
9. Monitor and record vital signs and ECG.
10. Initiate transport as soon as possible, with or without ALS. Do not allow patients to exert themselves and properly secure to cot in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

1. Control/stop any identified life threatening hemorrhage (direct pressure, pressure points, etc.). Tourniquets should be avoided if at all possible, except when absolutely required to prevent death due to life-threatening hemorrhage.

2. **Management of injured tissue:**
   a. Tissue still attached to body:
   - clean wound surface with sterile water or Normal Saline.
   - gently return skin to normal position if possible.
   - control bleeding and bandage wound with bulky pressure dressings.

   b. Complete amputation:
   - clean wound surface with sterile water or Normal Saline.
   - control bleeding and bandage wound.
   - retrieve amputated tissue/part(s) if possible.
   - wrap amputated tissue/part(s) in sterile gauze moistened with sterile water or Normal Saline.
   - place amputated tissue/part(s) in a plastic bag.
   - place sealed bag into a cool/cold water immersion. **NOTE:** ice cubes may be in the outer bag of water but no direct contact between injured tissue/part(s) and ice should occur.
3. Activate ALS intercept, if deemed necessary and if available.
4. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: treat for shock.
5. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS:**
   a. Provide advanced airway management if indicated due to other injuries and/or illness.
   b. Initiate IV Normal Saline (KVO) en route to the hospital.
   c. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2 Activate Paramedic intercept, if deemed necessary and if available.

3. Contact **MEDICAL CONTROL**. Medical control may order:
   a. Additional IV Normal Saline 250 mL - 500 mL bolus or wide open or titrate to patient's hemodynamic status.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management if indicated due to other injuries and/or illness.
   b. Assess and treat for pain according to the pain management protocol.
   c. Initiate IV Normal Saline (KVO) en route to the hospital.
   d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Administer a 250 mL bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

2. Contact **MEDICAL CONTROL.** Medical control may order:
   a. Additional Normal Saline 250 mL - 500 mL bolus or wide open titrated to patient's condition.

5. PEDIATRIC EMERGENCIES

5.1 *NEWBORN RESUSCITATION*

Infants born in the prehospital setting are at greater risk of complications due to respiratory distress, hypoxia, prematurity, infection, acidosis and hypothermia. Anticipation, adequate preparation, accurate evaluation, and prompt initiation of resuscitation steps are critical to successful outcome of a neonatal resuscitation. It is essential to prevent heat loss in newborns; it is important to rapidly dry the infant, cover the head, and wrap the child to avoid a drop in body temperature.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway, remove secretions and meconium (suction as needed) and assist ventilations as needed. NOTE: The newborn should be evaluated for *central* cyanosis. Peripheral cyanosis is common and may not be a reflection of inadequate oxygenation. If central cyanosis is present in a breathing newborn during stabilization, early administration of 100% oxygen is important while the neonate is being assessed for need of additional resuscitative measures.
3. Evaluate heart rate by one of several methods: auscultate apical beat with a stethoscope or palpate the pulse by lightly grasping the base of the umbilical cord. NOTE: Pallor may be a sign of decreased cardiac output, severe anemia, hypovolemia, hypothermia or acidosis.
4. APGAR scoring system provides a mechanism for documenting the newborn's condition at specific intervals after birth. The five objective signs are assessed at one (1) and five (5) minutes of age.

NOTE: The APGAR score should be documented but should not be used to determine need for resuscitation because resuscitative efforts, if required, should be initiated promptly after birth.

APGAR

SIGN	0 POINTS	1 POINT	2 POINTS
HEART RATE	ABSENT	< 100	> 100
RESPIRATORY EFFORT	ABSENT	WEAK CRY	STRONG CRY
MUSCLE TONE	FLACCID	SOME FLEXION	ACTIVE MOTION
REFLEX IRRITABILITY	NO RESPONSE	GRIMACE	COUGH, SNEEZE OR CRY
COLOR	BLUE, PALE	BODY: PINK EXTREMITIES: BLUE	FULLY PINK

ASSESSMENT / TREATMENT PRIORITIES (continued)

5. Establish pertinent medical (S-A-M-P-L-E) history, including maternal prenatal care, medications or drug use, illness and time of rupture of membranes.
6. Monitor and record vital signs and ECG of infant and mother.
7. Prevent / treat for shock.
8. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Maintain an open airway and suction the mouth, then nose. If meconium (brown stained fluid) is present, suction the hypopharynx (Contact ALS immediately if available for possible need of endotracheal intubation).
2. Dry the infant, place on a dry blanket, cover the head and keep the infant warm.
3. If the infant is ventilating adequately, administer free flow (blow-by) 100% oxygen at a minimum of 15 liters per minute close to the face. If ventilations are inadequate or if the chest fails to rise, reposition the head and neck, suction, and initiate positive pressure (bag-valve-mask) ventilations with 100% oxygen at 40-60 breaths per minute, using appropriate oxygen delivery device, as clinically indicated.
4. For heart rate **less than 60**, institute positive pressure manual ventilation and chest compressions.
5. Activate ALS Intercept if available.
6. Initiate transport as soon as possible with or without ALS.
7. If patient's BLOOD PRESSURE drops below age appropriate systolic pressure (see Appendix), treat for shock.
8. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS** (heart rate less than 60 and inadequate ventilations)
   a. Advanced Airway management if indicated.
   b. Initiate IV Normal Saline (KVO).
   c. If patient demonstrates signs and symptoms of hypo-perfusion administer a 10 mL/kg bolus of IV normal saline, and treat for shock
   d. Activate paramedic intercept if available and deemed necessary.

PARAMEDIC PROCEDURES

1. If meconium is present, consider early endotracheal intubation and suctioning. (DO NOT SUCTION/INTUBATE NEONATE WITH A VIGOROUS CRY).

2. **ALS-P STANDING ORDERS**

Newborn in distress and requiring emergency care:

For heart rate 60-80 and rapidly rising:
Continue manual ventilation and supplemental oxygen.
Cardiac Monitor **12 lead ECG - Manage dysrhythmias per protocol**
For heart rate less than 60:
Initiate CPR as indicated.
Continue manual ventilation with supplemental oxygen.
Advanced airway management if not already done.
Cardiac Monitor. **Manage dysrhythmias per protocol**.
If defibrillation is indicated: initial energy level: 2 joules/kg subsequent: 4 joules/kg.
If synchronized cardioversion is indicated: 0.5-1.0 joules/kg.
Establish IV or IO access, if indicated. (Note: appropriately trained EMT-Paramedics may utilize umbilical lines when necessary). Treat for shock.

3. Contact **Medical Control.** The following may be ordered in addition to other appropriate pediatric procedures needed to treat specific newborn resuscitation emergencies:

   a. **Epinephrine 1:10,000 (0.01-0.03 mg/kg) IV push or intraosseous.**
   b. **Epinephrine Infusion: 1:1,000, 0.1-1.0 µg/kg/min.**
   c. **Naloxone HCL 0.1 mg/kg of a 1 mg/mL solution, IV, or IO**. May repeat every two (2) to three (3) minutes as needed. If venous access is inadequate, may give subcutaneously (SC), intramuscularly (IM), or nasally.
   d. **Dextrose 10%, 0.5 g/kg IV or IO.**
   e. **Normal saline fluid challenge, 10 mL/kg IV or IO.**
   f. **Lidocaine 2%, 1 mg/kg IV, or IO.**

5.2 *PEDIATRIC ANAPHYLAXIS*

Anaphylaxis is an acute and generalized antigen-antibody reaction that can be rapidly fatal. Management is based upon severity. Anaphylaxis in children is unusual. As in adults, there are multiple causes of anaphylaxis: injected substances or drugs such as penicillin, cephalosporins, sulfa; other causes include food sensitivities, vaccines, insect stings, virtually any chemical or other environmental allergens.

Hypotension in children is usually due to other causes such as shock from sepsis or dehydration. Wheezing, another feature of anaphylaxis, is most often due to reactive airway disease, infection or foreign body. Drooling, hoarseness and stridor signal upper airway compromise, which is usually due to infection in children. If these symptoms are present, follow the Pediatric Upper Airway Obstruction Protocol.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine presence of upper airway involvement (stridor) or lower airway symptoms (wheezing). These may coexist. Maintain an open airway, remove secretions, vomitus and assist ventilations as needed.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess level of consciousness, ABCs and Vital Signs. Determine if blood pressure, if obtained, is appropriate for age (See Appendix).
5. Obtain appropriate S-A-M-P-L-E history related to event, including (prior allergies and/or anaphylaxis), or recent antigen exposure.
6. Determine if patient is in mild or severe distress:
   a. **MILD DISTRESS:** itching, isolated urticaria, nausea, no respiratory distress.
   b. **SEVERE DISTRESS:** poor air entry, flaring, grunting, cyanosis, stridor, bronchospasm, abdominal cramps, respiratory distress, tachycardia, shock, edema of lips, tongue or face and generalized urticaria.
7. Monitor and record ECG and vital signs.
8. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.
9. Prevent / treat for shock.

TREATMENT
BASIC PROCEDURES

1. Determine presence of upper airway involvement (stridor) or lower airway symptoms (wheezing). These may coexist. Maintain an open airway and assist ventilations as needed. This may include repositioning of the airway, suctioning, or use of airway adjuncts (oropharyngeal airway) as indicated.
2. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
3. Activate ALS intercept, if deemed necessary and if available.
4. **BLS STANDING ORDERS**

   a. If patient presents in Severe Distress, as defined in Assessment Priorities, and patient is over 5 years old, administer Auto-Injector Epi-pen Jr. **(for pediatric patient with a body weight less than 30 kg/66 lbs.).** If body weight is over 30 kg/66 lbs. use Adult Auto-Injector. A second injection in 5 minutes may be necessary.
   b. If patient's BLOOD PRESSURE drops below age appropriate systolic pressure (see Appendix), treat for shock.

c. Monitor vital signs and keep patient warm.

NOTE: EMTs must contact Medical Control prior to administration of epinephrine by auto-injector when patient is under age 5

5. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. If patient presents in Severe Distress, as defined in Assessment Priorities, and patient is over 5 years old, administer pediatric epinephrine auto-injector **(for pediatric patient with a body weight less than 30 kg/66 lbs.).** If body weight is over 30 kg/66 lbs. use Adult Auto-Injector. A second injection in 5 minutes may be necessary.
   c. Initiate IV Normal Saline (KVO). If patient demonstrates signs and symptoms of hypo-perfusion administer a 10 mL/kg bolus of IV normal saline, and treat for shock

NOTE: EMTs must contact Medical Control prior to administration of epinephrine by auto-injector when patient is under age 5

2. Initiate transport as soon as possible with or without paramedics.

3. Contact **MEDICAL CONTROL.** The following may be ordered:
   a. Administration of additional fluid bolus(es) (expected fluid bolus will be in aliquots of 20 mL/kg).

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management (if indicated).
   b. Initiate IV Normal Saline (KVO).
   c. If patient demonstrates signs and symptoms of hypo-perfusion administer a 10 mL/kg bolus of IV normal saline, and treat for shock
   d. **SEVERE DISTRESS:**
      - **Epinephrine 0.15 – 0.3 mg IM by weight-based dosing, BY AUTOINJECTOR ONLY. A repeat autoinjector dose may be given in 5 minutes if required.**
      - **Large Bore IV normal saline, titrate to appropriate BP for age.**
      - **Diphenhydramine** (Benadryl**)** 1.0 mg/kg **up to maximum single dose of 50 mg IM or IV push.**

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. **Epinephrine** 0.15 or 0.3 mg IM **by autoinjector**, or **0.01mg./kg. IM to a maximum 0.3mg., of a 1:1000 solution**
   b. **Epinephrine infusion 1:1,000 (1 mg/mL)** administer **0.1 to 1.0 µg/kg/min**.
   c. **Albuterol 0.5%** (via nebulizer):
      If age less **than 2 years, 1.25 mg by nebulizer**
      If age 2 years or greater**, 2.5-3.0 mg by nebulizer**
   d. **Epinephrine 1:10,000**; administer **0.01 mg/kg** IV Bolus up to maximum single dose 0.3 mg.
   e. **Diphenhydramine (Benadryl**) **1.0 mg/kg** up to maximum single dose of 50 mg via IM or IV push. For mild distress, 2 mg - 5 mg Benadryl IV push or IM may be administered.
   f. **20 mL/kg** IV fluid bolus of Normal Saline.

5.3 *PEDIATRIC BRADYDYSRHYTHMIAS*

Primary heart block is rare in children. Pathologically slow heart rates usually result from hypoxemia, acidosis, hypothermia and/or late shock. Bradycardia may be a late finding in cases of raised intracranial pressure (ICP) due to head trauma, infection, hyperglycemia and/or previous neurosurgery. Rarely, a toxic ingestion can cause bradycardia. Out of hospital treatment is directed to the symptomatic patient only. Heart rates that are normal in older patients may be bradycardia in children.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. This may include repositioning of the airway, suctioning to remove secretions and/or vomitus, or use of airway adjuncts as indicated.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms using O-P-Q-R-S-T model. Continually assess level of Consciousness, ABCs and Vital Signs including capillary refill and determine if appropriate for age. (**SEE APPENDIX**)
5. Obtain appropriate S-A-M-P-L-E history related to event, including underlying congenital heart disease and/or surgery and substance exposure, including possible ingestion or overdose of medications, specifically calcium channel blockers, beta-blockers, and/or digoxin preparations.
6. Severely symptomatic patients will have abnormally slow heart rates accompanied by decreased level of consciousness, weak and thready pulses, delayed capillary refill, and/or no palpable blood pressure.
7. Monitor and record vital signs and ECG.
8. Prevent / treat for shock.
9. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.

TREATMENT BASIC PROCEDURES

NOTE: Inasmuch as EMT-Basics are unable to confirm the presence of bradydysrhythmias, check patient for a slow and /or irregular pulse. If present, treat according to the following protocol.

1. If pulse is less than 60 in a child, AND the patient is severely symptomatic**,** consider starting Cardiopulmonary Resuscitation (CPR).
2. Prevent / treat for shock.
3. Activate ALS intercept, if deemed necessary and if available.
4. Initiate transport as soon as possible with or without ALS.
5. Notify receiving hospital.

INTERMEDIATE PROCEDURES

NOTE: Inasmuch as EMT-Intermediates are unable to recognize the presence of bradydysrhythmias, check patient for a slow and /or irregular pulse. If present, treat according to the following protocol.

1. **ALS STANDING ORDERS**
   a. Advanced Airway Management, if indicated.
   b. IV Normal Saline (KVO).

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. Normal Saline bolus at discretion of Medical Control (expected fluid bolus is 20 mL/kg).

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Advanced airway management, if indicated.
   b. IV Normal Saline (KVO). If hypovolemia component is suspected, administer a fluid bolus of 20 mL/kg.
   c. If patient is severely symptomatic:
      - **Epinephrine 1:10,000, 0.01 mg/kg IV or IO (maximum single dose 0.5 mg), or,**
      - **Atropine 0.02 mg/kg IV (minimum single dose 0.1 mg, maximum single dose 1.0 mg).**
      -
2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. Additional fluid boluses of Normal saline (20 mL/kg).
   b. Transcutaneous (pediatric) pacing if available.
   c. **Atropine 0.02 mg/kg** IV Bolus (minimum single dose 0.1 mg., maximum single dose 1.0 mg.)
   d. **Epinephrine 1:10,000** - **0.01-0.03 mg/kg** (maximum single dose of 0.5 mg), IV or Intraosseous (IO).
   f. **Epinephrine Infusion - 1:1,000, 0.1-1.0 µg/kg/min.**
   g. **Atropine 0.02 mg/kg** IV, IO.
   h. **Naloxone HCL 0.1 mg/kg of a 1-mg/mL solution**: IV, IO, or nasal via atomizer.
      If age less than 5 years: 0.1 mg/kg.
      If age 5 years or greater: 2.0 mg. (NOTE: May repeat every two (2) to three (3) minutes as needed. If perfusion is adequate may give Subcutaneously (SC) or intramuscularly (IM). If given via ET, follow with 2.0 mL sterile Normal Saline solution.)
   i. **Normal Saline** fluid bolus 10-20 **mL** /kg IV or IO.
   j. **Glucagon 0.1 mg/kg IV, IO, IM, SC or nasal** to max.1.0 mg for suspected beta blocker or calcium channel blocker toxicity.
   k. **Calcium Chloride 0.2 mL/kg IV, IO** slowly over 5 minutes for suspected calcium channel blocker toxicity.

5.4 *PEDIATRIC BRONCHOSPASM / RESPIRATORY DISTRESS*

Bronchospasm is defined as spasmodic narrowing of the lumen of a bronchus for whatever reason resulting in restricted airflow and the clinical sign of wheezing. Wheezing in children can occur from a variety of causes. Patients with asthma can suffer an attack in response to weather changes, stress, exercise, infection or allergy. Pneumonia, bronchitis and bronchiolitis are some of the infectious causes of wheezing. Other causes include foreign bodies and congenital abnormalities of mediastinal structures, including the heart, trachea and larynx. Unless cardiac problems are suspected, wheezing is treated with bronchodilating agents. Concurrent hypotension should raise concern regarding anaphylaxis or respiratory failure. If the patient has evidence of drooling, hoarseness or stridor, follow Pediatric Upper Airway Obstruction protocol.

Mild distress in children is evidenced by minor wheezing and good air entry.
Severe distress in children is evidenced by poor air entry, extreme use of accessory muscles, nasal flaring, grunting, cyanosis and/or altered mental status (weak cry, somnolence, poor responsiveness). **REMEMBER:** Severe bronchospasm may present without wheezes, if there is minimal air movement.

Respiratory Distress is defined as inadequate breathing in terms of rate, rhythm, quality and/or depth of breathing. Children who are breathing too fast or slow, or in an abnormal pattern or manner, may not be receiving enough oxygen to support bodily functions and may allow an increase in carbon dioxide to dangerous levels. Cyanosis is usually a late sign and requires immediate treatment.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway, remove secretions or vomitus, and assist ventilation as needed. Determine if patient is in mild or severe distress and presence of upper airway involvement (stridor) or lower airway findings (wheezing). These may coexist.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms using O-P-Q-R-S-T model. Continually assess Level of Consciousness, ABCs and vital signs. Evaluate capillary refill and determine if blood pressure is appropriate for age. (SEE APPENDIX)
5. Obtain appropriate S-A-M-P-L-E history related to event, including prior asthma, anaphylaxis, allergies, exposures to foreign body, (new) foods, medicines, chemicals or envenomation.
6. Monitor and record vital signs and ECG.
7. Prevent / treat for shock.
8. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.

5.4 PEDIATRIC BRONCHOSPASM / RESPIRATORY DISTRESS (cont.)

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Initiate transport as soon as possible with or without ALS.
3. **BLS STANDING ORDERS**

   MILD DISTRESS

   a. The following may be considered if the patient has not taken the prescribed maximum dose of their own inhaler prior to the arrival of EMS, and the inhaler is present
      - Encourage and/or assist patient to self-administer their own prescribed inhaler medication if indicated or if not already done.
      - If patient is unable to self-administer their prescribed inhaler, administer patient's prescribed inhaler.
      - Reassess vital signs.

4. Contact MEDICAL CONTROL. The following may be ordered
   a. Repeat a second dose if required, and if prescribed maximum dose has not been administered.

NOTE: EMT-B administration of an inhaler is CONTRAINDICATED, if:

a. The maximum dose has been administered prior to the arrival of the EMT.
b. The patient cannot physically use the device properly. (Patient cannot receive inhalation properly.)
c. The device has not specifically been prescribed for the patient.

5. ****If properly trained and authorized to do so, use the BLS Albuterol Protocol to treat the patient.**

   NOTE: YOUR MEDICAL DIRECTOR MUST HAVE AUTHORIZED YOU AS AN EMT TO UTILIZE THIS PORTION OF THE PROTOCOL.

6. If patient's BLOOD PRESSURE drops below age appropriate systolic pressure (see Appendix), treat for shock.
7. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**

MILD DISTRESS

a. The following may be considered if the patient has not taken the prescribed maximum dose of their own inhaler prior to the arrival of EMS **and the inhaler is present:**
   - Encourage and/or assist patient to self-administer their own prescribed inhaler medication if indicated or if not already done.
   - If patient is unable to self-administer their prescribed inhaler, administer patient's prescribed inhaler.
   - Reassess vital signs.

2. Contact **MEDICAL CONTROL**. The following may be ordered:

   a. Repeat a second dose if required, and if prescribed maximum dose has not been administered.

NOTE: EMT-I administration of an inhaler is CONTRAINDICATED, if:

- the maximum dose has been administered prior to the arrival of the EMT.
- the patient cannot physically use the device properly. (Patient cannot receive inhalation properly.)
- the device has not specifically been prescribed for the patient.

****If properly trained and authorized to do so, use the BLS Albuterol Protocol to treat the patient.**

NOTE: YOUR MEDICAL DIRECTOR MUST HAVE AUTHORIZED YOU AS AN EMT TO UTILIZE THIS PORTION OF THE PROTOCOL.

b. Provide advanced airway management if indicated.
c. Consider establishing an IV of Normal Saline if in severe distress.
d. If patient's BLOOD PRESSURE drops below 100mm Hg systolic: Treat for shock (See Appendix)

PARAMEDIC PROCEDURES

1. Cardiac monitoring. **Manage dysrhythmias per protocol**. 12-lead ECG if clinically appropriate.

2. **ALS-P STANDING ORDERS**

a. If the pediatric patient's condition is not improving with administration of supplemental oxygen, consider the following:

- **Albuterol Sulfate 1.25 mg with Ipratropium Bromide (Atrovent), 250 mcg via nebulizer if less than 2 years of age.**

- **Albuterol Sulfate 2.5-3.0 mg with Ipratropium Bromide (Atrovent), 500 mcg via nebulizer if age 2 years or greater.**

- **A second dose of Albuterol, with or without Ipratropium, may be administered as necessary.**

- Note that a multi-dose inhaler may be used to give albuterol or ipratropium (instead of nebulizer) if infection control is an issue (e.g. influenza-like-illness).

b. Consider Saline lock or IV Normal Saline if in severe distress.

c. For severe distress: **Epinephrine 0.15 mg to 0.3 mg. IM BY AUTOINJECTOR ONLY (maximum single dose 0.3 mg**). Consider **Magnesium Sulfate** 25 mg/kg. IV over 5 min.

3. Contact **MEDICAL CONTROL**. The following may be ordered:

a. **Albuterol Sulfate** (repeat dosages as identified above) via nebulizer or MDI.
b. **Epinephrine 0.15 mg to 0.3 mg. IM BY AUTOINJECTOR ONLY (maximum single dose 0.3 mg**).
c. **Magnesium Sulfate** 25 mg/kg. IV over 5 minutes.
d. If the pediatric patient's respiratory status worsens: go to Pediatric Anaphylaxis Protocol

5.5 *PEDIATRIC CARDIOPULMONARY ARREST: ASYSTOLE / AGONAL IDIOVENTRICULAR RHYTHM / PULSELESS ELECTRICAL ACTIVITY (PEA)*

Cardiopulmonary arrest in infants and children is usually the end result of deterioration in respiratory and circulatory function. Injury is the leading cause of death in children between 1 - 16 years. Other etiologies include, but are not limited to: severe dehydration, Sudden Infant Death Syndrome, congenital anomalies, airway obstruction, bacterial and/or viral infections, sepsis, asthma, hypothermia and drug overdose.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine unresponsiveness, absence of breathing and pulselessness.
3. Maintain an open airway, remove secretions, vomitus, and initiate CPR. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Continually assess level of consciousness, ABCs and Vital Signs, including capillary refill.
5. Obtain appropriate S-A-M-P-L-E history related to event, including possible ingestion or overdose of medications. Observe for signs of child abuse
6. Symptomatic patients may have absent or abnormally slow or rapid heart rates accompanied by decreased level of consciousness, weak and thready pulses, delayed capillary refill, and/or no palpable BLOOD PRESSURE.
7. Every effort should be made to determine the possible cause(s) for PEA including medical and/or traumatic etiologies.
8. Monitor and record vital signs (if any) and perform 12-lead ECG.
9. Treat for shock.
10. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, or pediatric immobilization device appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. If unable to ventilate child after repositioning of airway: assume upper airway obstruction and follow Pediatric Upper Airway Obstruction Protocol.
2. Initiate Cardiopulmonary Resuscitation (CPR).
3. EARLY DEFIBRILLATION
   a. Perform CPR.
   b. Use AED according to the standards of the American Heart Association or as otherwise noted in these protocols and other advisories

NOTE: AED use is dependent upon provider having an AED with FDA clearance for pediatric use that is age and weight appropriate. An AED should be used in compliance with manufacturer specific guidelines and Massachusetts treatment protocols and advisories.

4. Activate ALS intercept, if deemed necessary and if available.
5. Initiate transport as soon as possible; with or without ALS.
6. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. Initiate IV Normal Saline KVO.

2. Contact **MEDICAL CONTROL**. Medical Control may order:
   a. Normal Saline bolus IV (expected fluid bolus is 20 mL/kg).

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. Initiate IV Normal Saline KVO.

NOTE: If a vein can be visualized or palpated, establish an IV of Normal Saline KVO. If unable to visualize or palpate a vein and child is less than six years old, establish an intraosseous infusion of Normal Saline. If unable to visualize or palpate a vein and the child is greater than six years old, attempt external jugular access.

a. **Epinephrine:**

For Bradycardia: IV/IO: 0.01 mg/kg (1:10,000); Subsequent dosages: IV/IO repeat initial dose (0.01 mg/kg 1:10,000) every 3 - 5 minutes.

For Asystolic or PEA:

- **Initial Dose: IV/IO; 0.01 mg/kg (1:10,000) Subsequent doses every 3 - 5 minutes: IV/IO: Repeat initial dose.**
- **Epinephrine infusion: initial dose 0.1 μg/kg/min. Titrate to desired effect to maximum dose of 1.0 μg/kg/min.**

2. Contact **MEDICAL CONTROL**. Medical Control may order.
   a. Fluid bolus(es) of Normal Saline IV/IO (**20 mL/kg)**.
   b. **Sodium Bicarbonate 1 mEq/kg**: IV/IO.
   c. All other treatment modalities based upon suspected etiology for cardiopulmonary arrest.

5.6 *PEDIATRIC COMA / ALTERED MENTAL/ NEUROLOGICAL STATUS/ DIABETIC IN CHILDREN*

The Pediatric Coma/Altered Mental/Neurological Status/Diabetic in Children protocol covers a range of presentations. Coma is not difficult to recognize, but irritability, lethargy, changes in feeding or sleeping habits, and other subtle behavioral changes can all indicate a process impairing the normal functioning of the child's central nervous system. History from the caregiver is critical. The common causes of pediatric coma are injury, shock, metabolic disorders, ingestions and/or CNS infections. Pediatric shock, if suspected, should be treated according to the Pediatric Shock Protocol. Likewise, Pediatric Head Trauma, if suspected as the cause for altered mental/neurological status, should be treated according to the Pediatric Multiple Trauma Protocol. Remember that some forms of injury such as those associated with "shaken baby syndrome", can cause CNS trauma without external evidence of injury.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. This may include repositioning of the airway, suctioning and/or use of airway adjuncts (nasopharyngeal / oropharyngeal airway) as indicated. Assume spinal injury if associated with trauma and manage accordingly.
3. Evaluate capillary refill and determine if blood pressure is appropriate for age. (**See Appendix**).
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Determine patient's hemodynamic stability and symptoms. Continually assess level of consciousness, ABCs and Vital Signs.
6. Obtain appropriate S-A-M-P-L-E history related to event, including diabetes, CNS disorders and/or injury, overdose, or trauma.
7. Monitor and record vital signs and ECG.
8. Prevent / treat for shock.
9. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

1. **BLS STANDING ORDERS**
   a. If patient is a known diabetic (or is confirmed to be hypoglycemic) who is conscious and can speak and swallow, administer oral glucose or other sugar source as tolerated. One dose equals one tube. A second dose may be necessary.

   CAUTION: Do NOT administer anything orally if the patient does not have a reasonable level of consciousness and normal gag reflex.

2. Activate ALS intercept if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. If patient is unconscious or seizing, transport on left side (coma position) or as needed if trauma is suspected. If patient is in or exhibits signs and/or symptoms of shock, (i.e. If patient's blood pressure drops below age appropriate pressure (See Appendix), treat for shock.
5. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Consider IV Normal Saline.

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. **20 mL/kg Fluid bolus** of Normal Saline.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Advanced Airway Management if indicated.
   b. Initiate IV Normal Saline (KVO). If a hypovolemic etiology is suspected, administer fluid bolus at 20 mL/kg.
   c. Cardiac monitoring and consider 12 lead ECG – manage dysrhythmias per protocol
   d. Treatment for specific etiologies:

   - **Known hypoglycemia (glucose <70 mg./dl.):**
     i. **Dextrose 10% 0.5 gm/kg IV Bolus (for neonates).**
     ii. **Dextrose 25% 0.5 gm/kg IV Bolus (if estimated body weight is less than 50 kg).**
     iii. **Dextrose 50% 0.5 gm/kg IV Bolus (if estimated body weight is greater than 50 kg).**
     iv. **Glucagon 0.1 mg/kg IV Push, IO, IM, nasal, or SC up to maximum of 1.0 mg.**

   - **Coma of Unknown Etiology:**
     i. **If age less than 5 years:**
        - **Naloxone HCL: 0.1 mg/kg to max. dose of 2.0 mg, IV Push, IO, IM, SC, or nasal via atomizer.**
     - **Dextrose as listed above.**
     ii. **If age greater than 5 years:**
        - **Naloxone HCL: 2.0 mg IV Push, IO, IM, SC, or nasal via atomizer.**
        - **Dextrose as listed above.**

   e. For patients with confirmed adrenal insufficiency, give **Hydrocortisone** 2 mg./kg. to maximum 100 mg. IV, IM or IO or **Methylprednisolone** 2 mg./kg. to maximum125 mg. IV, IM or IO.

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. **Glucagon 0.1 mg/kg** IV Push, IO, IM, nasal, or SC up to maximum of 1.0 mg.
   b. **20 mL/kg** Normal Saline fluid Bolus.
   c. **Dextrose:**
      i. **Dextrose 10% 0.5 gm/kg IV Bolus (for neonates).**
      ii. **Dextrose 25% 0.5 gm/kg IV Bolus (if estimated body weight is less than 50 kg).**
      iii. **Dextrose 50% 0.5 gm/kg IV Bolus (if estimated body weight is greater than 50 kg).**
   d. **Naloxone:**
      i. **If age** less **than** 5 **years: 0.1 mg/kg** to max. dose of 2.0 mg **IV Bolus, IM, SC, IO, or nasal via atomizer.**
      ii. **If age** 5 **years** or greater**: 2.0 mg IV Bolus, IM, SC or IO.**
   e. Additional fluid boluses of 20 mL/kg at intervals as needed.
   f. If coma caused by specific drug overdose, physician may order:
      i. **Atropine 0.02 mg/kg IV Bolus or IO.**
      ii. **Sodium Bicarbonate 1-2 mEq/kg as slow IV Infusion.** CAUTION: Pediatric patients must have adequate ventilatory function prior to the administration of Sodium Bicarbonate.

5.7 *PEDIATRIC SEIZURES*

A seizure is a temporary alteration in behavior due to the inappropriate electrical discharge of one or more groups of neurons in the brain. Seizures can present in several different forms: generalized (absence or tonic-clonic), partial-simple (motor only), or partial-complex (behavioral). The single most common cause of seizure disorder is idiopathic epilepsy. However, there are multiple other causes: hypoglycemia, head trauma, vascular disorders, meningitis, sepsis, metabolic abnormalities, poisoning, hypoxemia, tumors, and shock. The seizure may be followed by a post-ictal state or complete coma depending upon cause. The most common cause of seizure in children age 1 - 4 is "benign febrile seizure". These seizures usually last less than 5 minutes and are tonic-clonic (grand mal) and non-focal (generalized).

ASSESSMENT/TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain an open airway and assist ventilations as needed. This may include repositioning of the airway, suctioning to remove secretions and/or vomitus, or use of airway adjuncts as indicated.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated or via blow-by method if seizure persists. Be certain that the oropharynx is clear of secretions and/or vomitus.
4. Obtain appropriate S-A-M-P-L-E history related to event, including possible ingestion or overdose of medications.
5. Question all witnesses or bystanders as to actual event.
6. The majority of seizures are self- limiting, followed by a gradual awakening. However, prolonged or recurrent seizures may indicate status epilepticus.
7. Monitor and record vital signs and ECG.
8. Prevent / treat for shock.
9. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Prevent patient from accidental self-harm. DO NOT use a bite block.
2. Activate ALS intercept if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. If patient's BLOOD PRESSURE drops below age appropriate systolic pressure (see Appendix), treat for shock.
5. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated.
   b. Initiate IV Normal Saline (KVO), while en-route to hospital, if vein is visible and/or palpable.
2. Initiate transport as soon as possible with or without Paramedics.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. Initiate IV Normal Saline (IV), in visualized or palpated vein.
   c. Determine Blood Glucose level with Dextrose stick.
      - If Glucose is less than **70**mg/dL, administer:
        i. **Dextrose 10% 0.5 gm/kg IV Bolus** (for neonates**).**
        ii. **Dextrose 25% 0.5 gm/kg IV Bolus** (if estimated body weight is less than 50 kg).
        iii. **Dextrose 50% 0.5 gm/kg IV Bolus** (if estimated body weight is greater than 50 kg).

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NOTE: Status epilepticus is considered to be occurring when it has been reported, or observed, that a patient has been seizing for 10 minutes, or greater. This will result in a standing order to provide Diazepam or Lorazepam, prior to contacting medical control.

   d. Seizures:
      Diazepam 0.25 mg/kg, IV, IO to maximum single dose of 5-10 mg. or a RECTAL DOSE: 0.5 mg/kg unless contraindicated

      OR

      Lorazepam 0.05-0.1 mg/kg IV, IO slowly (dilute 1:1 in normal saline), or IM to maximum single dose of 2 mg*.

2. Contact MEDICAL CONTROL. The following may be ordered:
   a. For **Status Epilepticus**
      - **Additional Diazepam or Lorazepam**
      - Additional IV **Dextrose** per above protocol.
      - Additional **Naloxone** per above protocol.
      - Normal Saline fluid challenge, if indicated 10-20 mL/kg.

Diazepam and **Lorazepam** should be used to treat only those children who suffer continuous tonic/clonic seizure activity for more than **10** minutes and who demonstrate signs of inadequate oxygenation, such as cyanosis. Apnea often follows intravenous administration of Diazepam; accordingly, field personnel should carefully monitor respiration and prepare to support ventilation with bag-valve-mask apparatus following administration of this agent. These drugs are relatively contraindicated in hypotension and head injury.

5.8 *PEDIATRIC SHOCK*

The most common cause of shock in children is acute volume loss. This can be due to: increased fluid loss (vomiting, diarrhea, hyperthermia, hemorrhage); decreased intake; or fluid-shift out of the vascular space. Regardless of etiology, treatment should be directed at rapid fluid replacement. **Severe shock** is present if the child exhibits a decreased level of consciousness, weak and thready pulses, no palpable blood pressure, or a capillary refill of more than 2 seconds.

Children are capable of developing significant sinus tachycardia in the face of dehydration, but if the heart rate is greater than 220/minute refer to the Pediatric Supraventricular Tachycardia (SVT).

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. In case of suspected head/neck injury, Ensure cervical spine immobilization / stabilization.
3. Maintain open airway and assist ventilations as needed. This may include repositioning of the airway, suctioning to remove secretions and/or vomitus, or use of airway adjuncts as indicated.
4. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
5. Control external bleeding sources and keep child warm.
6. Determine patient's hemodynamic stability and symptoms. Continually assess level of consciousness, ABCs and Vital Signs. Evaluate capillary refill and determine if BLOOD PRESSURE is appropriate for age.
7. If in severe shock, position child 15º Trendelenburg (head down position).
8. Obtain appropriate S-A-M-P-L-E history related to event, such as recent illness, change in eating pattern, excessive exercise or heat exposure, and/or trauma.
9. Monitor and record vital signs and ECG.
10. Prevent / treat for shock.
11. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Control external bleeding sources and keep child warm.
2. Activate ALS intercept, if deemed necessary and if available.
3. Initiate transport as soon as possible with or without ALS.
4. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management (endotracheal intubation ONLY), if indicated.
   b. Initiate IV Normal Saline (KVO), while en-route to hospital if vein is visible and/or palpable.

2. Contact **MEDICAL CONTROL.** The following may be ordered:
   a. Normal Saline bolus at discretion of Medical Control (expected fluid bolus is 20 mL/kg).

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. Initiate IV Normal Saline. NOTE: If a vein can be visualized or palpated, establish an IV of Normal Saline KVO. If unable to visualize or palpate a vein and child is less than six years old, establish an intraosseous infusion of Normal Saline to keep the line open. If unable to visualize or palpate a vein and the child is greater than six years old, attempt external jugular access.
   c. If severe shock is present, or suspect hypovolemic etiology, administer **20** mL/kg IV Bolus of normal saline (unless known history of heart disease).
   d. Cardiac Monitoring and if feasible12 lead ECG **-** manage dysrhythmias per protocol
   e. For patients with confirmed adrenal insufficiency, give **Hydrocortisone** 2 mg./kg. to maximum 100 mg. IV, IM or IO or **Methylprednisolone** 2 mg./kg. to maximum125 mg. IV, IM or IO.

2. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. Additional Normal Saline boluses IV at 20 mL/kg.
   b. Intraosseous Infusion of Normal Saline if less than 6 years of age. Once established, administer a single bolus of 20 mL/kg of Normal Saline (may be repeated).
   c. If known Cardiogenic Shock: **Dopamine** **(40 mg/mL solution)** DOSE: 2-20 μg/kg/minute.

5.9 *PEDIATRIC SUPRAVENTRICULAR TACHYCARDIA (SVT)*

Supraventricular tachycardia is the most common dysrhythmia producing cardiovascular instability during infancy, and it can occur throughout the pediatric years. It is critical that the rhythm be differentiated from sinus tachycardia, which is seen more often: some common causes of sinus tachycardia are dehydration, shock, hyperthermia, anxiety, pain and/or fear. Supraventricular Tachycardia in infants often produces a heart rate of 240 beats per minute and possibly up to 300 beats per minute. Wide QRS Pediatric Supraventricular Tachycardia is relatively uncommon in infants and children. Any wide-QRS tachycardia should be assumed to be of ventricular origin. Heart rates up to 220 bpm can be due to sinus tachycardia in children. Supraventricular Tachycardia in pediatric patients usually results from an abnormality of the cardiac conduction system. Although the heart rate can vary, it rarely needs treatment if under 220 in children.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. This may include repositioning of the airway, suctioning to remove secretions and/or vomitus, or use of airway adjuncts as indicated.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess level of consciousness, ABCs and Vital Signs including capillary refill and determine if BLOOD PRESSURE is appropriate for age.
5. Obtain appropriate S-A-M-P-L-E history related to event, including prior episodes of Supraventricular Tachycardia, or underlying congenital heart disease and/or surgery, and/or possible ingestion or overdose of medications. Determine if there is a history of possible causes for sinus tachycardia, such as fluid loss, fever, shock, or bleeding.
6. Symptomatic patients will have heart rates greater than 220 bpm, and one of the following signs of hypoperfusion: decreased level of consciousness, weak and thready pulses, delayed capillary refill, or no palpable BLOOD PRESSURE.
7. Monitor and record vital signs and ECG.
8. Prevent / treat for shock.
9. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

Note: Inasmuch as Basic EMTs are unable to confirm the presence of PSVT, check the patient for a rapid or thready pulse rate greater than 220 bpm and manage according to the following protocol:

1. If tachycardia is related to acute injury or volume loss, see Pediatric Shock Protocol.
2. Activate ALS intercept, if deemed necessary and if available.
3. Notify receiving hospital.

INTERMEDIATE PROCEDURES

Note: Inasmuch as Intermediate EMTs are unable to confirm the presence of PSVT, check the patient for a rapid or thready pulse rate greater than 220 bpm and manage according to the following protocol:

1. **ALS STANDING ORDERS**
   a. Advanced Airway Management if indicated.
      - IV Normal Saline (KVO), while en-route to hospital, if vein is visible and/or palpable.
2. Notify receiving hospital and **Contact MEDICAL CONTROL**. The following may be ordered:
   a. Fluid boluses of Normal Saline IV (expected fluid bolus of 20 mL/kg).

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Advanced Airway Management if indicated.
   b. IV Normal Saline (KVO). If hypovolemic component is suspected, administer **20 mL/kg** IV Bolus of Normal Saline.

2. Contact **MEDICAL CONTROL**. The following may be ordered:

   a. Additional fluid boluses of Normal Saline (20 mL/kg).
   b. Synchronized cardioversion **0.5 joules/kg** for symptomatic patients.* Subsequent cardioversion may be done at up to 1.0 joule/kg. If cardioversion is warranted, consider administration of any of the following for sedation:
      - **Diazepam: if patient < 70 kg: 2.5 mg SLOW IV Push or,**
      - **Midazolam 0.5 mg - 2.5 mg SLOW IV push or nasal, or,**
      - **Morphine Sulfate 2.0 mg - 5.0 mg IV or IM, or,**
      - **Fentanyl 1 mcg/kg. to max. 150 mcg. slow IV push or, if no IV access, nasally.**
   c. **Adenosine 0.1 mg/kg** IV Rapid IV push. If no effect, repeat **Adenosine 0.2 mg/kg** Rapid IV push. **MAXIMUM** single dose of Adenosine must not exceed 12 mg.
   d. **Consider** Vagal maneuvers (see **Reminder** below).

*Synchronized cardioversion should be considered for only those children whose heart rate is in excess of 220, and who demonstrate one or more of the following signs of hypoperfusion: Decreased level of consciousness, weak and thready pulses, capillary refill time of more than 4 seconds, or no palpable BLOOD PRESSURE.

REMINDER: Vagal maneuvers may precipitate asystole and therefore should be employed with caution in the field and only in a cardiac-monitored child with IV access.

5.10 *PEDIATRIC TRAUMA AND TRAUMATIC ARREST*

NOTE: For BURN/INHALATION, see protocol 4.2 which includes pediatric management.

Injury is the most common cause of death in the pediatric population. Blunt injuries, which are usually motor vehicle related, are more common than penetrating injuries, but the latter are unfortunately becoming more common. If a child has multiple injuries or bruises in varying stages of resolution, consider child abuse as a possible etiology. The death rate from traumatic injury in children is two times that of the adult patient. To resuscitate a pediatric traumatic arrest victim, aggressive in-hospital management, often times open thoracotomy, is required. The more prolonged the field time and the transport to the medical facility, the less likely the child is to survive.

ASSESSMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine unresponsiveness, absence of breathing and pulselessness.
3. Maintain open airway and assist ventilations as needed. This may include repositioning of the airway, suctioning to remove secretions and/or vomitus, or use of airway adjuncts as indicated. Assume spinal injury and treat accordingly.
4. Initiate Cardiopulmonary Resuscitation (CPR) if indicated.
5. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
6. Consider potential non-traumatic causes (hypothermia, overdose, underlying medical conditions etc.)
7. As patient's condition suggests, continually assess Level of Consciousness, ABCs and Vital Signs.
8. Prevent / treat for shock.
9. When multiple patients are involved, they need to be appropriately triaged.
10. Obtain appropriate S-A-M-P-L-E history related to event, including Mechanism of Injury, and possible child abuse.
11. Patient care activities must not unnecessarily delay patient transport to the nearest appropriate facility as defined by the Department-approved point-of-entry plans-
12. Monitor and record vital signs (if any) and ECG.
13. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.

TREATMENT
BASIC PROCEDURES

1. If patient is in cardiac arrest:
   a. Perform CPR.
   b. Use AED according to the standards of the American Heart Association or as otherwise noted in these protocols and other advisories
2. Activate ALS intercept, if deemed necessary and if available.
3. Notify appropriate receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**
   a. Provide advanced airway management, if indicated.
   b. Initiate IV Normal Saline KVO.

2. Contact **MEDICAL CONTROL**. Medical control may order:

a. Fluid bolus of Normal Saline (expected fluid bolus of 20 mL/kg). This order may be repeated at the discretion of medical control.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**
   a. Provide advanced airway management.
   b. Initiate IV Normal Saline (1 - 2 large bore IVs).
   c. Administer fluid bolus of Normal Saline (20 mL/kg) and titrate IV infusion rate to patient's hemodynamic status depending upon age/size/weight of child.
   d. If the child is in cardiopulmonary arrest and unable to establish vascular access, and the child is less than 6 years old, establish an Intraosseous Infusion of Normal Saline and administer **20 mL /kg** fluid bolus.
   e. If in cardiopulmonary arrest, no IV access and the child is greater than six years old, attempt external jugular access or intraosseous access and administer **20 mL /kg** fluid bolus.
   f. For patients with confirmed adrenal insufficiency, give **Hydrocortisone** 2 mg./kg. to maximum 100 mg. IV, IM or IO or **Methylprednisolone** 2 mg./kg. to maximum125 mg. IV, IM or IO.

2. **Contact MEDICAL CONTROL**
   a. In patients who require emergent intubation and cannot be intubated by conventional means, and the treating paramedic has been duly authorized by the Service's Medical Director in use of an alternative airway (e.g. LMA or Combitube)
   b. To facilitate intubation: Medical control may order:
      - (6 months- 5 years) **Midazolam** **0.05-0.1 mg/kg** IV or nasal to maximum dose of 5 mg.
      - (6-12 year old) **Midazolam** **0.1 mg/kg** IV or nasal to maximum dose of 8 mg.
   c. Needle cricothyroidotomy.
   d. Additional bolus(es) **20 mL /kg** of Normal Saline or wide open (depending upon child's age/size/weight).
   e. Needle decompression of the thorax if indicated.

5.11 PEDIATRIC UPPER AIRWAY OBSTRUCTION

Airway obstruction can vary in severity from mild to life threatening and the child's condition may change suddenly. Common mechanical causes or contributing factors include: tongue-obstructed airway, foreign bodies in the oropharynx, trachea, or esophagus; allergic swelling of upper airway structures ("angioedema"), chemical burns, inhalation injuries; altered mental status, and congenital abnormalities (patients with small jaws or large tongues). Infectious causes are common with croup and epiglottitis being the most prevalent. Although epiglottitis is becoming less common due to immunization against Hemophilus Influenza B, it still occurs.

Children, especially 1 to 3 years of age, are at greatest risk for aspirating foreign objects, particularly when running and/or falling. The most common objects aspirated resulting in airway obstruction in children include coins, buttons, beads, pins, candy, nuts, hot dogs, chewing gum, grapes and sausages.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine presence of upper airway obstruction (stridor):
   a. If the obstruction due to a foreign body is **complete** or is partial with **inadequate** air exchange: follow the American Heart Association (AHA) or American Red Cross (ARC) BCLS age appropriate guidelines for foreign body obstruction. Maintain an open airway, remove secretions, vomitus and assist ventilations as needed.
   b. If **partial obstruction** due to a foreign body is suspected and the child has **adequate** air exchange: transport to appropriate medical facility. Do not attempt to remove foreign body in the field.
   c. If suspected **croup** (barking cough, no drooling) or **epiglottitis** (stridor, drooling) but can maintain an open airway, place child in position of comfort and **avoid upper airway stimulation**.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Determine patient's hemodynamic stability and symptoms. Continually assess level of consciousness, ABCs and Vital Signs. Determine capillary refill status and if blood pressure is appropriate for age.
5. Obtain appropriate S-A-M-P-L-E history related to event, including recent infectious history (fever, cough, etc.) or exposure to allergens.
6. Monitor and record vital signs and ECG.
7. Prevent / treat for shock.
8. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, infant car seat or pediatric immobilization device, in position of comfort, or appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Activate ALS intercept, if deemed necessary and if available.
2. Notify receiving hospital.

*** See Tracheostomy Tube Obstruction Management in this Protocol.**

INTERMEDIATE PROCEDURES

1. Determine presence of upper airway obstruction (stridor):
   a. If the obstruction due to a foreign body is **complete** or is partial with **inadequate** air exchange: follow the American Heart Association (AHA) or American Red Cross (ARC) BCLS guidelines for foreign body obstruction. Maintain an open airway, remove secretions, vomitus and assist ventilations as needed.
   b. If **partial obstruction** due to a foreign body is suspected and the child has **adequate** air exchange: transport to appropriate medical facility. Do not attempt to remove foreign body in the field.
   c. If suspected **croup** (barking cough, no drooling) or **epiglottitis** (stridor, drooling) maintain an open airway, place child in position of comfort and **avoid upper airway stimulation**.
   d. If tracheostomy tube exists and there is evidence of obstruction resulting in inadequate air exchange; **CONTACT Medical Control** for further instructions. Medical control may provide instructions for emergent removal of the tracheostomy tube to establish an airway.*

*** See Tracheostomy Tube Obstruction Management in this Protocol**.

2. **ALS STANDING ORDERS**
   a. Provide advanced airway management if indicated for **mechanical obstruction**: Perform direct laryngoscopy if foreign body suspected. If foreign body is visible and readily accessible, attempt removal with Magill forceps.
   b. Provide positive pressure ventilations if needed.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS**

   a. Provide advanced airway management if indicated for **mechanical obstruction**: Perform direct laryngoscopy if foreign body suspected. If foreign body is visible and readily accessible, attempt removal with Magill forceps. If unable to remove obstructing foreign body, continue BLS airway management by providing positive pressure ventilations.
   b. If foreign body is removed proceed with endotracheal intubation if necessary.
   c. IV Normal Saline titrated to appropriate BLOOD PRESSURE for age en route.
   d. For suspected SEVERE croup with stridor at rest and respiratory distress, administer **Nebulized Racemic Epinephrine** 11.25 mg in 2.5ml of normal saline.

2. Initiate transport as soon as possible.
3. Contact **MEDICAL CONTROL**. The following may be ordered:
   a. **Needle cricothyroidotomy** if unable to clear airway obstruction, unable to intubate as needed or unable to perform positive pressure ventilations.
   b. Airway management under the difficult airway protocol**.**

*** See Tracheostomy Tube Obstruction Management in this Protocol.**

*Tracheostomy tube obstruction management:

In the patient with an obstructed tracheostomy tube, in whom no effective ventilation/oxygenation is possible, the following are to be considered Standing Orders:

- wipe neck opening with gauze
- attempt to suction tracheostomy tube
- remove tracheostomy tube if necessary
- once airway is open, begin ventilations as necessary/possible

- Intermediates and Paramedics may attempt intubation of the patient if no other means of ventilating/oxygenating the patient are possible

Medical Control may order:
- in patients in whom the removed tracheostomy tube is noted to be plugged, on-line medical control may order clearing of the tube and re-insertion.

In patients who are being oxygenated or ventilated by the above criteria, Medical Control may order:
- wipe neck opening with gauze
- attempt to suction tracheostomy tube
- remove tracheostomy tube as necessary
- once airway is open, begin ventilations as possible/necessary
- attempt to intubate the patient

Signs of inadequate oxygenation/ventilation are:
- falling pulse oximetry
- patient's color
- patient's vital signs
- inability to deliver oxygenation by all other means

5.12 PEDIATRIC VENTRICULAR FIBRILLATION / PULSELESS VENTRICULAR TACHYCARDIA

Cardiopulmonary arrest, as manifested by ventricular fibrillation or pulseless ventricular tachycardia, is quite rare in infants and children and is usually the end result of deterioration in respiratory and circulatory function. Common causes can be: sepsis, foreign body aspiration, SIDS, traumatic hemorrhages and meningitis. Primary cardiac insults are rare but may be due to: congenital heart disease, myocarditis or primary dysrhythmia.

ASSESSMENT / TREATMENT PRIORITIES

1. Ensure scene safety and maintain appropriate body substance isolation precautions.
2. Determine unresponsiveness, absence of breathing and pulselessness.
3. Maintain an open airway, remove secretions, vomitus, and initiate CPR.
   Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. Continually assess Level of Consciousness, ABCs and Vital Signs including capillary refill.
5. Obtain appropriate S-A-M-P-L-E history related to event. Observe for signs of child abuse.
6. Every effort should be made to determine the possible cause(s) of the infant's / child's presentation.
7. Prevent / treat for shock.
8. Basic and/or Intermediate providers should activate a paramedic intercept system (ACLS) as soon as possible, if available.
9. Initiate transport as soon as possible, with or without ALS. Properly secure to cot, or pediatric immobilization device, in position appropriate to treatment(s) required.

TREATMENT

BASIC PROCEDURES

1. Maintain an open airway and assist ventilations (ensure proper seal around the ventilation mask). This may include repositioning of the airway, suctioning to remove secretions and /or vomitus. Use airway adjuncts as indicated.
2. If indicated, treat spinal injury per protocol.
3. If unable to ventilate child after repositioning of airway, assume upper airway obstruction and follow Pediatric Upper Airway Obstruction Protocol.
4. DEFIBRILLATION
   a. Use AED according to the standards of the American Heart Association or as otherwise noted in these protocols and other advisories.
5. Activate ALS intercept, if deemed necessary and if available.
6. Initiate transport as soon as possible, with or without ALS.
7. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. **ALS STANDING ORDERS**

   a. Provide advanced airway management, if indicated.
   b. Ventilate with 100% oxygen.
   c. Initiate IV Normal Saline KVO**.**

2. Contact **MEDICAL CONTROL**: Medical Control may order:
   a. Normal Saline fluid bolus(es) at expected 20 mL / kg.

PARAMEDIC PROCEDURES

1. **ALS-P STANDING ORDERS:**
   a. Provide advanced airway management, if indicated.
   b. Ventilate with 100% oxygen.
   c. Initiate IV / IO Normal Saline, but do not delay defibrillation.
   d. Defibrillate once at 2-4J/kg.
   e. **Epinephrine:**
      - **Epinephrine IV / IO: 0.01 mg/kg (1:10,000, 0.1mL/kg).**
   f. Defibrillate 4-10 J/kg (do not exceed 10J/kg) every 2 minutes.
   g. **Epinephrine (subsequent doses):**
      - **IV / IO: as initial dose, repeat every 3-5 minutes.**
   h. **Amiodarone 5 mg./kg. IV/IO**.
   i. Continue CPR for 2 minutes
   j. Defibrillate 4 J/kg 30-60 seconds after each medication.

2. Contact MEDICAL CONTROL. Medical Control may order:
   a. Fluid bolus(es) of Normal Saline at expected rate of **20 mL/kg.**
   b. **Sodium Bicarbonate 1 mEq/kg IV / IO.**
   c. All other treatment modalities based upon suspected cause of VF/VT.

5.13 *PEDIATRIC PAIN and NAUSEA MANAGEMENT*

In the pediatric patient with suspected long bone fractures, significant burns or other clearly painful condition, pain management with analgesics should be considered utilizing the following protocol. In the pediatric patient with nausea from any cause consider anti-emetic treatment using this protocol. The purpose of this protocol is to:

- Attempt to decrease and/or alleviate pain and minimize patient anxiety
- Facilitate positioning and splinting techniques
- Enhance communication with the patient
- Prevent further injury

ASSESSMENT / TREATMENT PRIORITIES

1. Maintain appropriate body substance isolation precautions.
2. Maintain open airway and assist ventilations as needed. Assume spinal injury when appropriate and treat accordingly.
3. Administer oxygen using appropriate oxygen delivery device, as clinically indicated.
4. As patient's condition suggests, continually assess level of Consciousness, ABC's and Vital Signs.
5. Treat all life threatening conditions as they become identified.
6. Prevent / treat for shock.
7. When multiple patients are involved, they need to be appropriately triaged.
8. Obtain appropriate S-A-M-P-L-E history related to event, including mechanism of Injury, and possible child abuse.
9. Patient care activity must not unnecessarily delay patient transport to the nearest appropriate facility as defined by Department-approved point-of-entry plans.
10. Initiate transport as soon as possible with or without ALS. Properly secure to cot, or pediatric immobilization device, in position of comfort or appropriate to treatment(s) required.
11. Monitor and record vital signs.

BASIC PROCEDURES

1. Notify receiving hospital.

INTERMEDIATE PROCEDURES

1. ALS STANDING ORDERS

a. Provide advanced airway management, if indicated.
b. Initiate IV normal saline KVO

2. Contact **MEDICAL CONTROL**. Medical Control may order:
   a. Fluid bolus of Normal Saline (expected fluid bolus of 20 mL/kg). This order may be repeated at the discretion of Medical Control.

PARAMEDIC PROCEDURES

1. ALS-P STANDING ORDERS

a. Provide advanced airway management, if indicated.
b. Initiate IV normal saline KVO estimate weight using Length Based Tape (e.g. See Appendix or Use Broselow Tape)
c. **If IV access obtained**, **Morphine Sulfate** **0.1 mg/kg IV (maximum individual dose 5.0 mg)** or **Fentanyl** 1 mcg/kg. to max. 150 mcg. slow IV push.

d. If **NO** IV access, **Morphine Sulfate** **0.1 mg/kg** IM/SC/IO (maximum individual dose **5.0 mg)** or **Fentanyl** **1 mcg/kg.** to max **150 mcg** nasally.
e. **Ondansetron**, for child under or up to 30 kg. 1 mg. IV/IM; for a child over 30 kg., 2 mg. IV/IM.

2. **Contact MEDICAL CONTROL** who may also order:
   a. Fluid Bolus: Normal Saline 20 mL/kg IV
   b. **Morphine Sulfate** **0.1 mg/kg IV/IM/SC,** or **Fentanyl** **1 mcg/kg**. to max. 150 mcg. slow IV push or, if no IV access, nasally.
   c. **Naloxone** HCL 0.1 mg/kg of a 1.0 mg/mL solution IV/IO/nasal. If patient <5 years: 0.1 mg/kg. If patient > 5 years: 2.0 mg.
   d. **Ondansetron**, for child under or up to 30 kg. 1 mg. IV/IM; for a child over 30 kg., 2 mg. IV/IM.
   e. Use of IO access for any of the above medications.

APPENDIX A: MEDICATIONS LIST

Required Medications:
Activated Charcoal
Adenosine
Albuterol
Amiodarone
Aspirin
Atropine
Calcium Chloride
Cetacaine spray, phenylephrine spray, 2% lidocaine jelly
Dextrose D10, D25, and D50
Diazepam **and/or** Lorazepam
Diltiazem HCL
Diphenhydramine
Dopamine
Epinephrine (autoinjector, 1:1000, 1:10,000, racemic)
Fentanyl
Furosemide
Glucagon
Hydrocortisone or methylprednisolone
IV Solution (Normal Saline)
Ipratropium Bromide
Lidocaine
Magnesium Sulfate
Metoprolol
Midazolam
Morphine Sulfate
Naloxone
Nitroglycerin
Nitropaste
Ondansetron
Oral glucose
Oxygen
Saline Flush
Sodium Bicarbonate
Thiamine

Optional Medications at Service Discretion
Cyanide Antidotes
Hydroxocobalamin (Vitamin B_{12})
Nerve Agent Antidotes
Tetracaine
Vasopressin

APPENDIX B: COMFORT CARE / DNR ORDER VERIFICATION PROTOCOL

INTRODUCTION

Emergency medical technicians (EMTs) at all levels, and first responders (collectively called EMS personnel), are required to provide emergency care, and EMTs are required to transport patients to appropriate health care facilities. EMS personnel are further required to provide treatment to the fullest extent possible, subject to their level of training. However, more and more patients, where it is medically appropriate, are opting not to be resuscitated. Many patients arrange with their physician, nurse practitioner or physician assistant for a Do Not Resuscitate (DNR) order -- an order directing that the individual not be resuscitated in the event of cardiac or respiratory arrest.

This Comfort Care / DNR ("CC/DNR") Order Verification Protocol is designed to allow EMS personnel to honor a DNR order in an out-of-hospital setting. Before it came into being, there was no mechanism to enable EMS personnel to recognize DNR orders in out-of-hospital settings. EMS personnel were thus always obligated to perform full resuscitative measures when encountering a patient unable to convey directions regarding medical treatment, due to the patient being either unconscious or not competent, and the difficulty of ascertaining the validity of wishes asserted by family members or other witnesses on scene, under emergency conditions. Usually there is no ongoing relationship between the EMS personnel and the patient. Emergency conditions require an immediate response and accurate identification. Authentication of individuals and legal documents is difficult, if not impossible, under emergency field conditions, and placed an inappropriate burden on EMTs and first responders.

This Comfort Care/DNR, or CC/DNR protocol, provides for a statewide, uniform DNR order verification, issued by the Massachusetts Department of Public Health (DPH), Office of Emergency Medical Services (OEMS) that EMS personnel can instantly recognize as an acceptable verification of an existing DNR order. It is not a DNR order itself, but allows EMS personnel to honor a patient's request for no resuscitation, as documented in a valid DNR, and to provide the patient with palliative care in conformance with the Comfort Care protocol.

PURPOSE

The purpose of this protocol is to: (1) provide a verification/authentication of DNR orders to enable EMS personnel to honor DNR orders in out-of-hospital settings; (2) clarify the role and responsibilities of EMS personnel at the scene and/or during transport of patients who have a current, valid CC/DNR Order Verification; (3) avoid resuscitation of patients who have a current, valid CC/DNR Order Verification; and (4) provide palliative/comfort care measures for patients with a current, valid CC/DNR Order Verification. This protocol does not alter the standard of practice in issuing DNR orders in any way, but only provides a standardized mechanism for the verification of the DNR order so that it may be recognized in out-of-hospital settings.

APPENDIX B: COMFORT CARE / DNR ORDER VERIFICATION PROTOCOL (cont.)

DEFINITIONS

For purposes of this protocol, the following are defined:

1. Attending Physician: A physician, licensed pursuant to M.G.L. c.112, §2, selected by or assigned to a patient, who is responsible for the treatment and care of the patient, in whatever setting medical diagnosis or treatment is rendered. Where more than one physician shares such responsibility, any such physician may act as the attending physician for purposes of this protocol.

2. Authorized Nurse Practitioner ("Authorized NP"): A registered nurse in the Commonwealth with advanced nursing knowledge and clinical skills as required by M.G.L. c. 112, §80B and 244 CMR 4.00 et seq. A nurse practitioner may write a DNR order, where this activity is agreed upon by the nurse practitioner and the collaborating physician in written practice guidelines (244 CMR 4.22[1]). It is the obligation of the nurse practitioner, the collaborating physician, and the institution where the nurse practitioner is practicing at the time the CC/DNR is issued to ensure that the nurse practitioner is authorized under his/her written practice guidelines to write a DNR order and by extension to sign the Comfort Care Verification form.

3. Authorized Physician Assistant ("Authorized PA"): A person who meets the requirements for registration set forth in M.G.L. c. 112, §9I, and who may provide medical services appropriate to his or her training, experience and skills under the supervision of a registered physician. The Division of Registration provides that a physician assistant may write DNR orders if: (1) his/her supervising physician determines that issuing a DNR order is within the competence of the physician assistant given the physician assistant's level of training and expertise (263 CMR 5.04 [1]), and (2) with regard to DNR orders, the physician assistant must consult with his/her supervising physician prior to issuance. A physician assistant may properly review and renew a preexisting DNR order without prior consultation with his/her supervising physician. Since the Comfort Care/Do Not Resuscitate Order Verification is a verification of an existing valid DNR order, the signing of the verification is comparable to the renewal of a preexisting DNR order. It is the obligation of the physician assistant, his/her supervising physician, and the institution where the physician assistant is practicing at the time the CC/DNR is issued to ensure that the physician assistant is authorized under his/her practice guidelines to write a DNR order and by extension to sign the Comfort Care Verification form.

4. Cardiopulmonary Resuscitation ("CPR"): Includes for purposes of this protocol, cardiac compression, artificial ventilation, oropharyngeal airway (OPA) insertion, advanced airway management such as endotracheal intubation, cardiac resuscitation drugs, defibrillation and related procedures.

5. Comfort Care / DNR Order Verification Form ("form"): A standardized state-wide form for verification of DNR orders in the out-of-hospital setting, approved by the Department of Public Health. The CC/DNR Order Verification Form shall include the patient's name; date of birth; gender; address; date of issuance and date of expiration, if any, of the underlying DNR order; the signature and telephone number of an attending physician, authorized nurse practitioner, or authorized physician assistant; and the signature of the patient, guardian or health care agent. The CC/DNR Order Verification Form is the only DNR document that EMS personnel will be instructed to honor and can only be issued by an attending physician, authorized nurse practitioner, or authorized physician assistant.

APPENDIX B: COMFORT CARE / DNR ORDER VERIFICATION PROTOCOL (cont.)

6. **Comfort Care / DNR Order Verification Protocol**: A standardized statewide patient care protocol, part of the Statewide Treatment Protocols, to be followed by EMS personnel when encountering a patient with a current, valid CC/DNR Order Verification Form, whether an original or a copy. The protocol provides that the patient in respiratory or cardiac distress will receive palliative, comfort care consistent with the scope of the EMT's or first responder's training and certification, but no resuscitative measures. The protocol applies to all emergency medical services personnel (Basic, Intermediate and Paramedic EMTs, as well as first responders) operating in an out-of-hospital setting, and requires that they perform patient assessment and treatment in accordance with this protocol.

7. Emergency Medical Services Personnel: Any EMT or EFR certified pursuant to 105 CMR 170.000 et seq. and any First Responder as defined in 105 CMR 171.050.

8. Guardian: An individual appointed by the court, pursuant to M.G.L. c. 201, §§ 6, 6A, or 6B, to make decisions for a person who is mentally ill, mentally retarded or unable to make or communicate informed decisions due to physical incapacity or illness, provided that the appointment as guardian includes the right to make health care decisions; or, a parent or other individual who is legally entitled to make decisions about the care and management of a child during his/her minority.

9. Health Care Agent: An individual authorized by a health care proxy to make health care decisions on behalf of the principal, pursuant to M.G.L. c. 201D. The authority of the health care agent becomes effective only upon a written determination of the attending physician, pursuant to M.G.L. c. 201D, § 6, that the principal lacks the capacity to make or to communicate health care decisions.

10. Life-sustaining procedure: Cardiopulmonary resuscitation, as defined in number 4 above. Life-sustaining procedures shall not include any medical procedure or intervention considered necessary by the attending physician, EMS personnel, or the medical control physician to provide comfort care or to alleviate pain.

11. Medical Control Physician: A physician designated within the EMS system to provide on-line and off-line medical direction to EMS personnel.

12. Palliative care: Comfort care that eases or relieves symptoms without correcting the underlying cause or disease.

13. Out-of-hospital: Any setting outside a hospital where EMS personnel may be called and may encounter patients with CC/DNR Order Verifications including, but not limited to, long-term care, hospice, assisted living, private homes, schools, inter-facility transport, and other public areas.

AUTHORITY

It is well settled in Massachusetts that individuals, while competent, have the right to determine the course of their medical treatment, including the right to refuse medical treatment and to make end of life decisions. Norwood Hospital v. Munoz, 409 Mass. 116, 564 N.E.2d 1017 (1991); Brophy v. New England Sinai Hospital, 398 Mass. 417, 497 N.E.2d 626 (1986); Lane v. Candura, 6 Mass. App. Ct. 377, 376 N.E.2d 1232 (1978); and Superintendent of Belchertown State School v. Saikewicz, 373

APPENDIX B: COMFORT CARE / DNR ORDER VERIFICATION PROTOCOL (con't)

Mass. 728, 370 N.E.2d 417 (1977). Similarly, it is recognized that incompetent individuals have the same right to determine the course of their medical treatment as well as to refuse medical treatment. Brophy v. New England Sinai Hospital, supra; Saikewicz, supra; Matter of Spring, 380 Mass. 629, 405 N.E.2d 115 (1980). See also, Matter of Dinnerstein, 6 Mass. App. Ct. 466, 380 N.E.2d 134 (1978); and Care and Protection of Beth, 412 Mass. 188, 587 N.E.2d 1377 (1992).

As an extension of the health profession into the field, the emergency medical system has the same obligation to recognize an individual's right to refuse medical treatment in an out-of-hospital setting, where the authenticity of the documentation can be validated.

Further authority: M.G.L. c. 111C and 105 CMR 170.000 et seq.; M.G.L. c. 111 § 201 and 105 CMR 171.000 et seq.

IMPLEMENTATION PROCEDURES

Eligibility: Anyone with a current valid DNR order is eligible for a CC/DNR Order Verification Form, including minors.

A DNR order is an order, executed by a physician, authorized nurse practitioner, or authorized physician assistant, issued according to the current standard of care. The standard for issuing the DNR order is neither defined nor changed by this protocol. This protocol simply serves to verify, for EMS personnel, a DNR Order issued by a physician.

Validity: To assure that a DNR order is recognized in any out-of-hospital setting, an attending physician, authorized nurse practitioner, or authorized physician assistant must provide a patient, who has a current DNR order, with a fully executed CC/DNR Order Verification. Pursuant to this protocol, EMS personnel will be instructed to honor a current valid CC/DNR Order Verification Form (either an original or a copy). Patients without a CC/DNR Order Verification Form will be resuscitated by EMS personnel in accordance with standard EMS protocols.

Content: The CC/DNR Order Verification Form shall include:

- the name, date of birth, gender, and address of the patient;
- the name of the guardian or health care agent, if any;
- the signature of the patient or of the guardian or health care agent;
- verification by the attending physician, authorized nurse practitioner, or authorized physician assistant, of the existence of a current valid DNR order;
- the signature and telephone number of the attending physician, authorized nurse practitioner, or authorized physician assistant. If the signature is of an authorized nurse practitioner, or authorized physician assistant, the name (signature not required) of the collaborating or supervising physician shall also be included;
- the issuance date and expiration date, if any, of the DNR order; and,
- authorization of EMS personnel to act pursuant to the Comfort Care protocol.

APPENDIX B: COMFORT CARE / DNR ORDER VERIFICATION PROTOCOL (cont.)

Expiration: To the extent that the underlying DNR order has an expiration date, the CC/DNR Order Verification Form shall have an identical expiration date. This protocol does not prescribe an expiration date, but rather leaves the expiration date up to the physician, authorized nurse practitioner, or authorized physician assistant who issued the underlying DNR order. If the DNR order is revoked by the physician, authorized nurse practitioner, or authorized physician assistant, patient, guardian or authorized health care agent, the CC/DNR Order Verification Form shall be similarly revoked.

Access: The CC/DNR Order Verification form can be accessed by anyone, in downloadable format from the Massachusetts Department of Public Health/Office of Emergency Medical Services website, at www.mass.gov/dph/oems. But it must be fully completed and signed by the attending physician, authorized nurse practitioner or authorized physician assistant, as described above. The CC/DNR protocol is activated when EMS personnel encounter a CC/DNR Order Verification Form (original or copy). EMS personnel must:

- confirm the identity of the individual with the CC/DNR Order Verification Form; and,
- confirm that the CC/DNR Order Verification Form is current and valid.
- If there is a CC/DNR Order Verification Form, and either indicates a revocation or expiration of the CC/DNR Order Verification, EMS personnel shall resuscitate.

Patient Care: Upon confirmation of a current, valid CC/DNR Order Verification Form, EMS personnel shall follow the following procedures:

- If the patient is not in respiratory or cardiac arrest and the patient's heart beat and breathing are adequate, but there is some other emergency illness or injury, the EMS personnel shall provide full treatment and transport, as appropriate, within the scope of their training and level of certification.

- If the patient is in full respiratory or cardiac arrest, the EMS personnel shall not resuscitate, which means:
  - ⇒ do not initiate CPR;
  - ⇒ do not insert an oropharyngeal airway (OPA);
  - ⇒ do not provide ventilatory assistance;
  - ⇒ do not artificially ventilate the patient (mouth-to-mouth, bag valve mask, positive pressure, etc.);
  - ⇒ do not administer chest compressions;
  - ⇒ do not initiate advanced airway measures such as endotracheal intubation;
  - ⇒ do not administer cardiac resuscitation drugs; and,
  - ⇒ do not defibrillate.

- If the patient is **not** in full respiratory or cardiac arrest, but the patient's heart beat or breathing is inadequate, EMS personnel shall not resuscitate but shall provide, within the scope of their training and level of certification, full palliative care and transport, as appropriate, including:
  - ⇒ emotional support;
  - ⇒ suction airway;
  - ⇒ administer oxygen;

APPENDIX B: COMFORT CARE / DNR ORDER VERIFICATION PROTOCOL (con't)

- ⇒ application of cardiac monitor;
- ⇒ control bleeding;
- ⇒ splint;
- ⇒ position for comfort;
- ⇒ initiate IV line; and,
- ⇒ contact Medical Control, if appropriate, for further orders, including necessary medications.

- If EMS personnel have any question regarding the applicability of the CC/DNR Order Verification with regard to any specific individual, the EMS personnel shall:
  - verify with the patient, if the patient is able to respond;
  - provide full treatment; or,
  - contact Medical Control for further orders.

- If efforts are initiated prior to confirmation of the valid CC/DNR Order Verification, discontinue the following resuscitative measures upon verification:
  - ⇒ CPR;
  - ⇒ ventilatory assistance;
  - ⇒ cardiac medications; and,
  - ⇒ advanced airway measures.

Established IV lines and advanced airways should remain in place.

Documentation: When a CC/DNR Order Verification Form is encountered by EMS personnel, it shall be documented. EMS personnel must also document palliative care provided to the patient and that the CC/DNR Order Verification Form is current and valid. Ambulance service personnel must document the presence of the CC/DNR Order Verification on the ambulance trip record.

Revocation: EMS personnel are not to honor any DNR request where the CC/DNR Order Verification Form is void or not intact. If there is a CC/DNR Order Verification Form and it indicates a revocation, EMS personnel shall resuscitate.
The CC/DNR Order Verification may be revoked by the patient at any time, regardless of mental or physical condition, by the destruction or affirmative revocation of the CC/DNR Order Verification, or by his or her direction that the CC/DNR Order Verification not be followed by out-of-hospital providers or be destroyed. Patients shall be instructed, upon revocation, to destroy the CC/DNR Order Verification Form and the underlying DNR order.
If an individual identifying him/herself as the health care agent or guardian revokes the CC/DNR Order Verification, EMS personnel shall resuscitate, as this raises an issue of doubt as to the validity of the CC/DNR Order Verification.
EMS personnel, upon witnessing or verifying a revocation, shall communicate that revocation in writing to the hospital to insure its inclusion in the patient's medical record. Ambulance service personnel shall document the revocation on the ambulance trip record.

- **In any situation where EMS personnel have a good faith basis to doubt the continued validity of the CC/DNR Order Verification, EMS personnel shall resuscitate.**

Date: original, April 8, 1999; updated, January 22, 2007

APPENDIX C: WITHHOLDING AND CESSATION OF RESUSCITATION

Purpose: 1) To clarify for EMS services and their EMTs when resuscitative measures may be withheld for patients in cardiac arrest and 2) to define when EMTs can cease resuscitative measures already initiated.

Background and EMS Services' Training/Support Services Obligations:

Emergency Medical Technicians must begin or continue resuscitative measures for all patients in cardiac arrest except as indicated in this Protocol (also issued as Administrative Requirement (A/R) 5-515). If in doubt, begin resuscitative efforts.

All EMS services must provide appropriate training on management of death in the field, including legal, procedural, and psychological aspects; and access to support services.

EMS services and EMS personnel should be aware that the nursing staff of a health care facility, such as a skilled nursing facility, may need a physician order (including a medical control physician's order, if allowed by nursing home policy) to halt resuscitation attempts, even in the case of patients meeting EMS "obvious death" criteria, as set out below. Nursing staff and EMS personnel should come to a cooperative decision on continuation or termination of resuscitation; this process may include obtaining physician input and orders. If the medical professionals at the bedside are unable to reach agreement on attempting or terminating efforts, the presumption should be to continue resuscitative efforts and transport the patient to an emergency department.

I. Exceptions to Initiation of Resuscitation

Other than in overriding circumstances such as a large mass-casualty incident or a hazardous scene, the following are the **only** exceptions to initiating and maintaining resuscitative measures in the field:

1. Current, valid DNR, verified per the Comfort Care Protocol.
2. Trauma inconsistent with survival
    a. Decapitation: severing of the vital structures of the head from the remainder of the patient's body
    b. Transection of the torso: body is completely cut across below the shoulders and above the hips
    c. Evident complete destruction of brain or heart
    d. Incineration of the body
    e. Cardiac arrest (i.e. pulselessness) documented at first EMS evaluation when such condition is the result of significant blunt or penetrating trauma and the arrest is obviously and unequivocally due to such trauma, EXCEPT in the specific case of arrest due to penetrating chest trauma and short transport time to definitive care (in which circumstance, resuscitate and transport)

3. Body condition clearly indicating biological death.
    a. Complete decomposition or putrefaction: the skin surface (**not** only in isolated areas) is bloated or ruptured, with sloughing of soft tissue, and the odor of decaying flesh.
    b. Dependent lividity and/or rigor: when the patient's body is appropriately examined, there is a clear demarcation of pooled blood within the body, and/or major joints (jaw, shoulders, elbows, hips, or knees) are immovable.

Procedure for lividity and/or rigor: All of the criteria below must be established and documented in addition to lividity and/or rigor in order to withhold resuscitation:

APPENDIX C: WITHHOLDING AND CESSATION OF RESUSCITATION (cont.)

i. Respirations are absent for at least 30 seconds; **and**
ii. Carotid pulse is absent for at least 30 seconds; **and**
iii. Lung sounds auscultated by stethoscope bilaterally are absent for at least 30 seconds; **and**
iv. Both pupils, if assessable, are non-reactive to light.

II. Cessation of Resuscitation by EMTs

Emergency Medical Technicians must continue resuscitative measures for all patients in cardiac arrest unless contraindicated by one of the exceptions below.

1. EMTs, certified at the Basic, Intermediate and Paramedic levels, may cease resuscitative efforts at any time when any "Exception to Initiation of Resuscitation" as defined in I., above, is determined to be present.

2. EMTs certified at the **Paramedic level only** may cease resuscitative efforts in an adult patient 18 years of age or older, regardless of who initiated the resuscitative efforts, without finding "obvious death" criteria **only** by the following procedure, and **only** if the EMS system's Affiliate Hospital Medical Director has approved of use of this procedure, as follows:
   a. There is no evidence of or suspicion of hypothermia; **AND**
   b. Indicated standard Advanced Life Support measures have been successfully undertaken (including for example effective airway support, intravenous access, medications, transcutaneous pacing, and rhythm monitoring); **AND**
   c. The patient is in asystole or pulseless electrical activity (PEA), and REMAINS SO persistently, unresponsive to resuscitative efforts, for at least twenty (20) minutes while resuscitative efforts continue; **AND**
   d. No reversible cause of arrest is evident; **AND**
   e. The patient is not visibly pregnant; **AND**
   f. An on-line medical control physician gives an order to terminate resuscitative efforts.

Special Considerations and Procedures:

1. a. If during transport, EMTs cease resuscitation of a patient in accordance with the requirements above, they shall continue to the closest appropriate hospital for pronouncement of death. This is always a special circumstance that is in the interest of public health and safety, and thus meets the requirements of 105 CMR 170.365.
   b. During transports when resuscitative efforts have appropriately been ceased in accordance with the requirements above, EMTs must cover the person with a sheet, transport without the use of emergency vehicle audible and visual warning devices, and notify the receiving hospital in advance.

2. In all cases where EMTs have withheld or ceased resuscitative efforts in accordance with the requirements above, and left the person in the field, procedures must include notification of appropriate medical or medico-legal authorities, such as police.

3. EMS trip record documentation must reflect the criteria used to determine obvious death or allow cessation of resuscitative efforts.

APPENDIX D: EMERGENT AIRWAY PROTOCOLS (ADULT)

The **Emergent Airway Protocol** may be used in conjunction with any other protocol requiring airway control by those authorized to perform endotracheal intubation. When confronted with an airway that is evaluated as **unstable* (e.g., *unsuccessful intubation after a total of 3 attempts, unable to clear a foreign body airway obstruction, airway grading*** (Figure 1 & 2) *suggests intubation unlikely*)**, advanced providers should utilize alternate equipment and training to gain control of the airway. Additionally, if the Emergency Medical Technician is unable to ventilate the patient, a determination should be made as to whether this inability is due to a manageable cause (e.g., *poor technique, equipment failure, mask size, mask seal*) and corrective measures applied, when applicable.

****Grade: Assessment of patient's airway to determine if there is expected difficulties with regard to intubation, i.e., anatomical alignment of the airway for ventilation.**

ASSESSMENT / TREATMENT PRIORITIES

1. Determine if the patient's airway is unstable***.**
2. Ensure scene safety and maintain appropriate body substance isolation precautions.
3. Maintaining grading**** (Figure 1 & 2)** of the patient's airway.
4. Continue Bag-Valve-Mask (BVM) management with supplemental oxygen with oropharyngeal or nasopharyngeal adjuncts, (OPA or NPA) in place.
5. Initiate transport as soon as possible
6. Follow AHA & ARC guideline for management of the adult FBAO.

TREATMENT

INTERMEDIATE PROCEDURES

ALS STANDING ORDERS

1. Arrange for Paramedic intercept

2. After completing your assessment as listed above:
   a. Provide Rescue Airway Management.
   b. If BVM failure is the result of a manageable cause.
      - Apply countermeasures if applicable
   c. If the patient can be ventilated, the airway is unstable and the treating Intermediate has been duly authorized by the Service's Medical Director in use of an alternative airway (LMA or Combitube):
      - Insert the Laryngeal Mask Airway (LMA) or Combi-Tube
   d. Initiate IV Normal Saline en route to the hospital.
   e. If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 cc bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status
   f. Notify receiving hospital.

3. After use of an emergent airway, the treating intermediate will:
   a. Document appropriate airway placement with all of the following that apply to the method used:

APPENDIX D: EMERGENT AIRWAY PROTOCOLS (ADULT)

- Visualization of the tube passing through the vocal cords
- Appropriate bilateral breath sounds, lack of epigastic sounds
- Rise and fall of chest wall with ventilations
- Mist in the tube
- Rising pulse oximeter
- Positive ETCO2 device or Esophageal Device
- Note depth of device after securing
- Continued reassessment of placement

b. Fill out optional airway QA form as required by service

PARAMEDIC PROCEDURES

ALS-P STANDING ORDERS

1. After completing your assessment as listed above:
   a. Provide Rescue Airway Management.
   b. If BVM failure is the result of a manageable cause.
      - Apply countermeasures if applicable
   c. If the airway is unstable and the adult patient can be ventilated.
      - **In patients who require emergent intubation**
      - **Cannot be intubated by conventional means**
      - **The treating paramedic has been duly authorized by the Service's Medical Director in use of an alternative airway (LMA or Combitube)**

   To facilitate intubation:
   a. **Administer Midazolam 2.5 mg SLOW IV PUSH. Repeat if necessary to a total dose of 5.0 mg.**
   b. **If intubation is unsuccessful:**
      - **Insert the Laryngeal Mask Airway (LMA) or Combi-Tube**
   c. If the airway is unstable and the patient cannot be ventilated perform a needle cricothyrotomy and provide oxygen via jet ventilation.
   d. **Initiate IV Normal Saline (KVO) en route to the hospital**
   e. **If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 cc bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status**
   f. **Cardiac Monitoring 12 lead ECG - Manage dysrhythmias per protocol**
   g. Notify receiving hospital

2. After use of an emergent airway, the treating paramedic will:
   a. Document appropriate airway placement with all of the following that apply to the method used:
      - Visualization of the tube passing through the vocal cords
      - Appropriate bilateral breath sounds, lack of epigastic sounds
      - Rise and fall of chest wall with ventilations
      - Mist in the tube
      - Rising pulse oximeter
      - Positive ETCO2 device or Esophageal Device
      - Note depth of device after securing
      - Continued reassessment of placement
   b. Fill out optional airway QA form as required by service

APPENDIX D: EMERGENT AIRWAY PROTOCOL (ADULT)

Grade: Assessment of patient's airway to determine if there is expected difficulties with regard to intubation. i.e. anatomical alignment of the airway for ventilation.

Figure 1 depicts the Cormack & LeHane laryngoscopy classifications.

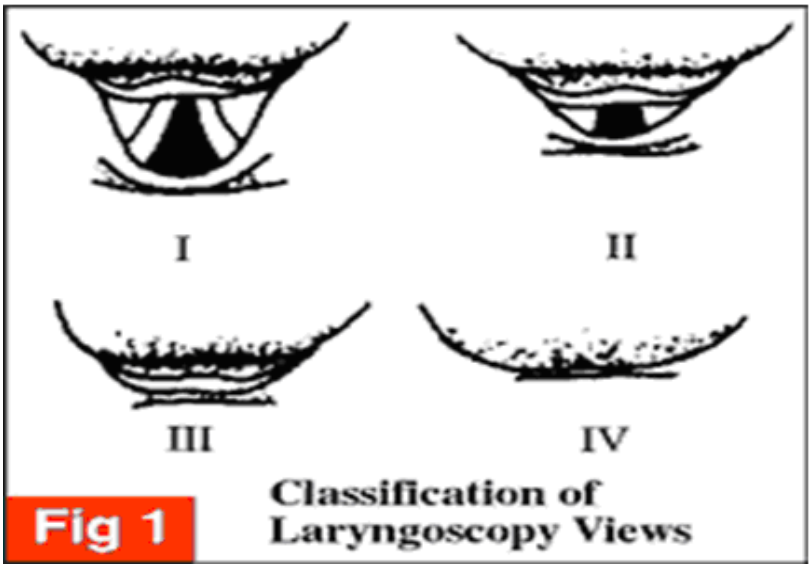


Figure 2 depicts the Mallampati system of airway grading, generally performed with patient sitting in full fowlers position with tongue extended.

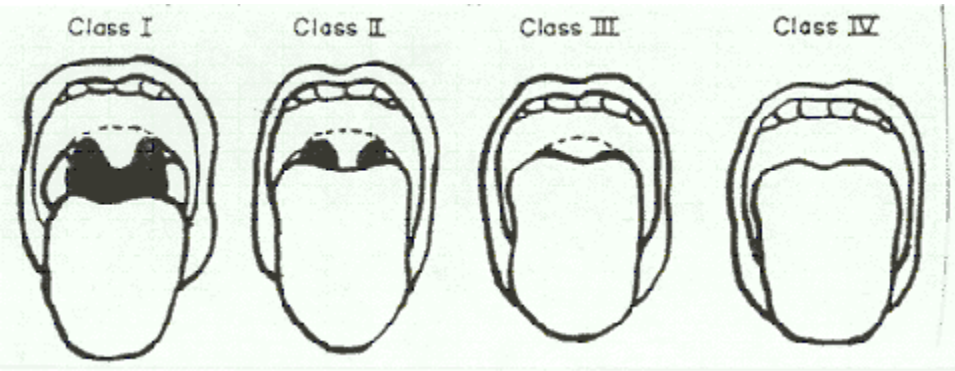


Fig 2

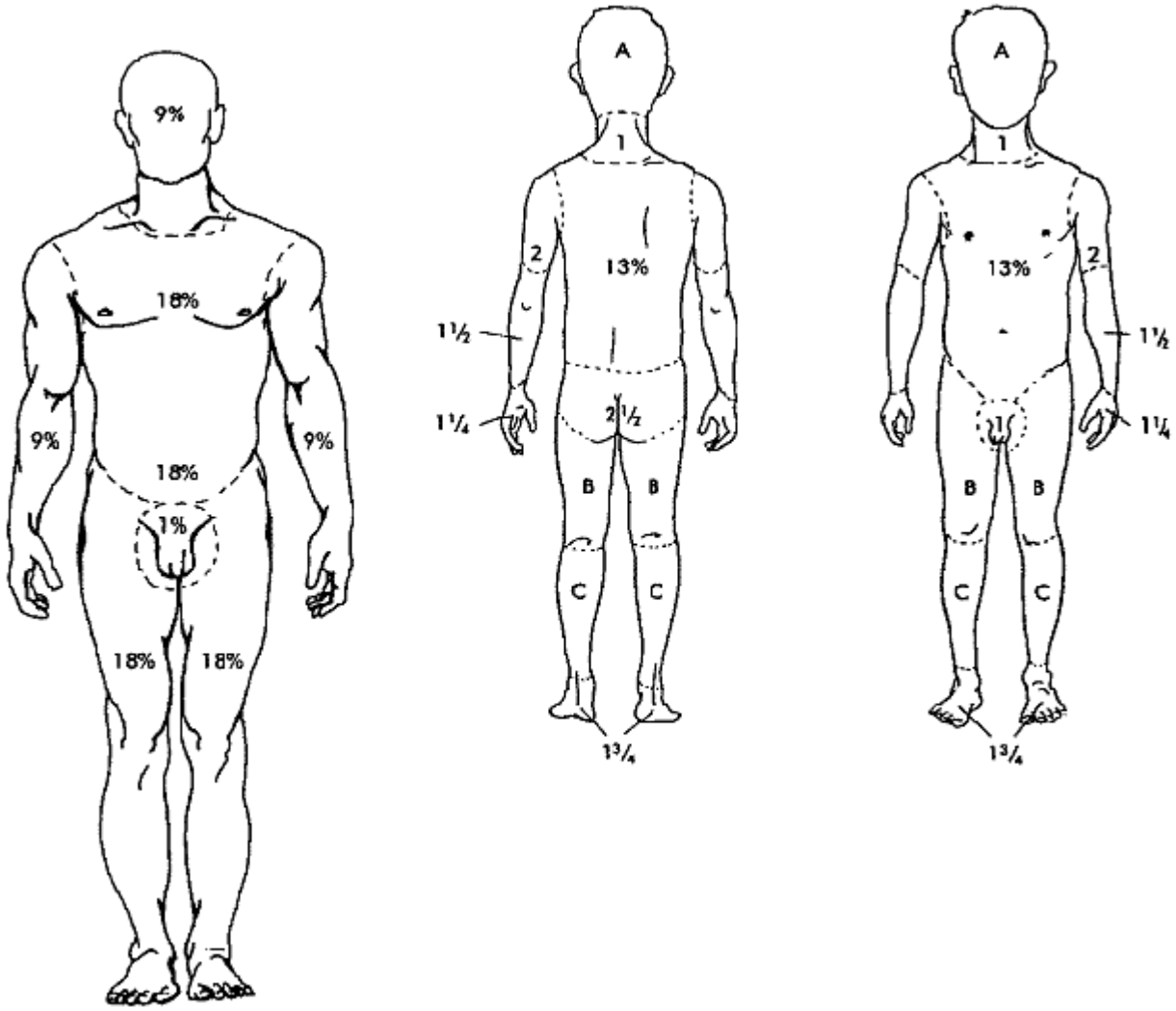
APPENDIX E: ENDOTRACHEAL TUBE SIZES

Suggested Sizes for Endotracheal (ET) Tubes:

Age	Internal Diameter of Tube in mm
Newborn	3.0
6 Months	3.5
18 Months	4.0
3 Years	4.5
5 Years	5.0
6 Years	5.5
8 Years	6.0
12 Years	6.5
16 Years	7.0

APPENDIX F: BURN CHART (Adult & Pediatric)

Lund & Browder Chart



Estimation of Burn Size (Children)

Area	Age 0	1 yr.	5 yr.	10 yr.	15 yr.
A - 1/2 of head	9 1/2 %	8 1/2 %	6 1/2 %	5 1/2 %	4 1/2 %
B - 1/2 of one thigh	2 3/4 %	3 1/4 %	4 %	4 1/4 %	4 1/2 %
C - 1/2 of one leg	2 1/2 %	2 1/2 %	2 3/4 %	3 %	3 1/4 %

APPENDIX G: TRAUMA SCORES

GLASGOW COMA SCORE	
Eye Opening:	
Spontaneous	4
To Voice	3
To Pain	2
None	1
Verbal Response:	
Oriented	5
Confused	4
Inappropriate Words	3
Incomprehensible Words	2
None	1
Motor Response:	
Obeys Command	6
Localizes Pain	5
Withdrawn (Pain)	4
Flexion (Pain)	3
Extension (Pain)	2
None	1
Total GCS Score:	3 - 15

Total GCS Points	
14 - 15	5
11 - 13	4
8 - 10	3
5 - 7	2
3 - 4	1

Revised Trauma Score

GCS	SBP	RR	Coded Values
13 - 15	>89	10 - 29	4
9 - 12	76 - 89	>29	3
6 - 8	50 - 75	6 - 9	2
4 - 5	1 - 49	1 - 5	1
3	0	0	0

SBP = Systolic Blood Pressure, RR = Respiratory Rate

APPENDIX G: TRAUMA SCORES

CALCULATION OF TRAUMA SCORE USING THE GLASGOW COMA SCALE

Glasgow Coma Scale

Eye Opening Response:	Spontaneous	4
	To Voice	3
	To Pain	2
	None	1
Best Verbal Response:	Oriented	5
	Confused	4
	Inappropriate Words	3
	Incomprehensible Sounds	2
	None	1
Best Motor Response:	Obey Command	6
	Localizes Pain	5
	Withdraws (Pain)	4
	Flexion (Pain)	3
	Extension (Pain)	2
	None	1
Total:	Apply this score to GCS portion of TS Below:	3 - 15

Trauma Score

GCS: (total points from above)	14 - 15	5
	11 - 13	4
	8 - 10	3
	5 - 7	2
	3 - 4	1
Respiratory Rate:	10 - 24 / Min.	4
	25 - 35 / Min.	3
	36 Min. or greater	2
	1 - 9 / Min.	1
	None	0
Respiratory Expansion:	Normal	1
	Retractive / None	0
Systolic Blood Pressure:	90 mm Hg or greater	4
	70 - 89 mm Hg	3
	50 - 69 mm Hg	2
	0 - 49 mm Hg	1
	No Pulse	0
Capillary Refill:	Normal	2
	Delayed	1

None	0
Total Trauma Score:	1 - 16

Trauma Score	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Percentage Survival	99	98	96	93	87	76	60	42	26	15	8	4	2	1	0	0

APPENDIX G - TRAUMA SCORES

COMPONENTS OF THE PEDIATRIC TRAUMA SCORE

	Values		
Component	**+2**	**+1**	**-1**
Size	≥ 20 kg	10 - 20 kg	≤ 10 kg
Airway	Normal	Maintainable	Unmaintainable
CNS	Awake	Obtunded	Coma
SBP	≥ 90 mm Hg	50 - 90 mm Hg	≤ 50 mm Hg
Open Wound	None	Minor	Major
Skeletal Injuries	None	Closed Fracture	Open or Multiple Fractures

CNS: Central Nervous System, SBP: Systolic Blood Pressure

APPENDIX H: REQUIRED SKILLS

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APPENDIX I: PROCEDURES

The following conditions must be met in order for your service to provide the following treatment as listed below:

1. Your medical director must have authorized you as an EMT to utilize the procedures in this Appendix to the Protocols based on your level of certification.

2. The minimum standard training component must be achieved as outlined by DPH/OEMS.

BLS:
a. Albuterol Administration via Nebulizer (Service Option), see advisory of 11/1907, at OEMS website.
b. Glucometry, see AR 5-520, at OEMS website.

ALS:
a. Needle Cricothyroidotomy, see below.

ALS: Needle Cricothyrotomy (Approved for Paramedics Only)

The following is a general description of one of several accepted techniques being used throughout the Commonwealth, and may be used as a guideline. Due to differences in medical devices used by individual systems, the procedure may vary slightly. Refer to your local and regional guidelines for the technique and equipment used in your system.

Note: Appropriate body substance isolation precautions are required whenever caring for the trauma patient.

Indications: The indications for performing a needle Cricothyrotomy on a patient will be:

1. **The patient is in imminent danger of death.**
2. **No alternative airway device/maneuver has been successful.**
3. **The patient cannot be oxygenated or ventilated by any other means**

The local EMS Medical Director has appropriately trained and authorized the treating EMT-Paramedics.

Examples of types of patients potentially meeting the above criteria include (but are not limited to):

1. **Patients suffering traumatic arrest**
2. **Patients suffering multiple traumatic injuries**
3. **Patients suffering an upper airway obstruction**

Recognizing the time critical nature of the emergency, Needle Cricothyrotomy will be a Standing Order for patients/systems/paramedics meeting all of the above criteria.(See Also Emergent Airway Protocol Appendix)

A. Assemble and prepare oxygen tubing by cutting a hole toward one end of the tubing. Connect the other end of the oxygen tubing to an oxygen source, capable of delivering 50 psi or greater at the nipple, and assure free flow of oxygen through the tubing.

B. Place the patient in a sitting position.

C. Assemble a #12 or 14-gauge, 8.5 cm, over-the-needle catheter to a 6- to 12-mL syringe.

D. Clean the neck with an aseptic technique, using antiseptic swabs.

E. Palpate the cricothyroid membrane, anteriorly, between the thyroid cartilage and cricoid cartilage. Stabilize the trachea with the thumb and forefinger of one hand to prevent lateral movement of the trachea during the procedure.

F. Puncture the skin midline with the needle attached to a syringe, directly over the cricothyroid membrane (i.e., mid-saggital).

G. Direct the needle at a 45 degree angle caudally, while applying negative pressure to the syringe.

H. Carefully insert the needle through the lower half of the cricothyroid membrane, aspirating as the needle is advanced.

I. Aspiration of air signifies entry into the tracheal lumen,

J. Remove the syringe and withdraw the stylet while gently advancing the catheter downward into position, being careful not to perforate the posterior wall of the trachea,

K. Attach the oxygen tubing over the catheter needle hub (you may use a 4.0 ET tube connector), and secure the catheter to the patient's neck.

L. Intermittent ventilation can be achieved by occluding the open hole cut into the oxygen tubing with your thumb for one second and releasing it for four seconds. After releasing your thumb from the hole in the tubing, passive exhalation occurs. Note: Adequate PaO2, can be maintained for only 30 to 45 minutes.

M. Continue to observe lung inflations and auscultate the chest for adequate ventilation.

Complications of Needle Cricothyrotomy

1. Asphyxia
2. Aspiration
3. Cellulitis
4. Esophageal perforation
5. Exsanguinating hematoma
6. Hematoma
7. Posterior tracheal wall perforation
8. Subcutaneous and/or mediastinal emphysema
9. Thyroid perforation
10. Inadequate ventilations leading to hypoxia and death

APPENDIX J: AIR MEDICAL TRANSPORT PROTOCOLS

Introduction:

The use of air medical services has become the standard of care for many critically ill or injured patients who require transport to specialized medical facilities such as Trauma Centers.

The purpose of these Guidelines is to establish a clinical framework for prehospital EMS personnel upon which to make decisions regarding when to access air medical support services. The following constitute the philosophical foundation for these Guidelines.

- EMS personnel should consider requesting ground advanced life support (ALS) and air medical support when operational conditions listed below exist and the following patient conditions are present;

- Patients with an uncontrolled or compromised airway should be brought to the nearest appropriate facility unless advanced life support (ALS) service (by ground or air) can intercept in a more timely fashion; and:

- Patients in cardiac arrest subsequent to blunt trauma should be taken to the nearest facility.

These guidelines have been established so that air medical support does not require prior Medical Control approval. However, Medical Control contact should be considered whenever appropriate for patient management issues.

OPERATIONAL CONDITIONS:

1. When a patient meets patient criteria defined below and scene arrival time to estimated arrival time at the nearest appropriate hospital, including extrication time, exceeds 20 minutes:
2. Patient location, weather or road conditions preclude the use of standard ground ambulance; or
3. Multiple casualties / patients are present which will exceed the capabilities of local hospital and agencies.

PATIENT CONDITIONS:

1. Physiologic Criteria:

a. Unstable Vital Signs
   - -Blood Pressure less than 90.
   - -Respiratory Rate greater than 30 or less than 10.

2. Anatomic Injury:

a. Evidence of Spinal Cord injury including paralysis or paresthesia.

b. Severe Blunt Trauma:
   - -head injury (Glasgow Coma Scale of twelve [12] or less)
   - -severe chest or abdominal injury.
   - -severe pelvic injury excluding simple hip fractures.

c. Burns:
   - - greater than 20% Body Surface Area (BSA) second or third degree burns;
   - - evidence of airway or facial burns;
   - - circumferential extremity burns; or
   - - burns associated with trauma.

d. Penetrating injuries of head, neck, chest, abdomen or groin.

APPENDIX J: AIR MEDICAL TRANSPORT PROTOCOLS (Cont.)

e. Amputations of extremities, excluding digits.

Special Conditions: The following should be considered in deciding whether to request air medical transport, but are **not** automatic or absolute criteria:

1. **Mechanism of Injury**
   a. Motor Vehicle Crash:
      -patient ejected from vehicle.
      -death in same passenger compartment.
   b. Pedestrian struck by a vehicle and thrown more than 15 feet, or run over by a vehicle.

2. **Significant Medical History**
   a. Age greater than 55 or less than 10.
   b. Significant coexistent illness.
   c. Pregnancy.

APPENDIX K: PROCESS FOR CHANGES TO THE STATEWIDE TREATMENT PROTOCOLS

All changes (any addition, deletion, or any other type of amendment) to the Massachusetts Statewide Pre-Hospital Treatment Protocols require statewide dissemination and often require training of EMTs and Medical Control physicians prior to implementation. Therefore, to ensure a thorough review and orderly implementation, all protocol changes shall be approved and implemented on an ANNUAL basis, with the exception of those arising out of procedures described in Part B below.

Any protocol change must be approved pursuant to the following procedures.

PART A
Procedures for ANNUAL Protocol Changes

1. All requests for protocol changes shall be submitted by at least one Regional Medical Director to the Medical Services subcommittee. The request for a protocol change shall include the following:
    a. A detailed description of the proposed change;
    b. A formal written endorsement from the Region(s) of origin for the proposed change;

2. The Medical Services subcommittee shall review and make a recommendation regarding each proposed change to the protocols. Where training is required for implementation of the protocol change, the Medical Services subcommittee shall timely distribute the approved protocol changes to the Training subcommittee for its approval of the training component.

3. All protocol changes approved by the Medical Services Committee, with Training Committee approval of training if appropriate, shall be forwarded to the Executive Committee. The EMCAB Executive subcommittee shall review the proposed protocol changes and make a final recommendation at its meeting.

4. A presentation of the approved changes shall be made at the first meeting of the full EMCAB following the Executive subcommittee recommendation.

5. Recommendations go to DPH/OEMS for review and final action. DPH/OEMS shall timely notify all providers of approved protocol changes and any requirements regarding implementation (i.e. training and implementation date).

6. Protocol changes to be implemented by the department shall be issued no later than January 15 of each year, with implementation no later than March 15 by EMS services unless the department specifies a longer window of implementation.

PART B
Procedures for Protocol Changes Allowable Other Than on an Annual Basis

1. The State Medical Director shall have the discretion to implement immediate protocol changes when such action is deemed by the Department to be necessary for the protection of public health and safety.
    a. The State Medical Director shall base such action on a thorough review of relevant literature, any applicable national and/or state standard(s) and, when feasible, consultation with EMS Regional Councils, the Medical Services subcommittee and/or the EMCAB Executive subcommittee.
    b. When feasible, the State Medical Director shall convene an emergency meeting of the Medical Services subcommittee. The Medical Services subcommittee shall recommend

any change to the protocols, and refer its recommendation and all supporting documents relating to the proposed change to the EMCAB Executive subcommittee for action. The EMCAB Executive subcommittee shall review the recommendation and make a final recommendation to DPH/OEMS.

c. DPH/OEMS shall review such recommendation and take final action. It can also establish reasonable time frames for said implementation, particularly if a change requires training, and shall timely disseminate such a protocol change and any relevant implementation requirements.

2. DPH/OEMS shall always have the discretion to make changes to bring the Protocols into compliance with national standards of care.
   a. This shall be done, when feasible, in consultation with Regional EMS Councils, the Medical Services subcommittee, and/or EMCAB Executive subcommittee.
   b. OEMS shall establish reasonable time frames for said implementation, particularly if a change requires training, and shall timely disseminate such a protocol change and any relevant implementation requirements.

APPENDIX L: MULTIPLE CASUALTY INCIDENTS (MCI) TRIAGE

Each MCI/Disaster scene presents its own unique hazards and difficulties. This plan is a general guide to the management of MCIs. It should be understood that modifications may need to be made by command personnel on scene as such changes are needed.

A multiple casualty incident (MCI) is any situation where the number of sick or injured patients exceeds the available local, regional or state EMS system resources to provide adequate care in a timely manner to minimize injury and death. An MCI may be the result of a man made disaster or a natural event. Successful management of an MCI will require preplanning and organization of local, regional and state EMS, fire, law enforcement and civil defense resources. Hospital resources and specialized care services must also be included in preparing your MCI plan.

MCI management process is defined in the Incident Command System (ICS). In general, the Fire Department establishes the overall command and designates the incident commander (IC). **NOTE:** Other agencies may function as the IC, for example, Law Enforcement agencies at a crime scene or hostage situation. Other agencies may assist the IC. Clear precise inter-agency communication networks must be established for successful MCI management.

Levels of response to an MCI can be developed and will dictate which personnel and resources will be required at the scene. These levels include:

Level I Response: A localized MCI that can be managed by local EMS and Rescue personnel without the need for mutual aid from outside organizations.
Level II Response: An MCI that overwhelms or severely taxes local EMS and Rescue personnel that requires the need for mutual aid and interagency coordination. Typically a large number of patients are involved.
Level III Response: An MCI that overwhelms both local and regional EMS and rescue resources. Multiple patients spread over multiple sites are often involved. Significant inter-agency coordination is required.

TRIAGE

Triage is a special process of sorting patients by the severity of injury or illness to determine the need of emergency care and transportation. This needs to be a continuous process throughout the management of an MCI. The initial triage process should be performed by the first crew to arrive on scene and needs to be continuously reevaluated since the patient's triage status may change. Presently there are no national standard guidelines established for triage. Massachusetts services in general will be using a form of the SMART TAG system, while New England services in general use START triage and compatible tagging methods.

APPENDIX L - MULTIPLE CASUALTY INCIDENTS / TRIAGE (cont.)

MCI triage and treatment priorities are generally defined as:

Zero priority (BLACK):	Deceased or live patients with obvious fatal and non-resuscitatable injuries
First priority (RED):	Severely injured patients requiring immediate care and transport. (e.g., respiratory distress, thoracoabdominal injury, severe head or maxillofacial injuries, shock/severe bleeding, severe burns)
Second priority (YELLOW):	Patients with injuries that are determined not to be immediately life threatening. (e.g., abdominal injury without shock, thoracic injury without respiratory compromise, major fractures without shock, head injury/cervical spine injury, and minor burns)
Third priority (GREEN):	Patients with minor injuries that do not require immediate stabilization. (e.g., soft tissue injuries, extremity fractures and dislocations, maxillofacial injuries without airway compromise and psychological emergencies)

SCENE ASSESSMENT AND TRIAGE PRIORITIES

1. Maintain universal blood and body fluid precautions.
2. The initial response team should assess the scene for potential hazards, safety and number of victims to determine the appropriate level of response.
3. Notify central dispatch to declare an MCI and need for interagency support as defined by incident level.
4. Identify and designate the following positions as qualified personnel become available:
5. Identify and designate sector areas of MCI
6. Post incident MCI Plan

BASIC, INTERMEDIATE,, AND PARAMEDIC MCI PROCEDURE SUMMARY

All EMT level personnel will eventually be involved in the management of an MCI. It is imperative that all EMTs implement the above incident command system (ICS) in all MCI situations. Every EMT must be aware and have a thorough knowledge of their particular role and responsibilities in the rescue effort.

Due to the many complexities of MCI/Disaster situations, it is recommended that all EMTs should participate and receive additional training in MCI/Disaster management.

Note that MCI response may entail use of a close hospital as a “triage” facility with further transport from that site by EMS. While state regulations cannot supersede Federal laws (e.g. EMTALA), OEMS recognizes that such actions may be in the best interest of patient care.

APPENDIX M: PEDIATRIC VITAL SIGNS CHART

PEDIATRIC EMERGENCY REFERENCE

Age Years	Weight Kg	Resp Rate	Heart Rate	Systolic Blood Pressure	Resus. Mask	Self Inflating Bag	Laryng-oscope Blade	ET Tube Size mm	ET Tube Lip Line cm	Suction Cath. Fr.	Naso/Oro Gastric Tube	BP Cuff cm
Newborn	3 - 5	30-60	100 - 160	60-80	Infant 0-1	Pediatric	O Miller	3.0	9.0	6	8	5
6 mos.	7	25-40	90-120	80-100	1	Pediatric	1 Miller	3.5	10.5	8	8	5
1 yr.	10	20-30	90-120	80-100	1-2	Pediatric	1 Miller	3.5	10.5	8	8	5
18 mos.	12	20-30	80-120	80-110	2	Pediatric	1 Miller	4.0	11.5	10	8	5
3 yrs.	15	20-30	80-120	80-110	3	Pediatric	2 Miller	4.5	14.0	10	10	5
5 yrs.	20	18-24	70-110	80-110	3	Pediatric	2 Miller	5.0	15.0	10	10	7
6 yrs.	20	18-24	80-100	80-110	3	Pediatric	2 Miller	5.5	16.5	10	10	7
8 yrs.	25	18-24	70-110	80-110	3	Adult	2 Miller	6.0	18.0	14	10	9.5
10 yrs.	30	16-20	70-110	90-120	3	Adult	2 Miller	6.0	18.0	14	12	9.5
12 yrs.	40	16-20	60-110	90-120	4	Adult	2 Miller 2 Mac	6.5	19.5	14	12	9.5
14 yrs.	50	16-20	60-105	90-120	4-5	Adult	3 Miller 3 Mac	7.0	21.0	14	14	Adult
16 yrs.	60	16-20	60-80	80-120	4-5	Adult	3 Miller 3 Mac	7.5	21.5	14	14	Adult
18 yrs.	70	16-20	60-80	80-120	5	Adult	3 Miller 3 Mac	7.5	21.5	16	16	Adult

APPENDIX M: PEDIATRIC VITAL SIGNS CHART

PEDIATRIC EMERGENCY REFERENCE

PEDIATRIC TRAUMA SCORE

Component	+2	+1	-1
Size	>20kg	10-20kg	<10kg
Airway	Normal	Maintainable	Not Maintainable
CNS	Awake	Obtunded	Comatose
Systolic BP	>90 mmHg	90-60 mmHg	<50 mmHg
Open Wound	None	Minor	Major/Penetrating
Skeletal	None	Closed	Open/Multiple Fx

*** Pediatric Trauma Center if PTS is 8 or less.**

AIRWAY MANAGEMENT

ABCs, 100% Oxygen
Bag-Valve-Mask
Suction with rigid catheter
Oropharyngeal airway
Laryngoscope with blade
Endotracheal tube/Stylet
SaO_2
End-tidal CO_2

LEVEL OF RESPONSE

A =Alert
V =Responds to Voice
P =Responds to Pain
U =Unresponsive

PUPILLARY ASSESSMENT

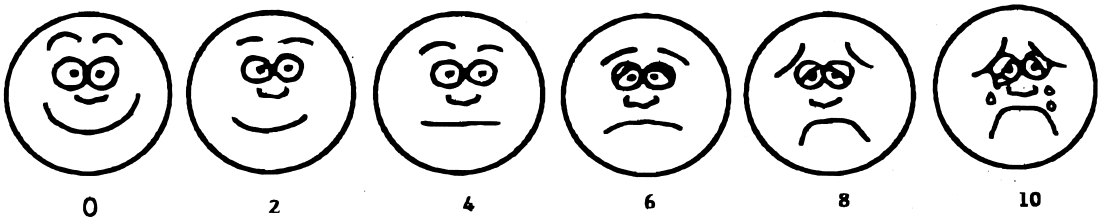
Pupil size in mm/reaction

N = Normal S =Sluggish F =Fixed

3mm 4mm 5mm 6mm 7mm 8mm

APPENDIX M: PEDIATRIC EMERGENCY REFERENCE (con't)

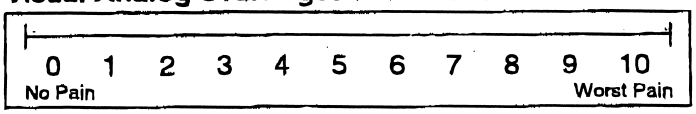
Wong-Baker Faces Pain Rating Scale



FLACC Scale

Categories	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractable	Difficult to console or comfort
Each of the five categories (F) Face; (L) Legs; (A) Activity; (C) Cry; (C) Consolability is scored from 0-2, which results in a total score between zero and ten.			

Visual Analog Scale *ages 7 and above*



APPENDIX N: ALS INTERFACILITY TRANSFER GUIDELINES

Minimum Standards for Interfacility Transfers:

1. Staffing, Training

   Minimum staffing at the Intermediate level requires one EMT-Basic and one EMT-Intermediate. Minimum staffing at the Paramedic level requires one EMT-Paramedic and EMT-Intermediate or EMT-Basic, in accordance with 105 CMR 170.305(C)(2).

   EMTs providing patient care during Interfacility Transfers must meet the following requirements as outlined in 105 CMR 170.000 et al:

   a. current certification as an EMT in Massachusetts;
   b. completion of Department approved supplemental training that is specific to and consistent with levels of certification of involved EMTs and includes
      - expanded roles and responsibilities
      - additional, approved treatment modalities, equipment, devices, and technologies; and
      - ambulance service policies and procedures regarding ALS Interfacility Transfers
   c. has maintained current authorization to practice pursuant to the Affiliate Hospital Medical Director's review of clinical competency

   Guidelines for approved ALS Interfacility Transfer training programs have been issued separately by the Department. It shall be the responsibility of the transferring ambulance service to ensure and to verify appropriate training of its personnel providing ALS Interfacility Transfers.

2. Affiliation Agreements; Medical Control

   An ambulance service must be licensed at an ALS level by the Department to provide ALS care during Interfacility Transfers, and it must maintain an affiliation agreement, in accordance with 105 CMR 170.300, with a hospital licensed by the Department for Medical Control, pursuant to 105 CMR 130.1501-130.1504 of the Hospital Licensure regulations. Such affiliation agreements must designate an Affiliate Hospital Medical Director (105 CMR 170.300(A)(2) and 105 CMR 130.1502(C)), whose medical oversight functions are defined in 105 CMR 130.1503. Standards for Affiliate Hospital Medical Directors are defined in 105 CMR 130.1504.

3. Communications:

   All communications with a Medical Control physician must be recorded.

4. Scope of Practice:

   Section 170.360(A) of the EMS Regulations states, "No ambulance service or agent thereof shall transport a patient between health care facilities who is receiving medical treatment that is beyond the training and certification capabilities of the EMTs staffing the ambulance unless an additional health care professional with that capability accompanies the patient..." Depending on the individual's condition, there may be situations in which a physician or some other specialist's presence might be necessary; such determination shall be made by the on-line medical control physician in consultation with the physician at the sending hospital. All involved in this decision should consider whether the benefits of the transfer sufficiently outweigh the risks; a patient's greatest benefit may result from being transported by a standard IFT crew to a higher level of hospital care rather than delay for other transport.

   The scope of practice for each EMT level is defined (1) in regulation (105 CMR 170.810, 170.820 and 170.840), (2) through established training programs approved by the Department, and (3) through the Statewide Treatment Protocols consistent with the Interfacility Transfer Guidelines.

The following are patient condition classifications and corresponding requirements for EMT personnel during ambulance transport:

a. Routine, scheduled transport; Patient clearly stable for transport with no requirement for airway management, IV maintenance and/or cardiac monitoring.

   Minimum Staffing: BLS licensed ambulance service; two EMT-Basics

b. Patient clearly stable for transport (as above) who has a "maintenance" IV running without additives; (e.g., cancer patient transported for radiation therapy, with unadulterated crystalloid IV solution running).

   Minimum Staffing: ALS-Intermediate licensed ambulance service; one EMT-Intermediate attending to patient care and one EMT-Basic driving

c. Patient with an acute or sub acute problem, who is either completely or, at least, to the best of a facility's ability, stabilized; who has the potential to become less stable during transport. Instrumentation or medication running must be consistent with the Interfacility Transfer Guidelines.

   Minimum Staffing: ALS-Paramedic licensed ambulance service; one EMT-Paramedic and one EMT-Intermediate or EMT-Basic, in accordance with 105 CMR 170.305(C)(2). The EMT with the highest level of certification must attend to patient care.

d. Patient with an acute problem with high potential to become unstable; Critical care patient with any other instrumentation or medication running that is not included in the Interfacility Transfer Guidelines.

   Minimum Staffing: Appropriate additional medical personnel (per 105 CMR 170.360(A)) must accompany the patient during transfer; any level of ambulance service licensure; two EMT-Basics. The ALS Interfacility Transfer Subcommittee recommends that the referring hospital consider Critical Care Transport for such a patient. In the event that CCT is unavailable, medical personnel accompanying the patient must be able to manage all equipment and instrumentation associated with the patient's care and provide advanced resuscitative measures if needed.

e. Critical Care Transports (see 105 CMR 170.000, for regulatory requirements regarding critical care transport).

Under no circumstances shall EMTs function or be assigned to transfers beyond, or potentially beyond, the scope of their training and level of certification. The scope of practice for all EMTs is limited to the levels of EMT certification and training and by licensure level of the ambulance service by which they are employed.

If (1) a patient's medical condition necessitates immediate transport to another health care facility and (2) the patient's medical treatment during transport will exceed the level of licensure of the transferring ambulance service and/or level of certification of the transferring ambulance's personnel, and (3) the transferring facility will not provide appropriate additional personnel pursuant to 105 CMR 170.360(A), Critical Care Transport by ground or air should be employed.

The transferring facility may at any time opt to exceed these minimum requirements by transferring patients in BLS ambulances with appropriate medical personnel as defined in 170.360(A) or by Critical Care Ground or Air Transport.

5. Quality Assurance/Quality Improvement

   a. Ambulance services providing ALS Interfacility Transfers shall be required to have quality assurance/quality improvement policies specific to ALS Interfacility Transfers in conjunction with both their affiliate hospital medical directors and their ambulance service medical directors, if any, and include at a minimum:
      - review of appropriateness of transfers, denials, and conformance with EMTALA regulations;
      - review of critical skills (e.g., intubations, cardiac arrest management, IV therapy), and other measures of system function as deemed appropriate by the Department;
      - steps for system improvement and individual remediation, available for Department review, of cases found to be deficient in critical interventions

   b. Ambulance services shall report to the Department and the Affiliate Hospital Medical Director any violations of 105 CMR 170.000, this Administrative Requirement and/or prevailing treatment protocols as they relate to ALS Interfacility Transfers.

   c. EMT skill maintenance and didactic knowledge will be continually assessed and appropriate measures taken to ensure quality of patient care by affiliate hospital medical directors and by ambulance service medical directors, if any.

Patient ALS Transfer Procedure

Once an ALS Interfacility Transfer has been deemed appropriate by the transferring ambulance service (see “Scope of Practice” above), paramedic staff, upon arrival at the transferring facility, will:

- receive a report from the staff of the transferring facility;
- assess the patient; and
- in cases where the patient’s care during the transfer exceeds the standing-order scope of practice as defined by the current version of the Statewide Treatment Protocols for an EMT-Paramedic or the patient is unstable or is likely to become unstable as defined previously (see “Scope of Practice” above) will provide a concise, complete and accurate patient report to an On-Line Medical Control physician, according to the EMS service’s and the Affiliate Hospital’s policies and procedures. When EMTs have a concern regarding the safety of the patient being transferred, the EMT-Paramedic will contact an On-Line Medical Control physician for guidance.

The report should include, at a minimum, the following information:

a. Names of transferring and receiving facilities;
b. Patient’s diagnosis;
c. Reason(s) for transfer;
d. Brief history of present illness and any intervention(s) which has occurred to date;
e. Pertinent physical findings;
f. Vital signs;
g. Current medications and IV infusions;
h. Presence of or need for additional medical personnel;
i. Anticipated problems during transport, if any;
j. Anticipated transport time; and
k. Staffing configuration of the transporting ambulance

NOTE: Complete copies of all pertinent medical records, including X-Rays, CT Scans, consultative notes and ECGs, as available, must accompany the patient to the receiving facility.

When necessary, the Medical Control Physician and paramedic will discuss with the transferring physician the orders for maintenance of existing and/or addition of new therapies according to the needs of the patient, within the scope of existing treatment protocols and EMT scope of practice. The Medical Control Physician will be responsible for all actions/interventions initiated by the EMS personnel during transport unless the referring physician accompanies the patient.

If the transferring physician is unavailable, or the patient is unstable, the Medical Control Physician may recommend to the transferring facility additional therapies prior to the transfer of the patient in the interest of patient safety and quality care.

In some situations, consistent with the intent of EMTALA, the transfer of a patient not stabilized for transport may be preferable to keeping that patient at a facility incapable of providing stabilizing care. If the transferring facility cannot provide appropriate medical care or appropriately trained and experienced personnel to accompany the patient, alternative means of transfer, including Critical Care Transport, must be utilized. The use of a local Emergency Ambulance Service is strongly discouraged in such a situation. All such responses must be reported by the ambulance service to the Department's Division of Health Care Quality and the Affiliate Hospital Medical Director for review. It is primarily the responsibility of the referring physician and Medical Control Physician to determine the appropriate method of transferring an unstable patient.

When a facility sends its own staff with the patient during transfer (additional medical personnel) and the patient's condition deteriorates en route, EMS personnel must contact the Medical Control Physician for appropriate intervention orders <u>and</u> notify the receiving facility of the change in patient status.

If the accompanying staff is an RN s/he will maintain patient care responsibility, functioning within his/her scope of practice and under the orders of the transferring physician. The Paramedic and the RN will work collaboratively in the provision of patient care. If the patient's condition deteriorates en route, the Paramedic may assume full responsibility in conjunction with their Medical Control Physician for care that exceeds the RN's scope of practice and/or the transferring physician's medical orders. Prior to transfer with an RN, the referring physician must contact the service's Medical Control Physician and provide staffing rationale.
.
If the accompanying staff includes a physician from the transferring facility, that physician shall be in charge of patient care. Prior to transfer, the transferring physician accompanying the patient must contact the service's Medical Control Physician and coordinate patient care between the physician-in-charge and the paramedic practicing within the Statewide Treatment Protocols. Clear lines of command and responsibility shall be established prior to transport.

<u>Interstate ALS Interfacility Transfers</u>
Interstate transfers are permitted. Paramedics must obtain Medical Control through normal channels, through the Affiliation Agreement for Medical Control of the ambulance service for whom they are working. Appropriate provisions for re-contacting the Medical Control physician en route, if necessary, should be made prior to departure from the transferring facility. If a transfer originates out of state and no contact with Medical Control Physician is possible, the transfer should be made at the BLS level only with appropriate additional personnel provided by the transferring facility.

APPENDIX N: ALS INTERFACILITY TRANSFER GUIDELINES: Protocols

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PART 1 – Determining the Need for Critical Care Transport

The purpose of this section is to determine which patients must be transported by critical care transport (CCT). Scenarios and circumstances beyond the scope of practice of the paramedic (including, but not limited to those described below) require CCT. CCT can be furnished by any of the following:

- Licensed critical care service
- An advanced life support (ALS) vehicle with hospital MD and / or RN on board.

  (A respiratory therapist is acceptable in place of MD and / or RN for ventilator management only)
- Any advanced (ALS) or basic life support (BLS) vehicle staffed by a self-contained and properly equipped critical care team.

If CCT is unavailable **AND** sending facility staff is unavailable, **AND** this patient has a condition requiring time-sensitive intervention **AND** it is approved by **MEDICAL CONTROL**, this patient may be transferred by any ALS ambulance, provided that all interventions are within the scope of practice of the transporting paramedic and vehicle.

The **MEDICAL CONTROL** physician and **SENDING PHYSICIAN** should be in direct communication if there are any **concerning** issues prior to patient transport.

1.1 – PEDIATRIC PATIENTS (8 years of age or younger)

- ❑ Any neonate patient (30 days of age or younger) requiring transfer to a higher level of care.
- ❑ Any pediatric patient with critical illness or injury.

  NOTE: On-line **MEDICAL CONTROL** should be involved in determining whether pediatric patients require critical care
- ❑ Any pathology associated with the potential for imminent upper airway collapse and / or obstruction (including but not limited to airway burns, toxic inhalation, epiglottitis, retropharyngeal abscess, etc.). If any concerns whether patient falls into this category, contact **MEDICAL CONTROL**.

  NOTE: On-line **MEDICAL CONTROL** should be involved in determining whether pediatric patients require critical care
- ❑ Any intubated pediatric patient requiring an interfacility transfer.

- All conditions that apply to adult medical patients also require CCT for the pediatric patient.

1.2 – ADULT MEDICAL PATIENTS

- Unless approved by **MEDICAL CONTROL**, patients requiring more than three (3) medication infusions by IV pump, not including maintenance fluids must be transported by CCT.

- Unless approved by **Medical Control**, any patient receiving more than one vasoactive medication infusion must be transported by CCT.

- Any patient who is being actively paced (either transvenous or transcutaneous) must be transported by CCT.

- Patients being transferred due to an issue with a ventricular assist device.

- Patients with an intra-aortic balloon pump.

- Any patients with a pulmonary artery catheter.

  NOTE: Central lines may be transported by ALS IFT

- Any patient with an intracranial device requiring active monitoring.

  NOTE: Except for chronic use devices, such as ventriculoperitoneal shunts, etc.

- Any pathology associated with the potential for imminent upper airway collapse and / or obstruction (including but not limited to airway burns, toxic inhalation, epiglottitis, retropharyngeal abscess, etc.). If any concerns whether patient falls into this category, contact **MEDICAL CONTROL**.

  NOTE: If any concerns about whether patient falls into this category, contact **MEDICAL CONTROL**.

- Any patient being artificially ventilated for ARDS or Acute Lung Injury.

Part 2 – General Protocols for ALS Interfacility Transfer Care

- Vital signs should be obtained and documented every ten (10) minutes, unless otherwise required by protocol.
  - If clinically indicated, patients will have continuous monitoring of electrocardiogram (ECG) and / or pulse oximetry (SpO2).
  - **All** artificially ventilated patients (and all other patients where it is clinically indicated) will have continuous monitoring of waveform capnography.
- The recommended route for medication infusions in the ALS IFT setting is the peripheral intravenous (IV) line. Intraosseous (IO) lines may also be used.
  - Medications may also be administered through any central venous catheter
  - Paramedics may administer medication boluses, infusions and fluids through administration sets connected by the sending facility to subcutaneous devices (e.g., Port-a-Cath)
- Patients who are being transferred ALS between facilities should have peripheral intravenous (IV) access, if possible.
  - Paramedics should attempt to establish IV access if no attempts have been made at the sending facility. Paramedics are authorized to establish IO access if warranted by the patient's condition.
- All monitoring and therapy will be continued until care is transferred to the receiving medical staff.
- Paramedics may not accept any medications from the sending facility for the purposes of bolus administration during transport.
- Any patient who qualifies for spinal immobilization per pre-hospital statewide treatment protocols who has not been cleared by CT scan or appropriate physician assessment must be fully immobilized for transport.
  - If any confusion arises regarding the need for spinal immobilization **MEDICAL CONTROL** will be contacted and the **MEDICAL CONTROL** physician and the **SENDING PHYSICIAN** should be in direct communication.
- Paramedics must be familiar with the treatments and interventions instituted at sending facility.
- Patient care documentation should include, at a minimum:
  - Patient's diagnosis / reason for transfer

- Brief history of present illness / injury
- Brief overview of interventions performed by sending facility
- Pertinent physical examination findings and recent vital signs
- Current medications and IV infusions
- Presence of or need for additional medical personnel

- ❑ For all patients being transferred to an emergency department, who are critically ill, unstable, or have a change in clinical status en route, EMTs should notify receiving emergency department via CMED prior to arrival. If local CMED is unavailable, entry notes should be made by telephone (on a recorded line, if possible).

- ❑ Paramedics will contact on-line **MEDICAL CONTROL** for:

  - Any intervention(s) that exceed the standing order scope of practice as defined by the current version of the Massachusetts Pre-Hospital Statewide Treatment Protocols for an EMT-Paramedic.
  - Any patient that is unstable or is likely to become unstable.
  - When there is any concern regarding the safety of the patient being transferred.
  - Any significant patient care related questions or issues prior to transfer or en route.

- ❑ The **MEDICAL CONTROL** physician and **SENDING PHYSICIAN** should be in direct communication if there are any **concerning** issues prior to patient transport.

- ❑ On occasion good medical practice and the needs of patient care may require deviations from these protocols, as no protocol can anticipate every clinical situation. In those circumstances, EMS personnel deviating from the protocols shall only take such actions as allowed by their training **and** only in conjunction with their **ON-LINE MEDICAL CONTROL PHYSICIAN**.

PART 3.1 – AORTIC DISSECTION

- ❑ It is recommended that central access and / or two large bore IV lines are in place prior to transport.
- ❑ Care during transport:
  - Administer high-flow supplemental oxygen
  - Continuous cardiac monitoring
  - Heart rate, blood pressure, neurologic evaluations documented every 5 – 10 minutes
    - Target heart rate = 60 – 80 bpm
    - Target systolic blood pressure = 90 – 100 mm Hg
    - Continually assess mentation.
    - If patient is outside of these parameters, contact **MEDICAL CONTROL**.
- ❑ If not approved by on-line **MEDICAL CONTROL** prior to transport, you must contact **MEDICAL CONTROL** to adjust all medication infusions:
- Adjust antihypertensive medications initiated at sending facility (until systolic blood pressure is less than 100 mm Hg and/or MAP is less than 60 mm Hg):
  - If **Labetalol** infusion has been initiated by sending facility, **increase by 2 mg / minute every 10 minutes** (to a maximum of 8 mg/minute)
  - If **Esmolol** infusion has been initiated by sending facility, **increase by 50 mcg / kg / minute every 4 minutes** (to a maximum of 300 mcg / kg / minute)
  - If **Nitroprusside** infusion has been initiated by sending facility, **increase by 0.5 mcg / kg / minute every 5 minutes** (to a maximum of 4 mcg / kg / minute)
  - Discontinue drip and contact medical control for instructions if:
    - Systolic blood pressure < 90 mm Hg, or;
    - Heart rate < 60 bpm
  - If no medication infusion has been initiated to control blood pressure and / or heart rate, **MEDICAL CONTROL** may order the administration of metoprolol 5 mg IV every 5 minutes to a maximum of 15 mg.

PART 3.2 – BLOOD TRANSFUSION REACTION

Symptoms of a Transfusion Reaction during Infusion of Packed RBCs (PRBCs)

Acute Hemolytic Reaction

Fever, hypotension, flushing, wheezing, dark and / or red colored urine, oozing from IV sites, joint pain, back pain, chest tightness

Nonhemolytic Febrile Reaction

Fever, chills, rigors, vomiting, hypotension

Allergic Reaction

Urticaria, hives (usually without fever or hypotension)

Anaphylactic Reaction

Dyspnea, wheezing, anxiety, hypotension, bronchospasm, abdominal cramps, vomiting, diarrhea

Volume Overload

Dyspnea, hypoxia, rales, tachycardia, jugular vein distention

Transfusion-Related Acute Lung Injury ("TRALI")

Dyspnea, hypoxia, rales (usually without fever or signs of pulmonary edema)

- ❑ STOP the infusion if any of the above symptoms are discovered!
- ❑ Start infusion of normal saline
- ❑ Contact **MEDICAL CONTROL**
- ❑ Treat hypotension and anaphylactic reaction with standing orders (established pre-hospital protocols)
- ❑ If minor allergic reaction (urticaria / wheezing) administer Benadryl, 50 mg IV
- ❑ If SpO2 is below 90% or patient experiences wheezing / rales, administer high-flow supplemental oxygen
- ❑ If SpO2 is below 90% and accompanied by rales, administer Lasix, 40 mg IV

PART 3.3 – CEREBROVASCULAR ACCIDENT, POST TPA

- ❑ Seizures (either generalized motor or nonconvulsive) should be quickly controlled.
  - After assessing airway, breathing, and applying high-flow oxygen:
    - Lorazepam, 2 mg IV every 2 minutes up to 0.1 mg / kg, ***or***
    - Diazepam, 5 – 10 mg IV / IO
    - **MEDICAL CONTROL** can authorize administration of Midazolam for seizure activity
- ❑ For an ischemic CVA, if a tPA (tissue plasminogen activator) infusion will be continued during the transport, follow these guidelines:
  - Sending facility staff should withdraw excess tPA from the bottle, so that the bottle will be empty once the full dose has infused.

    Example: 100 mg bottle of tPA contains 100 mL of fluid when reconstituted; if the total dose being administered is 70 mg, then the facility should remove 30 mL of fluid from the bottle before departure.
  - When the pump alarm indicates that the bottle is empty, you should take the following steps to ensure that the drug contained within the administration tubing is administered to the patient:
    - Remove the IV tubing from the tPA bottle and spike a bag of 0.9% NS and restart the infusion; the pump will stop infusing when the preset volume has been administered.
- ❑ If systolic blood pressure is found to be greater than 180 mm Hg or diastolic blood pressure is found to be greater than 105 mm Hg consult **MEDICAL CONTROL**, then:
  - Adjust antihypertensive medications initiated at sending facility:
    - If **Labetalol** has been initiated by sending facility;
      - ✓ **Increase by 2 mg/minute every 10 minutes** (to a maximum of 8 mg/minute) until systolic blood pressure is less than 180 mm Hg and/or diastolic blood pressure is less than 105 mm Hg
      - ✓ Discontinue drip and contact medical control for instructions if the reduction in MAP is greater than 30% of initial BP or SBP < 140 mm Hg, DBP < 80, or heart rate < 60 bpm
    - If **Nicardipine** has been initiated by sending facility;
      - ✓ **Increase by 2.5 mg / hour every 5 minutes** (to a maximum of 15 mg / hour) until systolic blood pressure is less than 180 mm Hg and/or diastolic blood pressure is less than 105 mm Hg

- ✓ Discontinue drip and contact medical control for instructions if the reduction in MAP is greater than 30% of initial BP or SBP < 140 mm Hg, DBP < 80, or heart rate < 60 bpm

- ❑ For any acute worsening of neurologic condition (e.g., acutely worsening neurological deficits, development of severe headache, acute hypertension, vomiting, etc.):
  - If patient is receiving tPA, discontinue the infusion.
  - Contact **MEDICAL CONTROL** for further instructions.
  - Contact receiving hospital emergency department with an update on patient's condition and an estimated time of arrival.

PART 3.4 – POST-ARREST INDUCED HYPOTHERMIA (PAIH)

- ❑ If post-arrest induced hypothermia (PAIH) therapy in progress at the time of IFT ALS arrival, it should be continued during the transport.
- ❑ Pre-transport temperature should be documented, and temperature should be monitored with vital signs every five minutes.
- ❑ The temperature target for post-arrest induced hypothermia (PAIH) is 32° C – 34°C (89°F – 93°F).
- ❑ If pre-transport or inter-transport temperature is less than or equal to 34°C:
  - Maintain temperature with cold packs placed in the groin, axillae, and on the chest and sides of neck.
  - Discontinue any cold saline infusion.
- ❑ If pre-transport or inter-transport temperature is greater than 34°C:
  - Continue cooling with cold packs placed in the groin, axillae, and on the chest and sides of neck.
  - Continue or initiate cold saline infusion, initially chilled and maintained at approximately 4°C, at 30 mL / kg over 30 minutes.
- ❑ Core temperature should be monitored if possible for transport times longer than 20 minutes.
- ❑ Patients should be handled gently (due to risk of arrhythmias).
- ❑ ALS IFT crews will not discontinue PAIH unless ordered to do so by **MEDICAL CONTROL**.
- ❑ If patient temperature is less than 31°C, contact **MEDICAL CONTROL** and utilize any external warming devices (blankets, etc.) to actively rewarm patient until the temperature is greater than 31°C.
  - If ordered by **MEDICAL CONTROL** and available, consider infusion of 250 mL IV boluses of warmed normal saline solution, until the temperature is greater than 31°C.
- ❑ If hemodynamically significant dysrhythmias or bradycardia of any type develop, or if the patient develops significant bleeding, PAIH should be stopped, **MEDICAL CONTROL** contacted, and active rewarming pursued.

PART 3.5 – PREGNANCY RELATED

- ❑ Patients who are in labor with concern for imminent delivery must be accompanied by sending facility staff.
- ❑ In high-risk situations, a physician / registered nurse will accompany the patient for transport.
- ❑ If any confusion arises regarding the need for additional OB staff **MEDICAL CONTROL** will be contacted and the **MEDICAL CONTROL** physician and **SENDING PHYSICIAN** should be in direct communication.
- ❑ In addition to the documentation standards listed in the General ALS IFT Care Guidelines, when transporting an obstetrical patient, the following should be documented:
    - The presence of a fetal heart rate before and after transfer
    - Estimated date of confinement, maternal history of any complications
    - Condition of membranes, dilation
    - Gravida / Para
    - Timing and nature of contractions
    - Fetal Position
- ❑ Patients should be transported in a left-lateral position or sitting upright, if possible.
- ❑ Document that the fetal heart rate was evaluated prior to transport and upon arrival.
- ❑ If patient should develop eclamptic seizures:
    - After assessing airway, breathing, and applying high-flow oxygen:
        - Lorazepam, 2 mg IV every 2 minutes up to 0.1 mg/kg, ***or*** Diazepam, 5 – 10 mg IV
        - **MEDICAL CONTROL** can authorize administration of Midazolam and administration of magnesium sulfate (4 g over 3 minutes) for seizures.
- ❑ **MEDICAL CONTROL** can authorize administration of Midazolam and administration of magnesium sulfate (1 - 4 g over 3 minutes) for seizure activity.

PART 3.6 – ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION (STEMI)

- **Paramedics should be familiar with the care and treatment the patient has received.**

- **Consider discontinuing or avoiding all medication infusions (except for basic IV fluids) to expedite transfer.**

- Receiving facility should be contacted to ensure rapid transfer to cardiac cath lab.

- Patients should receive appropriate supplemental oxygen therapy (minimum of 4 L/min via nasal cannula)

- All other interventions per state-wide treatment protocol, if not already administered:

  - Aspirin, 325 mg PO

- If patient continues to experience chest discomfort:

  - Nitroglycerine (if systolic blood pressure is greater than 100 mm Hg), 0.4 mg SL tablet or spray; may be repeated in 5 minute intervals for a total of three (3) doses

  - Morphine, 2 – 4 mg slow IV push; ***or,***

  - Fentanyl, 1 mcg / kg slow IV push, to a maximum of 150 mcg

PART 4.1 – GENERAL GUIDELINES FOR MEDICATION ADMINISTRATION

- ❑ The transport paramedic must be familiar or become familiar through consultation (i.e., with a drug reference or discussion with hospital staff) on the following attributes of each drug the patient has received prior to and will receive during transport:
  - The type and name of medication being administered.
  - The indication and contraindications for administration of the medication.
  - The correct dose, rate, and mixture of medication.
  - Any titration indications or instructions.
  - Any specific medical control instructions.
  - Any patient-specific information
  - Any adverse effects of the medication being administered.
  - The seven rights of medication administration should always be considered, even when transporting patients between facilities.
    - ✓ Right patient, drug, dose, route, time, outcome, documentation
- ❑ Paramedics may not accept any medications from the sending facility for the purposes of bolus administration during transport.

PART 4.2 – APPROVED MEDICATIONS AND MEDICATION CLASSES

Any of the following medications or medication classes, not currently part of the EMT Paramedic Statewide Treatment Protocols, may be maintained if initiated at the sending facility, and can only be titrated through specific IFT protocols **and** by on-line **MEDICAL CONTROL**.

- Aminophylline
- Analgesics
- Anticonvulsants
- Antidysrhythmics
- Antihypertensive agents
- Anti-infectives (e.g., antibiotics, anti-sepsis)
- Benzodiazepines
- Blood products
- Chemotherapeutic agents
- Electrolyte infusions
  - ✓ Potassium, limited to 10 mEq / hour
  - ✓ Magnesium, maintenance infusion limited to 2 g / hour
- Glycoprotein IIb / IIIa inhibitors
- Heparin
- Insulin infusions
- Intravenous steroids
- Mannitol infusions
- Octreotide
- Paralytics
- Parenteral nutrition
- Sedatives
- Standard IV infusion fluids (including 10% Dextrose)
- Thrombolytic agents
- Vasodilators (including all forms of Nitroglycerin)
- Vasopressors

PART 4.3 – MEDICATIONS REQUIRING THE USE OF AN IV PUMP

The following medications / types of medications must be administered by IV pump:

- Anticoagulant
- Anticonvulsants
- Antidysrhythmics
- Antihypertensives
- Electrolyte Solutions
- Insulin
- Paralytics
- Sedatives
- Thrombolytics
- TPN
- Vasodilators
- Vasopressors

PART 4.4 – BLOOD AND / OR BLOOD PRODUCT ADMINISTRATION

- ❑ Heating devices, automatic and rapid infusers are prohibited for ALS IFT use.
- ❑ Infusion / bloodbank documentation should be transported with the patient.
- ❑ Paramedics will not initiate a blood product infusion.
- ❑ At least one additional IV line should be in place.
- ❑ Paramedic will not administer any medications through an IV line which is being used to infuse blood or a blood product.
- ❑ Ensure the blood and / or blood products are infusing at the prescribed rate.
- ❑ Monitor and record the patient's vital signs every 5 – 10 minutes.
- ❑ **If any signs and symptoms of transfusion reaction, proceed immediately to the TRANSFUSION REACTION PROTOCOL (Part 3.2)**
- ❑ **Blood products should be infusing for at least 20 minutes prior to departure, to reduce the risk of transfusion reaction.**
  - ✓ The only exception to this is for administration of fresh frozen plasma (FFP) for patients suffering life-threatening intracranial bleeding
- ❑ When the transfusion has finished:
  - ✓ Record transfusion end-time and post-infusion vital signs.
  - ✓ Disconnect infusion set tubing from primary line.
  - ✓ Flush primary line with normal saline only.
  - ✓ Place any used supplies into a clean biohazard marked container or bag.
  - ✓ Deliver all empty transfusion bags and tubing to the receiving facility with the patient.

PART 5.1 – MECHANICAL VENTILATION

- All artificially ventilated patients must be transferred on a ventilator.

- All ventilators must be able to meet the demands of the patient's condition, taking into consideration all settings and features described or stipulated by the sending facility and / or physician.

- Ventilators may not be full control mode only and must be capable of meeting the patient's ventilatory needs.

- Unless the transfer is time sensitive in nature (e.g., STEMI, aortic dissection, acute CVA, unstable trauma, etc.), the following requirements apply to ventilator use and / or adjustment:

  - Patients must be observed, by the sending facility, for a minimum of 20 minutes after any adjustment in ventilator settings.

  - Patients should be on the transport ventilator for 20 minutes prior to departure.

- On-line **MEDICAL CONTROL** is required for any instance when adjustment of the ventilator settings is needed.

PART 5.2 – INTRAVENOUS PUMPS

Paramedics who operate at the ALS IFT level are expected to have a thorough understanding of the functions and operations of the infusion pump they will utilize (whether property of the ambulance service or sending facility).

Paramedics are expected to not only control the basic functions of the pump, but also be able to dynamically troubleshoot pump issues. Prior to transport, paramedics must be proficient at the following:

- ❑ How to turn the pump on and off.
- ❑ How to load and safely eject the administration set into pump.
- ❑ The importance of having spare tubing.
- ❑ How to suspend pump operation.
- ❑ How to adjust the infusion rate, if necessary.
- ❑ How to clear air bubbles from the tubing.
- ❑ How to troubleshoot problems (e.g., occlusion alarms).
- ❑ How the specific service addresses low battery or power issues.

It is strongly recommended that paramedics be trained and practiced on the infusion pump they will be using in the field.

PART 5.3 – PLEURAL CHEST TUBE MONITORING

- ❑ Obtain and document the indication for placement of the pleural chest tube.
- ❑ Ensure that the chest tube is secured to the patient, and that the drainage system remains in an upright position and below the level of the patient's chest at all times.
- ❑ Regularly evaluate lung sounds and vital signs.
  - Signs and symptoms of a tension pneumothorax include: Dyspnea, tachypnea, decreased / absent lung sounds on affected side, hypotension, tachycardia, jugular venous distention, tracheal deviation (late sign)
- ❑ Tubes and connections should be evaluated following any movement of the patient to ensure leak-proof operation and chest tube patency.
- ❑ Check the following initially and after moving the patient:
  - Ensure the dressing remains dry and occlusive.
  - Ensure there are no kinks or dependent loops (e.g., a loop or turn in the tubing that forces the drainage to move against gravity to reach the collection chamber) in the tubing.
  - Amount of water in the water seal chamber; if the water level appears low ask a staff member if it requires refilling prior to departure.
- ❑ Monitor the following items after routine assessment of patient's vital signs:
  - Drainage (document the appearance and amount of fluid, at the start and at the conclusion of transport)
  - Bubbling in the water seal chamber
  - Gentle rise and fall of the water level, which corresponds with the patient's respirations is called "tidalling" and indicates that the system is functioning properly.
- ❑ Troubleshooting / problems
  - ✓ **Abnormal bubbling in the water seal chamber**

- Remember, gentle rise and fall of the water level, which corresponds with the patient's respirations is called "tidalling" and indicates that the system is functioning properly.

- Continuous air bubbling confirms a constant air leak from a tube connection or from the patient's chest (e.g., unresolved pneumothorax).

- Intermittent bubbling confirms an intermittent air leak from the patient's chest.

- No air bubbling confirms no air leak from the patient's chest and no air leak from a tube connection.

✓ **If the entire chest tube is removed from the chest:** Cover with a three-sided dressing and contact **MEDICAL CONTROL**.

✓ **If the chest drainage system tips over and spills:** Contact **MEDICAL CONTROL**; you may be instructed to clamp tube.

✓ **If the chest drainage system is crushed or broken open, or the chest drain becomes detached from the chest tube:** Contact **MEDICAL CONTROL** immediately, do not reconnect; you may be instructed to place the end of the chest tube in a bottle of sterile water to create a seal.

Interfacility Equipment Monitoring allowed at BLS level:

IV lines if not actively infusing
Feeding tubes
NG Tubes
PICC Lines if not actively infusing
Bladder Irrigation
Wound suction devices

APPENDIX O: SPECIAL PROJECTS

1. **DPH/OEMS supports the concept of pre-hospital clinical research projects. Any service that would like to conduct a study which will add to or alter the existing Statewide Treatment Protocols, must apply to DPH/OEMS for a special project waiver, in accordance with procedures as outlined in the special project waiver administrative requirements, AR 5-211.**

2. **The AR 5-211 is available on line at the DPH/OEMS website at:** http://www.mass.gov/dph/oems/

APPENDIX P: APGAR SCORE

The APGAR scoring system provides a mechanism for documenting the newborn's condition at specific intervals after birth. The five objective signs are assessed at one (1) and five (5) minutes of age.

NOTE: The APGAR score should be documented, but should not be used to determine need for resuscitation, because resuscitative efforts, if required, should be initiated promptly after birth.

SIGN	0 POINTS	1 POINT	2 POINTS
HEART RATE	ABSENT	< 100	> 100
RESPIRATORY EFFORT	ABSENT	WEAK CRY	STRONG CRY
MUSCLE TONE	FLACCID	SOME FLEXION	ACTIVE MOTION
REFLEX IRRITABILITY	NO RESPONSE	GRIMACE	COUGH, SNEEZE OR CRY
COLOR	BLUE, PALE	BODY: PINK EXTREMITIES: BLUE	FULLY PINK

APPENDIX Q: THE MASSACHUSETTS STROKE SCALE (MASS)

(Modified from the Cincinnati Stroke Scale)

FACIAL DROOP (*Patient shows teeth or smiles)*

Normal: Both sides of face move equally

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

ARM DRIFT (*Patient closes eyes and extend both arms straight out for 10 seconds.)*

Normal: There is no drift at all or both arms drift the same

Abnormal: One arm drifts/moves down compared to the other arm or one arm noticeably weaker than the other.

SPEECH *(Score first attempt: Patient repeats, e.g. "The sky is blue in Boston.")*

Normal: The Patient says the correct words with no slurring of words on first attempt.

Abnormal: The patient slurs words, says the wrong words or is unable to speak on first attempt

APPENDIX R: FIBRINOLYTIC (THROMBOLYTIC) CHECKLIST

***Note:** This checklist is intended only as a tool for the pre-hospital identification of patients with significant contraindication(s) to the administration of fibrinolytics in the acute ST elevation M.I. (STEMI) setting. It is not intended to be a comprehensive list of all factors to be considered prior to administration of these agents. Significant contraindications may warrant the triage of these patients to facilities capable of percutaneous intervention (PCI). This list can also be used to determine if a possible ischemic stoke victim, is a candidate for ischemic stroke reperfusion.

Date: _____ Time: _____ Medic Unit: _____ Receiving Facility: _____

Patient Name: _____ Age: _____ Est. Wt.: _____lbs (_____kgs)

Duration of Chest Pain*: _____ Hours _____ Minutes *(>20 minutes and <12 Hours)

Exclusions _____ (**? = unknown)**

1. Is patient unconscious or exhibiting altered mental status? **Yes / No**
2. Is patient on oral anticoagulants? (e.g., Coumadin) **Yes / No / ?**
3. Is blood pressure consistently > 180/110 mm Hg.? **Yes / No**
4. GI or GU bleeding, or known bleeding condition, in past 2 weeks? **Yes / No / ?**
   (e.g., actively bleeding, black tarry stool, hematemesis, hematuria?)
5. Any history of esophageal varices or active peptic ulcer? **Yes / No / ?**
6. Recent major surgery, major trauma (incl. CPR) within last 2 weeks? **Yes / No / ?**
   (including open biopsy, puncture or catheterization of chest/neck vessel?)
7. History of AAA or known dissection or aneurysm of aorta? **Yes / No / ?**
   (pain radiating through to the back?)
8. Any history of CVA, TIA, cerebral bleeding, aneurysm, AVM or brain tumor? **Yes / No / ?**
9. Pregnancy? **Yes / No / ?**
10. Treatment with fibrinolytics in past 6 months? **Yes / No / ?**
    (**OR -** known allergy to fibrinolytic drugs in the past)

12-lead ECG: Time obtained: _____ Results: _____

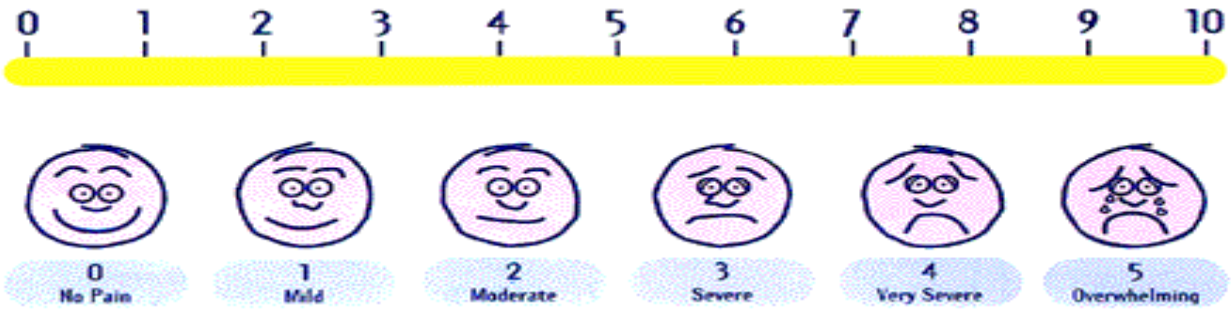
Compatible with AMI? (ST ↑ >1mm in 2 contiguous leads) **Yes / No / ?**

Is patient likely to be eligible for Fibrinolytic Therapy? **Yes / No / ?**

Receiving Physician: _____ Time: _____

Paramedic No. _____ Signature: _____

APPENDIX S: ADULT PAIN MANAGEMENT ASSESSMENT GUIDE



PAIN ASSESSMENT GUIDE

TELL ME ABOUT YOUR PAIN

W ords to describe pain

aching	throbbing	shooting
stabbing	gnawing	sharp
tender	burning	exhausting
tiring	penetrating	nagging
numb	miserable	unbearable
dull	radiating	squeezing
cramp	deep	pressure

Pain in other languages

itami	Japanese	dolor	Spanish
tong	Chinese	douleur	French
dau	Vietnamese	boln	Russian

I ntensity (0-10)

If 0 is no pain and 10 is the worst pain imaginable, what is your pain now? ... in the last 24 hours?

L ocation

Where is your pain?

D uration

Is the pain always there?
Does the pain come and go? (Breakthrough Pain)
Do you have both types of pain?

A ggravating and Alleviating Factors

What makes the pain better?
What makes the pain worse?

How does pain affect

sleep	energy	relationships
appetite	activity	mood

Are you experiencing any other symptoms?

nausea/vomiting	itching	urinary retention
constipation	sleepiness/confusion	weakness

Things to check

vital signs, past medication history, knowledge of pain, and use of noninvasive techniques

REFERENCES: Jacox A, Carr DB, Payne R, et al. Management of Cancer Pain. Clinical Practice Guideline No. 9. AHCPR Publication No. 94-0592. Rockville, MD: Agency for Health Care Policy and Research, U.S. Department of Health and Human Services, Public Health Service. March 1994. Wong, D. and Whaley, L. Clinical Handbook of Pediatric Nursing, ed. 2. The C.V. Mosby Company, St. Louis, 1986, p. 371.

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http://mayday.coh.org/pain_assessment.asp

City of Hope and
Beckman Research Institute
1500 E. Duarte Road
Duarte, CA 91010-3000
1-800-423-7119
www.cityofhope.org

APPENDIX T: NERVE AGENT DOSING & REFERENCE TABLES

NOTE: Be familiar with other agents. They may present with similar signs and symptoms as those of Nerve Agents.

Table Signs and Symptoms for Specific Agents

Sign/Symptom	Nerve Agent	Vesicant	Pulmonary Agent	Cyanide
Immediate cardiac arrest	X			X
Sudden syncope, seizures, or coma	X		X	X
Apnea without cyanosis				X
Cyanosis	X		X	X
Immediate difficulty breathing, wheezing, or gasping			X	
Rapid respiratory rate				X
Delayed dyspnea (hours)			Phosgene Phosgene oxide	
Nausea, vomiting, diarrhea, abdominal cramps	X			
Fasciculations and twitching	X			
Copious sweating	X			
Copious oral, nasal, or pulmonary secretions	X	X	X	
Incontinence	X			X
Pinpoint pupils	X			
Dilated pupils	X			X
Immediate eye and nose irritation		Lewisite	Chlorine Phosgene Phosgene oxide	
Delayed eye irritation (2-12 hrs)		Mustard		
Immediate skin burns, non-thermal		Lewisite		
Delayed skin burns, non-thermal		Mustard		
Exposure to burning plastic				X
Exposure to hot chlorinated hydrocarbons			Phosgene Phosgene oxide	
Bitter almond odor				X

NOTE: In a mass casualty incident, use triage cards as appropriate, always checking patients for evidence of prior triage and treatment.

APPENDIX T: NERVE AGENT DOSING & REFERENCE TABLES

SEVERITY	Cholinergic AGENT Signs & Symptoms	ADULT TREATMENT STANDING ORDERS
Mild	Runny nose Cough Pupils may be pinpoint Eye pain Lacrimation	Decontaminate Administer 100% oxygen Administer **One** kit IM **OR** 2 mg atropine IM **only &** either: 600 mg IM pralidoxime **OR** 1 gm IV pralidoxime
Moderate	Runny nose Cough Sweating, twitching Nausea, abdominal cramping Weakness Localized sweating (seen with dermal exposure) Eye pain, trouble seeing Wheezing, shortness of breath	Decontaminate Administer 100% Administer **Two to Three** kits IM **OR** 4 mg atropine IM **only &** either: 600-1200 mg IM pralidoxime **OR** 1 gm IV pralidoxime
Severe	All the above plus: Vomiting Diarrhea Drooling, copious respiratory secretions Significant weakness Seizures Decreased level of consciousness Apnea	Decontaminate Administer 100% oxygen Administer **Three** kits IM **OR** 6 mg atropine IM **only &** either: **1200 -**1800 mg IM pralidoxime **OR** 1 gm IV pralidoxime **&** *one of the following:* Diazepam 10 mg IM Autoinjector (CANA kit) **OR**, Diazepam 10 mg IM/IV **OR**, Lorazepam 2-4 mg IM/IV **OR**, Midazolam 5-10 mg IM/IV

NOTE: Dermal absorption of nerve agents may lead to delayed symptom onset up to 18 hours after exposure. Initial symptoms/signs may only be local such as localized fasciculation and sweating.

NOTE: Do not administer an adult dose to a child < 50 kg

APPENDIX T: NERVE AGENT DOSING & REFERENCE TABLES

PEDIATRIC DOSING FOR NERVE AGENT EXPOSURES

Kg	Age	Atropine	Pralidoxime	Midazolam	Diazepam	Lorazepam
		0.02-0.05mg/kg	20-40mg/kg	0.1mg/kg	0.25 mg/kg	0.05-0.2 mg/kg
1	Preemie	0.1 mg	20-40 mg	0.05-0.1 mg	0.25 mg	0.05-0.2 mg
2	Newborn	0.1 mg	40-80 mg	0.1-0.2 mg	0.5 mg	0.1-0.4 mg
5	3 mos	0.1-0.25 mg	100-200 mg	0.25-0.5 mg	1.25 mg	0.25-1 mg
10	12 mos	0.2-0.5 mg	200-400 mg	0.5-1 mg	2.5 mg	0.5-2 mg
15	2-3 yrs	0.3-0.75 mg	300-600 mg	1-1.5 mg	3.75 mg	0.75-3 mg
20	4-7 yrs	0.4-1 mg	400-800 mg	2 mg	5 mg	1-4 mg
25	6-9 yrs	0.5-1.25 mg	500 mg-1 g	2.5 mg	6.25 mg	1.25-4 mg
30	7-11 yrs	0.6-1.5 mg	600 mg-1 g	3 mg	7.5 mg	1.5-4 mg
35	8-13 yrs	0.7-1.75 mg	700 mg-1 g	3.5 mg	8.75 mg	1.75-4 mg
40	9-14 yrs	0.8-2 mg	800 mg-1 g	4 mg	10 mg	2-4 mg
45	10-16 yrs	0.9-2 mg	900 mg-1 g	4.5 mg	10 mg	2.25-4 mg
50	11-18 yrs	1-2 mg	1 g	5 mg	10 mg	2.5-4 mg
55	12-18 yrs	1.25-2 mg	1 g	5 mg	10 mg	2.75-4 mg
60	13-18 yrs	1.5-2 mg	1 g	5 mg	10 mg	3-4 mg
65	14-18 yrs	2 mg	1 g	5 mg	10 mg	3.25-4 mg
70	16-18 yrs	2 mg	1 g	5 mg	10 mg	3.5-4 mg

APPENDIX T: NERVE AGENT DOSING & REFERENCE TABLES

PEDIATRIC ATROPENS

Pediatric Atropine Dosing for Nerve Agent Toxicity Using Pediatric Atropens

Weight	Mild	Moderate	Severe
15-40 lb (7-18 kg)	1 x 0.5 mg Atropen	1 x 1 mg Atropen	3 x 0.5 mg Atropen
40-90 lb (18-41 kg)	1 x 1 mg Atropen	1 x 2 mg Atropen	3 x 1 mg Atropen
>90 lb (41 kg)	1 x 2 mg Atropen	2 x 2 mg Atropen	3 x 2 mg Atropen

Note: Pralidoxime reduced dose pediatric autoinjectors are not available

ADULT AUTOINJECTORS

Pediatric Dosing for SEVERE Nerve Agent Toxicity Using Adult Autoinjectors

(i.e. seizures, hypotension, coma, cardiac arrest)

Use only if Pediatric Atropen or when Atropine/Pralidoxime vials are not available

Approximate age	Approximate weight	Number of autoinjectors (each type)	Atropine dosage range (mg/kg)	Pralidoxime dosage range (mg/kg)
3-7 yrs	13-25 kg	1	0.08-0.13	24-46
8-14 yrs	26-50 kg	2	0.08-0.13	24-46
>14 yrs	>51 kg	3	0.11 or less	35 or less

- **NOTE: Mark I kits are not approved for pediatric use, however, they should be used as initial therapy in circumstances for children with severe life-threatening nerve agent toxicity when IV therapy is not available. This assumes 0.8 inch needle insertion depth**.
- **NOTE: Potential high dose of atropine and pralidoxime for age/weight. However, these numbers are within the general guidelines recommended for the first 60-90 minutes of therapy after a severe exposure.**
- **NOTE: Administer injection in large muscle mass. Avoid deltoid. Suggest using thigh.**

REFERENCE: Pediatric Preparedness for Disasters and Terrorism: A National Consensus Conference, Executive summary 2003. Markenson D, Redlener I. AHRQ, DHHS, EMSC Program of the Maternal and Child Health Resources Services Administration

APPENDIX U: FIRE REHABILITATION AND TACTICAL EMS PRINCIPLES

EMS personnel may be designated by a scene commander to function as "rehab" providers (HazMat or FD) or team medical support (e.g. police tactical teams).
The need for a rehab sector or group or for deployment of a tactical medical function should be based upon duration of operations, physical demands, tactical requirements and environmental conditions.

In rehab or tactical capacity, EMS personnel will follow the explicit orders and protocols of their AHMD or designee, or *medically-reviewed* written protocols based on nationally-accepted standards (e.g. SOCOM, NFPA, or the sample protocol given below), functioning under a *comprehensive* set of local policies and protocols. Rehab or tactical teams that provide ALS care must have a designated Affiliate Hospital Medical Director as per regulations.

EMS personnel may only provide care for predefined service members in this manner; any other persons presenting for care, or any service members who present with an acute medical issue, are to be considered patients under the definition of 305 CMR. Such care will be provided in accordance with the State Treatment Protocols.

Sample Protocol: Emergency Incident Rehabilitation

For events, including drills, fire ground operations, hazardous materials incidents, lengthy extrications, and any other event where a rehab sector is established:

When a person arrives in rehab with no significant complaints:

- Perform a visual evaluation for signs of heat exhaustion or fatigue. If the person exhibits any signs of heat exhaustion or fatigue, measure vital signs.
- Names and vital signs for each person so evaluated should be recorded on a log sheet for the incident. The log sheet will be submitted to the service's clinical coordinator following the incident.
- If any vital sign is out of the range listed below, protective gear should be removed, and the person should rest for at least 15 minutes, with monitored oral hydration, and oxygen when appropriate.
    - **Blood Pressure: Systolic >150 mm Hg or Diastolic > 100 mm Hg.**
    - **Respirations: >24 per minute.**
    - **Pulse: >110 per minute, or significantly irregular.**
    - **Temperature >100.6 (If monitoring equipment available)**
    - **If using CO-oximeter >12% abnormal,(<3% CO normal, smokers may have as high as 10%); use manufacturer or local standard levels if given**
- If vital signs return to within above limits, the person may be released.
- If vital signs are still beyond the limits, or symptoms develop, continue observation for another 15 minutes and determine if further intervention may be needed.
- If after 30 minutes the vital signs are above the limits, or symptoms develop, transport to the hospital should be initiated.
- As noted in appendix U, if a person arrives at the rehab area with complaints of chest pain, shortness of breath or an altered mental status follow the appropriate protocol. The person may *not* return to duty.

BIBLIOGRAPHY

1. "Paramedic Emergency Medicine". Brady. Prentice Hall Division. Bledsoe, Porter, Shade et al. *Third* Edition. *1997*.

2. "Mosby's Paramedic Textbook". Sanders, Lewis, Quick et al. Mosby-Year Book, Inc. *1997* Edition.

3. "Advanced Emergency Care for Paramedic Practice". J.P. Lippincott Company. Jones, Weigel. White, McSwain and Breiter et al. 1992 Edition.

4. "Mosby's EMT-Basic Textbook". Mosby-Year Book, Inc. Stoy, Barclay et al. 1996.

5. "Emergency Care". Brady / Prentice Hall. O'Keefe, Limmer, Grant, Murray, Bergeron, et al. Eighth Edition. 1998.

6. "Emergency Care in the Streets". Little, Brown & Company. Nancy L. Caroline, M.D. Fifth Edition. 1994.

7. "Advanced Pediatric Life Support". American Academy of Pediatrics. American College of Emergency Physicians. Bushore, Seidel, Fleisher, Wagner. 1995 Edition.

8. "Advanced Pediatric Emergency Care". Emergency Medical Services for Children. New Jersey Department of Health. 1996.

9. "Basic Pre-Hospital Pediatric Emergency Care". Emergency Medical Services for Children. New Jersey Department of Health. 1996.

10. "Pre-Hospital Care Protocols and Standing Orders". State of Rhode Island and Providence Plantations. Department of Health. 1995.

11. "Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care". American Heart Association. 1992 National Conference Edition.

12. "The Basic EMT: Comprehensive Pre-Hospital Patient Care". Mosby Lifeline. McSwain, White, Paturas and Metcalf. First Edition. 1997.

13. "Medical Direction of Emergency Medical Services". American College of Emergency Physicians. Werman et al. 1993 Edition.

14. "Manual of Pre-Hospital Emergency Medicine". Mosby Year Book, Inc. Miller, Wilson et al. 1992 Edition.

15. "Emergency Care & Transportation". Jones & Bartlett Publishing. American Academy of Orthopedic Surgeons. Seventh Edition. 1999.

16. "EMS Field Guide: A Pocket Reference for EMS Professionals". ALS Version. LeSage, Derr, Tardiff et al. Tenth and Eleventh Editions, 1994 and 1996.

17. "EMS Field Guide: A Pocket Reference for BLS and Intermediate Providers". BLS and Intermediate Version. Tardiff, Derr, LeSage et al. 1996 Edition.

18. “Pre-Hospital Treatment Protocols“. Maine Emergency Medical Services. 1994.

19. “Regional Protocols“: Commonwealth of Massachusetts. Various Editions.

20. “Paramedic Field Care“. Peter Pons, et al, American College of Emergency Physicians. 1997 Edition.

21. “Essentials of Emergency Care: A Refresher for the Practicing EMT-B“, Brady Publishing, Limmer, Elling & O’Keefe. Second Edition. 1999.

22. “Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care“. American Heart Association. International Consensus on Science.

23. Pediatric Preparedness for Disasters and Terrorism: A National Consensus Conference, Executive summary 2003. Markenson D, Redlener I.. AHRQ, DHHS, EMSC Program of the Maternal and Child Health Resources Services Administration

24. 2005 International Consensus on CPR and ECC- Science with Treatment Recommendations; Also referenced in *Circulation* Volume 112, Issue 24 Supplement; December 13, 2005

DRUG REFERENCE

PREGNANCY CATEGORY RATINGS FOR DRUGS

Drugs have been categorized by the Food and Drug Administration (FDA) according to the level of risk to the fetus. These categories are listed for each herein under "Pregnancy Safety" and are interpreted as follows:

- **Category A**: Controlled studies in women fail to demonstrate a risk to the fetus in the first trimester, and there is no evidence of risk in later trimesters; the possibility of fetal harm appears to be remote.

- **Category B**: Either (1) animal reproductive studies have not demonstrated a fetal risk but there are no controlled studies in women or (2) animal reproductive studies have shown an adverse effect (other than decreased fertility) that was not confirmed in controlled studies on women in the first trimester and there is no evidence of risk in later trimesters.

- **Category C**: Either (1) studies in animals have revealed adverse effects on the fetus and there are no controlled studies in women or (2) studies in women and animals are not available. Drugs in this category should be given only if the potential benefit justifies the risk to the fetus.

- **Category D**: There is positive evidence of human fetal risk, but the benefits for pregnant women may be acceptable despite the risk, as in life-threatening diseases for which safer drugs cannot be used or are ineffective. An appropriate statement must appear in the "Warnings" section of the labeling of drugs in this category.

- **Category X**: Studies in animals and humans have demonstrated fetal abnormalities, there is evidence of fetal risk based on human experience, or both; the risk of using the drug in pregnant women clearly outweighs any possible benefit. The drug is contraindicated in women who are or may become pregnant. An appropriate statement must appear in the "Contraindications" section of the labeling of drugs in this category.

CLASSIFICATION OF THERAPEUTIC INTERVENTIONS IN CPR AND ECC

AHA Guidelines 2010

Table 4. AHA Levels of Evidence[10]

SIZE OF TREATMENT EFFECT →

ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT	CLASS I *Benefit >>> Risk* Procedure/Treatment **SHOULD** be performed/administered	CLASS IIa *Benefit >> Risk* *Additional studies with focused objectives needed* **IT IS REASONABLE** to perform procedure/administer treatment	CLASS IIb *Benefit ≥ Risk* *Additional studies with broad objectives needed; additional registry data would be helpful* Procedure/Treatment **MAY BE CONSIDERED**	CLASS III *Risk ≥ Benefit* Procedure/Treatment should NOT be performed/administered **SINCE IT IS NOT HELPFUL AND MAY BE HARMFUL**
LEVEL A Multiple populations evaluated* Data derived from multiple randomized clinical trials or meta-analyses	■ Recommendation that procedure or treatment is useful/effective ■ Sufficient evidence from multiple randomized trials or meta-analyses	■ Recommendation in favor of treatment or procedure being useful/effective ■ Some conflicting evidence from multiple randomized trials or meta-analyses	■ Recommendation's usefulness/efficacy less well established ■ Greater conflicting evidence from multiple randomized trials or meta-analyses	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Sufficient evidence from multiple randomized trials or meta-analyses
LEVEL B Limited populations evaluated* Data derived from a single randomized trial or nonrandomized studies	■ Recommendation that procedure or treatment is useful/effective ■ Evidence from single randomized trial or nonrandomized studies	■ Recommendation in favor of treatment or procedure being useful/effective ■ Some conflicting evidence from single randomized trial or nonrandomized studies	■ Recommendation's usefulness/efficacy less well established ■ Greater conflicting evidence from single randomized trial or nonrandomized studies	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Evidence from single randomized trial or nonrandomized studies
LEVEL C Very limited populations evaluated* Only consensus opinion of experts, case studies, or standard of care	■ Recommendation that procedure or treatment is useful/effective ■ Only expert opinion, case studies, or standard of care	■ Recommendation in favor of treatment or procedure being useful/effective ■ Only divergent expert opinion, case studies, or standard of care	■ Recommendation's usefulness/efficacy less well established ■ Only divergent expert opinion, case studies, or standard of care	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Only expert opinion, case studies, or standard of care
Suggested phrase for writing recommendations*	should is recommended is indicated is useful/effective/beneficial	is reasonable can be useful/effective/beneficial is probably recommended or indicated	may/might be considered may/might be reasonable usefulness/effectiveness is unknown/unclear/uncertain or not well established	is not recommended is not indicated should not is not useful/effective/beneficial may be harmful

*Data available from clinical trials or registries about the usefulness/efficacy in different subpopulations, such as gender, age, history of diabetes, history of prior myocardial infarction, history of heart failure, and prior aspirin use. A recommendation with Level of Evidence B or C does not imply that the recommendation is weak. Many important clinical questions addressed in the guidelines do not lend themselves to clinical trials. Even though randomized trials are not available, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.

†In 2005, the ACC/AHA Task Force on Practice Guidelines developed a list of suggested phrases to use when writing recommendations. All guideline recommendations have been written in full sentences that express a complete thought, such that a recommendation, even if separated and presented apart from the rest of the document (including headings above sets of recommendations), would still convey the full intent of the recommendation. It is hoped that this will increase readers' comprehension of the guidelines and will allow queries at the individual recommendation level.

ACTIVATED CHARCOAL

Class

Adsorbent

Mechanism of Action

Adsorbs toxic substances from the GI Tract; Onset of action is immediate.

Indications

Most oral poisonings and medication overdoses; can be used after evacuation of poisons.

Contraindications

Oral administration to comatose patient; after ingestion of corrosives, caustics or petroleum distillates (ineffective and may induce vomiting); simultaneous administration with other oral drugs.

Adverse Reactions

May induce nausea and vomiting; may cause constipation; may cause black stools.

Drug Interactions

Bonds with and generally inactivates whatever it is mixed with, e.g., syrup of ipecac.

How supplied

25 gm (black powder) / 125 ml bottle (200 mg/ml)
50 gm (black powder) / 250 ml bottle (200 mg/ml)

Dosage and Administration

Note, if not **in Pre-mixed** slurry, dilute **with 1-part charcoal/ 4 parts water.**
Adult: 1-2 gm/kg PO or via NGT
Pediatric: 1-2 gm/kg PO or via NGT

Duration of action

depends upon GI function; will act until excreted.

Special Considerations

Often used in conjunction with magnesium citrate
Must be stored in a closed container
Does **not** adsorb cyanide, lithium, iron, lead and arsenic.

ADENOSINE

Class

Endogenous Nucleotide

Mechanism of action

Slows conduction time through the AV Node; can interrupt re-entrant pathways; slows heart rate; acts directly on sinus pacemaker cells. Is drug of choice for PSVT. Can be used diagnostically for stable, wide-complex tachycardias of unknown type after two doses of Lidocaine.

Indications

Conversion of **PSVT to sinus rhythm. May convert PSVT due to Wolff-Parkinson-White syndrome.**

Not effective converting atrial fibrillation / flutter.

Contraindications

Second or third-degree " block or Sick Sinus Syndrome
Atrial flutter / atrial fibrillation
Ventricular Tachycardia
Hypersensitivity to adenosine

Adverse Reactions

Facial flushing, shortness of breath, chest pain, headache, paresthesia, diaphoresis, palpitations, hypotension, nausea, metallic taste.

Drug Interactions

Methylxanthines (theophylline-like drugs) antagonize the effects of adenosine.
Dipyridamole (Persantine) potentiates the effects of adenosine
Carbamazepine (Tegretol) may potentate the AV Node blocking effects of adenosine.
May cause bronchoconstriction in asthmatic patients.

How Supplied

Three mg/ml in 2-ml flip-top vials for IV injection

Dosage and Administration

Adult: 6 mg over 1-3 seconds; If no response after 1-2 minutes, administer 12 mg over 1-3 seconds, Maximum total dose = 30 mgs.

Pediatric: 0.1 - 0.2 mg/kg rapid IV; maximum single dose = 12 mgs.

Duration of action

Onset and peak effects in seconds; duration 12 seconds.

Special Considerations

Short half-life limits side effects in most patients.
Pregnancy safety: Category C.

ALBUTEROL

Class

Sympathomimetic, bronchodilator.

Mechanism of **Action**

Selective b-2 agonist which stimulates adrenergic receptors of the sympathomimetic nervous system resulting in smooth muscle relaxation in the bronchial tree and peripheral vasculature.

Indications

Treatment of bronchospasm in patients with reversible obstructive airway disease **(COPD/asthma).** Prevention of exercise-induced bronchospasm.

Contraindications

Known prior hypersensitivity reactions to Albuterol.
Tachycardia dysrhythmias, especially those caused by digitalis.
Synergistic with other sympathomimetics

Adverse Reactions

Often dose-related and include restlessness, tremors, dizziness, palpitations, tachycardia, nervousness, peripheral vasodilatation, nausea, vomiting, hyperglycemia, increased blood pressure and paradoxical bronchospasm

Drug Interactions

Tricyclic antidepressants may potentate vasculature effects.
Beta-blockers are antagonistic.
May potentate hypokalemia caused by diuretics.

How Supplied

Solution for aerosolization: 0.5% (5 mg/ml)
Metered Dose Inhaler: 90 mcg/metered spray (17 gm canister with 200 inhalations)
Syrup: 2 mg/5 ml

Dosage and Administration

Adult: Administer 2.5 mg. Dilute 0.5 ml of 0.5% solution for inhalation with 2.5 ml normal saline in nebulizer and administer over 10-15 minutes.
MDI: 1-2 inhalations (90-180 mcg). Five minutes between inhalations

Pediatric: Administer solution of 0.01 - 0.03 ml (0.05 - 0.15 mg/kg/ dose diluted in 2 ml of 0.9% Normal Saline. May repeat every 20 minutes three times.

Duration of Action

Onset in 5-15 minutes with peak effect in 30-minutes - two hours and duration of 3-4 hours.

Special Considerations

Pregnancy Safety: Category C.
Antagonized by beta-blockers (e.g., Inderal, Metoprolol)
May precipitate angina pectoris and dysrhythmias.
Should only be administered by inhalation methodology in pre-hospital management.

AMINOPHYLLINE

Class

Xanthine bronchodilator (theophylline derivative).

Mechanism of Action

Respiratory stimulator and bronchodilator.

Indications

Limited usefulness in EMS arena although may be used in refractory COPD patients; interfacility transfers; bronchospasm.

Contraindications

Allergy to xanthines, e.g., caffeine; cardiac dysrhythmias.

Adverse Reactions

Tachycardia, palpitations, PVCs, Angina pectoris, headache, seizure, nausea and vomiting.

Drug Interactions

Beta blockers may oppose effects; Barbiturates and phenytoin may decrease theophylline levels.

How Supplied

500 mg / 10 ml ampule; 500 mg / 20 ml ampoule (preload) 25 mg/ml; 250 mg / ml ampoule (preload).

Dosage and Administration

Loading dose (Adult): 5-6 mg / kg in 60-100 ml of diluent over 30 min. IV infusion not to exceed 20 mg/min.;
Loading dose (Pediatric): 5-6 mg / kg in 50-100 ml; diluent IV infusion.
Maintenance infusion
Adult: First 12 hours: 0.5-0.7 mg/kg/hour (lower doses for elderly, CHF, liver disease). Subsequent: 0.1-0.5 mg/kg/hour (based on serum aminophylline levels)
Pediatric: 1.0 mg/kg/hour.

Duration of Action

Onset less than 15 minutes; Duration 4.5 hours.

Special Considerations

Pregnancy safety: Category C;
Use with caution in patients with cardiovascular disease., hypertension or hepatic/renal disease.
Doses should be halved in patients already taking theophylline preparations.
Therapeutic to toxic ratio is narrow!

AMIODARONE

Class

Antidysrhythmic.

Mechanism of Action

Prolongation of Action Potential; non-competitive alpha and beta sympathetic blocking effects; Calcium channel blocking effects.

Indications

Suppression of Ventricular Fibrillation refractory to defibrillation and Lidocaine.
Suppression of Ventricular Tachycardia refractory to cardioversion and Lidocaine.

Contraindications

Second or Third Degree heart block.
Medication-induced Ventricular dysrhythmias.
Hypotension, Bradycardia, Torsades de Pointes.
Profound Sinus Bradycardia.

Adverse Reactions

Hypotension, Bradycardia, Pulseless Electrical Activity, Congestive Heart Failure.
Nausea, fever, abnormal Liver Function Tests, Thrombocytopenia.

Drug Interactions

Will precipitate with Sodium Bicarbonate: incompatible.
Compatible with: Dopamine, Dobutamine, Isoproterenol, Lidocaine, NTG, Norepinephrine, Phenylephrine, KCL, Procainamide.

How Supplied:

150 mg in 3 ml vials.

Dosage and Administration

Adult: 300 mg slow IV Push over 1-2 minutes in 10 ml Normal Saline, (For ACLS VF/ Pulseless VT)

IV Drip 0.5-1mg per minute. (For malignant ventricular arrhythmias) per ordering physician.

Duration of Action:

Onset: Within 5-15 minutes.
Peak Effect: Variable.
Duration: Variable

Special Considerations

Pregnancy safety: Category C
Maintain at room temperature and protect from light in storage (light protection not required during administration).
Hypotension usually responsive to slowing infusion rate, IV Normal Saline.
Administer cautiously in patients with Heart Failure or poor systolic function.
May be especially effective in high-risk patients with recent acute MI.

AMYL NITRITE, SODIUM NITRITE, SODIUM THIOSULFATE

(CYANIDE ANTIDOTE KIT)

Class

Antidote

Mechanism of Action

Amyl Nitrite: affinity for cyanide ions; reacts with hemoglobin to form methemoglobin (low toxicity)

Sodium Nitrite: same as amyl nitrite

Sodium Thiosulfate: produces thiocyanate, which is then excreted

Indications

Cyanide or hydrocyanic acid poisoning.

Contraindications

Not applicable.

Adverse reactions

Excessive doses of amyl nitrite and sodium nitrite can produce severe, life-threatening methemoglobinemia. Use only recommended doses.

Drug Interactions

None.

How supplied

Amyl nitrite: in pledgettes similar to ammonia capsules.

Dosage and administration

Adult: Amyl nitrite: breathe 30 seconds out of every minute. Sodium Thiosulfate and sodium nitrite: IV per antidote kit directions.

Pediatric: Same as adult.

Duration of Action

Variable.

Special Considerations

Cyanide poisoning must be recognized quickly and treated quickly; if pulse persists, even in presence of apnea, prognosis is good with treatment. The antidote kit must be used in conjunction with administration of oxygen.

ASPIRIN

Class:
Platelet inhibitor, anti-inflammatory agent.
Mechanism of Action:
Prostaglandin inhibition.
Indications:
New onset chest pain suggestive of Acute Myocardial Infarction.
Contraindications:
Hypersensitivity.
Gastrointestinal bleeding.
Adverse Reactions:
Heartburn.
GI bleeding.
Nausea, vomiting.
Wheezing in allergic patients.
Prolonged bleeding.
Drug Interactions:
Use with caution in patients allergic to NSAIDS.
How Supplied:
160 mg or 325 mg tablets (chewable and standard).
Dosage and Administration:
160 mg or 325 mg PO.
Duration of Action:
Onset: 30-45 minutes.
Peak effect: variable.
Duration: Variable.
Special Considerations:
Pregnancy Safety: Category D.
Not recommended in pediatric population.

ATROPINE SULFATE

Class:
Anticholinergic agent.
Mechanism of Action:
Parasympatholytic: inhibits action of acetylcholine at postganglionic parasympathetic neuroeffector sites.
Increases heart rate in life-threatening bradydysrhythmias.
Indications:
Hemodynamically significant bradycardia.
Asystole.
Drug of choice for organophosphate poisoning.
Bronchospastic pulmonary disorders.
Contraindications:
Tachycardia.
Hypersensitivity.
Unstable cardiovascular status in acute hemorrhage and myocardial ischemia.
Narrow-angle glaucoma.
Adverse Reactions:
Headache, dizziness, palpitations, nausea and vomiting.
Tachycardia, dysrhythmias, anticholinergic effects (blurred vision, dry mouth, urinary retention).
Paradoxical bradycardia when pushed slowly or at low doses.
Flushed, hot dry skin.
Drug Interactions:
Potential adverse effects when administered with digoxin, cholinergics, physostigmine.
Effects enhanced by antihistamines, procainamide, quinidine, antipsychotics, benzodiazepines and antidepressants.
How Supplied:
Prefilled syringes: 1.0 mg in 10 ml of solution.
Nebulizer: 0.2% (1 mg in 0.5 ml) and 0.5% (2.5 mg in 0.5 ml).
Injection Solution as Sulfate: 0.5mg/ml (1ml); 1mg/ml (1ml); 0.1mg/ml (5ml,10ml); 0.4mg/ml (1ml, 20ml)
Autoinjectors: (See Nerve Agent Antidote)
Dosage and Administration:
Adult:

- **Bradydysrhythymias**: **0.5 - 1.0 mg IV every 3-5 minutes as needed to maximum total dose of 0 .0 4 mg / kg.**

- **Asystole: 1.0 mg IV push every 3-5 minutes as needed to maximum total dose of 0.04 mg / kg**

ATROPINE SULFATE (cont.)

Pediatric:

- **Bradydysrhythmias: 0.02 mg / kg IV / IO (minimum single dose 0.1 mg, maximum single dose 1.0 mg).**

- **Asystole: Same as for Bradydysrhythmias: minimum dose 0.1 mg; maximum dose 0.5 mg for a child and 1.0 mg for adolescent.**

OTHER:
Autoinjectors: (See Nerve Agent Antidote)

Duration of Action:
Onset: Immediate.
Peak Effect: Rapid to 1-2 minutes.
Duration: 2-6 hours.
Special Considerations:
Pregnancy Safety: Category C.
Moderate doses dilate pupils.

CALCIUM CHLORIDE / CALCIUM GLUCONATE

Class

Electrolyte.

Mechanism of Action

Increases cardiac contractile state (positive inotropic effect).
May enhance ventricular automaticity.

Indications

Hypocalcemia, magnesium sulfate overdose, hyperkalemia, calcium channel blocker toxicity.
Adjunctive therapy in treatment of insect bites and stings.

Contraindications

Hypercalcemia, VF during cardiac resuscitation; digitalis toxicity.

Adverse Reactions

Bradycardia, asystole, hypotension, peripheral vasodilatation, metallic taste, local necrosis, coronary and cerebral artery spasm, nausea, vomiting.

Drug Interactions

May worsen dysrhythmias secondary to digitalis.
May antagonize effects of Verapamil.
Flush line before and after administration of sodium bicarbonate.

How Supplied

10% solution in 10 ml ampules, vials and prefilled syringes (100 mg/ ml).

Dosage and Administration

Adult: 2-4 mg/kg of 10% solution slowly IV over 5 minutes; may repeat in 10 minutes. (maximum: 1 gm dose)
Pediatric: 20 mg/kg/dose of 10% solution slow IV/ IO (maximum: 1 gm dose); (may repeat in 10 minutes.)

Duration of Action

Onset: 5-15 minutes.
Peak effects: 3-5 minutes.
Duration: 15-30 minutes but may persist for 4 hours (dose dependent).

Special Considerations

Pregnancy safety: Category C.
For pediatrics: if calcium gluconate is unavailable, 1-2 ml of 10% calcium chloride solution, diluted with IV fluid, may be substituted.

DEXAMETHASONE SODIUM PHOSPHATE

Class

corticosteroid.

Mechanism of Action

Suppresses acute and chronic inflammation; immunosuppressive effects.

Indications

Anaphylaxis, asthma, spinal cord injury, croup, elevated intracranial pressure (prevention and treatment), as an adjunct to treatment of shock.

Contraindications

Hypersensitivity to product.

Adverse Reactions

Hypertension, sodium and water retention, GI bleeding, TB.
None from single dose.

Drug Interactions

Calcium
Metaraminol.

How Supplied

100 mg/ 5 ml vials or 20 mg/1 ml vials.

Dosage and Administration

Adult: 10-100 mg IV (1 mg/kg slow IV bolus). (considerable variance through Medical Control).
Pediatric: 0.25-1.0 mg/kg/dose IV, IO, IM.

Duration of Action

Onset: Hours.
Peak effects: 8-12 hours.
Duration of action: 24-72 hours.

Special Consideration

Pregnancy safety: unknown.
Protect medication form heat.
Toxicity and side effects with long-term use.

DEXTROSE

Class

Carbohydrate, hypertonic solution.

Mechanism of Action

Rapidly increases serum glucose levels.
Short-term osmotic diuresis.

Indications

Hypoglycemia, altered level of consciousness, coma of unknown etiology, seizure of unknown etiology, status epilepticus (controversial).

Contraindications

Intracranial hemorrhage, delirium tremens, ineffective without thiamine,

Adverse Reactions

Extravagation leads to tissue necrosis.
Warmth, pain, burning, thrombophlebitis, rhabdomyositis.

Drug Interactions

Sodium bicarbonate, coumadin.

How Supplied

25 gm/ 50 ml pre-filled syringes (500 mg/ml)

Dosage and Administration

Adult: 12.5-25 gram slow IV; may be repeated as necessary.
Pediatric: 0.5-1 gm/kg/dose slow IV; may be repeated as necessary.

Duration of Action

Onset: less than 1 minute.
Peak effects: variable.
Duration: Variable.

Special Considerations

Administer thiamine prior to D50 in known alcoholic patients.
Draw blood sugar before administering.
Do not administer to patients with known CVA unless hypoglycemia documented.

DIAZEPAM

Class

Benzodiazepine, sedative-hypnotic, anticonvulsant.

Mechanism of Action

Potentates effects of inhibitory neurotransmitters.
Raises seizure threshold.
Induces amnesia and sedation.

Indications

Acute anxiety states, acute alcohol withdrawal, muscle relaxant, seizure activity, agitation.
Analgesia for medical procedures (fracture reduction, cardioversion).
Delirium tremens.

Contraindications

Hypersensitivity, glaucoma. coma, shock, substance abuse, head injury.

Adverse Reactions

Respiratory depression, hypotension, drowsiness, ataxia, reflex tachycardia, nausea, confusion, thrombosis and phlebitis.

Drug Interactions

Incompatible with most drugs, fluids.

How Supplied

10 mg/5 ml prefilled syringes, ampules, vials and Tubex.

Dosage and Administration

Seizure activity: Adult: 5-10 mg IV q 10-15 minutes prn (5 mg over 5 min.) (maximum dose = 30 mgs.)

Seizure activity: Pediatric: 0.2-0.3 mg/kg/dose IV every 15-30 minutes (no faster than 3 mg over 5 minutes) (max. = 10 mg).
Rectal diazepam: 0.5 mg/kg via 2" rectal catheter and flush with 2-3 ml air after administration.
Sedation for cardioversion: 5- 15 mg IV over 5-10 minutes prior to cardioversion.

Duration of Action

Onset: 1-5 minutes.
Peak effect: minutes.
Duration: 20-50 minutes.

Special Considerations

Pregnancy safety: Category D
Short duration of anticonvulsant effect.
Reduce dose 50% in elderly patient.

DIAZOXIDE

Class
Vasodilator.
Mechanism of Action
Non-diuretic antihypertensive; arteriolar vasodilatation.
Indications
Hypertensive crisis, especially in pre-eclampsia.
Contraindications
Hypotension, dissecting aortic aneurysm, labor.
Adverse Reactions
Reflex tachycardia, angina, cerebral ischemia, CVA, dysrhythmia, hyperglycemia, nausea, vomiting.
Drug Interactions
Incompatible with heat, light or acid solutions.
How Supplied: 5 mg/ml 20 ml ampules.
Dosage and Administration
Adult: 5 mg/kg IV push over 10-30 seconds.
Pediatric: 5 mg/kg IV push over 10-30 seconds.
Duration of Action
Onset: Immediate.
Peak effects: 5 minutes.
Duration of action: 3-12 hours.
Special Considerations
Administer only to patient in supine position.
Extravasations can cause tissue necrosis.

DILTIAZEM HCL

Class:
Calcium channel blocker.
Mechanism of Action:
Block influx of calcium ions into cardiac muscle: prevents spasm of coronary arteries.
Arterial and venous vasodilator.
Reduces preload and afterload.
Reduces myocardial oxygen demand.
Indications:
Control of rapid ventricular rates due to atrial flutter, atrial fibrillation, PSVT.
Angina pectoris.
Contraindications:
Hypotension, sick sinus syndrome, second or third degree AV block
Cardiogenic shock.
Wide-complex tachycardias.
Adverse Reactions:
Bradycardia, second or third-degree AV blocks, chest pain, CHF, syncope.
V-Fib, V-tach, nausea, vomiting, dizziness, dry mouth, dyspnea, headache.
Drug Interactions:
Caution in patients using medications that affect cardiac contractility.
In general, should not be used in patients on Beta-blockers.
How Supplied:
25 mg / 5 ml vial; 50 mg / 10 ml vial.
Non - refrigerated: LYO-JECT syringe.
Dosage and Administration:
Adult: Initial bolus: 0.25 mg/ kg (average dose 20 mg) IV over two (2) minutes. If inadequate response, may re-bolus in 15 minutes: 0.35 mg / kg IV over two (2) minutes.
Maintenance infusion of 5-15 mg / hour.
Pediatric: not recommended.
Duration of Action:
Onset: 2-5 minutes.
Peak effect: Variable.
Duration: 1-3 hours.
Special Considerations:
Pregnancy safety: category C.
Use in caution in patients with renal or hepatic dysfunction.
PVCs may be noted at time of conversion of PSVT to sinus rhythm.

DIPHENHYDRAMINE

Class

Antihistamine; anticholinergic.

Mechanism of Action

Blocks cellular histamine receptors; decreases vasodilatation; decreases motion sickness. Reverses extrapyramidal reactions.

Indications

Symptomatic relief of allergies, allergic reactions, anaphylaxis, acute dystonic reactions (phenothiazines).

Blood administration reactions; used for motion sickness, hay fever.

Contraindications

Asthma, glaucoma, pregnancy, hypertension, narrow angle glaucoma, infants, patients taking

Monoamine Oxidase Inhibitors.

Adverse Reactions

Sedation, hypotension, seizures, visual disturbances, vomiting, urinary retention, palpitations, dysrhythmias, dry mouth and throat, paradoxical CNS excitation in children.

Drug Interactions

Potentates effects of alcohol and other anticholinergics, may inhibit corticosteroid activity, MAOIs prolong anticholinergic effects of diphenhydramine.

How Supplied

Tablet: 25, 50 mg; Capsules: 25, 50 mg.

50 or 100 mg prefilled syringes, vials (IV or IM); elixir 12.5 mg/5 ml.

Dosage and Administration

Adult: 25 - 50 mg IM or IV or P.O.

Pediatric: 1-2 mg/kg IV, IO slowly or IM. If given PO: 5 mg./ kg./ 24 hours.

Duration of Action

Onset: 15-30 minutes.

Peak effect: 1 hour.

Duration: 3-12 hours.

Special Considerations

Not used in infants or in pregnancy: Category B.

If used in anaphylaxis, will be in conjunction with epinephrine, steroids.

DOPAMINE

Class

Sympathomimetic, inotropic agent.

Mechanism of Action

Immediate metabolic precursor to Norepinephrine. Increases systemic vascular resistance, dilate renal and splanchnic vasculature. Increases myocardial contractility and stroke volume.

Indications

Cardiogenic, septic or spinal shock, hypotension with low cardiac output states. Distributive shock.

Contraindications

Hypovolemic shock, pheochromocytoma, tachydysrhythmias, VF.

Adverse Reactions

Cardiac dysrhythmias, hypertension, increased myocardial oxygen demand, extravagation may cause tissue necrosis.

Drug Interactions

Incompatible in alkaline solutions.
MAOIs will enhance effects of dopamine.
Beta blockers may antagonize effects of dopamine.
When administered with Phenytoin: may cause hypotension, bradycardia and seizures.

How Supplied

200 mg / 5 ml - 400 mg / 5 ml prefilled syringes, ampules for IV infusion.
400 mg in 250 ml D5W premixed solutions.

Dosage and Administration

Adult: 2- 20 mcg / kg / min. (Rate determined by physician).
Pediatric: 2 - 20 mcg / kg / min. (Rate determined by physician).

Duration of Action

Onset: 1-4 minutes.
Peak Effect: 5-10 minutes.
Duration: Effects cease almost immediately after infusion shut off.

Special Considerations

Pregnancy safety not established.
Effects are dose-dependent
Dopaminergic response: 2-4 mcg / kg / min.: dilates vessels in kidneys; inc. urine output.
Beta-adrenergic response: 4-10 mcg / kg / min.: Increased chronotropy and inotropy
Adrenergic response: 10-20 mcg / kg / min.: Primarily alpha stimulant / vasoconstriction.
Greater than 20 mcg / kg / min.: reversal of renal effects / override alpha effects.
Always monitor drip rate.
Avoid extravagation injury.

EPINEPHRINE

Class: Sympathomimetic.

Mechanism of Action

Direct acting alpha and beta agonist
Alpha: bronchial, cutaneous, renal and visceral arteriolar vasoconstriction.
Beta 1: positive inotropic and chronotropic actions, increases automaticity.
Beta 2: bronchial smooth muscle relaxation and dilation of skeletal vasculature
Blocks histamine release.

Indications

Cardiac arrest, asystole, PEA, VF unresponsive to initial defib.
Severe bronchospasm, asthma, bronchiolitis.
Anaphylaxis, acute allergic reactions.

Contraindications

Hypertension, hypothermia, pulmonary edema, coronary insufficiency, hypovolemic shock.

Adverse Reactions

Hypertension, dysrhythmias, pulmonary edema, anxiety, psychomotor agitation, nausea, angina, headache, restlessness.

Drug Interactions

Potentates other sympathomimetics.
Deactivated by alkaline solutions.
MAOIs may potentate effects of epinephrine.

How Supplied

1 mg / ml (1:1,000) ampules and 0.1 mg / ml (1:10,000) prefilled syringes.
Auto-injectors: EPI-Pen: 0. 3 mg / ml
EPI-Pen Jr.: 0.15mg/ml

Dosage and Administration

Adult

Allergic reactions and asthma: 0.3 - 0.5 mg (0.3 - 0.5 ml 1:1000) IM
Anaphylaxis: 0.3 - 0.5 mg (3- 5 ml 1:10,000) IV

Cardiac: (asystole, PEA, VF)
1 mg IV push (1:10,000) every 3- 5 minutes

Pediatric

Allergic reactions and asthma: 0.01 mg/kg (0.01 mL/kg 1:1000) IM to maximum of 0.5 mg.
Cardiac: (asystole, PEA, VF)
IV, IO: Standard initial dose: 0.01 mg/kg (1:10,000, 0.1mL/kg)

Severe croup: 5 mg. as 5 ml. of 1:1000 solution administered via nebulization; may repeat every 30 minutes.
Racemic epinephrine 11.25mg via nebulization

EPINEPHRINE (cont.)

Duration of Action

Onset: Immediate.
Peak Effects: Minutes.
Duration: Several minutes.

Special Considerations

Pregnancy safety: category C.
If given ET, may dilute in sterile NS (10 ml in adults).

FENTANYL CITRATE

Class: Narcotic Analgesic

Mechanism of Action: Fentanyl citrate is a narcotic analgesic. A dose of 100 mcg (0.1 mg) (2 mL) is approximately equivalent in analgesic activity to 10 mg of morphine or 75 mg of meperidine.

Indications: IV:

- for analgesic action of short duration during the anesthetic periods, premedication, induction and maintenance, and in the immediate postoperative period (recovery room) as the need arises.
- for use as a narcotic analgesic supplement in general or regional anesthesia.
- for administration with a neuroleptic such as droperidol injection as an anesthetic premedication, for the induction of anesthesia and as an adjunct in the maintenance of general and regional anesthesia.
- for use as an anesthetic agent with oxygen in selected high risk patients, such as those undergoing open heart surgery or certain complicated neurological or orthopedic procedures.

Contraindications: Fentanyl Citrate Injection is contraindicated in patients with known intolerance to the drug

Adverse Reactions:

- As with other narcotic analgesics, the most common serious adverse reactions reported to occur with fentanyl are respiratory depression, apnea, rigidity and bradycardia; if these remain untreated, respiratory arrest, circulatory depression or cardiac arrest could occur.
- Other adverse reactions that have been reported are hypertension, hypotension, dizziness, blurred vision, nausea, emesis, laryngospasm and diaphoresis.
- It has been reported that secondary rebound respiratory depression may occasionally occur. Patients should be monitored for this possibility and appropriate countermeasures taken as necessary.

How Supplied:
Fentanyl Citrate Injection, USP, equivalent to 50 mcg (0.05 mg) fentanyl base per mL, is available as follows:

IV:
10 mL DOSETTE ampuls
20 mL DOSETTE ampuls
30 mL Single Dose vials (NOT recommended due to OD risk)
50 mL Single Dose vials (NOT recommended due to OD risk)

FENTANYL CITRATE (cont.)

Dosage and Administration

Adult: 1 mcg/kg. to max. 150 mcg. slow IV push.

Pediatric: The safety and efficacy of fentanyl citrate in pediatric patients under two years of age has not been established.

Nasal administration may be permitted by the State Treatment Protocols in certain cases.

Duration of Action

Onset: The onset of action of fentanyl is almost immediate when the drug is given intravenously; however, the maximal analgesic and respiratory depressant effect may not be noted for several minutes.

Peak effect: The peak respiratory depressant effect of a single intravenous dose of fentanyl citrate is noted as 5 to 15 minutes following injection

Duration: The usual duration of action of the analgesic effect is 30 to 60 minutes after a single intravenous dose of up to 100 mcg.

Special Considerations

Pregnancy safety: Category C

FUROSEMIDE

Class

Loop diuretic.

Mechanism of Action

Inhibits electrolyte reabsorption and promotes excretion of sodium, potassium, chloride.

Indications

CHF; Pulmonary edema, hypertensive crisis.

Contraindications

Hypovolemia, anuria, hypotension (relative contraindication); hypersensitivity, hepatic coma.

Adverse Reactions

May exacerbate Hypovolemia, hypokalemia, ECG changes, dry mouth, hypochloremia, hyponatremia, hyperglycemia (due to hemoconcentration).

Drug Interactions

Lithium toxicity may be potentated by sodium depletion.
Digitalis toxicity may be potentated by potassium depletion.

How Supplied

100 mg / 5 ml, 20 mg / 2 ml, 40 mg / 4 ml vials.

Dosage and Administration

Adult: 0.5-1.0 mg / kg injected slowly IV.
Pediatric: 1 mg / kg / dose IV, IO.

Duration of Action

Onset: 5 minutes.
Peak Effects: 20-60 minutes.
Duration: 4-6 hours.

Special Considerations

Pregnancy safety: Category C.
Ototoxicity and deafness can occur with rapid administration.
Should be protected from light.

GLUCAGON

Class

Hyperglycemic agent, pancreatic hormone, insulin antagonist.

Mechanism of Action

Increases blood glucose by stimulating glycolysis.
Unknown mechanism of stabilizing cardiac rhythm in beta-blocker overdose.
Minimal positive inotrope and chronotrope.
Decreases GI motility and secretions.

Indications

Altered level of consciousness when hypoglycemia is suspected.
May be used as inotropic agent in beta-blocker overdose.

Contraindications

Hyperglycemia, hypersensitivity.

Adverse Reactions

Nausea, vomiting.
Tachycardia, hypertension.

Drug Interactions

Incompatible in solution with most other substances.
No significant drug interactions with other emergency medications.

How Supplied

1 mg ampules (requires reconstitution with diluent provided)

Dosage and Administration

Adult: 0.5 - 1 mg IM, SC, or slow IV; may repeat q 20 minutes PRN.
Pediatric: 0.03 - 0.1 mg / kg / dose (not to exceed 1 mg) q 20 min. IM, IO, SC, slow IV.
Nasal administration may be permitted by the State Treatment Protocols in certain cases.

Duration of Action

Onset: I minute.
Peak effect: 30 minutes.
Duration: Variable (generally 9-17 minutes).

Special Considerations

Pregnancy safety: Category C.
Ineffective if glycogen stores depleted.
Should always be used in conjunction with 50% dextrose whenever possible.
If patient does not respond to second dose glucagon, 50% dextrose must be administered.

GLUCOSE - ORAL

Class

Hyperglycemic.

Mechanism of Action

Provides quickly absorbed glucose to increase blood glucose levels.

Indications

Conscious patients with suspected hypoglycemia.

Contraindications

Decreased level of consciousness, nausea, vomiting.

Adverse Reactions

Nausea, vomiting.

Drug Interactions

None.

How Supplied

Glucola: 300 ml bottles.

Glucose pastes and gels in various forms.

Dosage and Administration

Adult: Should be sipped slowly by patient until clinical improvement noted.

Pediatric: Same as adult.

Duration of Action

Onset: Immediate.

Peak Effect: Variable.

Duration: Variable.

Special Considerations

As noted in indications section.

GLYCOPROTEIN IIb / IIIa INHIBITORS

Class

Chimeric monoclonal antibody fragment specific for platelet glycoprotein IIb/IIIa receptors.

Mechanism of Action

Blocks Platelet aggregation and thrombus formation

Indications

Adjunct to percutaneous transluminal angioplasty.
Adjunct to thrombolytic agents.
Unstable angina not responsive to conventional medical therapy when percutaneous angioplasty is planned within 24 hours.

Contraindications

Active internal hemorrhage.
Clinically significant hemorrhage (GI, GU) within last 6 weeks.
Cerebrovascular accident within past 2 years.
Bleeding disorders.
Thrombocytopenia (low platelets / < 100,000)
Major surgery or trauma within last 6 weeks.
Intracranial tumor, A/V malformation or aneurysm.
Severe Hypertension, Vasculitis.
Use of Dextran before PTCA or intent to use Dextran during PTCA.
Hypersensitivity.

Adverse Reactions

Major bleeding.
Intracranial bleeding.
Thrombocytopenia.

Drug Interactions

Oral anticoagulants contraindicated.
Concurrent Dextran contraindicated.
Concurrent Heparin will increase risk of bleeding.

How Supplied

Intravenous doses (bolus / infusion), variable depending upon Brand utilized.

Dosage and Administration

Variable depending upon Brand utilized

Duration of Action

Onset: Variable: 1.5 - 2.5 Hours.
Peak Effect: Variable: 2 - 3 Hours.
Duration: 2 Hours - 2 Days.

Special Considerations

Major bleeding in 14% of coronary angioplasty patients.
Bleeding from open areas may occur (catheter site).
Pregnancy Category: C

HEPARIN SODIUM

Class

Anticoagulant.

Mechanism of Action

Prevents conversion of fibrinogen to fibrin and affect clotting factors: IX, XI, XII, plasmin. Does not lyse existing clots.

Indications

Prophylaxis and treatment of : venous thrombosis, pulmonary embolus, coronary occlusion, disseminated intravascular coagulation (DIC), post-operative thrombosis. To maintain patency of IV injection devices and indwelling catheters.

Contraindication

Hypersensitivity.
Patients on antiplatelet drugs (relative contraindication).

Adverse Reactions

Hemorrhage, thrombocytopenia, allergic reactions (chills, fever, back pain).

Drug Interactions

Salicylates, some antibiotics and quinidine may increase risk of bleeding.

How Supplied

Heparin lock flush solutions in 10 and 100-unit / ml ampules and prefilled syringes.
1,000 - 40,000 units / ml ampules.

Dosage and Administration

Adult: Loading dose: 80 units / kg IV; maintenance dose: 18 units / kg / hour IV.
Pediatric: Loading dose: 50 u / kg IV; maintenance dose: 7.5 units / kg / hour IV.

Duration of Action

Onset: Immediate.
Peak Effect: Variable.
Duration: 4 hours after continuous infusion discontinued.

Special Considerations

May be neutralized with protamine sulfate at 1 mg protamine / 100 u Heparin: give slowly IV over 1-3 minutes.

HYDROCORTISONE/METHYLPREDNISOLONE

Class

corticosteroid.

Mechanism of Action

Replaces absent glucocorticoids; suppresses acute and chronic inflammation; immunosuppressive effects.

Indications

Anaphylaxis, asthma, spinal cord injury, croup, elevated intracranial pressure (prevention and treatment), adrenal insufficiency, as an adjunct to treatment of shock.

Contraindications

Hypersensitivity to product.

Adverse Reactions

Hypertension, sodium and water retention, GI bleeding, TB.
None from single dose.

Drug Interactions

Calcium
Metaraminol.

How Supplied

Hydrocortisone 100 mg/ 2 ml. vials.
Methylprednisolone 125 mg./2 ml. and 40 mg./2 ml. vials.

Dosage and Administration

Hydrocortisone, 2 mg./kg. IV bolus to maximum of 100 mg.; 100 mg. in adult.
Methylprednisolone 2 mg./kg/ IV bolus to maximum of 125 mg.; 125 mg. in adult.

Duration of Action

Onset: Minutes to Hours (depending on indication).
Peak effects: 8-12 hours.

Special Consideration

Protect medication from heat.
Toxicity and side effects with long-term use.

HYDROXOCOBALAMIN (Vitamin B_{12})

Class: Water soluble Vitamin

Pregnancy Category: C

Mechanism of Action:
Cyanide is an extremely toxic poison. In the absence of rapid and adequate treatment, exposure to a high dose of cyanide can result in death within minutes due to the inhibition of cytochrome oxidase resulting in arrest of cellular respiration. Specifically, cyanide binds rapidly with cytochrome a3, a component of the cytochrome c oxidase complex in mitochondria. Inhibition of cytochrome a3 prevents the cell from using oxygen and forces anaerobic metabolism, resulting in lactate production, cellular hypoxia and metabolic acidosis. In massive acute cyanide poisoning, the mechanism of toxicity may involve other enzyme systems as well. Signs and symptoms of acute systemic cyanide poisoning may develop rapidly within minutes, depending on the route and extent of cyanide exposure.

The action of hydroxocobalamin in the treatment of cyanide poisoning is based on its ability to bind cyanide ions. Each hydroxocobalamin molecule can bind one cyanide ion by substituting it for the hydroxo ligand linked to the trivalent cobalt ion, to form cyanocobalamin, which is then excreted in the urine.

Indications: Hydroxocobalamin is indicated for the treatment of known or suspected cyanide poisoning
.

Contraindications: None

Adverse Reactions
Serious adverse reactions with hydroxocobalamin include allergic reactions and increases in blood pressure.

Use caution in the management of patients with known anaphylactic reactions to hydroxocobalamin or cyanocobalamin. Consideration should be given to use of alternative therapies, if available.

Many patients with cyanide poisoning will be hypotensive; however, elevations in blood pressure have also been observed in known or suspected cyanide poisoning victims. Elevations in blood pressure (≥180 mmHg systolic or ≥110 mmHg diastolic) were observed in approximately 18% of healthy subjects (not exposed to cyanide) receiving hydroxocobalamin 5 g and 28% of subjects receiving 10 g. Increases in blood pressure were noted shortly after the infusions were started; the maximal increase in blood pressure was observed toward the end of the infusion. These elevations were generally transient and returned to baseline levels within 4 hours of dosing.

Drug Interactions

No formal drug interaction studies have been conducted with hydroxocobalamin

HYDROXOCOBALAMIN (Vitamin B_{12})

How Supplied: Hydroxocobalamin is supplied in vials containing 2.5 grams of hydroxocobalamin which are to be diluted in 100 ml of normal saline. Hydroxocobalamin is given as a 5 gram IV dose.

Dosage and Administration:
The starting dose of hydroxocobalamin for adults is 5 g (i.e., both 2.5g vials) administered as an intravenous (IV) infusion over 15 minutes (approximately 15 mL/min), i.e., 7.5 minutes/vial. Depending upon the severity of the poisoning and the clinical response, a second dose of 5 g may be administered by IV infusion for a total dose of 10 g. The rate of infusion for the second dose may range from 15 minutes (for patients in extremis) to two hours, as clinically indicated.

The **pediatric dose is 70 mg/kg.** This dose should be given **over 15 minutes**.

Duration of Action

Special Considerations:

1. Emergency Patient Management

In addition to Cyanokit, treatment of cyanide poisoning must include immediate attention to airway patency, adequacy of oxygenation and hydration, cardiovascular support, and management of any seizure activity. Consideration should be given to decontamination measures based on the route of exposure.

2. Use with other cyanide antidotes:

Caution should be exercised when administering other cyanide antidotes simultaneously with Hydroxocobalamin, as the safety of co-administration has not been established. If a decision is made to administer another cyanide antidote with Hydroxocobalamin, these drugs should not be administered concurrently in the same IV line.

3. Preparation of Solution for Infusion

Each 2.5 g vial of hydroxocobalamin for injection is to be reconstituted with 100 mL of diluent (not provided with Cyanokit) using the supplied sterile transfer spike. The recommended diluent is 0.9% Sodium Chloride injection (0.9% NaCl). Lactated Ringers injection and 5% Dextrose injection (D5W) have also been found to be compatible with hydroxocobalamin and may be used if 0.9% NaCl is not readily available. The line on each vial label represents 100 mL volume of diluent. Following the addition of diluent to the lyophilized powder, each vial should be repeatedly inverted or rocked, not shaken, for at least 30 seconds prior to infusion.

Hydroxocobalamin solutions should be visually inspected for particulate matter and color prior to administration. If the reconstituted solution is not dark red or if particulate matter is seen after the solution has been appropriately mixed, the solution should be discarded.

INSULIN

Class

Antidiabetic.

Mechanism of Action

Allows glucose transport into cells of all tissues; converts glycogen to fat; produces intracellular shift of potassium and magnesium to reduce elevated serum levels of these electrolytes.

Indications

Not used in emergency pre-hospital setting.
Diabetic ketoacidosis or other hyperglycemic state.
Hyperkalemia. (Insulin and D50 used together to lower hyperkalemic state).
Non-ketotic hyperosmolar coma.

Contraindications

Hypoglycemia, hypokalemia.

Adverse Reactions

Hypokalemia, hypoglycemia,, weakness, fatigue, confusion, headache, tachycardia, nausea, diaphoresis.

Drug Interactions

Incompatible in solution with all other drugs..
Corticosteroids, dobutamine, epinephrine and thiazide diuretics decrease the hypoglycemic effects of insulin.
Alcohol and salicylates may potentate the effects of insulin.

How Supplied

10 ml Vials of 100 Units / ml.

Dosage and Administration

Dosage adjusted relative to blood sugar levels.
May be given SC, IM or IV.
Standard doses for diabetic coma

Adult: 10-25 units Regular insulin IV, followed by infusion of 0.1 units / kg / hour.
Pediatric: 0.1 - 0.2 units / kg / hour IV or IM followed by infusion: 50 units of regular insulin mixed in 250 ml of NS (0.2 units / ml), at a rate of 0.1 - 0.2 units / kg / hour.

Duration of Action

Onset: Minutes
Peak Effect: Approximately 1 hour (short-acting); 3-6 hours (intermediate-acting); 5-8 hours (long-acting).
Duration: Approximately 6-8 hours (short-acting); 24 hour (intermediate-acting); 36 hour (long-acting).

Special Considerations

Insulin is drug of choice for control of diabetes in pregnancy.
Usually require refrigeration.
Most rapid absorption if injected in abdominal wall; next most rapid absorption: arm; slowest absorption if injected into the thigh.

IPRATROPIUM BROMIDE

Class: Bronchodilator

Mechanism of Action: Blocks the action of acetylcholine at the parasympathetic sites in bronchial smooth muscle causing bronchodilitation.

Indications: Used in bronchospasm especially associated with COPD, and emphysema.

Contraindications: Hypersensitivity to atropine or its derivatives**.**
Adverse Reactions:
Ipratropium is poorly absorbed from the lung, so systemic effects are rare.

>10% CNS: Dizziness, Headache, Nervousness
Respiratory: Cough

1-10% Cardiac: Hypotention, palpitations

How Supplied: Nebulizing Ampule: 0.02% (2.5ml)
Inhaler: 18mcg/actuation

Dosage and Administration:

Adult: 2-3 puffs via metered dose inhaler (MDI) tid-qid; maximum 12 puffs/day.
ALT: 500mcg NEB q 6-8hrs (may mix neb solution with Albuterol if used within 1 hour)

Pediatric: < 12 yo: 1-2 puffs (MDI) tid-qid; max: 8 puffs
ALT: 250mcg NEB q 6-8hrs (may mix neb solution with Albuterol if used within 1 hour)

Kinetics:
Onset: 1-3 minutes after administration
Peak effects: Within 1.5- 2 hours
Duration of Action: Up to 4-6 hours
T1/2: 2 hrs after inhalation

Special Considerations

Pregnancy Safety: Category B.

LABETALOL

Selective alpha and nonselective beta-adrenergic blocker, weak intrinsic sympathomimetic activity.

Cardiac effects include decreased heart rate, contractile force, and cardiac work load, which reduces myocardial oxygen consumption, enhances coronary artery blood flow, and improves myocardial perfusion. The antihypertensive mechanism of beta blockers is related to decreased cardiac output (negative inotropic and chronotropic effects), reduced adrenergic activity, and inhibition of renin release.

Half life 5-8 hours. Max effect with IV administration seen at about 5 minutes.

Contraindications

Asthma or COPD
Cardiogenic shock
Hypersensitivity to labetalol
Prolonged or severe hypotension
Overt cardiac failure
Second and third degree AV block
Sinus bradycardia

Serious adverse effects

Bronchospasm
Hepatotoxicity
Hyperkalemia (in renal transplant patients or on hemodialysis. Rare)
Ventricular arrhythmia
Allergic reaction

Precautions

Myocardial depression after surgery/anesthesia
Avoid abrupt withdrawal (rebound)
Bronchospastic disease
CHF
Diabetes
Hyperthyroidism
Ischemic heart disease
Liver disease
Peripheral vascular disease
Pheochromocytoma (paradoxical hypertension)
Postural hypotension

No dose adjustment required for renal failure
Lower doses required for hepatic insufficiency due to first pass metabolism
Lower doses may be required for elderly patients

Pregnancy class C
OK for breastfeeding

LACTATED RINGERS Solution

Class: Isotonic crystalloid

Mechanism of Action: Volume Replacement

Indications: Hypovolemic Shock

Contraindications: Congestive Heart failure, Renal Failure

Adverse Reactions: Rare

Drug Interactions: None

How Supplied: IV Infusion

Dosage and Administration:

Adult: (Systolic <90 mmHg) Infuse wide open until systolic pressure of 100mmHg is obtained.
(Systolic 100mmHg or >) Infuse at a rate of 100 ml/hr.

Pedi: 20 ml/kg repeated as required based on hemodynamic response

LIDOCAINE HCL (2%)

Class

Antidysrhythmic.

Mechanism of Action

Decreases automaticity by slowing the rate of spontaneous Phase 4 depolarization.

Indications

Suppression of ventricular dysrhythmias (V-tach, VF, PVCs).
Prophylaxis against recurrence after conversion from V-tach, VF.

Contraindications

Second degree and third degree blocks in absence of artificial pacemaker).
Hypotension.
Stokes Adams Syndrome.

Adverse Reactions

Slurred speech, seizures, altered mental status, confusion, lightheadedness, blurred vision, bradycardia.

Drug Interactions

Apnea induced with succinylcholine may be prolonged with high doses of Lidocaine.
Cardiac depression may occur in conjunction with IV Dilantin.
Procainamide may exacerbate the CNS effects.
Metabolic clearance decreased in patients with liver disease or those patients taking beta-blockers.

How Supplied

100 mg in 5 ml solution prefilled syringes.
1 and 2 gram additive syringes.
100 mg in 5 ml solution ampules.
1 and 2 gram vials in 30 ml of solution.

Dosage and Administration

Adult:
Cardiac arrest VT/ VF: 1.5 mg / kg IV push; repeat q 3-5 minutes to maximum dose of 3 mg/kg. After conversion to NSR, begin drip at 2-4 mg / min.
VT with pulse: 1-1.5 mg / kg IV Push; then 0.50 - 0.75 mg / kg q 5-10 min. to max. of 3 mg/kg. Start drip at 2-4 mg/min. ASAP.
PVCs with pulse: 0.5-1.5 mg/kg IV Push; additional boluses of 0.5-1.5 mg/kg q 5-10 min. to max. of 3 mg/kg. Start drip at 2-4 mg/ min. ASAP.
VF prophylaxis: 0.5 mg/kg IV Push; additional boluses 0.5 mg/kg in 8-10 minutes up to 2 mg/kg. Start drip at 2-4 mg/min. ASAP.
IM dose: 300 mg (4 mg/kg) of 10% solution.
Pediatric:
VF or Pulseless V-tach: 1 mg/kg IV / IO per dose. Infusion: 20-50 mcg/kg/min.
PVCs with pulse: 1 mg/kg IV / IO per dose. Infusion: 20-50 mcg/kg/min.

Duration of Action

Onset: 1-5 minutes.
Peak Effect: 5-10 minutes.
Duration: Variable. (15 min. - 2 hours).

LIDOCAINE HCL (2%) (cont.)

Special Considerations

Pregnancy safety: Category B.
Reduce maintenance infusions by 50% if patient is over 70 years of age, has liver disease, or is in CHF or shock.
A 75-100 mg bolus maintains levels for only 20 minutes.
If bradycardia occurs with PVCs, always treat the bradycardia with atropine, Isoproterenol or both.
Exceedingly high doses of Lidocaine can result in coma or death.
Avoid Lidocaine for reperfusion dysrhythmias after thrombolytic therapy.
Cross-reactivity with other forms of local anesthetics.

LORAZEPAM

Class

Benzodiazepine; sedative; anticonvulsant.

Mechanism of Action

Anxiolytic, anticonvulsant and sedative effects; suppresses propagation of seizure activity produced by foci in cortex, thalamus and limbic areas.

Indications

Initial control of status epilepticus or severe recurrent seizures.
Severe anxiety.
Sedation.

Contraindications

Acute narrow-angle glaucoma.
Coma, shock or suspected drug abuse.

Adverse Reactions

Respiratory depression, apnea, drowsiness, sedation, ataxia, psychomotor impairment, confusion.
Restlessness, delirium.
Hypotension, bradycardia.

Drug Interactions

May precipitate CNS depression if patient is already taking CNS depressant medications.

How Supplied

2 and 4 mg / ml concentrations in 1 ml vials.

Dosage and Administration

Note: When given IV or IO, must dilute with equal volume of sterile water or sterile saline; When given IM, Lorazepam is not to be diluted.
Adult: 2-4 mg slow IV at 2 mg / min. or IM; may repeat in 15-20 minutes to maximum dose of 8 mg. For sedation: 0.05 mg / kg up to 4 mg IM.
Pediatric: 0.05 - 0.20 mg / kg slow IV, IO slowly over 2 minutes or IM; may repeat in 15-20 minutes to maximum dose of 0.2 mg / kg.

Duration

Onset of action: 1-5 minutes.
Peak effect: variable.
Duration of action: 6-8 hours.

Special Considerations

Pregnancy safety: Category D.
Monitor BP and respiratory rate during administration.
Have advanced airway equipment readily available.
Inadvertent arterial injection may result in vasospasm and gangrene.
Lorazepam expires in 6 weeks if not refrigerated.

Note From DPH/Drug Control Program: Re: Storage of Lorazepam.
According to stability information, Lorazepam injection requires refrigeration and should be stored at 2 - 8º C (35 - 45º F). Lorazepam injection should be protected from light, which can be accomplished by retaining the vial in the carton until ready for use. In addition, freezing of the injection should be avoided. Ambulances are required to ensure stability of all drug products stored on site. Those ambulances unable to meet the above-mentioned storage conditions should refrain from using Lorazepam. For further information, contact the Drug Control Program **at (617) 983-6700 or the** Office of Emergency Medical Services **at (617) 753-7300**.

MAGNESIUM SULFATE

Class

Electrolyte

Mechanism of Action

Reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholinesterase release at the myoneural junction; manages seizures in toxemia of pregnancy; induces uterine relaxation; can cause bronchodilation after beta-agonists and anticholinergics have been used.

Indications

Seizures of eclampsia (Toxemia of pregnancy).
Torsades de Pointes.
Hypomagnesemia.
TCA overdose-induced dysrhythmias.
Digitalis-induced dysrhythmias.
Class IIa agent for refractory VF and VT after administration of Lidocaine doses.

Contraindications

Heart blocks.
Renal diseases.

Adverse Reactions

Respiratory and CNS depression.
Hypotension, cardiac arrest and asystole may occur.
Facial flushing, diaphoresis, depressed reflexes.
Circulatory collapse.

Drug Interactions

May enhance effects of other CNS depressants.
Serious changes in overall cardiac function may occur with cardiac glycosides.

How Supplied

2 ml and 20 ml vials of a 50% solution.

Dosage and Administration

Adult: Seizure activity associated with pregnancy: 1-4 gm IV over 10 minutes.
For Torsades de Pointes or Refractory VF/VT: 1-2 grams IV over 1-2 minutes.
Pediatric: Asthma/bronchospasm, severe: 25 mg./kg. over 10 minutes IV.
Usually mixed in 50-100 CC of NS to be given IV.

Duration of Action

Onset: Immediate.
Peak effect: variable.
Duration: 3-4 hours.

Special Considerations

Pregnancy safety: Recommended that drug not be given in the 2 hours before delivery, if possible.
IV calcium gluconate or calcium chloride should be available as antagonist if needed.
Use with caution in patients with renal failure.
Magnesium sulfate is being used for acute MI patients in some systems under Medical Direction.

MANNITOL 20%

Class

Osmotic diuretic.

Mechanism of Action

Promotes the movement of fluid form the intracellular space to the extracellular space.
Decreases cerebral edema and intracranial pressure.
Promotes urinary excretion of toxins.

Indications

Cerebral edema.
Reduce intracranial pressure for certain cause (space-occupying lesions).
Rhabdomyolysis (myoglobinuria).
Blood transfusion reactions.

Contraindications

Hypotension, renal failure, electrolyte depletion, dehydration, intracranial bleeding.
Severe CHF with pulmonary edema
hyponatremia.

Adverse Reactions

CHF, pulmonary edema, hypertension, nausea, vomiting, headache, seizures, chest pain, tachycardia. Electrolyte depletion, dehydration, hypotension, sodium depletion.

Drug Interactions

May precipitate digitalis toxicity in when given concurrently.

How Supplied

250 ml and 500 ml of a 20% solution for IV infusion (200 mg / ml)
25% solution in 50 ml for slow IV push.

Dosage and Administration

Adult: 0.50g - 2 g / kg IV infusion over 15-30 minutes; may repeat after 5 minutes if no effect.
Pediatric: 0.5 - 1g / kg / dose IV, IO infusion over 30-60 minutes; may repeat after 30 minutes if no effect.

Duration of Action

Onset: 1-3 hours for diuretic effect; 15 minutes for reduction of intracranial pressure.
Peak effect: variable.
Duration: 4-6 hours for diuretic effect; 3-8 hours for reduction of ICP.

Special Considerations

Pregnancy safety: Category C.
May crystallize at temperatures below 7.8 degrees Centigrade.
In-line filter should always be used.
Effectiveness depends upon large doses and an intact blood-brain barrier.
Usage and dosages in emergency care are controversial.

MEPERIDINE

Class

Opioid Analgesic

Mechanism of Action

Synthetic opioid agonist that acts on opioid receptors to produce analgesia, euphoria, respiratory and physical depression; a schedule II drug with potential for physical dependency and abuse.

Indications

Analgesia for moderate to severe pain.

Contraindications

Hypersensitivity to narcotic agents.
Diarrhea caused by poisoning.
Patients taking MAOIs.
During labor or delivery of a premature infant.
Undiagnosed abdominal pain or head injury.

Adverse Reactions

Respiratory depression, sedation, apnea, circulatory depression, dysrhythmias, shock.
Euphoria, delirium, agitation, hallucinations, visual disturbances, coma.
Seizures, headache, facial flushing.
Increased ICP, nausea, vomiting.

Drug Interactions:

Do not give concurrently with MAOIs (even with a dose in the last 14 days!).
Exacerbates CNS depression when given with these medications.

How Supplied

50 / ml in 1 ml pre-filled syringes and Tubex.

Dosage and Administration

Adult: 50-100 mg IM, SC or 25 - 50 mg slowly IV.
Pediatric: 1-2 mg / kg / dose IV, IO, IM, SC.

Duration of Action

Onset: IM: 10-45 minutes; IV: immediate.
Peak effect: 30-60 minutes.
Duration: 2-4 hours.

Special Considerations

Pregnancy safety: Category C.
Use with caution in patients with asthma and COPD.
May aggravate seizures in patients with known convulsive disorders.
Naloxone should be readily available as antagonist.

METOPROLOL

Class: Antianginal; Antihypertensive Agent; Beta Blocker

Mechanism of Action: Selective inhibitor of beta1-adrenergic receptors; completely blocks beta1 receptors , with little or no effect on beta 2 receptors at doses <100 mg;

Indications: Treatment of hypertension and angina pectoris; prevention of myocardial infarction, atrial fibrillation, flutter, symptomatic treatment of hypertrophic subaortic stenosis; to reduce increased sympathetic stimuli in acute MI.

Contraindications: Hypersensitivity to metoprolol or any component of the formulation; sinus bradycardia; heart block greater than first degree (except in patients with a functioning artificial pacemaker); cardiogenic shock; uncompensated cardiac failure; pregnancy (2nd and 3rd trimesters)

Adverse Reactions:
Respiratory: Bronchospasm
Cardiovascular: Bradycardia, palpitations, edema, congestive heart failure, reduced peripheral circulation.
Central nervous system: Drowsiness, insomnia.

Drug Interactions:
Drugs which slow AV conduction (**digoxin**): effects may be additive with beta-blockers.
Glucagon: Metoprolol may blunt the hyperglycemic action of glucagon.
Verapamil or diltiazem may have synergistic or additive pharmacological effects when taken concurrently with beta-blockers; avoid concurrent I.V. use.

How Supplied: Metoprolol tartrate, is a selective beta$_1$-adrenoreceptor blocking agent, available in 5-ml (1mg/ml) ampuls for **intravenous** administration.

Dosage and Administration:
Adults: I.V.
Hypertension: Has been given in dosages 1.25-5 mg every 6-12 hours in patients unable to take oral medications

Myocardial infarction (acute): I.V. 5 mg every 5-10 minutes up to 3 doses in early treatment of myocardial infarction.

Duration of Action: Peak antihypertensive effect:
Oral: Within 1.5-4 hours
Duration: 10-20 hours
Half-life: 3-4 hours; End-stage renal disease: 2.5-4.5 hours

Special Considerations:
Pregnancy Safety: Category C (manufacturer); D (2nd and 3rd trimesters - expert analysis)

Not recommended in pediatric population. The safety and effectiveness of Metoprolol have not been established in children

MIDAZOLAM

Class

Short-acting benzodiazepine CNS depressant.

Mechanism of Action

Anxiolytic and sedative properties similar to other benzodiazepines.
Memory impairment.

Indications

Sedation, Anxiolytic prior to endotracheal or nasotracheal intubation.
Administer for conscious sedation.

Contraindications

Glaucoma, shock, coma, alcohol intoxication, overdose patient.
Depressed vital signs.
Concomitant use with other CNS depressants, barbiturates, alcohol, narcotics.

Adverse Reactions

Hiccough, cough, over-sedation, nausea, vomiting, injection site pain, headache, blurred vision.
Hypotension, respiratory depression and arrest.

Drug Interactions

Should not be used in patients who have taken CNS depressant.

How Supplied

2, 5, 10 ml vials (1 mg / ml).
1, 2, 5, 10 ml vials (5 mg/ ml).

Dosage and Administration

Adult: 0.5 - 2.5 mg slow IV push;
(may be repeated to total maximum: 0.1 mg / kg).

Pediatric: To facilitate intubation: Medical control may order:
(6 months- 5 years) Use of Midazolam 0.05-0.1 mg/kg IV maximum dose of 5 mg.
(6-12 year old) Use of Midazolam 0.1 mg/kg IV maximum dose of 8 mg.__

WMD: (See APPENDIX Dosing Table)

Nasal administration may be permitted by the State Treatment Protocols in certain cases.

Duration of Action

Onset: 1-3 minutes IV and dose dependent.
Peak effect: variable.
Duration: 2-6 hours and dose dependent.

Special Considerations

Pregnancy safety: category D.
Administer immediately prior to intubation procedure.
Requires continuous monitoring of respiratory and cardiac function.

MORPHINE SULFATE

Class

Opioid analgesic. (Schedule II drug).

Mechanism of Action

Alleviates pain through CNS actions
Suppresses fear and anxiety centers in brain.
Depresses brain stem respiratory centers.
Increases peripheral venous capacitance and decreases venous return.
Decreases preload and afterload, decreasing myocardial oxygen demand.

Indications

Analgesia for moderate to severe acute and chronic pain (use with caution).
Severe CHF, pulmonary edema.
Chest pain associated with acute MI.

Contraindications

Head injury, exacerbated COPD, depressed respiratory drive, hypotension.
Undiagnosed abdominal pain, decreased level of consciousness.
Suspected hypovolemia.
Patients who have taken MAOIs within past 14 days.

Adverse Reactions

Respiratory depression, hypotension, decreased level of consciousness, nausea, vomiting.
Bradycardia, tachycardia, syncope, facial flushing, euphoria, bronchospasm, dry mouth.

Drug Interactions

Potentates sedative effects of phenothiaxines.
CNS depressant may potentate effects of morphine.
MAOIs may cause paradoxical excitation.

How Supplied

10 mg in 1 ml of solution, ampules and Tubex syringes.

Dosage and Administration

Adult: 1-3 mg IV, IM, SC every 5 minutes titrated to maximum of 10 mg.
Adult: **Morphine 0.1mg/kg to a maximum of 10mg IV/IM/SC**

~

Pediatric: 0.1 - 0.2 mg / kg / dose IV, IO, IM, SC every 5 minutes titrated to max. of 5 mg.

Duration of Action

Onset: Immediate.
Peak effect: 20 minutes.
Duration: 2 - 7 hours.

Special Considerations

Pregnancy safety: Category C.
Morphine rapidly crosses the placenta.
Safety in neonate not established.
Use with caution in geriatric population and those with COPD, asthma.
Vagotonic effect in patient with acute inferior MI (bradycardia, heart block).
Naloxone should be readily available as antidote.

NALOXONE

Class

Narcotic antagonist

Mechanism of Action

Competitive inhibition at narcotic receptor sites.
Reverse respiratory depression secondary to depressant drugs.
Completely inhibits t effect of morphine.

Indications

Opiate overdose, coma.
Complete or partial reversal of CNS and respiratory depression induced by opioids
- Narcotic agonist
  - Morphine, heroin, hydromorphone (Dilaudid), methadone.
  - Meperidine (Demerol), Paregoric, Fentanyl (Sublimase).
  - Oxycodone (Percodan), codeine, propoxyphene (Darvon).
- Narcotic agonist and antagonist
  - Butorphanol (Stadol).
  - Pentazocine (Talwin).
  - Nalbuphine (Nubain).

Decreased level of consciousness.
Coma of unknown origin.

Contraindications

Use with caution in narcotic-dependent patients.
Use with caution in neonates of narcotic-addicted mothers.

Adverse Reactions

Withdrawal symptoms in the addicted patient.
Tachycardia, hypertension, dysrhythmias, nausea, vomiting, diaphoresis.

Drug Interactions

Incompatible with bisulfite and alkaline solutions.

How Supplied

0.02 mg / ml (neonate); 0.4 mg/ml, 1 mg/ml; 2.0 mg / 5 ml ampules; 2 mg/5 ml prefilled syringe.

Dosage and Administration

Adult: 0.4 - 2.0 mg IV, IM, SC, <u>Nasal via atomizer</u>; min. recommended = 2.0 mg repeat at 5 minute intervals to 10 mg maximum dose. (Medical Control may request higher amounts). Infusion: 2 mg in 500 ml of D5W (4 mcg/ml), infuse at 0.4 mg / hr (100 ml/hour).

Pediatric: 0.1 mg / kg / dose IV, IM, SC; maximum of 0.8 mg; if no response in 10 minutes, administer an additional 0.1 mg / kg /dose.

Duration of Action

Onset: within 2 minutes.
Peak effect: variable.
Duration: 30-60 minutes.

Special Considerations

Pregnancy safety: category B.
Seizures without causal relationship have been reported.
May not reverse hypotension.
Use caution when administering to narcotic addicts (violent behavior, etc.).

NERVE AGENT ANTIDOTES (AUTO-INJECTORS)

1. Duodote™ Nerve Agent Antidote

Duodote is a single, dual-chambered auto-injector containing two separate drug products; 2.1 mg atropine sulfate equivalent; 600 mg pralidoxime chloride.- 1 injection required.

Meridian Medical Technologies, Inc

2. MARK 1 KIT: Nerve Agent Antidote Kit

Each **MARK 1 KIT** contains 1- Atropine, (2 mg/0.7 ml) and 1- Pralidoxime Chloride (600-mg/2 **ml**) (2-PAMCL)

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) (cont.)

3. <u>(ATNAA): Antodote Treatment Nerve Agent Auto-Injector</u>
Each Dual Chamber (ATNAA) Auto-Injector delivers 2.1 mg Atropine in 0.7 ml and 600 mg Pralidoxime Chloride in 2 ml sequentially using a single needle.

4. <u>ATOX ComboPen: Delivers 220 mg Obidoxime Chloride and 2 mg Atropine in 2 ml. (Available outside the U.S. Pending FDA approval.)</u>

Meridian Medical Technologies, Inc

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) (cont.)

5. <u>Pralidoxime Chloride Injection (2-Pam)</u> Delivers 600mg Pralidoxime Chloride in 2 ml.

Meridian Medical Technologies, Inc

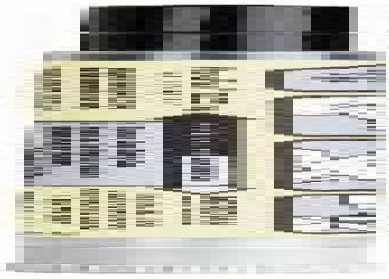
6. <u>DIAZEPAM AUTO-INJECTOR: CONVULSANT ANTIDOTE NERVE AGENT (CANA):</u>

Each **CANA Autoinjector** contains 10mg diazepam in 2ml.

Meridian Medical Technologies, Inc

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) (cont.)

7. <u>AtroPen® Autoinjector: (Pediatric)</u> Delivers 0.25 mg Atropine Sulfate equivalent in 0.3ml.



Meridian Medical Technologies, Inc.

8. <u>Adult - Pediatric AtroPen® Autoinjectors</u>: Three strengths of ATROPEN are available in color coded containers: 0.5mg (blue); 1.0mg (Dark Red) **<u>or</u>** 2.0 mg (Green) Each ATROPEN delivers atropine in 0.7 ml. of sterile solution.

Adults and children weighing over 90 lbs (generally over 10 years of age) 2 mg AtroPen® (GREEN LABEL)	Needle extends rapidly from GREEN Tips. YELLOW Safety Caps 2 mg
Children weighing 40 lbs to 90 lbs (generally 4 to 10 years of age) 1 mg AtroPen® (DARK RED LABEL)	1 mg
Children weighing 15 lbs to 40 lbs (generally 6 months to 4 years of age) 0.5 mg AtroPen® (BLUE LABEL)	0.5 mg

Meridian Medical Technologies, Inc.

Drug reconstitution

Intramuscular solution from 1 gram vial of pralidoxime chloride (2-PAM). 3 ml of sterile water or normal saline for a concentration of 300 mg/ml.

Intravenous: 1 gram vial of pralidoxime (2-PAM) diluted with 20 ml of sterile water or normal saline. Add to 100 ml IV bag of normal saline. Adult dosing is 1 gram infused over at least 30 minutes. More rapid dosing is associated with hypertension and paralysis. Slow infusion if hypertension develops.

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) (cont.)

PREPARATION OF WEIGHT BASED DOSING USING MARK I KITS

Under sterile conditions, clean 10 ml sterile water or sterile saline vial top with isopropyl alcohol. Withdraw entire contents of vial and discard. Swab injection surface of the autoinjector with isopropyl alcohol while autoinjector is still in protective plastic safety case to prevent inadvertent firing. Remove autoinjector and firmly press autoinjector against surface of emptied sterile vial until all contents are discharged. Label vial as atropine or pralidoxime. One vial will now contain 2 mg atropine in 0.7 ml diluent (2.9 mg/ml) and the other has 600 mg pralidoxime in 2ml diluent (300 mg/ml). The pediatric dose should then be drawn up in a syringe with a filter needle (autoinjector may discharge a plug of rubber into the vial) and needle changed for injection.

NICARDIPINE

Calcium channel blocker resulting in coronary and peripheral vasodilatation, often with a compensatory elevation in heart rate. It increases the cardiac index and cardiac output while reducing the systemic vascular resistance. There are no antiarrhythmic effects.
Metabolized by the liver.

Peak response in about 2 minutes. Half life 44-107 minutes for a single IV dose.

Contraindications

Advanced aortic stenosis
Asphyxia (neonates)
Hypersensitivity to calcium channel antagonists

Adverse reactions

Arteriolar dilator with peripheral effects (edema, flushing, reflex tachycardia or palpitations, usually transient
Prolonged PR interval or bundle branch blocks
Flushing
Tinnitus
Acute pulmonary edema

Precautions

CHF
Exacerbation of angina during initial therapy, with dose increases, or during B blocker withdrawal
Hepatic or renal impairment
Persistent dermatologic reaction progressing to erythema multiforme or exfoliative dermatitis
Pheochromocytoma
Portal hypertension
Symptomatic hypotension

No dose adjustment required for renal failure

Pregnancy class C
Inadequate information for breast feeding

NITROGLYCERIN

Class

Vasodilators.

Mechanism of Action

Smooth muscle relaxant acting on vascular, bronchial, uterine and intestinal smooth muscle. Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the work load of the heart and, thereby, myocardial oxygen demand.

Indications

Acute angina pectoris.
Ischemic chest pain.
Hypertension.
CHF, pulmonary edema.

Contraindications

Hypotension, hypovolemia.
Intracranial bleeding or head injury.

Adverse Reactions

Headache, hypotension, syncope, reflex tachycardia, flushing.
Nausea, vomiting, diaphoresis, muscle twitching.

Drug Interactions

Additive effects with other vasodilators.
Incompatible with other drugs IV.

How Supplied

Tablets: 0.15 mg (1/400 grain); 0.3 mg (1/200 grain); 0.4 mg (1/150 grain); 0.6 mg (1/100 grain).
NTG spray: 0.4 mg - 0.8 mg under the tongue.
NTG IV (TRIDIL).

Dosage and Administration

Adult:

Tablets: 0.3 - 0.4 mg SL; may repeat in 3-5 minutes to maximum of 3 doses.

NTG spray: 0.4 mg under the tongue; 1-2 sprays.

NTG IV infusion: 5 ug / min.; increase by 5-10 ug / min. every 5 minutes until desired effect.

Pediatric: not recommended.

Duration of Action

Onset: 1-3 minutes.
Peak effect: 5-10 minutes.
Duration: 20-30 minutes or if IV, 1-10 minutes after discontinuation of infusion.

Special Considerations

Pregnancy safety: category C.
Hypotension more common in geriatric population.
NTG decomposes if exposed to light or heat.
Must be kept in airtight containers.
Active ingredient may have a stinging effect when administered SL.

NITROPASTE

Class: Vasodilator

Mechanism of Action: Smooth muscle relaxant acting on vascular, bronchial, uterine and intestinal smooth muscle. Dilation of arterioles and veins in the periphery reduces preload and afterload, decreases the work load of the heart and, thereby, myocardial oxygen demand.

Indications: Angina pectoris and chest pain associated with acute MI, CHF/PE; Hypertension (HTN).

Contraindications: Hypotension, hypovolemia, Intracranial bleeding or head injury.

Adverse Reactions: Headache, hypotension, syncope, reflex tachycardia, flushing. Nausea, vomiting, diaphoresis, muscle twitching.

How Supplied: Topical Ointment: (Nitrol®) 2% [20 mg/g] (30g, 60g)

Dosage and Administration

Adult: For CHF/PE; HTN

Paste: Apply 1 inch, cover with plastic wrap and secure with tape.

Pediatric: not recommended

Duration of Action

Onset: 30 minutes.
Peak effect: Variable.
Duration: 18-24 hours.

Special Considerations

Pregnancy safety: Category C.

Apply in thin uniform layer on non-hairy area.
1 inch equals approximately 15 mg nitroglycerin.
Avoid using fingers to spread paste.
Store past in cool place with tube tightly capped.
Erratic absorption rates quite common.

OCTREOTIDE

Class: Endocrine-metabolic

Mechanism of Action: reduces variceal bleeding

Indications: GI bleed due to varices

Contraindications: Hypersensitivity to octreotide or any of the formulation's components

Adverse Reactions:
Hyperglycemia, hypoglycemia, nausea, headache, drowsiness, bradycardia

How Supplied:
Injection, solution varying concentrations,

Dosage and Administration

Adult: as per infusion orders.

Duration of Action

Half-life elimination: Adults: ~1.7 hours

Special Considerations
Pregnancy safety: Category B

ONDANSETRON

Class: Antiemetic

Mechanism of Action: Selective 5-HT receptor antagonist, blocking serotonin, both peripherally on vagal nerve terminals and centrally in the CNS chemoreceptor trigger zone

Indications: Treatment and prevention of nausea and vomiting

Contraindications: Hypersensitivity to ondansetron, other selective 5-HT3 antagonists, or any component of the formulation

Adverse Reactions:
Headache, drowsiness, pruritus

How Supplied:
Infusion as hydrochloride [premixed in D5WJ (Zofran: 32 mg (50 mL)
Injection, solution, as hydrochloride (Zofran): 2 mg/mL (2 mL, 20 mL)
Solution, as hydrochloride (Zofran: 4 mg/5 mL (50 mL) [contains sodium benzoate; strawberry flavor]

Dosage and Administration:
Children:
For child under or up to 30 kg. 1 mg. IV/IM;
For a child over 30 kg., 2 mg. IV/IM.

Adults:
Adult: 4 mg. IV/IM.

Duration of Action

Onset of action: ~30 minutes
Half-life elimination: Children <5 years: 2-3 hours;
Adults: 3-6 hours

Special Considerations
Pregnancy safety: Category B

OXYGEN

Class

Naturally occurring atmospheric gas

Mechanism of Action

Reverses hypoxemia.

Indications

Confirmed or expected hypoxemia.
Ischemic chest pain.
Respiratory insufficiency.
Prophylactically during air transport.
Confirmed or suspected carbon monoxide poisoning.
All other causes of decreased tissue oxygenation.
Decreased level of consciousness.

Contraindications

Certain patients with COPD, emphysema who will not tolerate Oxygen concentrations over 35%.
Hyperventilation.

Adverse Reactions

Decreased level of consciousness and respiratory depression in patients with chronic CO2 retention.
Retrolental fibroplasia if given in high concentrations to premature infants. (maintain 30-40% 02)

Drug Interactions

None.

How Supplied

Oxygen cylinders (usually green and white) of 100% compressed oxygen gas).

Dosage and Administration

Adult:

Cardiac arrest and Carbon Monoxide poisoning: 100%.
Hypoxemia: 10-15 L/ min. via non-rebreather.

COPD: 0-2 L/ min. via nasal cannula or 28-35% venturi mask. Be prepared to provide ventilatory support if higher concentrations of oxygen needed.
Pediatric: Same as for adult with exception of premature infant.

Duration of Action

Onset: Immediate.
Peak effect: not applicable.
Duration: Less than 2 minutes.

Special Considerations

Be familiar with liter flow and each type of delivery device used.
Supports possibility of combustion.

PRALIDOXIME CHLORIDE

Class

Cholinesterase reactivator.

Mechanism of Action

Reactivation of cholinesterase to effectively act as an antidote to organophosphate pesticide poisoning. This action allows for destruction of accumulated acetylcholine at the neuromuscular junction.

Indications

As an antidote in the treatment of poisoning by organophosphate pesticides and chemicals.
In the pre-hospital arena, is used when atropine is or has become ineffective in management of organophosphate poisoning.

Contraindications

Use with caution in patients with reduced renal function.
Patients with myasthenia gravis and organophosphate poisoning.

Adverse Reactions

Dizziness, blurred vision, diplopia, headache, drowsiness, nausea, tachycardia, hyperventilation, muscular weakness, excitement and manic behavior

Drug Interactions

No direct drug interactions, however, patients with organophosphate poisoning should not be given barbiturates, morphine, theophylline, aminophylline, succinylcholine, reserpine and phenothiazines.

How Supplied

Emergency Single Dose Kit containing:

- One 20 ml vial of 1 gram sterile Protopam Chloride.
- One 20 ml ampule of sterile diluent.
- Sterile, disposable 20 ml syringe.
- Needle and alcohol swab.

Dosage and Administration

NOTE: If Protopam is to be used, it should be administered almost simultaneously with atropine.

Adult: Initial dose of 1-2 grams as an IV infusion with 100 ml saline over 15-30 minutes.
Pediatric: 20-40 mg / kg as IV infusion over 15-30 minutes.
Doses may be repeated every 1 (one) hour if muscle weakness persists.
If IV administration is not feasible, IM or SC injection may be utilized.
For Autoinjectors: (See Nerve Agent Antidote)

Duration of Action

Onset: Minutes
Peak effects: Variable.
Duration: Variable

Special Considerations

Pregnancy safety: unknown.
Treatment will be most effective if given within a few hours after poisoning.
Cardiac monitoring should be considered in all cases of severe organophosphate poisoning.

PROCAINAMIDE

Class

Antidysrhythmic Class Ia

Mechanism of Action

Suppresses phase IV depolarization in normal ventricular muscle and Purkinje fibers, reducing automaticity of ectopic pacemakers; suppresses reentry dysrhythmias by slowing intraventricular conduction.

Indications

Suppress PVCs refractory to Lidocaine.
Suppress VT with a pulse refractory to Lidocaine.
PSVTs with wide-complex tachycardia of unknown origin (drug of choice when associated with WP).

Contraindications

Second and Third Degree block.
Torsades de Pointes.
Lupus.
Digitalis toxicity.
Myasthenia gravis.

Adverse Reactions

PR, QRS, and QT widening, AV Block, cardiac arrest, hypotension, seizures.
Nausea, vomiting, reflex tachycardia, PVCs, VT, VF.
CNS depression, confusion.

Drug Interaction

None with other emergency drugs.

How Supplied

1 gram in 10 ml vial (100 mg / ml).
1 gram in 2 ml vials (500 mg / ml) for infusion.

Dosage and Administration

Adult: 20-30 mg / min.; maximum total dose is 17 mg / kg. Maintenance infusion: 1-4 mg / min.
Pediatric: 2-6 mg / kg IV, IO at less than 20 mg / min.; maximum dose is 17 mg / kg. Maintenance infusion: 20-80 micrograms/kg/min.

Duration of Action

Onset: 10-30 minutes.
Peak effect: Variable.
Duration: 3-6 hours.

Special Considerations

Discontinue infusion if hypotension develops, the QRS complex widens by 50% of its original width or a total of 17 mg / kg has been administered or if the dysrhythmia is suppressed.
Pregnancy safety: Category C.
Potent vasodilating and inotropic effects.
Hypotension with too rapid an infusion.
Carefully monitor vital signs and ECG.
Administer cautiously to patients with renal, hepatic or cardiac insufficiency.
Administer cautiously to patients with asthma or digitalis-induced dysrhythmias.

SODIUM BICARBONATE 8.4%

Class Buffer, alkalinizer.

Mechanism of Action

Reacts with hydrogen ions to form water and carbon dioxide thereby acting as a buffer for metabolic acidosis.

Indications

Known pre-existing bicarbonate-responsive acidosis.
Upon return of spontaneous circulation after long arrest interval.
TCA overdose.
Hyperkalemia.
Phenobarbital overdose.
Alkalinization for treatment of specific intoxications.

Contraindications

Metabolic and respiratory alkalosis.
Hypocalcemia and hypokalemia.
Hypocloremia secondary to GI loss and vomiting.

Adverse Reactions

Metabolic alkalosis, hypokalemia, hyperosmolarity, fluid overload.
Increase in tissue acidosis.
Electrolyte imbalance and tetany, seizures.
Tissue sloughing at injection site.

Drug Interactions

May precipitate in calcium solutions.
Half-lives of certain drugs may increase through alkalinization of the urine.
Vasopressors may be deactivated.

How Supplied

50 mEq in 50 ml of solvent.

Dosage and Administration

Adult: 1 mEq / kg IV; may repeat with 0.5 mEq / kg every 10 minutes.
Pediatric: same as for adult.

Adult infusion: 1 – 4 amps in 1 liter D5W or NS, rate determined by sending physician.
Pediatric infusion: same as for adult.

Duration of Action

Onset: 2-10 minutes.
Peak effect: 15-20 minutes.
Duration: 30-60 minutes.

Special Considerations

Pregnancy safety: Category C.
Must ventilate patient after administration.
Whenever possible, blood gas analysis should guide use of bicarbonate.
Intracellular acidosis may be worsened by production of carbon dioxide.
May increase edematous states.
May worsen CHF.

STREPTOKINASE

Class Thrombolytic agent.

Mechanism of Action

Combines with plasminogen to produce an activator complex that converts free plasminogen to the proteolytic enzyme plasmin. Plasmin degrades fibrin threads as well as fibrinogen, causing clot lysis.

Indications

Acute evolving MI.
Massive pulmonary emboli.
Arterial thrombosis and embolism.
To clear arteriovenous cannulas.

Contraindications

Hypersensitivity.
Active bleeding, recent surgery (within 2-4 weeks), recent CVA.
Prolonged CPR.
Intracranial or intraspinal neoplasm, arteriovenous malformation or surgery.
Recent significant trauma (particularly head trauma).
Uncontrolled hypertension.

Adverse Reactions

Bleeding (GU, GI, intracranial, other sites).
Allergic reactions, hypotension, chest pain.
Reperfusion Dysrhythmias.
Abdominal pain.

Drug Interactions

Aspirin may increase risk of bleeding as well as improve outcome.
Heparin and other anticoagulants may increase risk of bleeding as well as improve outcome.

How Supplied

250,000, 750,000, 1.5 Million IU vials.

Dosage and Administration

NOTE: Reconstitute by slowly adding 5 ml sodium chloride or D5W, directing stream to side of vial instead of into powder. Gently roll and tilt vial for reconstitution; Dilute slowly to 45 ml total.
Adult: 500,000 - 1,500,000 IU diluted to 45 ml IV over one (1) hour.
Pediatric: safety not established.

Duration of Action

Onset: 10 - 20 minutes. (fibrinolysis 10-20 minutes; clot lysis: 60 - 90 minutes).
Peak effects: Variable.
Duration: 3-4 hours (prolonged bleeding times up to 24 hours).

Special Considerations

Pregnancy safety: Category A.
Do not administer IM injections to patients receiving thrombolytics.
Obtain blood sample for coagulation studies prior to administration.
Carefully monitor vital signs.
Observe patient for bleeding.

TETRACAINE

Class Local Anesthetic

Mechanism of Action Blocks the initiation and conduction of nerve impulses

Indications: Topically applied local anesthetic for eye examination

Contraindications Hypersensitivity to ester anesthetics; Not to be applied in large amounts or to Infants of less than 1 year old.

Adverse Reactions 1-10% Dermal: Angioedema, burning, contact dermatitis, stinging.
< 1% : Methemoglobinemia in infants

How Supplied Ophthalmic: 0.5% [5mg/ml] (1ml, 2ml, 15ml)

Dosage and Administration

Adult: Ophthalmic Solution: Instill 1-2 drops

Pediatric: Safety and efficacy have not been established.

Kinetics
Onset: Within 60 seconds.

Special Considerations

Pregnancy category C

Storage Store in a light resistant container

Stability: Lasts 6 months refrigerated; Lasts 4 weeks at room temperature: Discard if solution discolors (should be clear)

Caution in Child < 6 years old

THIAMINE

Class

Vitamin (B1)

Mechanism of Action

Combines with ATP to form thiamine pyrophosphate coenzyme, a necessary component for carbohydrate metabolism. The brain is extremely sensitive to thiamine deficiency.

Indications

Coma of unknown origin.
Delirium tremens.
Beriberi.
Wernicke's encephalopathy.

Contraindications

None

Adverse Reactions

Hypotension from too rapid injection or too high a dose.
Anxiety, diaphoresis, nausea, vomiting.
Rare allergic reaction.

Drug Interactions

Give thiamine before glucose under all circumstances.

How Supplied

1,000 mg in 10 ml vial (100 mg / ml).

Dosage and Administration

Adult: 100 slow IV or IM.
Pediatric: 10-25 mg slow IV or IM.

Duration of Action

Onset: Rapid.
Peak effects: variable.
Duration: Dependent upon degree of deficiency.

Special Considerations

Pregnancy safety: Category A.
Large IV doses may cause respiratory difficulties.
Anaphylaxis reactions reported.

TISSUE PLASMINOGEN ACTIVATOR (tPA)

Class

Thrombolytic agent.

Mechanism of Action

Binds to fibrin-bound plasminogen at the clot site, converting plasminogen to plasmin.
Plasmin digests the fibrin strands of the clot restoring perfusion.

Indications

Acute evolving myocardial infarction.
Massive pulmonary emboli.
Arterial thrombosis and embolism.
To clear arteriovenous cannulas.

Contraindications

Recent sugary (within three weeks).
Active bleeding, recent CVA, prolonged CPR,, intracranial or intraspinal surgery.
Recent significant trauma, especially head trauma.
Uncontrolled hypertension (generally BP over 200 mm Hg.).

Adverse Reactions

GI, GU intracranial and other site bleeding.
Hypotension, allergic reactions, chest pain, abdominal pain, CVA.
Reperfusion dysrhythmias.

Drug Interactions

Acetylsalicylic acid may increase risk of hemorrhage.
Heparin and other anticoagulants may increase risk of hemorrhage.

How Supplied

20 mg with 20 ml diluent vial.
50 mg with 50 ml diluent vial.

Dosage and Administration

Adult: 10 mg bolus IV over 2 minutes; then 50 mg over one hour, then 20 mg over the second hour and 20 mg over the third hour for a total dose of 100 mg. (other doses may be prescribed through Medical Direction.
Pediatric: safety not established.

Duration of Action

Onset: clot lysis most often within 60-90 minutes.
Peak effect: variable.
Duration: 30 minutes with 80% cleared within 10 minutes.

Special Considerations

Pregnancy safety: contraindicated.
Closely monitor vital signs.
Observe for bleeding.
Do not give IM injection to patient receiving tPA.

VASOPRESSIN (Pitressin)

Class

Non- adrenergic peripheral vasoconstrictor
Anti-diuretic hormone (ADH)

Mechanism of Action

Stimulation of V1 smooth muscle receptors, potent vasoconstrictor when given in high doses.

Indications

Adjunct in the treatment of diabetes
Unlabeled and investigational; Cardiac arrest situations caused by Ventricular fibrillation, pulseless ventricular tachycardia, pulseless electrical activity (PEA)
Alternate vasopressor to the first or second dose of epinephrine in cardiac arrest, may be useful in cases of vasodilatory shock.

Contraindications

None noted for this indication; Responsive patients with cardiac disease

Adverse Reactions

May cause hypertension and bradycardia if a rhythm resumes; Bronchoconstriction, ischemic chest pain, nausea vomiting

Drug Interactions

None indicated for this indication

How supplied

20 pressor units per ml or 20u/ml in 1ml or 2ml prefilled syringes

Dosage and Administration

Adult: 40 units (as a single dose only) IV or IO to replace the first or second dose of epinephrine in cardiac arrest

Duration of action

Onset; Immediate
Peak effects ; two (2) hours
Duration; to variable to accurately determine

Special Considerations

Fetal risk revealed in various studies; may use if benefits outweigh risk to fetus